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Journey from a Rentier to a Knowledge-based Economy

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Developing Regional Innovation Systems in the Gulf

A Study of Dubai's Journey from a Rentier to a
Knowledge-based Economy

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Thesis Submitted for the Degree of Doctor of Philosophy

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School of Finance and Management

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To Sidra, Zehra, and Sulaiman

Abstract

As countries in the Gulf Cooperation Council pursue an economic diversification agenda to move beyond their rentier roots, fostering environments conducive to innovation is a key objective. Academic research on Systems of Innovation—the field concerned with all the actors and interactions which come together dynamically to build these environments—has recognized that these systems are highly dependent on their territorial contexts, and, although much has been theorized and empirically explored in Europe and the Americas, research on the Gulf is almost non-existent.

To bridge this gap in the literature, this study closely examines the case of Dubai, United Arab Emirates—the only example of a Gulf regional economy that has effected a successful transition from oil-dependency to diverse industries. The objective is to develop insights from Dubai's unique journey that are relevant to other Gulf regions currently in earlier stages of similar innovation-driven diversification efforts.

This study follows a mixed methods approach, combining in-depth interviews of senior decision makers at four leading entities in Dubai (DP World, Emirates Airline, Dubai Internet City, and Dubai Multi Commodities Centre) with a quantitative firm-level Community Innovation Survey—likely the first of its kind deployed in the Gulf—to answer the following central research question: *How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems (RIS) in a Gulf state context?*

The findings of the study show that Dubai has achieved high levels of innovation despite its atypical RIS. The government plays a unique leading role setting the innovative vision, while counterintuitively limiting direct financial support and insisting on open competition. Knowledge spillovers from people and firms migrating into Dubai serve in lieu of deep research institutions. Although these features have served Dubai well while developing a service-based economy, becoming a knowledge-based economy requires further strengthening of the RIS components, especially the underdeveloped university sector.

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I am indebted to all 25 interviewees who took precious time away from the large organizations they manage to share their insights for the purposes of this research. Although each conversation was uniquely helpful, I'd like to extend a special acknowledgment to one individual from each of the four case studies. HE Mohammad Al Gergawi, UAE Minister of Cabinet Affairs, was extremely generous with his time, offering insights into the formation story of Dubai Internet City, as well as a broader understanding of the Dubai government's approach relevant to my research questions. DP World Group Chairman & CEO Sultan bin Sulayem, Emirates CCO Adnan Kazim, and DMCC Executive Chairman & CEO Ahmed bin Sulayem each opened their organizations to this research and shared pivotal comments that anchored my findings.

I am deeply grateful to my mother and father, whose lifelong pursuit of knowledge has inspired me to go down this journey. Their example of hard work and academic dedication has profoundly influenced me. My heartfelt appreciation goes to my wife, Nour. She has tirelessly supported me from the beginning, offering both a sounding board for my ideas and a consistent source of encouragement to persevere. Finally, to my dear children—Sidra, Zehra, and Sulaiman—this thesis is dedicated to you. I hope it stands as a testament to the importance of lifelong learning, a principle instilled in me by my own parents and one I hope to pass on to you.

Table of Contents

List of Tables.....	12
List of Figures	13
Chapter 1 Introduction	14
Dubai Case Study.....	16
Research Questions.....	20
Importance of this Study	22
Structure of the Thesis	24
Chapter 2 Literature Review	26
Entrepreneurship and Innovation.....	26
Defining Entrepreneurship.....	27
Entrepreneurship and Economic Growth.....	28
Challenging Schumpeter.....	32
Defining Innovation.....	34
Copycats, Imitators, and Clones.....	38
Business Model Innovation.....	41
Systems of Innovation.....	43
Theoretical Origins of Systems of Innovation.....	43
Districts, Clusters, and Milieus	46
National System of Innovation.....	52
Regional Innovation Systems.....	55
Other Organizing Lenses	62
National Learning Systems	64
Industrial Path Development.....	65
Triple Helix.....	67
Chapter 3 Conceptual Framework.....	71
Triple Helix in the Gulf.....	71

Conceptual Framework	74
Research Overview	76
Role of Government	77
Role of Industry.....	80
Role of Universities.....	82
Chapter 4 Methodology	85
Ontology and Epistemology	85
Critical Realism.....	87
Mixed Methods Research Design	89
Case Selection Method.....	91
Qualitative Interviews	94
Data Collection.....	94
Semi-structured Interview Format.....	96
Interviews Conducted	98
Quantitative Survey.....	103
History of the CIS Survey.....	103
Deploying the Survey at DMCC	104
Responses and Statistical Significance.....	104
Research Analysis.....	105
Structure of Research Analyses	105
Research Analysis Method	106
Abductive Analysis	107
Researcher’s Background.....	110
Ethical Considerations	113
Chapter 5 Dubai Regional Context.....	115
History.....	115
The Creek.....	116

Political Stability.....	116
Trucial States.....	117
Overtaking Sharjah.....	118
Formation of the United Arab Emirates (UAE).....	119
Entry into the Gulf Cooperation Council (GCC)	120
Dubai in the Literature	122
Government Innovation Policy	122
Infrastructure Preconditions for Innovation.....	125
Innovation Systems in Dubai	128
Late Rentierism	130
Dubai Economic Model.....	132
R&D Trap	132
Triple Helix in Dubai	133
Government.....	134
Industry	135
University.....	137
Chapter 6 DP World: Expanding the Ports & Logistics Industry	142
Introduction	142
Interviewees.....	142
Historical Context.....	144
Interview Data on Research Questions	152
Role of Government	152
Role of Industry.....	161
Role of Universities.....	170
Innovation Examples	175
Conclusion.....	181
Government.....	182

Industry	182
University.....	183
Innovations.....	184
Chapter 7 Emirates Airline: Launching an Aviation Industry	185
Introduction	185
Interviewees.....	186
Historical Context.....	187
Interview Data on Research Questions	193
Role of Government	193
Role of Industry.....	202
Role of Universities.....	210
Innovation Examples	217
Conclusion.....	222
Government.....	222
Industry	223
University.....	224
Innovations.....	224
Chapter 8 Dubai Internet City: Building a Technology Sector	226
Introduction	226
Interviewees.....	227
Historical Context.....	228
Interview Data on Research Questions	234
Role of Government	234
Role of Industry.....	248
Role of Universities.....	255
Innovation Examples	262
Conclusion.....	268

Government.....	268
Industry	269
University.....	270
Innovations.....	271
Chapter 9 DMCC: Trading Commodities & Beyond	272
Introduction	272
Interviewees.....	272
Historical Context	274
Interview Data on Research Questions	279
Role of Government	279
Role of Industry.....	291
Role of Universities.....	294
Innovation Examples	299
Conclusion	305
Government.....	306
Industry	307
University.....	308
Innovations.....	308
Chapter 10 Community Innovation Survey Results	310
Introduction	310
Customization of the Survey for Dubai	311
Surveyed Population	311
Results	312
Comparisons to the UK.....	314
Conclusion	316
Chapter 11 Conclusion: RIS Applied to Dubai	318
Introduction	318

Summary of Triple Helix Themes Across Cases.....	321
Responses to Research Questions.....	323
How effective has Dubai’s RIS been in fostering local innovation?	323
What characterizes the Dubai government’s involvement in developing its RIS, and how successful has this approach been?	330
What role does the industry play in developing Dubai’s RIS?	340
How has relatively lower local R&D intensity impacted the development of Dubai’s RIS?	344
How do different actors of the economy—government, industry, and academia— interact to impact the development of Regional Innovation Systems in a Gulf state context?	349
Key Contributions to the Literature	354
Policy Recommendations	361
Limitations and Areas for Further Research	364
Epilogue: Self-Reflection	366
References	368
Appendix A NVivo Screenshots.....	378
Appendix B News Archive Articles	380
DP World.....	380
Emirates Airline.....	386
Dubai Internet City	391
DMCC	399
Appendix C Survey Form	401
Appendix D Survey Results	413
Appendix E Sample Interview Questions	419
Appendix F Global Innovation Index Ranking	420

List of Tables

Table 1 Overview of Research Questions.....	22
Table 2 All Interviewees Across Cases	102
Table 3 GCC Patent Activity 2010-2020.....	138
Table 4 UAE R&D Expenditure as % of GDP per Sector.....	139
Table 5 GCC Students Studying in the UK in the 2021/22	139
Table 6 GCC Students Studying in the UK in the 2014/15	140
Table 7 GCC Postgraduate Students Studying in the UK in 2021/22.....	140
Table 8 GCC Postgraduate Students Studying in the UK in 2014/15.....	141
Table 9 DP World Interviewees	142
Table 10 Dubai Population by Nationality	161
Table 11 Summary of DP World Themes	181
Table 12 Emirates Airline Interviewees	186
Table 13 Emirates Airline Summary of Themes.....	222
Table 14 Dubai Internet City Interviewees.....	227
Table 15 Dubai Internet City Summary Themes	268
Table 16 DMCC Interviewees	272
Table 17 DMCC Summary Themes.....	306
Table 18 Summary of Triple Helix Themes Across Cases.....	322
Table 19 Overview of Research Questions.....	323
Table 20 Innovation Examples Across Cases	326
Table 21 Role of Government Themes Across Cases	331
Table 22 Role of Industry Themes Across Cases	340
Table 23 Role of University Themes Across Cases	344
Table 24 R&D Expenditure as Percentage of GDP Per Sector in 2020,.....	347
Table 25 Most Important Triple Helix Themes Across Cases.....	350

List of Figures

Figure 3.1 Visual Model of the Conceptual Framework	74
Figure 4.1 Multiple Case Design: Case Pairing Diagram.....	93
Figure 5.1 1971 Article on Sheikh Rashid's Industry-Building Ambitions.....	121
Figure 6.1 Port Rashid in 1972	147
Figure 6.2 Announcement of DP World Launch	151
Figure 7.1 First Emirates flight prepares to depart Dubai for Karachi in 1985.....	189
Figure 7.2 Announcement of Emirates Airline Launch.....	192
Figure 8.1 HE Mohammad Al Gergawi and Microsoft's Regional CEO laying the foundation stone	231
Figure 8.2 Sheikh Mohammed Bin Rashid Al Maktoum, opened Microsoft's new regional headquarters at Dubai Internet City	231
Figure 8.3 Announcement of Launch of Dubai Internet City	233
Figure 9.1 Almas Tower under Construction in DMCC	276
Figure 9.2 DMCC after Construction Completion.....	277
Figure 9.3 Announcement of Launch of DMCC.....	278
Figure 10.1 DMCC CIS Survey Participants by Business Activity	312

Chapter 1 | Introduction

Innovation is widely hailed by governments around the world as the panacea that can drive domestic economic growth. Since Joseph Schumpeter first linked entrepreneurship and innovation to growth in 1939,¹ several interrelated academic fields were born, at the center of which is Systems of Innovation (SI) theory, seeking the best ways to effectively foster the multifaceted and dynamic environments that produce innovations.

As the field of SI evolved, it became clear that defining a universal formula that can be applied to facilitate innovation is impossible—context matters. For this reason, the lens of SI theory itself has continuously narrowed in the literature over the years, first at the national level, then to the regional level, and most recently to subcomponents of the regional lens. This study focuses on the regional level—Regional Innovation Systems (RIS) introduced by Cooke in 1992²—as the most compelling construct to explain how innovation is spread unevenly over different geographies.

Throughout this narrowing down to the regional focus, however, one aspect has remained constant in the literature: The theoretical foundations and empirical applications are overwhelmingly European and North American, with little attention paid in academia to emerging markets. Over 70% of all scholarly RIS articles from 1998 to 2015 studied these two broad geographical areas, with Asia comprising about 20%, and the balance 10% from all other areas around the world.³ Even within the

¹ Schumpeter, “Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process.”

² Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems.”

³ Doloreux and Porto Gomez, “A Review of (Almost) 20 Years of Regional Innovation Systems Research,” 378.

small number of RIS research articles covering non-Western and non-Asian markets, the Middle East is conspicuously missing, which is particularly puzzling when the rentier states of the Gulf Cooperation Council (GCC)—the Kingdom of Bahrain, the State of Kuwait, the Sultanate of Oman, the State of Qatar, the Kingdom of Saudi Arabia and the United Arab Emirates—comprise a unique context of well-financed, centrally managed economies in transition towards diversification and development of knowledge-based industries. The premise of this study is that by investigating the Gulf context in depth, novel insights into the way the RIS framework applies across a wider range of countries will be developed.

Gulf countries comprise a substantially different context compared to what is typically studied in the RIS literature. Governments play a more proactive role fueling innovation programs with public funding, the industry is comprised of a mix of local family businesses, international firms, and SMEs, and the university landscape is underdeveloped, especially with regards to R&D outputs.⁴ The innovation financing ecosystem is rapidly improving through private sector participation, although banks are still reticent to make anything but the most traditional loans.⁵ The workforce is a mix of local talent with expatriates from all over the world, sharing knowledge and expertise to build the RIS. These components combine to form a unique environment that should impact the way innovation takes place, warranting a study to better understand to what extent this is the case and across which dimensions. This is the premise that motivates the current research, seeking to unpack the unique factors at play and their implications for innovation in this distinct context.

⁴ Hvidt, “The State and the Knowledge Economy in the Gulf.”

⁵ Ewers and Malecki, “LEAPFROGGING INTO THE KNOWLEDGE ECONOMY,” December 2010.

Dubai Case Study

To discover how these differences impact the development and successful implementation of a regional innovation strategy, this study selects one Gulf regional context—the emirate of Dubai within the United Arab Emirates (UAE)—as a case study. As a late rentier state, the UAE is proactively investing in innovation development to achieve economic diversification and growth⁶ and is relatively understudied in the literature.⁷ The UAE has been undergoing a transformation that is quite unique in its scope and speed, evolving from relative obscurity several decades ago into a leader in key sectors, with flagship brands like Emirates Airline that serve the entire world. The emirate of Dubai is a fascinating case since it is an extremely rare example of a rentier economy successfully diversifying away from oil and building homegrown industries from the ground up, competitive on an international scale. Furthermore, Dubai is often held as a model to be emulated by other countries in the Gulf and beyond, so understanding this case has direct implications on other rentier markets pursuing economic diversification.

As Dubai itself has taken what has been called a “proactive state entrepreneurship”⁸ approach to rapidly developing from a sparsely inhabited desert outpost into a globally competitive city, and I have been directly involved in building the entrepreneurship ecosystem in Dubai as a practitioner over the last decade,⁹ this study investigates the RIS from an entrepreneurial perspective. Furthermore, the role

⁶ Gray, “A Theory of ‘Late Rentierism’ in the Arab States of the Gulf,” 28.

⁷ Tok, “Can GCC States Achieve Sustainable Economic Diversification and Development by Driving Entrepreneurship Efforts?,” 6.

⁸ Mishrif and Kapetanovic, “Dubai’s Model of Economic Diversification,” 96.

⁹ See Chapter 5, “Researcher’s Background”

of state-guided entrepreneurship in Dubai's economic development is understudied in the academic literature¹⁰ and is a key reason for conducting this research.

Dubai's journey towards building a knowledge-based economy can be split into three sequential phases. The first phase combines Dubai's origins as a pre-industrial trading hub and pearling center with its short-lived period as an oil-based rentier economy. The second phase was a direct result of Dubai investing its natural resource wealth to quickly build an impressive, albeit mostly SOE-led, service-based economy with marquee brands like Emirates and DP World, along with regulatory reforms that spurred the real estate sector through allowing foreign ownership and establishing economic free trade zones. Having successfully transitioned its economy away from oil (GDP from oil production is less than 1% today, down from 50% in the past)¹¹ and into a diversified set of service industries, Dubai is currently undergoing the transition into the third phase of its economic development as a knowledge-based economy:

1. Past: Pre-industrial and Rentier Economy
2. Present: Service-based Economy
3. Future: Knowledge-based Economy

This study adopts a historical lens, examining Dubai's development over time through case analyses that reflect the two transition periods between the phases above: from rentier to service-based and from service- to knowledge-based economies. Instead of comparing two different regions with each other to understand the differences between the two transitions, Dubai itself is a unique context that can be

¹⁰ Mishrif and Kapetanovic, "Dubai's Model of Economic Diversification," 99.

¹¹ Winkler, "Dubai's the Very Model of a Modern Mideast Economy."

looked at historically, thereby controlling for other variables that can impact outcomes.

When focusing on one region in this way, it is important to first understand the underlying characteristics of the Dubai RIS and the types of innovations that have been most successfully born within this context. The field of innovation studies has been getting progressively more complex over the years, outlining a range of innovation typologies from incremental to radical, process to product.¹² Understanding what Dubai has been best at fostering to date, and why, and the gaps that should be filled to accommodate other innovation types is an important foundational goal of this study. This has wide-ranging implications, as focusing prematurely on types of innovative businesses that the market is not ready to receive can—ironically—hold the region back from growing at the pace it desires.¹³

This study is based on a mixed methods research methodology, combining qualitative and quantitative approaches. For a region that has very little data publicly available, particularly in the field of innovation, it was important to introduce a quantitative dimension to anchor the findings surfaced from the qualitative case studies. Four representative cases across the two historical transition points mentioned above were selected to examine their stories in depth and understand the roles they played in developing the RIS in Dubai. Key stakeholders with intimate knowledge of each case have been interviewed using a semi-structured interview format to examine the research questions core to this study, as outlined below.

¹² Garcia and Calantone, “A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review.”

¹³ Flynn, “A Critical Exploration of Sponsorship, Infrastructure, and New Organizations,” 135.

Two representative sectors—aviation and logistics—are studied to understand Dubai’s transition from a reliance on oil to a post-oil service-based economy diversified across industries. Each of which is represented by an anchor case study—the aviation sector by Emirates Airline and logistics by DP World. These two government-spurred private sector players successfully launched entire industries which now comprise significant portions of the overall Dubai GDP, as well as contributing to economies across the world where they operate.

These two historical cases are paired with two newer entities building the technology and commodity industries in Dubai: Dubai Internet City (DIC) and the Dubai Multi Commodities Centre (DMCC). These government free zones are leading Dubai’s transition into a knowledge economy by attracting top international firms to the market and providing a platform for innovation in sectors that were locally developed within the last 20 years. Each of the four cases will be examined in light of the existing RIS framework to determine if it is adequately explanatory and if any adjustments should be made for the Gulf regional context.

The qualitative, interview-based approach employed is paired with a quantitative survey examining innovation activity at a firm level within the DMCC, the fourth case study cited above. To the best of the author’s knowledge, this study includes the first dataset from a survey based on the internationally recognized Community Innovation Survey (CIS) conducted in a Gulf country. The CIS has been deployed across dozens of countries over 30 years, providing a useful benchmark to compare Dubai’s effectiveness in building an RIS that drives actual innovation at a firm level. The DMCC was chosen since at its surface it seems to be the least likely venue for innovative activity, as its primary sectoral focus is on building the commodities industry in the region. The surprising result that the survey revealed was

that even in such a context, firms operating in Dubai are actively innovating at rates higher than many other more developed markets. Furthermore, this survey helps answer the question about the innovation typologies most commonly successful in Dubai, supplementing the qualitative findings from the interviews conducted.

Research Questions

Using the RIS framework as a foundation and the Dubai historical case as a lens to understand the potential evolution of other Gulf economies, this study aims to answer the following central research question: *How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems in a Gulf state context?* This central question is answered in four parts corresponding to the sub-research questions below, which 1) evaluate overall innovation levels in Dubai and the roles of 2) government, 3) industry, and 4) academia in developing its RIS.

As this study uses Dubai as the region upon which this modified RIS model is built, it is important to contextualize the research question above by understanding the structure and gauging the effectiveness of the Dubai RIS. This is done by researching the level of innovation achieved as Dubai transitioned from a rentier-based economy to a burgeoning knowledge economy, as well as the degree to which the dominant innovation type successful in this market has been radical vs. incremental, as described above. To this end, the first framing question is used to establish the usefulness of the Dubai case as a model to use in the broader Gulf region: *How effective has Dubai's RIS been in fostering local innovation?*

After this initial framing question, the central research question is refined with specific questions about each of the three named subcomponents. On the role of

government, this study investigates the impact of the public sector setting the innovation agenda, one of the unique aspects of Dubai's RIS. The extent to which the government takes a top-down, prescriptive role, and the impact of that dynamic is explored in the second sub-question: *What characterizes the Dubai government's involvement in developing its RIS, and how successful has this approach been?*

Next, the study examines the multifaceted role of industry in a region marked by many distinguishing factors, such as a high concentration of international firms, family-owned businesses, and SOEs. Within this setting, the relative performance of sectors based on the concept of industrial path dependence is examined—a theory that contends that industry evolution is fundamentally tied to the economic history of the region, and regions can pursue a range of new path development strategies, from simple existing path extension to radically new path creation, with many intermediary sub-types.¹⁴ This path dependency angle links to the second research question above exploring the innovation typology most suited for Dubai, but here it is examined from an industry lens. In this context, the study asks: *What role does the industry play in developing Dubai's RIS?*

Finally, on the role of academia, this study broadens the scope to understand how a quickly transforming environment like the Gulf should compensate for a lack of research and development outputs that directly lead to commercialized innovations. Since R&D contributions to the RIS are typically modeled after the MIT and Stanford University ecosystems, which developed over 100+ years, it is important to understand the role this component should play in a much less developed academic context.¹⁵ Since comparable research institutions do not exist in the Gulf, one may ask

¹⁴ Martin and Sunley, "Path Dependence and Regional Economic Evolution."

¹⁵ Etzkowitz and Zhou, *The Triple Helix*.

if an RIS can be effectively built in such a context, and, if so, does the lack of domestic R&D result in less overall innovation? To this end, the study asks: *How has relatively lower local R&D intensity impacted the development of Dubai’s RIS?*

	Research Question	Topic
RQ1	How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems in a Gulf state context?	Central Research Question
RQ2	How effective has Dubai’s RIS been in fostering local innovation?	Assessment of Dubai's RIS
RQ3	What characterizes the Dubai government’s involvement in developing its RIS, and how successful has this approach been?	Government Role
RQ4	What role does the industry play in developing Dubai’s RIS?	Industry Role
RQ5	How has relatively lower local R&D intensity impacted the development of Dubai’s RIS?	Academia Role

Table 1 Overview of Research Questions

Importance of this Study

Scholars in the field of innovation systems differ with respect to the centrality of the role of government in driving these systems forward, opening a space for this study to present a new perspective on the question, anchored in the experiences of the Gulf. Traditionally, the view espoused by Cooke and other early scholars was the prioritization of industry actors relative to the other components of the system.¹⁶ Recent scholarship has been starting to surface government’s importance as a central pillar of the innovation system, although this has not been examined in depth across different contexts. It is interesting to note that one of the pioneering innovation systems scholars, Bengt-Åke Lundvall, has recently acknowledged the critical role the state can play within an innovation system, highlighting the case of the artificial intelligence technology race between the United States and China. In their book on the topic, Rikap and Lundvall show how the Chinese state “combined supportive innovation policies with protectionist measures” to effectively counter the US

¹⁶ Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems.”

government's approach of "colossal public investments in R&D and the strengthening and broadening of intellectual property rights."¹⁷

Most of the other scholarly contributions that raise the profile of the government in the innovation formula, such as Mazzucato's conception of a "mission-oriented"¹⁸ public sector participating directly, are anchored solely in the experience of the United States. One of such studies by Lazonick and Tulum examines the biopharmaceutical (BP) industry, finding that "the knowledge base that BP companies can tap to develop products comes much more from government investments than from business investments."¹⁹ These examples of scholars raising the profile of the role of government in innovation systems are important precursors to this study. Studying the Dubai example presents an opportunity to explore this important question from a new perspective, highlighting the development of four representative case studies over time as well as an internationally recognized survey to measure levels of local innovation quantitatively for the first time.

This study offers a novel contribution to the RIS framework by extending it into a new context, namely a post-rentier Gulf region pursuing innovation-driven growth. Besides providing concrete recommendations for the path forward in Dubai itself, as mentioned above, the insights from this study will be particularly useful for other countries in the GCC (most notably Saudi Arabia during its recent transformation journey diversifying its economy away from sole reliance on oil income) and countries farther afield undergoing transformations of their own. As Dubai is the regional model many states have sought to learn from, it is critical to

¹⁷ Rikap and Lundvall, *The Digital Innovation Race: Conceptualizing the Emerging New World Order*, 10.

¹⁸ Mazzucato, *The Entrepreneurial State*.

¹⁹ Lazonick and Tulum, "US Biopharmaceutical Finance and the Sustainability of the Biotech Business Model," 1171.

understand what factors led to the success and why some recent initiatives failed to produce the intended results. The ultimate goal of this research is to outline an adjusted RIS model that accurately explains the Gulf rentier context throughout its phases of economic development, serving as a practical guide to governments so that they can best focus their efforts—financial investment, regulatory facilitation, and overall governance—to foster an RIS that enables the transition into a thriving knowledge economy.

Structure of the Thesis

This introductory chapter has served to set the context and objectives of the study, outlining the research questions and approach that will be taken to answer them. Chapter 2 presents a literature review of the research conducted in innovation and its related fields to date, framing the key scholarly debates and surfacing the relevant gaps and questions unanswered that this study aims to address.

Chapter 3 begins by presenting the Triple Helix model as an organizing framework for the research and then presents this study's conceptual framework. This is followed by an overview that addresses each of the three dimensions of the Triple Helix as related to the Gulf regional context and the main arguments surfaced from the literature. Transitioning to the empirical section, Chapter 4 outlines the mixed methods research methodology utilized in this study, with a discussion on why the specific cases were chosen. Chapter 5 covers Dubai's history and defining characteristics across the RIS components, with a discussion of the limited existing research on Dubai's innovation system.

This context sets the stage for the case studies presented in Chapters 6 through 9. Each case study is covered in a dedicated chapter, with DP World in Chapter 6,

Emirates Airline in Chapter 7, Dubai Internet City (DIC) in Chapter 8, and Dubai Multi Commodities Centre (DMCC) in Chapter 9. Chapter 10 is reserved for the quantitative findings from the Community Innovation Survey, which helps anchor the findings from the DMCC case in particular and the Dubai regional context in general. Finally, the thesis concludes in Chapter 11 with an analysis of the insights derived from across the four cases, formally responding to each of the five research questions and sharing reflections on the impact of this research on the RIS framework within the Gulf context and its novel contributions to the innovation studies literature. This chapter also offers some policy recommendations for the UAE and other Gulf countries embarking on a similar path of economic diversification fueled by innovation.

Chapter 2 | Literature Review

This chapter presents a review of the academic literature landscape as it pertains to the research questions posed in this study. In so doing, developments of the core theories are traced and put into context, the most important advances in academia are discussed, and research gaps that can be addressed in this study are surfaced. The broad fields of entrepreneurship and innovation are first outlined, defining both and addressing how they relate to economic growth in different environments. Innovation types are explained, with a focus on how innovations diffuse into emerging markets such as the Gulf. With this context, the central topic of Systems of Innovation (SI) is addressed, including sections on its national, regional, and other variants. The literature review concludes with a discussion of the Triple Helix as an organizing model, setting the foundation for this study's conceptual framework, which is introduced immediately afterwards in Chapter 3.

Entrepreneurship and Innovation

This literature review begins with a discussion of entrepreneurship since the foundational theorist in the study of innovation, Joseph Schumpeter, presented the two as integrally linked. Furthermore, as explained in Chapter 1, Dubai itself is well-established in the literature as taking an entrepreneurial approach to economic development, and I come from this professional background prior to embarking on this research. For these reasons, although the primary focus of this research is on innovation, understanding the entrepreneurial context is a useful starting point. Schumpeter's views will be explored in further detail in the section on "Entrepreneurship and Economic Growth" below. First, the concept itself is defined.

Defining Entrepreneurship

Entrepreneurship is a notoriously difficult concept to comprehensively define, as almost all introductions to the term in the literature highlight, owing to the multiple vantage points taken by scholars when setting their definitions—that of the individual, the firm, or even society at large.²⁰ It is, therefore, worth beginning this literature review by briefly outlining some different definitions of entrepreneurship and presenting the perspective that will be used in this analysis.

The most popular definition of entrepreneurship in the literature is exemplified by Reynolds et al. and is simply, “creating something new.”²¹ Although such a definition does unify all scholars who write on the topic, it is a lowest-common-denominator, overly simplified approach that does not reflect the depth of what makes the entrepreneurship a field of study worth researching. By focusing exclusively on the entrepreneur as an individual taking a specific creative action, this approach ignores the second half of the equation, which is the opportunity itself.

At the most basic level, entrepreneurship is the intersection between an enterprising individual and a lucrative opportunity. Shane and Venkataraman define the field of entrepreneurship more comprehensively as “the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited.”²² This is the definition used in the present study as it usefully frames the field with respect to three component dimensions: 1) the *sources* of opportunities; 2) the *processes* to discover, evaluate, and exploit them; and 3) the enterprising *individuals* who undertake these processes.²³

²⁰ Wennekers and Thurik, “Linking Entrepreneurship and Economic Growth,” 51.

²¹ Reynolds et al., “Global Entrepreneurship Monitor,” 208.

²² Shane and Venkataraman, “The Promise of Entrepreneurship as a Field of Research,” 218.

²³ Shane and Venkataraman, 218.

In their work, Shane and Venkataraman also take the important step of separating the entrepreneurial opportunity from the entrepreneur, saying, “although recognition of entrepreneurial opportunities is a subjective process, the opportunities themselves are objective phenomena that are not known to all parties at all times.”²⁴ This means that once the market creates an opening for an entrepreneurial opportunity, that entrepreneurial opportunity exists regardless of whether or not anyone notices it.

The idea of the distinction between the entrepreneur as a person and the entrepreneurial opportunity as a separate objective reality is also posited by Peter Drucker. He then takes the concept further by dissecting the entrepreneurial opportunity and laying out the seven sources from which it can emerge.²⁵ His work, along with that of Shane and Venkataraman, on the existence of entrepreneurial opportunities as a discrete concept, is important in the context of this study, as innovations that are launched in developed markets immediately create real entrepreneurial opportunities across the world for enterprising individuals who can implement them in other geographic contexts, such as emerging markets—they just need to recognize them.

Entrepreneurship and Economic Growth

As mentioned in the introductory chapter, Schumpeter is widely viewed as the founding figure in the fields of entrepreneurship and innovation, arguing in the first half of the 20th century that higher rates of entrepreneurship foster innovation and economic growth. This underlying assumption drives most innovation policy to this

²⁴ Shane and Venkataraman, 220.

²⁵ Drucker, *Innovation and Entrepreneurship: Practice and Principles*, 35.

day, and his thesis influences many of the scholarly fields that will be covered in this literature review.

In his works, Schumpeter shifts the focus to the entrepreneur as the primary agent driving innovation through a process he terms “creative destruction,”²⁶ whereby incumbent firms are challenged by entrepreneurial entrants who introduce into the market “new combinations,” the core of his definition of innovation.²⁷ In so doing, Schumpeter outlines the basic argument at the foundation of “disruptive innovation,”²⁸ for which Clay Christensen became known fifty years later.

The arrival of new competitors, often called “Schumpeter’s gale” in the literature, breaks the existing “equilibrium, creating opportunities for economic rent.”²⁹ This sets into motion a cycle of entrepreneurs starting additional spin-off ventures as they “stand to gain entrepreneurial rents if the opportunity materializes,”³⁰ which, in turn, leads to economic growth.

More recently, Wennekers and Thurik present a multidimensional framework connecting entrepreneurship to economic growth. Besides formally mapping the three levels—individual, firm, and society—from which scholars view the effects of entrepreneurship, they split entrepreneurs into three categories: Schumpeterian high-growth entrepreneurs, corporate intrapreneurs, and traditional business owners.³¹ They conclude that each of these three types plays an important role in the economy

²⁶ Schumpeter, *Capitalism, Socialism and Democracy*.

²⁷ Becker, Knudsen, and Swedberg, “Schumpeter’s Theory of Economic Development,” 924.

²⁸ Bower and Christensen, “Disruptive Technologies.”

²⁹ Wong, Ho, and Autio, “Entrepreneurship, Innovation and Economic Growth,” 336.

³⁰ Anokhin and Wincent, “Start-up Rates and Innovation,” 43.

³¹ Wennekers and Thurik, “Linking Entrepreneurship and Economic Growth,” 48.

and eventually reach the same conclusion as Schumpeter that “a rise in the number of entrepreneurs should lead to increased economic growth at the national level.”³²

Although there is empirical truth to the assertion that entrepreneurship in certain forms does bring about growth, Schumpeter’s approach does not answer the important question of: under what conditions? His broad-stroke claims do not draw the necessary nuanced distinctions between types of entrepreneurial ventures, leading to an implied blanket policy in support of increasing the volume of entrepreneurship in any form to achieve the outcomes he promises.

The critical challenge faced when policymakers seek to realize this growth is understanding the difference between types of entrepreneurs in order to support those who will have the highest economic impact. This is succinctly summarized by Schoar, who suggests that “most policy makers as well as economic researchers treat entrepreneurs as a homogenous group of actors that are uniformly affected by economic conditions or policy interventions.”³³ She uses this observation to make a distinction between subsistence (self-employment) and transformational (high-growth) entrepreneurship in emerging markets, arguing that the common policy mistake emerging market governments make is designing regulations and support programs that serve subsistence entrepreneurs with the hopes of eventually creating transformational ones, “implicitly or even explicitly [assuming] that subsistence entrepreneurship is the first step toward transformational entrepreneurship.”³⁴ Her arguments echo those of Shane, who makes it clear through his empirical study that governments should “stop subsidizing the formation of the typical start-up and focus

³² Wong, Ho, and Autio, “Entrepreneurship, Innovation and Economic Growth,” 337.

³³ Schoar, “The Divide between Subsistence and Transformational Entrepreneurship,” 58.

³⁴ Schoar, 59.

on the subset of businesses with growth potential,” prioritizing quality over quantity.³⁵

Just as Schoar and Shane make their arguments about the heterogeneity of entrepreneurs and associated policies to support them effectively, this study makes a similar argument about the various types of ventures across the innovativeness spectrum. The study examines to what extent the Dubai RIS, and by extension other similar Gulf regions, are currently set up to support transformational entrepreneurs developing radical innovations or should they be focused on imitative, incremental innovations. Based on this, government policies and programs should align with the kinds of ventures that would have the highest likelihood of success in the market.

This study extends Shane’s thesis that economic growth from government policy comes from “encouraging the formation of high quality, high growth companies” and “eliminating incentives to create [...] low probability companies.”³⁶ Furthermore, this study applies Shoar’s argument on aligning entrepreneur types with policy to the domain of business model types, extending her original focus on the entrepreneurs themselves to the characteristics of the businesses being supported. In so doing, this study calls out the fact that governments must align their policies to the types of entrepreneurial ventures that are most likely to succeed in a given market based on an understanding of the innovation types that the market is set up to best support.

³⁵ Shane, “Why Encouraging More People to Become Entrepreneurs Is Bad Public Policy,” 145.

³⁶ Shane, 141.

Challenging Schumpeter

The Schumpeterian proposition of increasing the quantity of entrepreneurial ventures in an economy as a way to boost the rate of growth and innovation has been questioned by many scholars.

On the most basic level, before accounting for the heterogeneity of ventures and which types drive the results desired, some studies discovered a surprising inverse relationship between startup numbers and innovation. Anokhin and Wincent, for example, in their eight-year examination of startups in both developed and emerging markets, argue that “overrepresentation of start-ups in a country may lead to below-average rates of innovation.”³⁷ Their study, conducted across 35 countries, revealed a particularly negative correlation between startup rates and innovation in emerging markets due to the prevalence of what they term “necessity-based entrepreneurship” instead of the “opportunity-based entrepreneurship” more regularly seen in developed countries.³⁸ Necessity-based entrepreneurship, which results from the entrepreneur’s need for a livelihood, is generally much more risk-averse, whereas opportunity-based entrepreneurship refers to high-growth ventures willing to take many more risks and a longer timespan to get a large payback from the business.

It is a false dichotomy, however, to present necessity-based entrepreneurship as the main feature of developing markets and opportunity-based entrepreneurship as the main feature of developed markets, as is done by Anokhin and Wincent and other scholars. There are ample examples of ventures in the developing world which are opportunity-based—particularly in a market like Dubai, the subject of this research.³⁹

³⁷ Anokhin and Wincent, “Start-up Rates and Innovation,” 42.

³⁸ Anokhin and Wincent, 55.

³⁹ Anokhin and Wincent, 55; Schoar, “The Divide between Subsistence and Transformational Entrepreneurship,” 57.

Dubai-based ride-hailing app Careem, which sold for over \$3 billion, is an excellent example of that. It is not just this outlier case that exists, however. Hundreds of UAE venture capital fund portfolio companies—that are by definition opportunity-based—are ignored in the dichotomy described above.

Sensitive to these nuances, Shoar debunks the myth that certain cultures or geographies are inherently weaker when it comes to entrepreneurial skills, saying “social scientists from anthropologists to economists have invoked the lack of a so-called entrepreneurial culture” to account for different levels of entrepreneurship across countries. This is a weak explanation with a hypothesis that “does not seem to be borne out in the data.”⁴⁰

Similarly, Wong, Ho, & Autio showed in their analysis of Total Entrepreneurial Activity (TEA) data from the Global Entrepreneurship Monitor (GEM) across 37 countries that “having a higher degree of entrepreneurship or new business creation prevalence does not guarantee enhanced economic performance and faster rates of economic growth.”⁴¹ Despite the popularity of Schumpeter’s thesis, more recent studies have shown that blanket support policies for entrepreneurship may stunt growth in innovation rather than facilitate it.

Understanding this nuance in applying the Schumpeterian philosophy into policy is essential within the context of this study, as the Gulf in general, and Dubai in particular, is on a path of innovation-driven economic diversification fueled by the government; ensuring that the right ventures are supported given the needs of the market and what innovation types are best suited for the environment is critical.

⁴⁰ Schoar, “The Divide between Subsistence and Transformational Entrepreneurship,” 68.

⁴¹ Wong, Ho, and Autio, “Entrepreneurship, Innovation and Economic Growth,” 334.

Defining Innovation

After examining the literature on entrepreneurship, this section now transitions to the related field of innovation. At its simplest level, an innovation is the result of an invention adopted by the market. The applied definition is much more complex, however, as innovations fall on a wide spectrum ranging from imitating an existing idea in a new geography all the way to a globally novel, radical innovation that can change an entire industry. Furthermore, an innovation can span both products (new or improved goods and services) as well as process (new ways of producing products or delivering services). This broad definition of innovation is important particularly in a context like the Gulf where research universities are less active in helping bring radical product innovations to market; both incremental innovations based on imported technologies as well as process improvements developed within firms are forms of innovation that are equally beneficial to building the innovation ecosystem.

Garcia et al. take on the difficult task of making sense of the often interchangeable, overlapping, and sometimes incompatible labeling structure used in the literature on innovation and then present a unified typology from the lens of new product development. They begin by defining innovation as “an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention.”⁴² This is an important starting point as they explicitly make the distinction outlined above between an invention, which is an idea pre-commercialization, and an innovation, which necessitates a direct link to the market. Secondly, the fact that they begin the

⁴² Garcia and Calantone, “A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review,” 112.

definition with the word “iterative” is instructive, since innovation is a process and goes through different levels during its lifecycle, “and thus, necessitates a typology to describe different types of innovations.”⁴³

Fagerberg simplifies the above description by positing that the first occurrence of an idea is an invention, while the first attempt to commercialize it is an innovation.⁴⁴ An extension of this definition is a further subdivision of innovation. If his innovation is a “first” attempt at commercializing, that assumes that there may be future attempts in other market contexts which would also be types of innovation.

He explicitly addresses the new market context question, which is one of the rare examples in the innovation literature that was uncovered in this review, asking how should an innovation first introduced in one context be categorized if it is introduced into a new context. He shares two approaches consistent with the literature—1) calling the first the innovator and the second the imitator, or 2) calling both innovators.⁴⁵ Both approaches can be justified, and the point on imitation is further explored in the section below.

Garcia et al. identify a single constant across the myriad of innovation definitions, namely that “innovativeness is a measure of discontinuity in the status quo in marketing factors and/or technology factors,”⁴⁶ thereby identifying the critical factor as the degree of change achieved through the innovation. From this lens, innovation is not just a new technological development—it can also be a change in marketing environment and actions. The diffusion of innovation is an illustration of

⁴³ Garcia and Calantone, 112.

⁴⁴ Fagerberg, *Innovation*, 8.

⁴⁵ Fagerberg, 8.

⁴⁶ Garcia and Calantone, “A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review,” 118.

this, transplanting an innovation already proven in a leading market into an lagging market context and then adapting it based on the local environment through a process of incremental innovation.

Part of defining innovation involves assessing the degree of an innovation's newness. To do this, Garcia et al. offer six different perspective points from which to take the measurement—an innovation can be new to the world, industry, scientific community, marketplace, firm, and the customer.⁴⁷ In an otherwise comprehensive analysis, however, they seem to miss the category most pertinent to this study, namely that of a geographically-bound market. Their “marketplace” refers to a subset of an industry, like the laptop market which is a part of the broader computer industry, not an additional geographic market.⁴⁸ Throughout their analysis, the authors take a US-centric view, without any reference to the implications of spreading innovations to different countries at varying levels of development. Since their article is an attempt at summarizing and creating a coherent typology out of 21 influential empirical studies on product innovation, the fact that the topic of introducing innovations into new geographic markets is not addressed is telling that there is a gap in the scholarship on this topic—a gap that this study aims to fill.

Another important point to note when defining innovation is its association with, but difference from, entrepreneurship. Schumpeter famously connected the two concepts with his aforementioned “creative destruction” wielded by entrepreneurs, but the reality is more nuanced, something that most policymakers have failed to see. As noted above, they regularly “[associate] entrepreneurship with innovation, [and] many nations, regions, states, and universities have adopted policies to stimulate innovation

⁴⁷ Garcia and Calantone, 113.

⁴⁸ Garcia and Calantone, 124.

by entrepreneurial firms, in the hope of facilitating economic growth.”⁴⁹ This perspective, again, has its roots in a Schumpeterian framework since he most famously tied entrepreneurship and innovation together with economic growth, but his extrapolated, simplified conclusions miss the mark. Although entrepreneurs do sometimes innovate, less than 30% of new ventures surveyed across 80 countries reported that their products were new to their customers and most competitors.⁵⁰

By the same token, two separate yet interrelated domains—innovation policy and entrepreneurship policy—are the subjects of this research. Although policymakers often use them interchangeably, there are important differences owing to the origins of these two areas of scholarship. In fact, Dahlstrand and Stevenson have recently proposed the integrated concept of “innovative entrepreneurship policy,”⁵¹ which is the intersection between the two policy areas. Innovation policy has its origins in science and technology (S&T) and research and development (R&D) policy, rich areas of scholarship in their own rights. For this reason, innovation policy scholarship began with a “‘linear model,’ focused primarily on funding of science-based research in universities and government laboratories.”⁵² The challenges, however, with adopting a linear model are well-documented, most importantly that the textbook case of lab to product to market rarely materializes in such a simple manner. Feedback loops with the market are essential for developing radical or even incremental innovations, which this model does not account for. Entrepreneurship policy emerged from SME policy, with an important distinction being the object of support as the individual entrepreneur instead of the SME. Relative to innovation policy,

⁴⁹ Autio et al., “Entrepreneurial Innovation,” 1097.

⁵⁰ Autio et al., 1098.

⁵¹ Dahlstrand and Stevenson, “Innovative Entrepreneurship Policy.”

⁵² Dahlstrand and Stevenson.

entrepreneurship policy places much stronger focus on commercialization over invention.⁵³

Ultimately, from a theoretical perspective, very few new companies are radically innovative in the sense that they are bringing something completely new to the world. Rather, it is innovation that comes from incremental improvements, applications of proven business models to new geographies, etc. that is much more common. If governments setting innovation policies recognized this, they may shift how they design their support programs and policies.

Copycats, Imitators, and Clones

An interesting perspective on innovation mentioned in the literature relates to the issue of “diffusion”—innovations diffuse from their original inventors to the market, where entrepreneurs who may have been completely disconnected from the invention itself can commercialize it. Although it is easy to assume that the entrepreneurs are merely taking a copy of the inventor’s prototype to the market, “diffusion is seldom, if ever, a simple process of replication by unimaginative imitators.”⁵⁴ What some people might see as imitation is in fact a complex process of changing and adapting the invention to the circumstances of the new market.

Fagerberg advanced the argument, building on Schumpeter, that productivity growth can be achieved by either innovation or diffusion and that “countries on a comparatively low economic and technological level may realize higher growth rates than other countries by exploiting the potential for imitation.”⁵⁵ What is important to note is that imitation is rarely as easy as the term seems; rather, the challenge of

⁵³ Dahlstrand and Stevenson.

⁵⁴ Freeman, “The Economics of Technical Change,” 305.

⁵⁵ Fagerberg, “A Technology Gap Approach to Why Growth Rates Differ,” 92.

applying imported knowledge within a new context can be quite daunting as it requires tacit knowledge and technical capabilities. Therefore, “the distinction between innovation and diffusion is a relative one, because the systemic factors that favour an effective diffusion are partly the same as those that favour innovation.”⁵⁶

In one study that examines the juxtaposition of imitation and innovation, for example, it is recognized that companies can move from imitation to innovation over time. Luo et al. identify a category of companies founded in emerging economies they term emerging economy copycats (EECs), defined as enterprises that “begin with imitation and later progress toward innovation.”⁵⁷ The name can be confusing, however, as this type of company is not meant to include those that copy other businesses by infringing on their intellectual property rights.⁵⁸ To this point, the authors cite Steven Schnaars in his 1994 work *Managing Imitation Strategy: How Late Entrants Seize Markets From Pioneers*, which outlines six categories of imitations in increasing levels of sophistication: 1) counterfeits, 2) clones, 3) design copies, 4) creative adaptations, 5) technological leapfrogging, and 6) adaptation to another industry.⁵⁹ The first category of counterfeits, or pirated copies, is not included in their study, and the level of innovation increases as companies progress from basic copies of the business model through becoming world-class innovators, bringing the technology to new heights or applying it to new sector contexts.

Luo et al. simplify the categorization of EECs into two types—duplicative and innovative—and a duplicative type can develop into an innovative type over time.

⁵⁶ Almeida, Figueiredo, and Rui Silva, “From Concept to Policy,” 1334.

⁵⁷ Luo, Sun, and Lu Wang, “Emerging Economy Copycats: Capability, Environment, and Strategy,” 37.

⁵⁸ Luo, Sun, and Lu Wang, 38.

⁵⁹ Luo, Sun, and Lu Wang, 38.

One high-profile example of the latter case is Huawei in China, which started purely copying the West and now has become a global innovative powerhouse.

Imitation is typically disparaged because of implied intellectual property breaches and low-end copying, but in fact, the truth is quite different. What begins as imitation can evolve into a highly innovative business that must react to a radically different context. Imitative innovation is an important driver of real economic value, particularly in emerging markets, where the risk of attempting breakthrough innovation is relatively higher (market risk compounded with business model risk, plus a lack of early stage venture investors) with lower potential rewards (lower market demand for frontier innovations). Despite this fact, imitative innovation is generally undervalued, and in the technology world, a pejorative term, “clones,” is often used for imitation-based businesses, inaccurately implying that entrepreneurs have simply wholesale copied a business from another geography and mindlessly applied it in a new context. The reality is quite different, with necessary innovations happening at the execution level, often completely transforming the imitator relative to the source. Furthermore, the EEC cases empirically studied by Luo et al. have shown that innovation does not necessarily need to be high-end technological breakthroughs; it can also be “incremental improvements to products and processes” that are undertaken by firms imitating others.⁶⁰

Taking this topic of imitation from another angle, ignoring the value of imitation can stunt the spread of technology in a market. In one study, Kanninen and Stenbacka illustrate this by “[establishing] a novel result which points to underinvestment in imitation leading to a suboptimal degree of technology

⁶⁰ Luo, Sun, and Lu Wang, 53.

diffusion.”⁶¹ They find that diffusion of innovations from the source across the economy and into others is socially optimal, and that firms engaged in imitation help facilitate this. Counterintuitively, they are also staunch supporters of intellectual property rights, maintaining that patent lengths, in fact, should be increased to incentivize imitators to “invent around while a patent is in force.”⁶² Again, the point is not to pirate an existing business, it is to be inspired by the business model and build an imitation based on it, executing it in a way that is relevant to the market context.

Business Model Innovation

Schumpeter’s 1934 classifications of innovators into five categories included “new ways to organize business”—what is today known as business model innovation.⁶³ By this, he meant a new organizational structure for the way a firm works—how it captures value in the market and benefits its stakeholders.

Teece calls the business model the “conceptual map of the business,” the logic for how it functions outside of the raw financial plan.⁶⁴ Some examples of business models recently popularized are the 1) razor-razorblade model of selling a base product near cost with the plan of making profit from the replenishments, such as with printers and their ink cartridges; 2) the digital ads-driven model where software is given for free and revenue is made through a sponsor—in this case the ads network such as Google; and 3) the freemium model where a free version of a product is offered with limited features, hoping to hook the customer to upgrade to the premium, paid version after establishing value.

⁶¹ Kannianen and Stenbacka, “Endogenous Imitation and Implications for Technology Policy,” 379.

⁶² Kannianen and Stenbacka, 379.

⁶³ Casadesus-Masanell and Zhu, “Business Model Innovation and Competitive Imitation,” 464.

⁶⁴ Teece, “Business Models, Business Strategy and Innovation,” 172.

Casadesus-Masanell and Zhu maintain that business model innovation is difficult to protect, since the formula is not typically patentable, and competitors can replicate it readily after the business model is revealed in market.⁶⁵ Teece agrees, writing in his work that “at a superficial level, all businesses models might seem easy to imitate,”⁶⁶ and this lends further credence to the principle that an idea is basically worthless—the real value is in executing that idea in a real market context. That said, he admits, it is not so easy to wholesale copy the entire business model from a competitor since many of the systems, processes, and—most importantly—human capital resources, are often quite difficult to replicate, in addition to the fact that it is hard to understand in full detail what is happening within another firm.⁶⁷

In addition to Teece’s points, it is worth noting that even if there were full transparency on the exact functioning of a competitor’s business model and access to the resources needed to replicate it completely, the challenge of market context remains, particularly for firms seeking to replicate a successful business model in a new geography. What is even more interesting is that the false assumption that copying the “home” model as closely as possible will lead to success is what actually leads companies to fail, blinded to the requisite customization that needs to happen to factor for local market particularities.

Business model innovation is the “unsung hero” of the innovation literature as typically all of the attention is placed on the impact of pure scientific and technological innovations; whereas, innovations on the business model level can have

⁶⁵ Casadesus-Masanell and Zhu, “Business Model Innovation and Competitive Imitation,” 464.

⁶⁶ Teece, “Business Models, Business Strategy and Innovation,” 181.

⁶⁷ Teece, 182.

wide-ranging implications across many firms and greater overall economic and societal impact.⁶⁸

Systems of Innovation

The isolated (exclusively firm-centric) and linear (R&D lab to market) view of innovation conceptualized during the era of Schumpeter evolved over time to reflect a broader theoretical understanding based on interdependence, learning and evolution.⁶⁹ This Systems of Innovation (SI) approach gained traction quickly in academic circles as well as on the policy implementation side, birthing a variety of geographic and sectoral lenses. The initial broad definition evolved into the more specific National System of Innovation (NSI)⁷⁰ and subsequently, Regional Innovation Systems (RIS)⁷¹—which is the dominant lens used to analyze innovation policy today and features in this study’s conceptual framework. Further organizing lenses such as sectoral, local, and even global are also examined. This section begins with the origins of the SI concept and then discusses each of the currently referenced theories in the field, including the Triple Helix theory used as an organizing framework for this study.

Theoretical Origins of Systems of Innovation

General systems theory, first introduced by Ludwig von Bertalanffy in the 1950s, serves as a significant precursor to the SI approach. The general systems theory emphasizes the importance of studying systems as a whole, rather than focusing on individual components. It posits that systems consist of interrelated and

⁶⁸ Teece, 186.

⁶⁹ Tödting and Trippel, “One Size Fits All?,” 1205.

⁷⁰ Lundvall, *National Systems of Innovation*.

⁷¹ Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems.”

interdependent parts that function together as a coherent entity.⁷² This systems thinking laid the groundwork for the SI approach, which emphasizes the interconnectedness and interdependence of actors and institutions within an innovation ecosystem.

Another essential precursor to the SI approach is the concept of innovation as an interactive process, which emphasizes the importance of collaboration and interaction among various stakeholders in the innovation process.⁷³ This perspective challenges the traditional linear model of innovation, which assumes a straightforward progression from R&D to market. Instead, it highlights the complex, non-linear, and iterative nature of innovation, characterized by feedback loops and reciprocal relationships among different actors.⁷⁴

The SI approach gained further theoretical support from the evolutionary economics perspective, which draws on ideas from biology and evolutionary theory to understand economic change. Evolutionary economics emphasizes the importance of learning, adaptation, and variation in shaping the innovation process.⁷⁵ This perspective aligns with the SI approach by highlighting the role of institutions and the importance of dynamic, adaptive processes in driving innovation.

The work of Christopher Freeman (1987) is widely regarded as a seminal contribution to the development of the SI approach. Freeman's book, *Technology Policy and Economic Performance: Lessons from Japan*, introduced the concept of NSI as a framework for understanding how institutions, organizations, and policies shape innovation processes and outcomes. Freeman argued that innovation is a

⁷² Bertalanffy, *General System Theory*.

⁷³ Kline and Rosenberg, "An Overview of Innovation."

⁷⁴ Kline and Rosenberg.

⁷⁵ Nelson and Winter, *An Evolutionary Theory of Economic Change*.

collective and systemic process, influenced by a complex web of interactions among various actors and institutions.⁷⁶ This perspective has since been expanded upon and refined by numerous scholars, leading to the development of various geographic and sectoral lenses within the SI approach, which will be discussed in detail in the following sections.

An important critique of the SI approach is its “conceptual diffuseness”⁷⁷ owing to the fact that the boundaries of the system are not clearly defined and are interpreted in different ways by different authors.⁷⁸ For this reason and the fact that it is difficult to use a systems approach alone to empirically test conjectures, scholars such as Edquist have argued that SI should not be termed a theory; rather, it is closer to an approach or a conceptual framework. The degree to which SI should be theorized vs. left open to inductive findings is a debate in the literature, with Lundvall, in particular, arguing that it should be “kept open and flexible.”⁷⁹

In conclusion, the origins of the SI approach can be traced back to various theoretical foundations, including general systems theory, the concept of innovation as an interactive process, evolutionary economics, and the seminal work of Christopher Freeman. These foundations have contributed to the development of a rich and diverse field of study, encompassing various geographic and sectoral lenses, including the Triple Helix theory that forms the basis of this study's conceptual framework.

⁷⁶ Freeman, *Technology Policy and Economic Performance*.

⁷⁷ Fagerberg, Mowery, and Nelson, *The Oxford Handbook of Innovation*, 186.

⁷⁸ Edquist, *Systems of Innovation*.

⁷⁹ Lundvall, *National Systems of Innovation*, 13.

Districts, Clusters, and Milieus

Three interrelated concepts of Industrial Districts, Clusters, and Innovation Milieus are addressed in this next section. They are taken in order of their appearance in the literature and are important theoretical precursors to and organizing lenses within the territorial-bound national and regional innovation systems. In fact, Asheim et al. contend that the “RIS approach provides a unifying framework for territorial innovation models.”⁸⁰

Industrial Districts

The concept of industrial districts emerged over 100 years ago when the scholar Alfred Marshall first showed how small and medium sized enterprises (SMEs) could leverage their physical proximity within a sector-specific district to remain competitive in light of new competition from large-scale manufacturers. These Marshallian industrial districts in Italy became a case study for “local collaboration and knowledge spillovers”⁸¹ leading to a variety of direct benefits.

Marshall found that co-locating small firms in the same district enabled these businesses to realize cost savings normally unattainable on their own, as well as economic opportunities typically reserved for larger firms.⁸² They reduced their labor and transportation costs, as well as their cost of inputs. Within a district, firms could specialize and rely on others within the district to complete the entire value chain. A unique characteristic of Marshallian industrial districts is the deep integration between the economy and society within the district.

⁸⁰ Asheim, Smith, and Oughton, “Regional Innovation Systems,” 877.

⁸¹ Asheim, Isaksen, and Trippel, *Advanced Introduction to Regional Innovation Systems*, 17.

⁸² Sheppard, *A Companion to Economic Geography*, 153.

The growth of these industrial districts in the “Third Italy” region (north-east and central) was due to many convening factors—historical roots in traditional crafts, trade schools, concentration of small businesses, culture, and social factors.⁸³ Most of these distinguishing factors started to fade with the onset of globalization and even the model Italian industrial districts cited by Marshall became mere regional clusters over time.

It is interesting to note that despite their long history, industrial districts were never a significant topic in the literature until about 1985 when their mention became ubiquitous in business studies publications— “interest in industrial districts far exceeds their empirical significance.”⁸⁴ This may stem from a broader interest in a regional lens to capitalism and democracy that emerged in this more recent period. It is also likely that the associated theoretical advancements and policy traction of regional clusters and science parks led to more being said about the underlying theory.

One of the most important critiques of industrial districts, which led to the development of other broader theories outlined below, is the fact that they operate as a disconnected island without being embedded within a broader context, as noted by Markusen in her “Typology of Industrial Districts.”⁸⁵ Without a focus on the cross-district institutions, an industrial district lens may have explanatory power on a micro level, but it becomes less compelling as the scope is widened. Furthermore, the Italian industrial districts which were the inspiration for the concept eventually largely lost their defining characteristics, such as “the dominance of SMEs, the embeddedness of industrial activity (fusion of economy and society), and the whole value chain being

⁸³ Clark, Feldman, and Gertler, *The Oxford Handbook of Economic Geography*, 413.

⁸⁴ Sheppard, *A Companion to Economic Geography*, 150.

⁸⁵ Markusen, “Sticky Places in Slippery Space: A Typology of Industrial Districts,” 293.

inside the districts, disappeared as a consequence of globalization.”⁸⁶ They developed into more ordinary “clusters,” which are addressed in the next section below.

Clusters

Clusters represent geographically proximate groupings of interconnected firms, specialized suppliers, service providers, and associated institutions in a particular field.⁸⁷ They have emerged as a key concept in the study of innovation and regional development, given their potential to foster innovation, increase productivity, and enhance regional competitiveness. The main difference between clusters and industrial districts is the idea that “clusters are geographic concentrations of firms operating in the same or in related industries.”⁸⁸ This section reviews the main scholarly arguments on clusters, identifies gaps in the literature, and discusses the relevance of clusters to this study.

Michael Porter's seminal work on clusters has been influential in shaping the research and policy discourse on regional innovation and competitiveness.⁸⁹ Porter argues that clusters enable firms to access specialized inputs, knowledge, and skills, thus driving innovation and productivity growth. The presence of dense networks and localized externalities within clusters has been found to facilitate knowledge spillovers, collaboration, and learning.⁹⁰

Several studies have sought to identify the factors that contribute to the development and success of clusters. Some researchers emphasize the role of local institutions, such as universities and research centers, in providing knowledge and

⁸⁶ Asheim, Isaksen, and Trippel, *Advanced Introduction to Regional Innovation Systems*, 18.

⁸⁷ Porter, “Clusters and the New Economics of Competition.”

⁸⁸ Asheim, Smith, and Oughton, “Regional Innovation Systems,” 878.

⁸⁹ Porter, “Clusters and the New Economics of Competition.”

⁹⁰ Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*.

skills, and fostering innovation within clusters.⁹¹ Others highlight the importance of regional culture, social capital, and trust in facilitating cooperation and knowledge exchange among cluster actors.⁹² However, there is ongoing debate regarding the relative importance of these factors and the extent to which they can be replicated in different regional contexts.

A key issue in the cluster literature is the question of how cluster policies should be designed and implemented. Some scholars argue that governments should play an active role in supporting cluster development, through targeted interventions such as funding for R&D, infrastructure, and skills development.⁹³ Others contend that cluster policies should be more market-driven and focused on creating the conditions for clusters to emerge spontaneously, rather than trying to "pick winners".⁹⁴

Asheim et al. highlight three main differences between clusters and networks in general. First, clusters can exist in a geographic area based solely on trade transactions between co-located firms, without depth of networking between them, in what is known as a "shallow cluster."⁹⁵ Next, clusters are necessarily territorially-bound while networks are an "a-spatial concept."⁹⁶ Finally, each concept lends itself to a different type of external economic outcome, with clusters leading to "unintended spillovers of knowledge, and the attraction of related trades, labour and consumers to the cluster through normal market processes" and networks causing firms to "actively

⁹¹ Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy."

⁹² Storper, "The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies."

⁹³ Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy"; Asheim, Cooke, and Martin, *Clusters and Regional Development: Critical Reflections and Explorations*.

⁹⁴ Martin and Sunley, "Deconstructing Clusters: Chaotic Concept or Policy Panacea?"

⁹⁵ Swann, *The Economics of Innovation*, 149.

⁹⁶ Asheim, Smith, and Oughton, "Regional Innovation Systems," 879.

engage in cooperative activity, such as research and development (R&D), training, joint marketing, etc.”⁹⁷

Despite the extensive research on clusters, there are still gaps in the literature. One such gap is the limited understanding of cluster dynamics in non-Western contexts, particularly in the Gulf region. Most studies on clusters have been conducted in North America, Europe, and East Asia, while there is a lack of research on cluster development and policies in regions such as the Middle East. Additionally, there is a need for more research on the role of multinational corporations and global networks in shaping cluster dynamics and regional innovation.⁹⁸ Finally, an area covered more recently by Giuliani and Bell distinguishes between the effects of collocation on business transaction vs. knowledge flows, arguing that the more important factor is on knowledge and that the absorptive capacity of firms within a cluster determines how successful that cluster will be.⁹⁹ Porter did not address the question of causality in such a way to explain why firms located in a cluster are more competitive.

In relation to this study, the concept of clusters offers a useful lens for examining the RIS in Dubai and the broader Gulf context. By exploring the role of clusters in fostering innovation and competitiveness, this research can contribute to the understanding of how different actors within the innovation system interact in the context of the Gulf region. This is accomplished through the two cluster case studies of Dubai Internet City and DMCC in Chapters 8 and 9 respectively. Furthermore, analyzing the cluster policies and strategies adopted in Dubai can provide insights into

⁹⁷ Asheim, Smith, and Oughton, 879.

⁹⁸ Beugelsdijk, McCann, and Mudambi, “MNEs as Border-Crossing Multi-Location Enterprises: The Role of Discontinuities in Geographic Space,” 420.

⁹⁹ Giuliani and Bell, “The Micro-Determinants of Meso-Level Learning and Innovation.”

how governments in the Gulf can effectively support the development of innovation ecosystems and enhance regional competitiveness.

Innovation Milieus

Innovation milieus represent the social, cultural, and institutional context in which innovation occurs, and they have been recognized as an important factor influencing the innovation process and outcomes. Innovation milieus are characterized by the presence of specific conditions that foster the generation, diffusion, and exploitation of knowledge and innovation.¹⁰⁰ These conditions include the availability of skilled labor, infrastructure, and research institutions, as well as the existence of a supportive regulatory environment and culture of entrepreneurship.¹⁰¹ The concept of innovation milieus is closely related to the idea of learning regions, which emphasizes the importance of regional learning and innovation networks in driving economic growth and competitiveness.¹⁰²

Several studies have sought to identify the factors that contribute to the development and success of innovation milieus. Some researchers emphasize the role of local institutions, such as universities and research centers, in providing knowledge and skills, and fostering innovation within these environments.¹⁰³ Others highlight the importance of regional culture, social capital, and trust in facilitating cooperation and knowledge exchange among actors in the innovation milieu.¹⁰⁴ However, there is

¹⁰⁰ Camagni, "The Concept of Innovative Milieu and Its Relevance for Public Policies in European Lagging Regions."

¹⁰¹ Doloreux and Parto, "Regional Innovation Systems: Current Discourse and Unresolved Issues"; Cooke and Leydesdorff, "Regional Development in the Knowledge-Based Economy: The Construction of Advantage."

¹⁰² Florida, "Toward the Learning Region."

¹⁰³ Etzkowitz and Leydesdorff, "The Dynamics of Innovation"; Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy."

¹⁰⁴ Storper, "The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies"; Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*.

ongoing debate regarding the relative importance of these factors and the extent to which they can be replicated in different regional contexts.

National System of Innovation

The theoretical underpinning for the National System of Innovation (NSI) concept, unanimously cited by the early scholars in the field as the origins of the approach, is Friedrich List's 1841 "National System of Political Economy," in which he "advocated not only protection of infant industries but a broad range of policies designed to accelerate, or make possible, industrialisation and economic growth."¹⁰⁵ He pointed to the importance of learning about new technologies and applying them within industry, and suggested that government policy should be put in place to support training and infrastructure development.¹⁰⁶ List offers a counterpoint to Adam Smith's dominant perspective at the time, critiquing the fact that Smith "wrongly maintains that the revenues of the nation are dependent only on the sum of its material capital."¹⁰⁷ It is fascinating to see how many elements of modern NSI theory were seeded almost two centuries ago with his scholarship.

Christopher Freeman was the first scholar to outline the NSI approach in 1987, defining it in the context of a study he conducted on Japan as basically "a network of institutions in the public and private sectors whose activities and interactions initiate, import, modify, and diffuse new technologies."¹⁰⁸ In his landmark book, he showed how institutions in Japan were able to facilitate cooperation between research institutions and the private sector, resulting in a competitive edge in innovation when compared to the United States and Europe in the 1980s. Freeman's work built on the

¹⁰⁵ "The 'National System of Innovation' in Historical Perspective," 5.

¹⁰⁶ Lundvall, *National Systems of Innovation*, 17.

¹⁰⁷ List, Friedrich, *The National System of Political Economy*, 183.

¹⁰⁸ Freeman, *Technology Policy and Economic Performance*.

general theory initiated by List and made explicit the role of R&D, cross-pollination between firms, and the multidimensional role of the government on a national level. He demonstrates how developing countries can apply an alternative to neoclassical economics to build innovation systems that make them competitive with more advanced economies, very much in the light of List's recommendations for Germany at the time.

Although Freeman was the first to use the term, the most important early publications on the topic were by Lundvall¹⁰⁹ and Nelson¹¹⁰ in 1992 and 1993 respectively. Although all the early scholars of NSI shared the perspective that innovations arise from the sharing of knowledge and experience between organizations based the same country, they each proposed different definitions of the term. Lundvall takes a theoretical approach, focusing on interactive learning while Nelson prioritizes institutional arrangements and bases his book heavily on empirical case studies. Lundvall adopted a "broad" definition of NSI and Nelson opted for a "narrow" one, as explained below. Each of these foundational scholars' contributions to the field will be examined in turn.

Lundvall argues for a loose definition of the NSI concept that is "open and flexible regarding which sub-systems should be included and which processes should be studied."¹¹¹ Although it is convenient to allow for all potential factors that impact an innovation system, a definition without boundaries invites critique. His "broad" definition of NSI prioritized the exchange of knowledge, combining both science-based advancements as well as societal factors like labor market dynamics.

¹⁰⁹ Lundvall, *National Systems of Innovation*.

¹¹⁰ Nelson, *National Innovation Systems*.

¹¹¹ Lundvall, *National Systems of Innovation*, 14.

Definitionally, the farthest he went was in identifying five core areas that should comprise these national systems: 1) the firm itself, 2) inter-firm relationships, 3) public sector, 4) financial sector, and 5) R&D. By combining the first, second and fourth areas which all deal with the private sector and its interactions, one can begin to see the outlines of the Triple Helix theory, discussed in detail later in this section.

Although Nelson has the same definitional openness as Lundvall, his contribution to the field was presenting a comparative empirical method to give the NSI approach stronger analytic grounding and causal links. He prefers a “narrow” definition that focuses on the role of science-based learning, with less of an emphasis on experiential learning and tacit knowledge.¹¹² He laments the fact that authors in this field advocate steps to boost economic performance based on weak evidence drawn from a single country’s experience. His preferred method is to investigate the evidence across geographies to draw conclusions, versus proposing a theory and then working backwards to prove or adjust it. He delivers an implied critique of Freeman’s approach without naming him, claiming that “many of the allegedly comparative studies concentrated on one country—in recent times Japan—with comparisons with other countries mainly implied.”¹¹³ Nelson proceeds to compile case studies written by a variety of scholars on a diverse set of fifteen countries in the volume he edited, spanning high income countries like the US and Sweden to lower income countries like Taiwan and Argentina. As is the trend in the field, none of the selected country examples were from the Arab world, much less the Gulf. That said, his concerns are as valid today as when he first authored his book, as governments around the world

¹¹² Chaminade, Lundvall, and Haneef, *Advanced Introduction to National Innovation Systems*, 7.

¹¹³ Nelson, *National Innovation Systems*, 4.

are implementing policies without enough calibration based on country context. This research works towards filling that gap in the Gulf region.

Regional Innovation Systems

Regional Innovation Systems (RIS) emerged as a complementary theoretical perspective to NSI in the late 1990s. Cooke et al. argued that a regional lens could offer valuable insights into the dynamics of innovation, as all of the major elements that NSI holds to be important are region-specific¹¹⁴— “institutional framework, the nature of inter-firm relationships, learning capability, R&D intensity and innovation activity.”¹¹⁵ This approach allows for more context-sensitive policymaking and paved the way for bottom-up Smart Specialization policies based on entrepreneurial discovery in each locale.¹¹⁶

In order to distinguish RIS from NSI, a clear definition of what constitutes a region is necessary. This definitional clarity also helps justify the selection of Dubai as a region of study for this research. The regional lens is a “meso-level political unit set between the national or federal and local levels of government that might have some cultural or historical homogeneity but which at least had some statutory powers to intervene and support economic development, particularly, innovation.”¹¹⁷ While some scholars prioritize the regional level in understanding SI dynamics, it is crucial to acknowledge that certain aspects, such as laws and state-wide policies, are necessarily at the national level. Ultimately, each lens serves as a focusing mechanism rather than excluding the others.

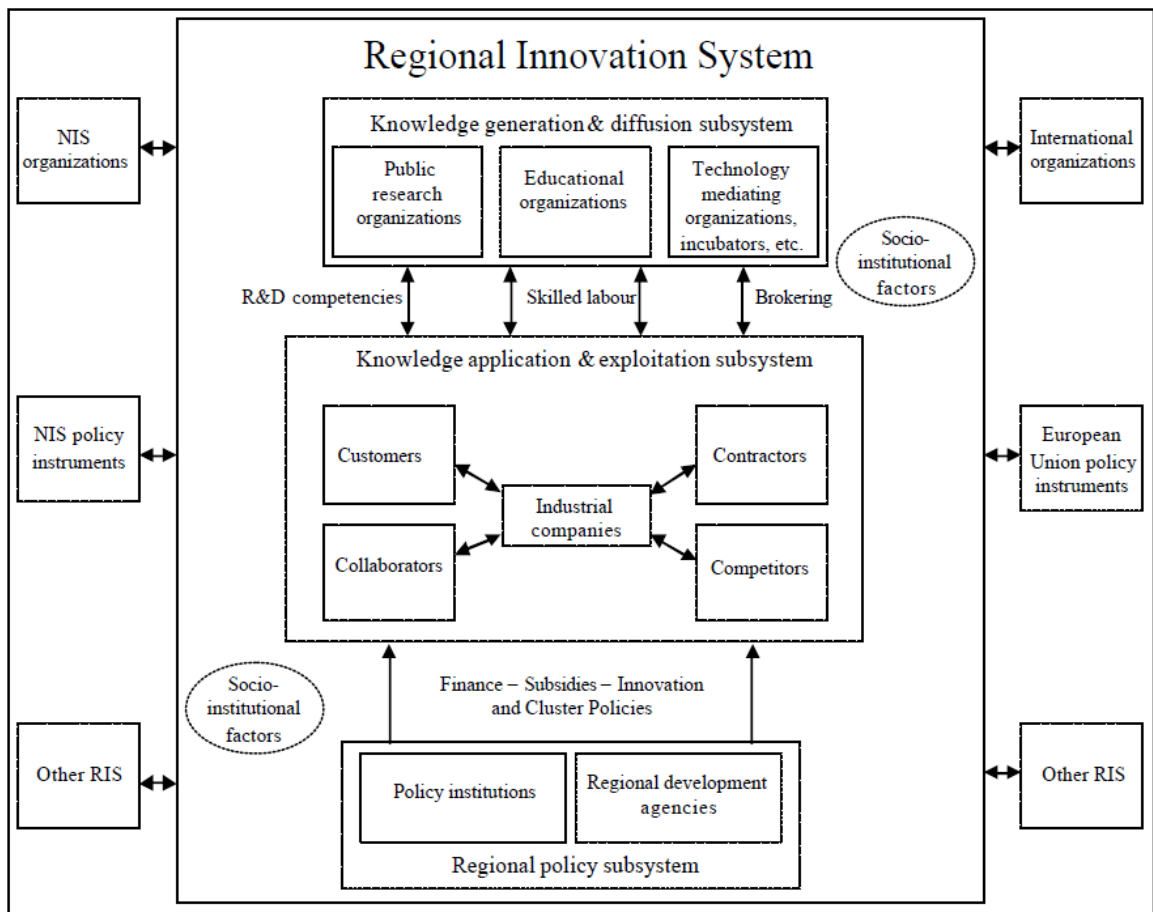
¹¹⁴ Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems.”

¹¹⁵ Oughton, Landabaso, and Morgan, “The Regional Innovation Paradox: Innovation Policy and Industrial Policy.”

¹¹⁶ Foray, David, and Hall, “Smart Specialisation: The Concept.”

¹¹⁷ Almeida, Figueiredo, and Rui Silva, “From Concept to Policy,” 1332.

The RIS perspective builds on concepts such as industrial districts and clusters described in the section above, emphasizing the economic and social interactions between public and private sector agents in fostering and diffusing innovation within regions embedded in broader national and global systems.¹¹⁸ This approach highlights the importance of regional interdependencies and the role of localized knowledge in shaping innovation processes. The most important distinguishing element of an RIS compared to the national or sectoral typologies, is the importance of enabling factors supporting tacit knowledge spillovers, which are more concentrated in a confined geographic region.



¹¹⁸ Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy."

This illustration above of the structure of an RIS by Micheala Trippl¹¹⁹ is an amalgamation of several scholars' views, combining the original conception by Autio that outlines two subsystems: 1) Knowledge generation and diffusion, and 2) knowledge application and exploitation.¹²⁰

It is interesting to note that the three main components of the central research question—government, industry, and academia—anchor the center of this structure, with academia represented by “knowledge generation and & diffusion subsystem,” industry represented by “knowledge application & exploitation subsystem,” and government represented by “regional policy subsystem,” showing that the organizing framework of this study is quite comprehensive and represents the RIS concept well.

Emerging markets, such as the Gulf countries, exemplify the relevance of the RIS approach. For instance, the UAE, with its distinct innovation ecosystems in Dubai, Abu Dhabi, and other smaller emirates like Sharjah demonstrates the value of examining regional dynamics rather than focusing solely on national or global perspectives. Similarly, in Saudi Arabia, the Eastern Province and the greater Jeddah area, anchored by globally recognized research institutions like KFUPM and KAUST, contrast with the industry and public sector focus of the capital, Riyadh. Each of these areas requires tailored innovation policies that address regional needs and specificities.

Despite the growing body of literature on RIS, there remain gaps in understanding how this framework applies to emerging markets and the challenges they face in building effective innovation systems. More research is needed to explore the role of international inputs in shaping RISs in such contexts and how different

¹¹⁹ Trippl, “Cross-Border Regional Innovation Systems,” 5.

¹²⁰ Autio, “Evaluation of RTD in Regional Systems of Innovation,” 134.

regional innovation ecosystems within the same country can learn from each other to foster overall national innovation performance.

In conclusion, the RIS approach offers a valuable perspective in understanding the dynamics of innovation, particularly in the context of emerging markets like the Gulf countries. By focusing on the regional level, RIS can help identify the specific needs and characteristics of different innovation ecosystems and inform more effective, context-sensitive policies. Future research should continue to explore the application of RIS in emerging markets, addressing the gaps in the literature and contributing to a better understanding of how regional innovation systems can be fostered and supported in diverse contexts.

Regional Innovation Paradox

The regional innovation paradox presented by Oughton et al. argues that lagging regions most in need of governmental subsidies into R&D are the ones that are least able to “absorb public funds” and turn financial assistance into measurable outcomes.¹²¹ While their study’s context was European, the same concept can be extended to the Gulf states. They suggest that resolving this paradox necessitates policies that “increase the capacity of regions to absorb investment funds for innovation related activities.”¹²² The resolution of the innovation paradox is no-doubt context-sensitive, and so this study will explore how the Gulf states—which have relatively underdeveloped R&D infrastructure—compensate for this handicap.

¹²¹ Oughton, Landabaso, and Morgan, “The Regional Innovation Paradox: Innovation Policy and Industrial Policy,” 97.

¹²² Oughton, Landabaso, and Morgan, 97.

Smart Specialization

Noticing that the gap was widening between the United States and Europe with regards to economic growth and productivity stemming from commercialized innovation, the European Commission's Directorate-General of Research supported a series of studies in 2006-2009 to diagnose the issue and devise solutions. The experts found that "the European market, unlike the US, is much less integrated" and suffers from "fragmentation and duplication of efforts."¹²³ As outlined by Foray, et al. in their brief introducing the concept of Smart Specialization (SS), the theory was formulated as a way to optimize the allocation of R&D and other resources across the different regions of Europe to harness the relative strengths of each geography and concentrate public spending where it will have the greatest impact.¹²⁴

SS became integrated into RIS, creating a combined policy area called Regional Innovation Systems Smart Specialization (RIS3), and made its mark by suggesting that governments avoid setting top-down industrial policy and allow for a process of entrepreneurial discovery to guide decisions into which areas should receive support.¹²⁵ This Entrepreneurial Discovery Process (EDP) ensure that bottom-up inputs from the market inform policy and, as outlined in the conceptual framework section above, the EDP plays a central role in this study.

To understand the development of the entrepreneurial discovery process, it is beneficial to review the three main entrepreneurship theory schools of thought, as each one views discovery in a different light.

¹²³ Hermosa, Elorduy, and Eguía, "Smart specialization and entrepreneurial discovery," 7.

¹²⁴ Foray, David, and Hall, "Smart Specialisation: The Concept," 25.

¹²⁵ Foray et al., *Guide on Research and Innovation Strategies for Smart Specialisation (RIS3 Guide)*, 12.

Neoclassical equilibrium theories assume that “everyone can recognize all entrepreneurial opportunities” and “fundamental attributes of people, rather than information about opportunities, determine who becomes an entrepreneur.”¹²⁶ This is in contrast to psychological theories, which point to the people’s personalities as the determining factor of who becomes an entrepreneur and what opportunities they discover.¹²⁷ Scholars who take this perspective, such as Begley and Boyd, focus on the willingness of the individual to take the risk and exploit an opportunity.¹²⁸

Finally, the Austrian theories challenge both of the previous theories, claiming that it is impossible for people to be aware of all entrepreneurial opportunities (in contrast to neoclassical equilibrium) and that the knowledge about the opportunity is more important than any fundamental attribute of the person (in contrast to the psychological theories).¹²⁹ Austrian theories assume a starting point of disequilibrium in terms of peoples’ knowledge of entrepreneurial opportunities and the “possession of idiosyncratic information allows people to see particular opportunities that others cannot see, even if they are not actively searching for such opportunities.”¹³⁰

Shane presents empirical evidence in support of the Austrian perspective and Kirzner’s characterization of entrepreneurial discovery,¹³¹ arguing that “idiosyncratic prior knowledge makes people better able to discover certain opportunities than others.”¹³²

¹²⁶ Shane, “Prior Knowledge and the Discovery of Entrepreneurial Opportunities,” 449.

¹²⁷ Shane and Venkataraman, “The Promise of Entrepreneurship as a Field of Research,” 222.

¹²⁸ Begley and Boyd, “Psychological Characteristics Associated with Performance in Entrepreneurial Firms and Smaller Businesses,” 79.

¹²⁹ Kirzner, “Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach,” 62.

¹³⁰ Shane, “Prior Knowledge and the Discovery of Entrepreneurial Opportunities,” 449.

¹³¹ Kirzner, “Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach,” 71.

¹³² Shane, “Prior Knowledge and the Discovery of Entrepreneurial Opportunities,” 466.

In light of this SS approach, Foray et al. suggest that governments have three main responsibilities when setting the correct innovation policies: 1) Facilitate the EDP by incentivizing entrepreneurs and other agents with insights into sectors of regional strength to contribute their perspectives, 2) Measure results and adjust accordingly to ensure that the programs and policies selected are delivering impact, and 3) Invest in complementary areas like training institutions to support the generation of local applications to General Purpose Technologies (GPTs).¹³³

Examples of GPT inventions include the microprocessor and—more recently—blockchain. Once a GPT has been invented and commercialized, a world of additional “applications” can be developed on top of the core technology. SS theory posits that there should be a separation between leading regions that invest into developing new GPTs and “follower regions” that are “better advised to invest in the «co-invention of applications»—that is—the development of the applications of a GPT in one or several important domains of the regional economy.”¹³⁴ The European Union has used this theory to decide on which regions are allocated R&D budgets for which areas of specialization, instead of just assuming every region is equal in ability and need.

The importance of RIS3 and GPTs in the context of this study is that they reflect the need to look at an innovation system more broadly than the national or regional lens to understand the role in an international context. GPTs are particularly important in emerging markets such as the Gulf, where they are imported and local applications are made, resulting in incremental innovations on a local level.

¹³³ Foray, David, and Hall, “Smart Specialisation: The Concept,” 28.

¹³⁴ Foray, David, and Hall, 27.

Other Organizing Lenses

Since the academic field of innovation studies maintains a close linkage to the policy implementation side, and governments typically enact laws and policies on a national level, NSI is the classically dominant approach. In fact, the regional approach gained steam—counter-intuitively—from a supranational policy alignment across the EU, as described above in the section on Smart Specialization and RIS3. The regional lens is also useful in large countries or in countries such as the United Arab Emirates where the relative differences within the country are substantial across the dimensions important to fostering innovation and administration of policy is regional. Although the national and regional approaches are the most highly cited in the SI literature, a range of other lenses have been proposed by scholars over the years, denoting different spatial and sectoral boundaries. In this section, we address three of the most relevant ones to this study: sectoral, local, and global.

Sectoral Innovation System (SIS)

Sectoral innovation systems focus on the innovation processes and knowledge flows within specific industries or sectors.¹³⁵ The SIS approach emphasizes the role of sector-specific characteristics, such as technological regimes, market structures, and institutions, in shaping innovation patterns and performance.¹³⁶ Researchers have found significant differences in innovation processes across sectors, suggesting that policy interventions should be tailored to the specific needs and dynamics of each sector.¹³⁷ However, the SIS literature has been critiqued for its limited attention to

¹³⁵ Malerba, “Sectoral Systems of Innovation and Production.”

¹³⁶ Breschi and Malerba, “Sectoral Innovation Systems: Technological Regimes, Schumpeterian Dynamics, and Spatial Boundaries.”

¹³⁷ Nelson and Winter, *An Evolutionary Theory of Economic Change*; Malerba, “Sectoral Systems: How and Why Innovation Differs across Sectors.”

cross-sectoral linkages and interactions, which can be important drivers of innovation and growth.¹³⁸

Local Innovation System (LIS)

Local innovation systems focus on the innovation processes and networks at the sub-regional or city level.¹³⁹ The LIS approach highlights the importance of local embeddedness, proximity, and social capital in facilitating knowledge exchange, learning, and innovation.¹⁴⁰ Studies have shown that localized learning and innovation networks can be important sources of regional competitiveness and resilience, particularly in the face of global economic challenges.¹⁴¹ However, the LIS literature has been criticized for its lack of clarity regarding the boundaries and definitions of local innovation systems, as well as the role of global networks and linkages in shaping local innovation dynamics.¹⁴²

Global Innovation System (GIS)

Finally, it is interesting to note that the main SI scholarship starts at the national level and then narrows down to a regional, local, or sector level, despite the trend of globalization in modern economies. Addressing this trend is the somewhat niche literature on Global Innovation Systems (GIS), which focuses on the innovation processes and networks that span across national borders and regions.¹⁴³ The GIS approach emphasizes the role of multinational corporations, global value chains, and

¹³⁸ Asheim and Coenen, “Knowledge Bases and Regional Innovation Systems: Comparing Nordic Clusters.”

¹³⁹ Braczyk, Cooke, and Heidenreich, *Regional Innovation Systems: The Role of Governances in a Globalized World*.

¹⁴⁰ Boschma, “Proximity and Innovation: A Critical Assessment.”

¹⁴¹ Gertler, “Tacit Knowledge and the Economic Geography of Context, or the Undefinable Tacitness of Being (There).”

¹⁴² Bathelt, Malmberg, and Maskell, “Clusters and Knowledge: Local Buzz, Global Pipelines and the Process of Knowledge Creation.”

¹⁴³ Carlsson, “Internationalization of Innovation Systems: A Survey of the Literature.”

international knowledge flows in shaping innovation patterns and performance.¹⁴⁴

Researchers have found that global innovation networks can be important drivers of knowledge creation, diffusion, and learning, particularly in the context of an increasingly interconnected and globalized economy.¹⁴⁵ However, the GIS literature has been critiqued for its limited attention to the role of local and regional factors, as well as the uneven distribution of innovation capabilities and benefits across countries and regions.

National Learning Systems

An important critique of the academic literature in the field of SI relates to its applicability to late industrializing economies. Viotti presents an alternative approach anchored in learning instead of innovation, arguing that the process of learning is much more relevant to these countries since they are not typically bringing new innovations to market. He specifically defines learning as a “process of technical change achieved by the absorption of already existing techniques, i.e., of innovations engendered elsewhere, and the generation of improvements in the vicinity of the acquired innovations.”¹⁴⁶ This National Learning Systems (NLS) approach highlights the central role of diffusion and incremental innovation in such market contexts, an important contribution to the field. Although Viotti’s contribution is important as it highlights the real difference in late industrializing countries such as the United Arab Emirates and other GCC nations, it isn’t clear why the broad definition of innovation would not be applicable to even these more learning-inclined contexts.

¹⁴⁴ Archibugi and Iammarino, “The Globalization of Technological Innovation: Definition and Evidence”; Lundvall et al., “National Systems of Production, Innovation and Competence Building.”

¹⁴⁵ Ernst, “Global Production Networks and the Changing Geography of Innovation Systems: Implications for Developing Countries”; Mudambi, “Location, Control and Innovation in Knowledge-Intensive Industries.”

¹⁴⁶ Viotti, “National Learning Systems A New Approach on Technological Change in Late Industrializing Economies and Evidences from the Cases of Brazil and South Korea,” 653.

The main scholars who have championed the NLS approach in late industrializing economies have investigated case studies in countries located in sub-Saharan Africa,¹⁴⁷ South America,¹⁴⁸ and East Asia.¹⁴⁹ As with the other theories researched in this study, the Middle East in general—and the Gulf in particular—are conspicuously missing from the literature.

Industrial Path Development

Industrial path development has been a central topic in the economic geography and regional innovation literature over the last few decades. Path development is concerned with understanding the processes by which industries evolve and transform in response to various economic, social, and technological factors. In this context, scholars have debated the different types of industrial path development, their underlying dynamics, and the implications for regional economic growth and innovation.

The concept of path dependency, initially formulated by David¹⁵⁰ and Arthur¹⁵¹, has become an essential component of the path development literature. Path dependency emphasizes the role of historical events, decisions, and accumulated knowledge in shaping the future trajectories of industries and regions. It is suggested that the development of industrial paths is, to a significant extent, determined by the past and that incremental changes are more likely than radical shifts.¹⁵²

¹⁴⁷ Lall and Pietrobelli, “National Technology Systems in Sub-Saharan Africa.”

¹⁴⁸ Viotti, “National Learning Systems A New Approach on Technological Change in Late Industrializing Economies and Evidences from the Cases of Brazil and South Korea.”

¹⁴⁹ Mathews, “National Systems of Economic Learning.”

¹⁵⁰ David, “Clio and the Economics of QWERTY.”

¹⁵¹ Arthur, “Competing Technologies, Increasing Returns, and Lock-in by Historical Events.”

¹⁵² Martin, “Roepke Lecture in Economic Geography—Rethinking Regional Path Dependence: Beyond Lock-in to Evolution.”

Two main strands of path development have been identified in the literature: path extension and path creation. Path extension refers to the process by which existing industries and competencies within a region are gradually adapted and upgraded over time, often through incremental innovations. Path creation, on the other hand, involves the development of entirely new industries and competencies within a region, often driven by radical innovations or the emergence of new markets and technologies.¹⁵³ Because elements of an RIS must be viewed in their systemic context and “transferring knowledge ... into new product and process innovations, and the diffusion of innovations, is a complex, dynamic process that is difficult to replicate and transfer across borders” Asheim et al. argue that “differences across nations and regions are likely to persist across time and space in a path-dependent way.”¹⁵⁴

The debate surrounding path extension and path creation has focused on the factors that determine the emergence and sustainability of different types of path development. Some scholars argue that regions with strong path dependencies and well-established industries are more likely to engage in path extension, as they can leverage their existing competencies and networks to adapt to changing market conditions.¹⁵⁵ In contrast, others suggest that path creation is more likely to occur in regions with weak or nonexistent industrial paths, where entrepreneurs and policymakers are more open to experimenting with new ideas and technologies.¹⁵⁶

The study of industrial path development in the context of Dubai and the broader Gulf region can contribute to the ongoing debate in several ways. First, it can

¹⁵³ Garud and Karnøe, “Path Creation as a Process of Mindful Deviation.”

¹⁵⁴ Asheim, Smith, and Oughton, “Regional Innovation Systems.”

¹⁵⁵ Martin, “Roepke Lecture in Economic Geography—Rethinking Regional Path Dependence: Beyond Lock-in to Evolution.”

¹⁵⁶ Isaksen and Trippel, “Regional Industrial Path Development in Different Regional Innovation Systems: A Conceptual Analysis.”

help to identify the specific factors that drive path extension and path creation in this unique regional context, characterized by its rapid economic growth, high levels of government intervention, and relatively low local R&D intensity. The cases selected for this study represent both major types of industrial path development: DP World and DMCC are examples of path extensions and Emirates Airline and DIC represent path creations. Second, it can shed light on the role of RIS and the Triple Helix model in shaping the development of industrial paths in Dubai and the Gulf region, as well as the implications of these interactions for regional innovation and economic diversification.

Triple Helix

Within the context of innovation systems—whether they be construed as national, regional, or otherwise—enters a framework that governs the multifaceted interactions of the university–industry–government triad to generate and adopt innovations in a market: the Triple Helix model of innovation. When defining the Triple Helix framework in 1995, Etzkowitz and Leydesdorff noted the growing trend of universities and industry “assuming tasks that were formerly largely the province of the other,” and, contributing to that change, governments were starting to play a direct role pushing industry to innovate through incentives and facilitating the movement of academia towards activities that generate economic impact.¹⁵⁷ By focusing on the interactions and relationships among these three spheres, the Triple Helix theory seeks to understand the dynamics that drive innovation processes and outcomes within specific contexts.

¹⁵⁷ Etzkowitz and Leydesdorff, “The Triple Helix -- University-Industry-Government Relations,” 1.

Linear models that theorize innovations come from a predictable straight path from the laboratory to the patent office and into the market have been “superseded by evolutionary models that analyze the developments in terms of networks.”¹⁵⁸

Although the linear model seems quite unrealistic in its simple conception of innovation as a sequential flow starting from research laboratories and ending in the market, the view maintained control over the field until the relatively recent diffusion of the systems approach in academia. Many challenges have been cited in the literature, including a “complete absence of feedback paths.”¹⁵⁹ In contrast, the interactions between the three poles of the Triple Helix are multidirectional and complex.

An important implication from the Triple Helix mode of innovation is the change in perspective of the “production of research as an end in itself” to measuring “research utilization, especially across the academic–industry interface.”¹⁶⁰ Impact metrics, therefore, must go far beyond the number of patents registered, for example. Within the Triple Helix lens, the role of universities must be measured against the impact on industry, with an understanding of IP commercialization, for example. Etzkowitz and Leydesdorff argue that the “university can play an enhanced role in innovation in increasingly knowledge-based societies,” contrasting with the industry-centric perspective of the traditional NSI approach.¹⁶¹

The Triple Helix has been challenged by some scholars who claim it oversimplifies a multi-modal, multi-dimensional interactivity of many more than three factors in the innovation ecosystem. This has led to the development of the quadruple

¹⁵⁸ Etzkowitz and Leydesdorff, 2.

¹⁵⁹ Tiwari, “Public Procurement as the Demand Side Innovation Policy in India,” 166.

¹⁶⁰ “Introduction to Special Issue on Science Policy Dimensions of the Triple Helix of University-Industry-Government Relations,” 4–5.

¹⁶¹ Etzkowitz and Leydesdorff, “The Dynamics of Innovation,” 109.

and quintuple helix by Carayannis and Campbell, incorporating the dimensions of civil society and the environment into the model.¹⁶² In defining the civil society dimension, the authors include aspects of the public sphere such as culture and media, and their definition of the fifth helix specifically relates to the role the natural, ecological environment plays, a key area in more recent sustainable development discussions.

While there are undoubtedly other important actors in any innovation system, the fact remains that the university, industry, and government are three core elements that retain the bulk of the explanatory power. This study is more interested in the weight and relative roles of the three factors within a Gulf market context over the introduction of more variables into the framework. Furthermore, the relative weakness of civil society and lack of awareness of the ecological environment in the Gulf context would make these additional two dimensions less interesting to study as they would not yield much explanatory data from the interviewees. Finally, adding every factor into the model can be self-defeating as it makes the model less useful to understand reality.

The element that is understudied in the literature relating to the Triple Helix is the way this theory applies in emerging markets contexts, such as the Gulf. More specifically, the strong implied distinction between government and industry is less relevant in the case of Dubai, where the government plays an active role in the development of the private sector, as described further in Chapter 5 on the Dubai regional context. In addition, and perhaps most importantly, there is a gap in investigating the role of the university pillar of the Triple Helix in a region that does

¹⁶² Carayannis and Campbell, “‘Mode 3’ and ‘Quadruple Helix.’”

not have deep research institutions. Does the theory still have explanatory power in such environments? Are adjustments needed to make it more relevant?

One of the core pillars of the Triple Helix is an integrated entrepreneurial university, often modeled after institutions such as Stanford University or the Massachusetts Institute of Technology (MIT), but “research has found that a model design based on MIT worked less efficiently in different contexts with more average universities, different university policies and forms of funding such as those in Continental Europe.”¹⁶³ These questions will be addressed through the Dubai-based cases investigated in this study. In fact, the Triple Helix was selected as the organizing theory for this study because, as described in the introductory chapter, each dimension is substantially different in Dubai compared to the more typically studied Western contexts like Europe and the Americas. This, combined with the fact that the model is so widely recognized in the literature, guided the choice to anchor the research around the theory.

¹⁶³ Asheim, Isaksen, and Trippl, *Advanced Introduction to Regional Innovation Systems*, 30.

Chapter 3 | Conceptual Framework

The purpose of this chapter is to introduce the conceptual framework of this study, building upon the ideas presented in the literature review in Chapter 2. This study of Dubai's RIS is organized using the widely-cited Triple Helix framework, theorized by Etzkowitz and Leydesdorff,¹⁶⁴ characterizing the complex relationships between three key actors in the innovation system—government, industry, and university—and showing how they interact to produce “non-linear models of innovation.”¹⁶⁵ The chapter begins by first contextualizing the model to a Gulf environment, then the conceptual framework itself is presented, and finally each of the dimensions of the Triple Helix is examined with relation to the main scholarly arguments and the aims of this research.

Triple Helix in the Gulf

The unexplored area of academic research addressed by this study is how to apply the RIS framework within the context of the Gulf rentier (or post-rentier) economies, which substantially differ from their Western counterparts across all three dimensions of the Triple Helix. They are each taken in turn below with some initial observations as to the distinguishing factors of the Gulf, which are hypothesized to play a role in shaping the unique RIS under research in this study. These dimensions will be examined again in Chapter 5 as they pertain to Dubai specifically.

- 1) **Government:** First, the government plays an outsized role within the economy and society at large. Government decision making is highly centralized. Leadership can make fast, sweeping decisions and take

¹⁶⁴ Etzkowitz and Leydesdorff, “The Triple Helix -- University-Industry-Government Relations.”

¹⁶⁵ Etzkowitz and Leydesdorff, “The Dynamics of Innovation,” 114.

entrepreneurial bets on what directions to push the economy. By the same token, regulations are also centrally controlled, making it easier to effect regulatory changes quickly when needed. These governments tend to have an outsized role relative to the other components of the innovation ecosystems. They have significant budgets—derived from their natural resource wealth—to directly invest into building the innovation systems necessary to achieve the economic diversification they realize is essential to their long-term survival. As such, they take bold moves to invest in the requisite infrastructure, facilitate the attraction of top international talent, and establish business-friendly environments such as free trade zones to support the market entry of global companies.

- 2) **Industry:** Second, the types of firms most active in the innovation systems of these markets are either multinational companies that bring with them innovations developed in other countries or homegrown players that receive substantial support from the government, as described above. Cluster-based¹⁶⁶ industrial development strategies are favored. The relationship between industry and government is tighter, sometimes resulting in direct participation in the private sector through launching State-Owned Enterprises (SOEs) or their involvement can take the form of directing the private sector through setting ambitious objectives and convening the key players to share learnings. Firms in the Gulf are typically more risk-averse than their counterparts in more mature economies, owing to the dominance of traditional industries (many of

¹⁶⁶ Porter, “Clusters and the New Economics of Competition.”

which are run as family businesses), cultural factors including the social stigma of failure, and the relatively limited access to risk capital.

- 3) **University:** Finally, most universities in the Gulf are relatively new and do not yet produce the volume or quality of research or patents as the US or Europe, limiting the role of the university pillar of the Triple Helix. Companies seeking to innovate do not have a deep university ecosystem they can easily plug into and therefore need to invest into internal innovation capabilities or attempt international partnerships. Innovations are more likely to be imported than developed domestically. The local talent landscape fueling innovation is less mature, heavily relying on expatriates and is not supported by a robust research and development infrastructure. These countries have had to adjust, finding ways to compensate in the short term while building the research institutions that can take decades or more to take root.

Conceptual Framework

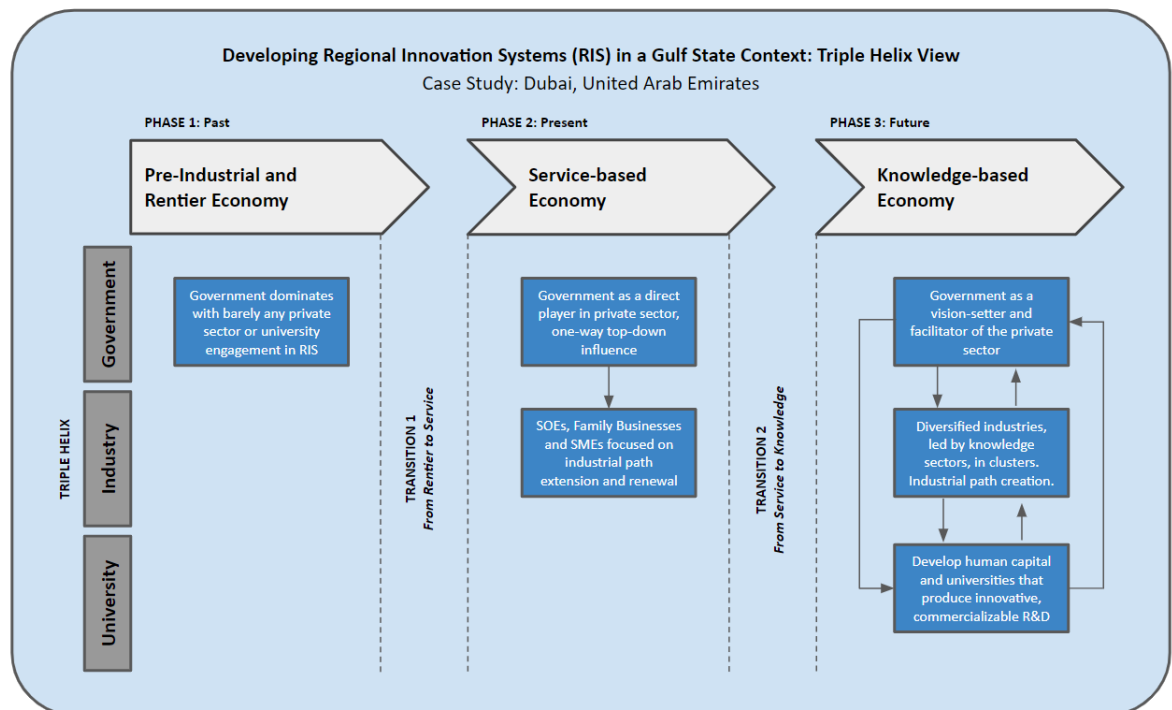


Figure 3.1 Visual Model of the Conceptual Framework

The conceptual framework above summarizes the author’s understanding of the literature on RIS, Triple Helix, and related disciplines as they apply to the context of Gulf rentier states transitioning from an oil-based to a knowledge-based economy. The specific regional case being examined as the basis of this study is Dubai, UAE, as it has made the most progress out of the Gulf economies towards effecting the full transition. While Dubai is currently undergoing the second transition into a knowledge economy, most other Gulf regions are still in the first transition into a service-based economy.

As described in the section above, Dubai’s journey towards developing a knowledge-based economy is represented in three phases. The conceptual framework depicts the first phase, “Pre-Industrial and Rentier-based Economy,” as dominated by the government dimension of the Triple Helix and the RIS is basically non-existent.

The industry and university dimensions are omitted from the framework as they are extremely underdeveloped at this stage.

The second phase, “Service-based Economy,” is characterized by the government taking a leading role in directing the private sector top-down or by directly running corporations through launching SOEs like DP World and Emirates Airline, examples of industrial path extension and creation, respectively. The industry diversifies with many SMEs in a few sectors and family businesses, supported by exclusive import contracts granted by the government to facilitate international trade, rise.

Dubai is currently in transition into the final phase, “Knowledge-based Economy,” where the Triple Helix is fully activated across its three dimensions and the RIS enables cross-pollination throughout all actors in the economy, in contrast to the primarily top-down flow from the previous phase.

Each of the three phases is shown to sequentially add one dimension of the Triple Helix, which represents the maturity of the RIS during the respective phase. The fact that the university component is absent in the first two phases does not mean that universities are physically missing; rather, it denotes the fact that the talent and academic research pillars are not the focus during that time. Similarly, the lack of an industry component during the first phase is representative of the fact that hardly any industrial activity existed prior to the discovery of oil, and after it was discovered, it dominated.

The research questions in this study are examined through four case studies from Dubai, United Arab Emirates, selected to understand the underlying RIS conditions that led to their success or failure. Two of the case studies focus on

“Transition 1: From Rentier to Service-based Economy” and two focus on “Transition 2: From Service- to Knowledge-based Economy,” as shown in the conceptual framework. By focusing on these two periods, insights can be derived into how the same government addressed the different challenges associated with these transitions, thereby shedding light on how RIS theory should be refined for a Gulf rentier context.

Research Overview

Through investigating four representative case studies found in Dubai, United Arab Emirates, the current study endeavors to answer the central research question: *How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems in a Gulf state context?*

From this central question, four sub-questions are asked to understand the Dubai context and each of the sub-components of the Triple Helix in further depth:

- *How effective has Dubai’s RIS been in fostering local innovation?*
- *What characterizes the Dubai government’s involvement in developing its RIS, and how successful has this approach been?*
- *What role does the industry play in developing Dubai’s RIS?*
- *How has relatively lower local R&D intensity impacted the development of Dubai’s RIS?*

This study selects one Gulf post-rentier region—the Emirate of Dubai in the UAE—to analyze as a case study and make a novel contribution to the innovation systems literature, enriching it to account for a more diverse set of contexts. In this research, the Dubai case will provide the lens through which three unresolved debates in the RIS literature will be examined.

Role of Government

The first scholarly debate addressed in this study is about the optimal role of government in building a successful System of Innovation (SI), particularly in the context of how innovation policies should be defined and by whom. In a multi-stakeholder SI, there is no doubt that governments must enact the selected policies in the end, but the way that these policies are formed is subject to discussion, anchored by two opposing viewpoints. The traditional stance, exemplified by Lundvall in the literature on National Systems of Innovation (NSI), assumes top-down government ownership of the learning process to implement the correct policies centrally.¹⁶⁷ When scholars such as Cooke et al. started to view innovation systems on a sub-national level,¹⁶⁸ a new perspective emerged: RISs that apply “non-neutral logics of resource allocation”¹⁶⁹ based on a discovery process that is derived from the experience of entrepreneurs in the market. The policy area of Smart Specialization (SS) introduced by Foray et al. to enhance the competitiveness of the EU compared to the United States, formalized the use of an Entrepreneurial Discovery Process,¹⁷⁰ a bottom-up surfacing of what market opportunities exist in each region, and became formally integrated into RIS in the RIS3 framework.¹⁷¹

Swinging the pendulum back the other way, Mazzucato re-invigorated this debate with her 2011 conception of a mission-oriented “entrepreneurial state” with the “state as catalyst, and lead investor, sparking the initial reaction in a network that will then cause knowledge to spread. The state as creator of the knowledge economy.”¹⁷²

¹⁶⁷ Lundvall, *National Systems of Innovation*, 89.

¹⁶⁸ Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems,” 475.

¹⁶⁹ Foray, “On Sector-Non-Neutral Innovation Policy,” 1.

¹⁷⁰ Foray, David, and Hall, “Smart Specialisation: The Concept,” 26.

¹⁷¹ Foray et al., *Guide on Research and Innovation Strategies for Smart Specialisation (RIS3 Guide)*.

¹⁷² Mazzucato, *The Entrepreneurial State*, 20.

Her arguments, however, have been the subject of substantial critique,¹⁷³ which will be discussed in further detail below. Whether or not top-down policy setting works in a Western economy context—and there is a robust debate in the literature¹⁷⁴ as to its efficacy even in this case—the impact of applying this same approach to Gulf regions such as Dubai is understudied.

One of the risks of setting top-down innovation policy and adopting the Mazzucato “entrepreneurial state” approach in a Gulf region context is the “picking winners” problem, with government bureaucrats rarely in the position to make properly-informed decisions about which specific innovations to support locally based on their potential economic impact.¹⁷⁵ In the shift toward developing innovation-driven economies, many governments have been taking a leapfrogging approach, attempting to import radical innovations from abroad in order to seed entirely new, high-growth industries—new industrial paths—with the hope that they will drive the same massive economic growth and diversification experienced in leading markets.¹⁷⁶ Again, these rarely work as they do not usually have a sustainable link to the fundamental economy and, in the Gulf context, end up perpetuating rentier state dynamics.¹⁷⁷

D.J. Storey first argued in 1994 that governments should not pick winners when designing entrepreneurship policy based on two reasons: 1) it is incredibly difficult even for venture capital professionals to accurately identify which firms will

¹⁷³ Karlson, Sandström, and Wennberg, “Bureaucrats or Markets in Innovation Policy? -- A Critique of the Entrepreneurial State.”

¹⁷⁴ Karlson, Sandström, and Wennberg.

¹⁷⁵ Autio and Rannikko, “Retaining Winners,” 42.

¹⁷⁶ Gaughan, Javalgi, and Young, “An Institutional Theory Approach to Improve Planning for Innovation and Entrepreneurship Ecosystems in Developing Economies,” 127.

¹⁷⁷ Ennis, “Between Trend and Necessity,” 138.

succeed, and 2) the government may inadvertently crowd out more viable alternatives when it prefers one firm over another.¹⁷⁸

Another approach to this challenge of government agents picking winners is proposed by Autio and Rannikko, who cite Shane and Acs when echoing the fact that “only a small proportion of new entrepreneurial ventures create the bulk of economic benefits—such as new jobs.”¹⁷⁹ They suggest a policy that “*retains* winners by applying a series of performance milestones” instead of trying to identify them pre-hoc.¹⁸⁰ Government agents can allow a broad set of ambitious participants at first, apply the milestones checks, and trigger the next level of support only after the milestones are achieved.

Addressing this question from another angle, sponsorship theory is a guiding framework that helps rationalize the most logical allocation of public resources in support of innovation systems. Flynn defines sponsorship as “a deliberate attempt to provide a significantly higher and more stable level of resources for new organizations” with the goal of supporting their creation and long-term survival.¹⁸¹

Flynn concludes that sponsorship is successful when supporting “the initial development of industries compatible with the local infrastructure”¹⁸² and “sponsorship that fails to consider the existing infrastructure may crowd out more effective usage of local resources.”¹⁸³

He offers several examples of the infrastructure conditions—such as the specialized talent needed to seed a biotechnology industry—to illustrate that no

¹⁷⁸ Autio and Rannikko, “Retaining Winners,” 44.

¹⁷⁹ Autio and Rannikko, 42.

¹⁸⁰ Autio and Rannikko, 43.

¹⁸¹ Flynn, “A Critical Exploration of Sponsorship, Infrastructure, and New Organizations,” 130.

¹⁸² Flynn, 145.

¹⁸³ Flynn, 135.

degree of government sponsorship can immediately overcome the challenge of missing the supporting conditions for a new industry to thrive. Flynn cautions “authorities against being overly zealous in trying to create new organizations without sufficient understanding of the existing physical, industrial, and socioeconomic infrastructure.”¹⁸⁴

This study extends Flynn’s sponsorship theory to the realm of RIS within a Gulf markets context, surfacing the same warning about avoiding a disconnect between the realities of the environment and the goals of sponsorship. Frontier innovations that require specialized talent unavailable in market and rely on government contracts because there is no local demand yet risk being an ineffective use of resources, as Flynn warned. This study examines the weaker elements of the Dubai RIS that need to be remedied so that investments from the public sector will be more successful.

Role of Industry

The second scholarly debate in the recent RIS literature revolves around the intersection between the fields of industrial path development and RIS, namely, how should different regions decide what types of industrial path development to pursue? The options range on a spectrum from path extensions to new path creation, and the potential benefit of each approach depends on each region’s ability to execute on it—the effectiveness is highly context dependent, both in terms of geography as well as developmental phase. This question has not been investigated in the literature in the context of a post-rentier Gulf region transitioning to a knowledge economy.

¹⁸⁴ Flynn, 135.

On the one hand, proponents of new path creation argue that the potential economic benefit of leapfrogging into the latest industries are so high that it is worth the risk of failure. In the frame of a well-financed rentier government supporting the growth of industry, there is a temptation to take the biggest bets and attempt to fashion entire industries from scratch, as experienced in Dubai when it created the aviation sector through its flagship brand Emirates Airline. This was a bold bet on a new industrial path which ended up anchoring one of the key sectors of the economy—tourism.

On the other hand, by supporting the development of industrial paths that leverage the economic sectors that are already deeply rooted in the local economy instead of trying to build radically new sectors, governments increase the likelihood of new venture success and, therefore, economic growth. By the same token, supporting ventures that build on existing, de-risked business models, governments increase the likelihood of their success as they have already been proven in other markets. What remains is the local incremental innovation to ensure the model is applied effectively to a new context.

Lerner is a strong proponent of the importance of connecting governmental support efforts to the private sector from the start, recommending to “let the market provide direction”¹⁸⁵ when deciding on how to distribute subsidies designed to stimulate entrepreneurial activity. This recommendation is especially relevant in a GCC context where governments are prone to single-handedly fund entrepreneurial development efforts without considering how they may be sustained by the private sector in the future.¹⁸⁶

¹⁸⁵ Lerner, “The Future of Public Efforts to Boost Entrepreneurship and Venture Capital,” 261.

¹⁸⁶ Ennis, “Between Trend and Necessity,” 116.

To further describe this point in detail, Lerner laments that “far too often, government officials have encouraged funding in industries [...] where private interest simply did not exist.”¹⁸⁷ Echoing these sentiments, Eisenberg suggest that governments “engage the private sector from the start”¹⁸⁸ when designing an entrepreneurial ecosystem support strategy. Researching the extent to which the Dubai government has aligned its entrepreneurial innovation support strategies with real private sector needs—and the resulting impact—is one of the outcomes of the empirical research proposed.

Unfortunately, the innovation valued by government bureaucrats rarely is the same as the innovation that creates actual economic impact. Part of this problem can be explained by agency theory— “separation of ownership from control [creating] interest alignment problems”¹⁸⁹—since these government agents do not usually have the requisite experience or incentive to decide which programs should be funded in support of innovation development in their countries. The result is policy and programs that have high public relations value but low economic impact.

Role of Universities

The third scholarly debate addressed in the present study is particularly important for regions applying RIS and Triple Helix models in a context without deep research institutions that feed locally developed innovations into the private sector. The mainstream assumption based on the experience of leading markets—and linking back to the foundational scholarship of Joseph Schumpeter in defining innovation as “new combinations”¹⁹⁰—is that successful radical innovations are the primary drivers

¹⁸⁷ Lerner, *Boulevard of Broken Dreams*, 13.

¹⁸⁸ Eisenberg, “How to Start an Entrepreneurial Revolution,” 44.

¹⁸⁹ Teece, “Explicating Dynamic Capabilities,” 1339.

¹⁹⁰ Schumpeter, “Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process.,” 84.

of economic growth and that policy efforts should be focused on generating more of these radical innovations, but some scholars question the universal applicability of such a prioritization. For example, Vyas found that the “remarkable economic success of Hong Kong entrepreneurs is attributed to incremental rather than radical change, technological followership rather than leadership.”¹⁹¹ This study will examine how context impacts the optimal role of R&D from universities in successful innovation systems and what this means for the university pillar of the Triple Helix as applied to a Gulf region transitioning to a knowledge-based economy.

Although there is converging consensus in recent innovation systems literature against the simple “linear model” of a sequential process from research to the market in favor of more complex “interactive learning as a basis for innovation,”¹⁹² the best way to allocate public resources in light of this fact is not universally agreed-upon. The implicit assumption in most of the literature is that regions have robust university systems that are able to effectively absorb funding and turn it into measurable outcomes, but as explained in the regional innovation paradox,¹⁹³ lagging regions that most need the positive effects of innovation are often the ones that are least successful at effectively utilizing government support and, ultimately, at commercializing Intellectual Property (IP). One way of addressing this challenge is through SS policy, as described above, allocating resources in a “smart” way, where they can be best absorbed, but what if the entire region is not currently capable of producing market-ready radical innovations?

¹⁹¹ Vyas, “Imitation, Incremental Innovation and Climb Down,” 109.

¹⁹² Lundvall, *National Systems of Innovation*, 98.

¹⁹³ Oughton, Landabaso, and Morgan, “The Regional Innovation Paradox: Innovation Policy and Industrial Policy,” 97.

Investigating the Gulf case presents a non-Western context where university-driven research is relatively weaker in terms of absolute quantity of output,¹⁹⁴ quality,¹⁹⁵ and commercializability of the resulting IP, but there is a willingness and ability to heavily invest into the innovation infrastructure. Through the Dubai case studies being examined in this study, the role of universities—and more broadly talent—will be explored to refine RIS and Triple Helix theories so that they take the Gulf context into consideration.

¹⁹⁴ “UNESCO Science Report: Towards 2030 - UNESCO Digital Library,” 443.

¹⁹⁵ “UNESCO Science Report: Towards 2030 - UNESCO Digital Library,” 446.

Chapter 4 | Methodology

This chapter addresses the methodological questions that underpin this research, beginning with a high-level discussion of my view of reality and the creation of knowledge. These foundational ontological and epistemological discussions lead to a presentation of critical realism as the guiding philosophy behind this research. This is then followed by a section on the mixed methods research design employed and the reasons for choosing the four cases selected for this research. The two primary types of research design—qualitative interviews and the quantitative survey—are next taken in turn, prior to a review of the approach to the research analysis itself, with a discussion of abductive analysis as the primary way insights are derived from the data. Finally, a section on my background, incorporating views on reflexivity, and a section on ethical considerations conclude the chapter.

Ontology and Epistemology

Before addressing the research design, it is appropriate to begin with a discussion of how I view the nature of reality and, as a result of that, the generation of knowledge. This section will provide an overview of ontology and epistemology in the context of the present study's research methodology and establish their significance within the chosen research philosophy: critical realism.

Ontology is the study of the nature of reality, dealing with questions related to the existence of entities and the relationship between the researcher and the researched phenomenon. Ontological assumptions inform researchers about the nature of the world they are investigating and guide their methodological choices. Conversely, epistemology is concerned with the study of knowledge and the nature of knowing. It examines the relationship between the knower and the known, focusing

on the role of the researcher in the process of knowledge production, the validity of knowledge claims, and the criteria for determining what counts as knowledge. For example, one extreme ontological view is seeing organizations through a positivistic lens, in which they operate like physical objects, governed by a universal single truth. This would lead to an epistemology that mirrors the physical sciences, heavily focused on capturing measurable data to “create law-like generalisations like those produced by scientists.”¹⁹⁶ This positivistic view of reality leads a researcher to leverage mostly quantitative research methods to seek out the universal laws that govern social phenomena. Positivists are also keen to “remain neutral and detached”¹⁹⁷ from the research to make sure they are not biasing the results because of their personal background. This pursuit of unadulterated data uninfluenced by the researcher’s own views is a hallmark of an extreme positivistic philosophy.

In the context of the present research uncovering the nature of how the multifaceted RIS functions in Dubai, such a rigid ontological approach does not lend itself to uncovering the nuance embedded within such a system. Furthermore, the researcher’s ability to ask probing questions and uncover new perspectives is precisely because of his involvement in the field, a topic discussed in depth later in this chapter under the topic of reflexivity. Although I do not fundamentally believe in relativistic views of reality, as promulgated by proponents of postmodernism as an ontological construct, I believe that the nature of reality is more complex than the basic positivistic perspective. For this reason, the philosophy I chose to guide this research is the stratified critical realism approach.

¹⁹⁶ Saunders, *Research Methods for Business Students*, 145.

¹⁹⁷ Saunders, 146.

Critical Realism

Whereas positivists take what they directly observe for granted and base their findings upon first order measurements of the world around them, critical realists explain reality in a more nuanced way. As a philosophical approach, critical realism seeks to uncover the underlying structures and mechanisms that drive observable phenomena.¹⁹⁸ This methodology provides a powerful framework for understanding the complex relationships between variables in the innovation process, as well as the interplay between cultural, economic, and political factors that shape the innovation landscape in the GCC region. It combines elements from both positivist and interpretivist traditions, asserting that reality exists independently of our perceptions, yet acknowledging that our understanding of this reality is inevitably filtered through our subjective experiences and interpretations.

Importantly, critical realists “embrace epistemological relativism,”¹⁹⁹ meaning that knowledge is necessarily situated within a context and cannot be summarily applied across geographic as well as historic contexts without adjusting for the differences. As the premise of this study is that the generalized RIS theories are not adequately explanatory for the Gulf context, this is an important baseline assumption. The use of critical realism methodology in this thesis consists of several stages, which are outlined below.

In line with the critical realist perspective, the data analysis employed to derive insights adopts a stratified ontology, which distinguishes between the empirical, actual, and real domains of reality. The empirical domain consists of observable events and experiences, the actual domain encompasses unobservable

¹⁹⁸ Bhaskar, *A Realist Theory of Science*.

¹⁹⁹ Saunders, *Research Methods for Business Students*, 148.

events that have real effects, and the real domain includes underlying structures and mechanisms that generate these events.

The analytical process involves retroduction, which is a form of reasoning that seeks to uncover the underlying structures and mechanisms responsible for observed patterns and relationships. Through a systematic comparison of empirical data and existing theoretical frameworks, I will identify potential causal mechanisms that can explain the uniqueness of RISs in a Gulf context. Retroduction is also known as abduction, which is explained in further detail in the case analysis section below as this study's primary method of analysis.

Critical realism also emphasizes the importance of reflexivity and critical engagement with the research process. This involves continually questioning and revisiting my assumptions, interpretations, and conclusions, as well as engaging with alternative perspectives and explanations that may challenge or enrich the emerging understanding of the phenomena under investigation. The proposed causal mechanisms will be elaborated into more detailed theoretical models, which will then be empirically tested using the collected data. This process will involve a continuous cycle of theory development, empirical testing, and refinement, aimed at enhancing the explanatory power of the emerging critical realist framework.

The final stage of the critical realism methodology involves integrating the refined theoretical models with the empirical findings, in order to produce a comprehensive and context-specific understanding of the factors influencing the development of the Dubai RIS. By employing a critical realism methodology, this thesis aims to contribute to the academic literature on RISs by providing a nuanced and context-specific understanding of the factors shaping innovation in GCC

countries. Moreover, the critical realist approach enables the identification of policy implications and recommendations that are grounded in both objective reality and subjective interpretation, thereby offering valuable insights for policymakers and practitioners in the region.

Methodologically, critical realism encourages the use of multiple methods and data sources to triangulate evidence and develop a richer understanding of the phenomena under investigation. In this thesis, I employ a combination of qualitative case studies and a quantitative survey to gather rich, contextually embedded data on the experiences and perspectives of participants in the RIS and the Triple Helix model. This data is then subjected to systematic analysis, with the goal of identifying key themes, patterns, and relationships that can shed light on the underlying structures and mechanisms shaping the development of RIS and the Triple Helix model in a Gulf state context.

Mixed Methods Research Design

This study initially employed a qualitative, case-based approach and later evolved into a mixed methods approach by incorporating a quantitative dimension through a firm-level innovation survey. This section outlines the rationale for prioritizing qualitative interview data and explains the addition of a quantitative element.

As the primary goal of this research is to develop a nuanced understanding of *how* RISs operate in a Gulf context, the primary method selected at the outset was a qualitative approach through interviews of the key individuals within organizations that play a central role in fostering the RIS itself. The mixed method offers several advantages for this study, ranging from theoretical to practical considerations.

Theoretically, as highlighted by Robert Yin in his seminal work on case methodology, the strength of this approach lies in its ability to “*explain* some contemporary circumstance” and answer questions that require an “‘in-depth’ description of some social phenomenon.”²⁰⁰ RIS research tends to be more suited to a case approach, as the exploration of various factors contributing to the system's formation and operation varies significantly across contexts.

Moreover, compared to other potential methods used in social science research, the mixed method design appears most appropriate for this study. Although some historical information is available for the two older cases, DP World and Emirates, the research questions in this study are too specific to be addressed by existing literature alone. Speaking directly to decision-makers provides unique insights and a novel edge. Furthermore, a purely quantitative approach or experiment would not offer the necessary nuance for understanding the complex dynamics at play.

From a practical standpoint, publicly available data and history are scarce for even the most well-known cases in Dubai, such as Emirates Airline, and some sources may lack objectivity. An interview-based case approach leverages the my advantage in obtaining unique insights through pre-existing relationships and privileged access within the business community, enabling access to decision-makers who might otherwise be difficult to reach.

The lack of publicly available data in the Middle East, and the GCC in particular, poses challenges for research. If a firm-level innovation survey with available results had already been conducted, there would have been no need for this

²⁰⁰ Yin, *Case Study Research and Applications*, 4.

study to administer its own survey. Conducting a survey helps triangulate results across methods, increasing confidence in the findings.²⁰¹

Case Selection Method

Having established the logic for utilizing mixed methods for this research, it is now important to discuss the reason for selecting the four Dubai cases that form the basis of this research.

As described in the introduction, the four cases selected for this study are divided into two categories—*Rentier to Service* and *Service to Knowledge*—based on when they were established during Dubai’s history and the roles they have played in diversifying the economy. The cases of DP World and Emirates Airline lay the foundations for the logistics and aviation sectors, respectively. These were chosen as they represent two of the most critical industries for Dubai, feeding other secondary sectors that have emerged since, such as tourism and retail. DP World has its origins in Port Rashid, the anchor of Dubai’s early economy before it was even a part of the United Arab Emirates. Emirates grew out of the ambitious plans by Sheikh Rashid to extend Dubai’s role in connecting the world from the seas into the skies through the opening of an airport in 1960. By 1985, the vision grew under his son Sheikh Mohammad Al Maktoum, and flagship carrier Emirates Airline was launched. Emirates has become synonymous with Dubai itself, so selecting it as a case study to represent the *Rentier to Service* phase was only logical. Although the study is anchored in the historical role these two entities played in developing service industries, since they are still operating and innovating today, their latest advances

²⁰¹ Saunders, *Research Methods for Business Students*, 185.

towards a knowledge economy will also be investigated as an additional dimension alongside the two core cases below representing this next phase.

The two cases selected to represent the *Service to Knowledge* phase—Dubai Internet City (DIC) and Dubai Multi Commodities Centre (DMCC)—are both government projects to build entire industries as a cluster within an economic free zone. Selecting the free zones themselves instead a single company within these zones was a way to achieve a broader perspective and facilitates a closer look at the governmental impact on the RIS in Dubai, one of the critical differentiators this study is interested in exploring. In addition, I had privileged access to both of these entities through his work developing the technology ecosystem in Dubai, which facilitated unique access to the most senior leadership of these organizations.

Just as cases are paired based on their phase during Dubai's history of economic development, there are similarities which cross-link them on a secondary level. DP World and DMCC represent industrial path extensions of the existing shipping and gold trading industries that had deep historical roots in Dubai, whereas Emirates Airline and DIC represent industrial path creation of entirely new industries that never existed. Including two examples of each of these categories within the research is a further reason why these cases were selected.

It is important to note that the four cases comprise two government entities and two private sector companies, albeit ones that are ultimately owned by the Dubai government. This reflects the dominant role that the government plays in Gulf economies generally, and Dubai shares this trait with the rest of the GCC, especially for the major players in the economy. Realizing that the voice of non-government related organizations was missing in the qualitative data, the Community Innovation

Survey was deployed to SMEs in the DMCC free zone as a way to collect quantitative data on the state of firm-level innovation within SMEs in Dubai.

The cases are presented in chronological order, starting with DP World, as it has its formal origins as the Port Rashid Authority founded in 1972. Emirates Airline is the next case presented, founded in 1985. These two cases are paired, as described above, and contrasted with the cases of DIC and DMCC, inaugurated in 2001 and 2002 respectively.

Two pairs of cases (paired both in terms of historical context as well as industrial path development), offer redundancy when extracting insights and address the concern of uniqueness in single-case studies.²⁰²

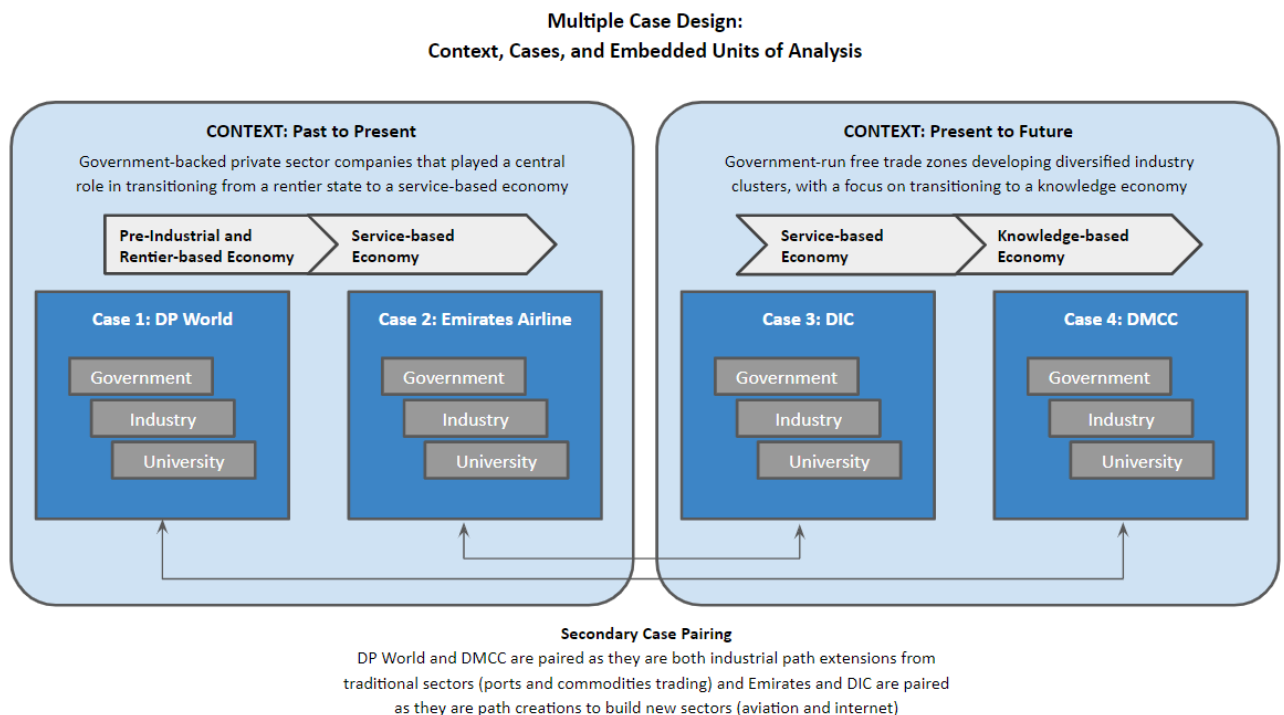


Figure 4.1 Multiple Case Design: Case Pairing Diagram

²⁰² Yin, *Case Study Research and Applications*, 62.

Qualitative Interviews

Data Collection

As I had lived in Dubai for a decade prior to commencing this study and was active in the business community, I had privileged access to business leaders based on personal relationships, critical in an environment like the Gulf. These personal relationships opened doors to individuals such as a member of the UAE royal family instrumental to the growth of Emirates Airline, His Highness Sheikh Majid Al Mualla, one of the early team members that built the company and an active member of the current senior executive team. The other critical pre-existing relationship was with UAE Minister of State, His Excellency Mohammed Al Gergawi, architect of Dubai Internet City and leading voice behind Dubai's drive towards becoming an innovative knowledge-based economy. Anchoring with interviewees of this seniority lent the study itself credibility in the eyes of prospective interviewees, which was important in a region not accustomed to these types of academic studies.

Despite the senior relationships and industry credibility I brought to the table, it was more difficult than expected to convince subjects to participate in this study. Where a personal introduction was not possible, I used techniques such as messaging through the online LinkedIn professional network or sending cold emails directly to the intended interviewee explaining the research and requesting participation. Although some responses came through these channels, the preferred method was through direct personal introductions through my business network. This may partially explain why so little research of this type has been conducted; the barriers to entry are high for researchers to recruit participants.

Interviews were conducted primarily in-person using a voice recorder and some were conducted over videoconferencing technology whenever the interviewee was not available for an in-person discussion. Face-to-face discussions were always prioritized in order to build rapport and trust, as these were often first meetings. Even in the case of a pre-existing relationship, such as Bashar Kilani from IBM (Dubai Internet City case) and Ahmed bin Sulayem from DMCC, the in-person discussion over coffee created a more relaxed environment and spurred a longer and more multi-faceted discussion than other shorter, more formal online discussions such as the interviews with Rashid Abdulla and Franco Bosoni (DP World). Although all interviews were conducted primarily in English, many of the conversations mixed Arabic with English, depending on the comfort level of the interviewee. All interviews were fully manually transcribed and translated into English whenever necessary. Interviews typically were scheduled for one hour and oftentimes ran over based on the quality of the discussion and the availability of the interviewee.

Consent was obtained from each of the interviewees prior to the scheduled session to audio record the interview and to use their names explicitly, as well as quoting their recorded statements, in the context of this research. This has provided me with a rich base of over 150,000 words of transcribed interview content from which to derive insights into the unique nature of the Dubai RIS. Many of these interviewed individuals have never been on the public record, and for the more prominent public-facing figures, the interviews provided an opportunity to delve into sides of the story not otherwise available.

To better understand the historical conditions surrounding the launch and development of each of the four case studies in this research, archival research was used to complement the primary source of human participants through interviews and

surveys. As with secondary economic and survey data, the challenge in the Gulf is that public data sources are not readily available and local newspaper archives are not indexed online. After inquiring with all the major newspapers in the country through a process that took several months, I was able to identify one that had archives accessible to researchers and a long enough history on file (since 1978). I visited the headquarters of *Gulf News*, one of the oldest English-language newspapers in region, to search the on-premises archives on multiple occasions. This archival research uncovered the news stories announcing the launch of each of the four cases, with commentary as to the original vision and some follow-up articles regarding the evolution of the entities over time. On average, I identified approximately ten key articles per case study and used these articles when framing the historical context for each case. As these are not available in the public domain, scans of the key articles have been included in Appendix B, and some clippings are embedded in the case studies themselves, where appropriate.

Semi-structured Interview Format

As almost all the interviewees selected for this study were senior executives with extremely limited availability in their schedules to participate in academic research, interviews were scheduled for one hour and were conducted in an efficient manner to address the study's main areas of inquiry. That said, four of the key interviews of this research with the most senior individuals at the entities studied were extremely generous with their time and extended the scheduled hour into deep conversations that spanned one and a half to two hours each: Mohammed Sharaf (ex-CEO, DP World), HH Sheikh Majid Al Mualla (Senior VP, Emirates), Ahmed bin Sulayem (CEO, DMCC), and HE Mohammad Al Gergawi (Founding Chairman, DIC and current UAE Minister of State). These served as the anchor interviews for the

four cases, both in terms of their seniority with regards to the entities being studied as well as based on the depth of the discussion. Several others also extended beyond the allotted time, and a few had to be completed in an even shorter timeframe, owing to their work commitments and the lack of a prior personal relationship with me. For this reason, the average time across all of the interviews was about one hour per interview, which was enough time to address all of the critical areas of inquiry.

As outlined by Yin when addressing interviews as a key source of data for case studies, shorter case interviews can still be highly effective when the interviewee follows a protocol more closely and is efficient with his time during the unstructured interview.²⁰³ A semi-structured interview format based on the core areas of inquiry was followed to keep the discussion informal and allow for natural interjections. The primary topics covered during the interviews were: 1) personal background and relationship with the entity studied, including roles and responsibilities, 2) role the entity itself played in fostering an innovation ecosystem in Dubai, 3) role the relationship with the government played in enabling innovation, 4) role the relationship with industry played in enabling innovation, 5) role research and development as well as specialized talent played in facilitating innovation, 6) examples of innovations that the entity brought to market, and, finally, 7) any other topics that were not formally addressed relating to innovation and the research at hand.²⁰⁴ Asking the last open-ended, reflective question often extended the interview beyond the scheduled time and surfaced some of the most interesting insights, so this was an important practice throughout the study.

²⁰³ Yin, 119.

²⁰⁴ See Appendix E for a sample list of interview questions.

I conducted the interviews in a casual, conversational style, cognizant of the fact that I sometimes framed the questions cited in Appendix E in a way that was slightly leading in nature. As discussed in the section on researcher reflexivity below, I approached this study as an insider; my views influenced the entire process, from the framing of the research questions to the selection of the cases and interviewees, all the way to the way I have analyzed the data to derive conclusions. Accordingly, I decided to surface some of my knowledge of the organizations studied when asking about the ways the interviewees fostered innovation both personally and as an organization, as I knew they were all involved in that process to some degree and would share more useful data if prompted accordingly. Furthermore, I prompted the interviewees to cite both positive as well as negative aspects about the roles of government, industry, and academia in developing the innovation system. The semi-structured, conversational format made it more difficult to read very neutral, standardized questions without breaking the flow of the conversation. I believe that the benefit derived from the free-flowing style of the conversation and the resulting frank data surfaced outweighed any potential benefit of completely neutral questions.

Interviews Conducted

This study targeted conducting at least five interviews per case to ensure enough perspectives were gathered and saturation of data was reached regarding the research questions being investigated. The most important variables optimized during interviewee selection were 1) seniority of the subject's role, 2) tenure at the company, and 3) ability to provide insights into the innovation system questions being posed in this research. An initial target list was compiled based on these factors, including both aspirational targets as well as ones that were easier to reach.

Over the span of 18 months, through a combination of direct personal contacts, second-degree introductions, and cold message requests, six to seven interviews were successfully conducted for each case, with a total of 25 interviews completed across the study. Although it was possible to conduct even more interviews, the decision was taken to stop data collection at this point since all three variables listed above were sufficiently covered and the people with the most intimate knowledge of the questions posed had been included. The number of senior executives with organizational decision-making authority reached exceeded initial expectations, particularly because these individuals do not usually partake in academic research and are much more difficult to reach and find time in their diaries. The responses started repeating across interviewees within each case, and saturation was reached.

Importantly for the historical context, among the interviewees were firsthand witnesses of the formative years of all four cases. Abdul Aleem started at Emirates Airline the year the company launched in 1985, handling domestic sales in the Northern Emirates, and Sultan bin Sulayem joined DP World in 1982 when it was a still a local port operator, before it began its transformation into a global logistics player. HE Mohammad Al Gergawi and Ahmed bin Byat were the founding Chairman and CEO, respectively, of Dubai Internet City, from the time it was still an idea, prior to its official announcement in 1999. Finally, Ahmed bin Sulayem was part of the DMCC from its inception, holding the Executive Chairman title for many years until he also undertook the CEO role in 2019. Just as there is strong coverage of each of the origin stories, about half of the interviewees are still currently at the organization being researched, with current insights to contribute to the study.

Academic research in business is rare in the Gulf and so gaining access to interviewees willing to share their perspectives on the organizations they work at was a challenge. This was particularly the case for interviewees that were not at the top of their organizations as they worried about having the permission to share their views in the context of academic research. I was explicitly told by many perspective interviewees that they would prefer not to speak about their views, even if the data were anonymized. Many others likely did not respond to my outreach to be interviewed because of the same concern.

As described earlier, I leveraged my existing relationships and reputation in the business community for the decade prior to commencing this study to convince the main interviewees to participate, and then they opened doors to other people within their organization. Although it was extremely beneficial to have such senior interviewees who could reflect on the entire history as well as all of the parts of the organization, it is important to note the methodological limitation that this approach introduces to the study: they could introduce positive bias into their responses because they represent the organizations being studied. The subjects interviewed have a vested interest in projecting a positive perception to others about their own roles as well as the Dubai story as a whole. As such, the findings must be weighed with this positive bias in mind.

Furthermore, I considered anonymizing the interviewees but opted not to do so for the following three reasons. First, since the organizations themselves must be identified in order to contextualize their position within the Dubai economy and draw deeper insights into the formation of the innovation system, it would have been obvious who many of the interviewees were when revealing just a title or role. This would have negated any benefit of interviewee anonymization. Second, these senior

interviewees are always “on the record,” and would not have changed their answers in any meaningful way if they knew that the responses would be anonymous (partly because they realize the difficulty in ensuring the words are not attributed to them, as described in the first point). Finally, there is a clear benefit to the research to know what the founders and leaders of the organizations examined think about the questions at hand, and sharing these perspectives for the first time in the academic literature is an important contribution of this study, especially since all of the interviewees readily consented to being recorded and quoted directly for this research.

The decision to select such senior interviewees who always consider themselves to be on the record and are integral parts of the Dubai story being critically examined has drawbacks in terms of the bias introduced to the data accuracy. Naming them explicitly could also further deepen this bias. This made it more difficult to extract criticism about the government’s approach from the interviewees beyond the common sentiment that there has been an underinvestment in local universities. As described in the conclusion, an important area for further qualitative research is complementing this senior-level study of Dubai’s RIS with an empirical study of smaller organizations and less known business leaders with anonymized data. This study benefits from the quantitative survey data as a secondary source with less of this type of bias since responses to the survey are all anonymized and the firms studied are much smaller, not the flagship Dubai brands. It is reassuring that the survey results align with the interview data in terms of the innovation performance of Dubai, showing that the data accuracy bias introduced by approaching such senior interviewees and naming them has been controlled.

What follows is a directory of all interviewees, who, as explained above, consented to being recorded and cited by name in this study.

Case 1 Interviewees: DP WORLD	Title (Terminal)	Tenure at DP World
HE Sultan bin Sulayem	Group Chairman & CEO	1982-Present
Dr. Mohammed Sharaf	Group CEO	1992-2016
Yousif Almutawa	Chief Information Officer	2009-2016
Rashid Abdulla	CEO and MD for Europe	1995-Present
Anwar Wajdi	SVP Corporate Strategy	1992-2016
Franco Bosoni	Product Development Manager	2020-Present

Case 2 Interviewees: EMIRATES AIRLINE	Title (Terminal)	Tenure at Emirates
Adnan Kazim	Chief Commercial Officer	1992-Present
Dr. Nejjib Ben-Khedher	Chief Information Officer (Interim)	2012-Present
HH Sheikh Majid Al Mualla	Divisional Senior VP, International Affairs	1996-Present
Keenan Hamza	VP Technology Futures & Innovation	2019-Present
Neetan Chopra	Senior Vice President, IT Strategic Services	1995-2018
Saleh Makouk	Head of Innovation	2008-2022
Abdul Aleem	Senior Sales Executive	1985-2020

Case 3 Interviewees: DUBAI INTERNET CITY	Title (Terminal)	Tenure at Dubai Internet City
HE Mohammad Al Gergawi	Chairman	1999-2004
HE Ahmad bin Byat	CEO	1999-2002
Malek Al Malek	Group CEO	2002-Present
Majed Al Suwaidi	Managing Director	2006-Present
Hasnaa Kebouri	Senior Consultant	2001-2007
Bashar Kilani	Region Executive - Middle East (IBM)	1995-2021

Case 4 Interviewees: DMCC	Title (Terminal)	Tenure at DMCC
Ahmed bin Sulayem	Executive Chairman & CEO	2001-Present
Gautam Sashittal	CEO	2009-2019
Malcom Morris	CEO	2009-2014
Ahmed Hamza	Executive Director Free Zone	2012-Present
James Bernard	Director of Business Development	2006-2022
William Skidmore	Consultant	2018-Present

Table 2 All Interviewees Across Cases

Quantitative Survey

History of the CIS Survey

The questionnaire deployed to firms in the DMCC community was modeled after the internationally respected Community Innovation Survey (CIS) to create a dataset that can reliably compare Dubai to other geographies. The method for conducting these surveys is outlined in the Oslo Manual, a document created by the OECD, European Commission, and academics to enable a unified approach to measuring firm-level innovation across European regions. This approach became a de facto global standard and spread to many countries outside of Europe, such as Canada, Australia, New Zealand and South Africa. The first harmonized CIS surveys were deployed in 1992 across 14 countries, although methodologies in each geography ended up being slightly different due to different national priorities. The initial priority in CIS 1 was technological innovation, focused on the manufacturing sector.

CIS evolved by 1996 with the introduction of CIS 2, guided by the second edition of the Oslo Manual, and adding for the first time service innovation to the fold. The survey continued to be refined over the years with CIS 4 in 2004 guided by the 3rd edition of the Oslo Manual and included non-technological innovation (e.g., organizational). Finally, CIS 2018, guided by the 4th edition of the Oslo Manual, is what has guided the formulation of questions in the survey used in this study (a form sample is available in the appendix). Two types of innovations are measured—product and process—along with innovation activities, expenditures, and funding.

The CIS served as an ideal questionnaire to deploy in Dubai as it has already been rigorously scientifically tested across geographies and no such survey had been

previously performed in the Gulf, leading to a novel dataset to enrich the present study of innovation in Dubai.

Deploying the Survey at DMCC

As there is no public directory of local companies easily accessible to researchers, the only way to deploy a larger-scale survey to firms in Dubai is to do so in partnership with the government. The bureaucratic challenges of obtaining the right approvals to conduct such a survey, however, are significant. For this reason, I elected to focus on one of the cases, the DMCC free zone, which is semi-autonomous in its operations. As I had a pre-existing relationship with the Executive Chairman and CEO, Ahmed bin Sulayem, an approval was obtained to run this survey and access was given to a subset of DMCC companies so that over 100 responses could be achieved.

Since the DMCC free zone licenses companies across the spectrum of economic activities, the pool is representative of Dubai as a region. This is unique, as all other free zones focus on a sector, like technology in DIC for instance. Most DMCC companies are micro-sized (less than five employees) and do not have substantial operations in Dubai. A subset of companies with five or more employees was selected as the target sample and the DMCC team helped generate a list of 1,000+ target companies.

Responses and Statistical Significance

Obtaining 105 responses was a three-month long process, from August 26, 2022 to November 24, 2022. During this period, 1,131 companies were emailed multiple times and then followed up with phone calls to explain the importance of the survey and obtain a commitment from the firm's leadership to fill out the online

survey. 530 firms of which committed to filling it out, but in the end many of these commitments only turned into partial survey responses, which were not usable for this study. In the end, 105 full survey responses were recorded, a 9.3% response rate.

Assuming a 95% confidence interval, a sample size of 105, and a population of 1,131, the margin of error for this survey is +/- 9.11%. Ideally, the survey would have recorded over 300 responses, which would have given the results a sub 5% margin of error, but, as described above, this was the best result which could be obtained given the constraints of time and the level of cooperation from the firms, which are not used to filling out surveys in Dubai. This margin of error will be taken into consideration when analyzing the findings from the survey in Chapter 10. Despite a higher margin of error, the fact remains that the survey is unique in its scope and has revealed beneficial insights into the state of innovation in Dubai, helping answer the first research sub-question.

Research Analysis

Structure of Research Analyses

Each case begins with a discussion of the historical context relevant to the organization, both in terms of the broader industry in which it operates as well as the establishment of the entity itself. The relative importance of the case in building the innovation ecosystem of Dubai is addressed to help explain why the case was chosen.

With this context, a brief background on the subjects interviewed follows. This lays the ground for the main analysis, which is structured around the three dimensions of the Triple Helix, framing the study's central research question: the roles of government, industry, and universities. An additional section on examples of innovations concludes this section.

After presenting all the data, the next section asks what can be learned from the case, and these main insights are outlined. Finally, once each case has been analyzed independently across the core research question dimensions in separate chapters, a concluding chapter is presented that integrates findings using cross-case analysis. Here the key themes are addressed once again, with generalizable conclusions drawn based on the evidence presented from each of the cases and linking these insights to the literature.

Research Analysis Method

The analytic technique used to derive findings from the four cases in this study is *explanation building*, a subset of the *pattern matching* technique, best known for its relevance in a multiple case context when the researcher's goal is "to build a general explanation that fits each individual case, even though the cases will vary in their detail."²⁰⁵ The explanation building technique begins with a hypothesis that initially guides the research. This proposed theory is compared to the findings of the first case and then revised based on empirical evidence collected. The process is repeated across each of the cases, until a final proposed theory emerges that is satisfactorily explanatory across all the cases.

When asking how RISs function in a post-rentier Gulf context, this study begins with high-level hypotheses across each of the dimensions of the Triple Helix and uses the four case studies to check and refine these hypotheses. The novelty in this research is the explanation of how Dubai's RIS differs from other non-Gulf models proposed by other researchers in the years since RIS first emerged as a theory.

²⁰⁵ Yin, *Case Study Research and Applications*, 180.

The explanation building method combines a deductive approach, anchoring with an initial hypothesis, with inductive reasoning, incorporating the data from the cases themselves to build an explanatory theory. This case analysis method lends itself well to the abductive approach, as described in the section below.

Abductive Analysis

Abductive analysis, employed in this thesis, is an approach that combines inductive and deductive reasoning to explore complex phenomena and develop new theoretical insights. In the context of this study, abductive analysis is utilized to systematically examine empirical data from the four case studies to derive the unique factors that characterize a Gulf RIS. “Abduction in scientific research is a logic that organizes the process of coming up with a new hypothesis based on surprising research findings.”²⁰⁶

When deciding how to conduct the research analysis, I opted to use Braun and Clarke’s thematic analysis as the method that most closely aligns with the critical realist, abductive approach to this study. I followed the six-step process they outline to conduct an effective thematic analysis in their seminal paper, “Using Thematic Analysis in Psychology.”²⁰⁷ First, I re-read the transcriptions of the recorded interviews across an entire case, approximately six interviews worth of content per case, to remind myself of the breadth of the discussions and start noticing some patterns. Second, I subjected these interviews to coding, which, per Braun and Clarke, can be either “data-driven” or “theory-driven.”²⁰⁸ Aligning with my critical realist approach and the fact that the research is anchored in the Triple Helix model as a

²⁰⁶ Timmermans and Tavory, *Data Analysis in Qualitative Research*, 3.

²⁰⁷ Braun and Clarke, “Using Thematic Analysis in Psychology,” 87–93.

²⁰⁸ Braun and Clarke, 88.

guiding framework that informed the core research questions, I elected to use a theory-driven approach to coding. Most of my coding is marking when each of the interviewees addresses each of the three dimensions of the Triple Helix, allowing me to then derive themes from each of these areas across the cases. After completing the coding across all 25 interviews, I engaged in the third step, which was searching for themes across the data. In this step, I re-read all of the data organized by code instead of interviewee, making notes whenever topics were repeated. This led to an initial, draft list of themes per case study. The fourth and fifth steps were reviewing the themes and then naming them. This is when the abductive approach of going back and forth between the source data and the derived themes was helpful to hone the findings and refine the naming of themes, especially across the four organizations studied. I then proceeded to the final, sixth step, which was producing Chapters 6-9 to outline all of these themes and put them into context.

To aid in conducting this type of thematic research analysis, I employed a qualitative analysis software tool, NVivo 12, to organize the interview transcripts and enable investigation across cases along nodes that correspond to the main topics being researched. After uploading all interview transcripts and creating nodes to summarize the main areas of inquiry, I highlighted sections of each interview based on the node it addressed to build a cross-case view of the most relevant themes and assist in the discovery of insights.²⁰⁹ In addition to this deductive approach, new codes were added to the initial set while analyzing the interview data in an inductive manner.

²⁰⁹ See Appendix A for screenshots of the nodes used and sample coding of the interview data.

Subsequently, I compared the concepts and relationships identified through the coding with existing theoretical frameworks in the literature on RIS and the Triple Helix model. This comparison allows for the assessment of the extent to which the empirical findings can be explained by existing theories and the identification of any gaps or inconsistencies that may require the development of new theoretical insights.

Based on the comparison with existing theory, I engage in abduction, a process of creative and iterative reasoning that involves generating new theoretical concepts and relationships that can better account for the empirical observations. Abductive analysis thus enables me to move beyond the confines of existing theories and develop new insights that are grounded in empirical data.

Finally, the new theoretical insights generated through abduction are subjected to further scrutiny and validation. This step involves revisiting the empirical data to assess the extent to which the new concepts and relationships can explain the observed patterns and relationships, as well as comparing the new insights with existing literature to assess their theoretical plausibility and coherence.

By employing abductive analysis in this thesis, I aim to generate novel theoretical insights into the development of RIS in a Gulf state context, offering a more nuanced understanding of the factors that shape innovation and collaboration in the region. This methodological approach has the potential to contribute significantly to the existing body of knowledge on RIS and the Triple Helix model, addressing gaps in the literature and providing valuable insights for policymakers and practitioners.

Researcher's Background

I am a Dubai-based entrepreneur practitioner turned academic. I studied business at the Wharton School of the University of Pennsylvania as an undergraduate and subsequently continued my studies at the Stanford Graduate School of Business. Upon completing my MBA in 2010, I moved to Dubai to participate in the development of the city and became an active part of the business community, in several roles relevant to this study.

After a year working as a consultant at McKinsey & Company, I co-founded one of the early venture-backed internet startups in the MENA region, Namshi. This eCommerce platform grew from a few people to over 100 employees in less than two years and eventually was sold to Emaar Malls in one of the largest tech company acquisitions in the region's history, marking one of the first major exits in the tech ecosystem. At Namshi, I experienced firsthand the journey of launching an innovative company in Dubai and sensed the coming wave of startups about to take flight soon thereafter.

Based on this experience, I co-founded my next company, AstroLabs, which is a tech ecosystem builder for the MENA region. AstroLabs has been supporting high-growth companies with their expansion into the Gulf for over a decade, giving me unique insights into the challenges and opportunities of the Dubai RIS. In my capacity as Founding Partner of AstroLabs, I have interfaced with government representatives, local universities, and industry players from small startups to multinationals. The relationships I built since 2010 through my work in Dubai has facilitated access to a uniquely senior set of interviewees, as explained in the section above. Furthermore, my experience in the field, coupled with a deep dive into the relevant academic

literature, sparked the questions that led to this study in a way that would be difficult to attain without such practical experience.

This same experience that sparked my interest in the academic field and helped me narrow down my focus to the questions laid out in this study has drawbacks in terms of bias and subjectivity, which I address below. My professional background and resulting pre-formed perspectives on Dubai's innovation landscape could shape the data collection, analysis, and interpretation process. It is crucial to recognize that my preconceptions and assumptions played a role in the development of this study's research questions, the selection of many of the participants based on previous business relationships, and interpretation of the data.

An important first step is recognizing that the researcher's background introduces a level of bias into the study and highlighting this fact transparently to the reader in a method to protect the study's validity known as researcher reflexivity. That is the primary reason for including this "Researcher's Background" section. Furthermore, triangulation is an important way to ensure key findings are consistent, both in terms of empirical data collection as well as through the theoretical lens. This study incorporated redundancy in terms of the number of organizations examined (two pairs of two cases), as well as the methods used (mixed combining qualitative and quantitative). The interviewees selected were able to shed light on the same questions from different vantage points in time and position within the entity being studied, providing another layer of triangulation of data. Furthermore, the theoretical framework rests on the well-established Triple Helix model as well as the broader RIS literature. Although there are some drawbacks to being entrenched in the field being researched, on balance, the advantages far outweigh the potential negative impact in this case.

It is widely documented that pre-understanding can afford researchers distinct benefits such as the ability to “ask better research questions, deal with and evaluate existing literature in a more informed way, and design and conduct empirical work in more original and appropriate ways.”²¹⁰ Knowledge of the way the innovation system in Dubai functions, particularly which dimensions may be most different from regional systems in Europe or North America, informed the selection of the Triple Helix as an overall theory from the literature to frame the central research question. The design of the methodology in terms of which cases were selected as well as the ability to run a unique firm-level innovation survey were also the result of my background in the field.

I have not endeavored to remove myself from the analysis nor pretend that I am a dispassionate neutral observer; my experience as a practitioner in the field has helped me select organizations to study that would reveal the most useful data to answer the research questions at hand, select the right individuals to interview within these organizations, ask more insightful questions during the interviews and make the connections needed to surface the surprising findings through the abductive approach. I embed myself into the analysis by explicitly bringing this practical experience to the interviews, which had the effect of encouraging the interviewees to share deeper insights since there was a common practical understanding of the topic between us.

For all the benefits pre-understanding and pre-existing local relationships afford this type of academic research, the drawbacks are also well-documented and have been closely considered in the design of this study. Researchers with such an entrenched background in the field can get “caught in a framework naturalizing a

²¹⁰ Alvesson and Sandberg, “Pre-Understanding,” 5.

specific way of seeing things, share taken-for-granted views of informants and/or within the academic subtribe and, thus, be inclined to reproduce institutionalized ‘truths’.’²¹¹ To address these concerns, I have strived to maintain reflexivity throughout the research process and engage in constant self-evaluation to minimize the influence of my positionality on the study's outcomes. The fact that the main finding of the study was a surprise to me, as described in detail in the conclusion chapter, is one indication that these attempts at minimizing the impact of my incoming assumptions on the results were successful.

Ethical Considerations

Ethical considerations are essential in conducting research, especially when it involves human participants. This study regional innovation systems in a Gulf context is committed to upholding ethical principles and guidelines to ensure the protection of participants, the credibility of the research, and the researcher's integrity.

One key ethical consideration addressed in this research is informed consent. Prior to data collection, participants were provided with detailed information about the research, its objectives, and potential implications. They were informed about their rights to participate voluntarily, to withdraw at any time without penalty, and to have their questions answered. Consent was obtained from each participant, in writing or orally prior to commencing the interview, ensuring their willingness to participate in the study. In this particular study, and as described earlier, all interviewees consented to be named and quoted in the research. Their consent to be identified demonstrates their trust in the research process and its outcomes. On the other hand, survey participants' data have been anonymized to protect their privacy.

²¹¹ Alvesson and Sandberg, 5.

Another ethical consideration in this research is minimizing harm. The research design and data collection methods were carefully considered to minimize any potential harm or discomfort to participants. This included avoiding any sensitive or intrusive questions and ensuring that participants felt comfortable throughout the research process. Any concerns or issues that arose during data collection were promptly addressed to minimize harm.

The research also emphasizes the importance of data storage and security. All research data, including both interview and survey data, are securely stored to protect participants' privacy and confidentiality. Electronic files are stored on password-protected devices or encrypted cloud storage, with access limited to me. Hard copies of data are stored in locked cabinets, with access restricted to authorized personnel only. Data will be retained for a specified period, as per institutional guidelines or funder requirements, and then securely disposed of.

As discussed previously, reflexivity and researcher integrity play a significant role in the ethical conduct of this research. Throughout the research process, reflexivity is maintained by critically examining my positionality, assumptions, and potential biases. This involves being transparent about my role, acknowledging any limitations, and engaging in ongoing self-reflection to ensure the credibility and trustworthiness of the findings.

By adhering to these ethical considerations, this study aims to ensure the protection of participants' rights and well-being, maintain the credibility and integrity of the research, and contribute to the development of ethically responsible knowledge on RIS in a Gulf state context.

Chapter 5 | Dubai Regional Context

Before analyzing the four case studies and innovation survey results in Chapters 6–10, the Dubai regional context is examined below. First, the history of the emirate is briefly covered to show how it developed from a sparsely populated desert outpost to a world-leading, cosmopolitan city as part of the United Arab Emirates. Second, the academic literature on Dubai is outlined, highlighting the prior work on innovation systems and the emirate’s unique economic model. Next, the dimensions of the Triple Helix are reexamined from the Dubai perspective, and, finally, a discussion on why Dubai was chosen for this study concludes the chapter.

History

One cannot help but begin by noting just how unlikely the regional innovation case studies that follow would have emerged in the Arabian Gulf, one of the most desolate places on earth, hardly inhabited for most of human history. The population of the land currently known as the United Arab Emirates likely did not exceed 80,000 people until the 1930s.²¹² The sheer heat and lack of fresh water made life in this region very difficult, and it was generally avoided by all but its hardened local tribes until the advent of air conditioning and the discovery of oil in 1966.

This study’s most senior interviewee, HE Mohammad Al Gergawi, Minister of State of the UAE, commenced his comments noting that although Dubai is a thoroughly modern city and the UAE itself is only about 50 years old as a country, the history of Dubai that set it on a path towards building an innovative environment goes back much further:

²¹² Krane, *City of Gold*, 3.

The history of Dubai is not a history of 10, 15, or 20 years; it is 100+ years old. Innovation requires a couple of elements—the most important element is talent, and talent requires openness. When you look at the history of the region, the periods which had tolerance and openness, the region thrived. From the days of the House of Wisdom to Damascus, to Andalusia. To understand the history of Dubai, we should understand this principle.

It is important to first understand the region's historical context before examining the four case studies in the upcoming chapters.

The Creek

The importance of the natural seawater inlet known as the Dubai Creek cannot be understated, as will be discussed in further detail in the historical context section of the DP World case study. Particularly during its earliest days, the Creek served as Dubai's lifeline and connection to the rest of the world, birthing critical industries such as commodity trading and pearl diving. Furthermore, the Creek became a symbol of the openness of Dubai's culture that Al Gergawi alludes to and was the channel through which its uniquely diverse society started forming. This exchange of people and cultures played a crucial role in shaping the character of Dubai as a cosmopolitan city and contributed to its rich cultural heritage.

Political Stability

The Al Maktoum dynasty began with Sheikh Maktoum bin Butti, who established Dubai as an independent emirate, and his descendants have continued to rule the emirate to this day. "Not one of the sheikhs who governed Dubai since 1833 was overthrown or murdered. By the chaotic standards of the region, 175 years of

uninterrupted succession is probably unprecedented.”²¹³ This stable political environment has been critical to Dubai’s commercial success over the years.

Over the years, the Al Maktoum family has focused on maintaining internal stability and promoting economic development. They have pursued a policy of openness and tolerance, which has helped attract foreign investment and build strong international relationships. The rulers have also been successful in avoiding major conflicts and maintaining a relatively peaceful environment within the emirate.

Trucial States

In the early 19th century, British interests in the Arabian Gulf increased due to their strategic interests in India and the growth of trade with the Indian subcontinent. In 1820, the British signed a maritime truce with several local sheikhdoms, including Dubai, which became known as the Trucial States. This agreement marked the beginning of a British protectorate in the region, with the local sheikhs relinquishing their rights to negotiate treaties with foreign powers other than the British.

Throughout the 19th and 20th centuries, the British continued to maintain a presence in the region, primarily through a series of treaties and agreements, such as the Exclusive Agreement of 1892, which solidified the British protectorate status over the Trucial States. Under these agreements, the British took responsibility for the defense and foreign affairs of the Trucial States in exchange for non-interference in internal governance. However, British control was limited, as the ruling sheikhs of the individual emirates maintained a significant degree of autonomy in running their territories.

²¹³ Krane, 19.

Overtaking Sharjah

Historically, Sharjah was one of the wealthiest and most influential emirates in the region due to its strategic location at the intersection of important trade routes, both by land and sea. It was a prominent trading hub, and its ruler, Sheikh Sultan bin Saqr Al Qasimi, signed the General Maritime Treaty with the British in 1820. As a result, Sharjah gained a reputation as a center of culture, education, and commerce in the region. Its port and airport were the most important in the Trucial States, and the British based their representative there when they were administering the region in the early years.

Dubai, on the other hand, began as a small settlement along the Dubai Creek. Its importance grew in the 19th century with the expansion of the pearl trade. However, it was not until the 20th century that Dubai started to catch up with Sharjah in terms of economic growth and influence. The turning point came during the rule of Sheikh Rashid bin Saeed Al Maktoum (1958–1990), who was a visionary leader and had ambitious plans for Dubai's development.

The key factors that contributed to Dubai overtaking Sharjah were Sheikh Rashid's strategic investments in infrastructure and his efforts to create a business-friendly environment. He undertook large-scale projects, such as the dredging of the Dubai Creek, which allowed bigger ships to access the port and facilitated trade. Other significant developments included the construction of the Al Maktoum Bridge, Port Rashid, Dubai International Airport, and the Jebel Ali Free Zone.

These investments, combined with Dubai's more liberal business policies and tax incentives, attracted international trade and investments, fueling the emirate's rapid economic growth. By the late 20th century, Dubai had emerged as the

preeminent economic and commercial center in the region, overtaking Sharjah and other emirates.

Formation of the United Arab Emirates (UAE)

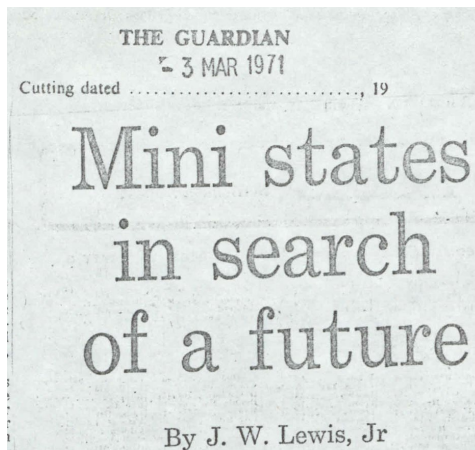
After 151 years of foreign control by the British, the UAE was formed on December 2, 1971 when the rulers of Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Fujairah, and Ras Al Khaimah came together under the leadership of Sheikh Zayed bin Sultan Al Nahyan, the ruler of Abu Dhabi, who served as the first President and Sheikh Rashid bin Saeed Al Maktoum, the ruler of Dubai, the first Prime Minister and Vice President.

From the beginning, Sheikh Rashid was a strong supporter of the idea of a federation, as he believed that the unity of the Trucial States would lead to greater prosperity, stability, and security for the region. His support and vision were instrumental in convincing other rulers to join the union. Furthermore, Dubai played a pivotal role in mediating and negotiating the terms of the federation. Given its strategic location and economic strength, Dubai was able to bring together the other emirates and facilitate discussions on various aspects of the union, including the constitution, the distribution of power, and the allocation of resources. At the time of the formation of the UAE, Dubai was already a thriving trade hub and had a relatively diversified economy compared to other emirates. Its port facilities, airport, and infrastructure served as a solid foundation for the newly formed UAE. Dubai's economic contributions were critical in supporting the early stages of the federation and setting the stage for the nation's future development.

Entry into the Gulf Cooperation Council (GCC)

The UAE is one of the original members of the regional union formally known as the Cooperation Council for the Arab States of the Gulf, commonly called the GCC. The regional pact was signed in Abu Dhabi in 1981, ten years after the formation of the UAE, and serves as a political and economic union bringing together the six Arab states of the Arabian Gulf: Saudi Arabia, Bahrain, Qatar, Oman, Kuwait, and the United Arab Emirates. The regional organization was formed primarily for security concerns, since the Iran-Iraq war caused these neighboring states to worry about the stability of the region in light of the conflict nearby. Forming a united front would, in theory, enhance their ability to defend themselves and deter any potential threat. That said, Iraq's 1990 invasion of Kuwait revealed the limited military capability of the union and its inability to defend itself against such a powerful invader.

The second reason for the formation of the GCC and the entry of the UAE into the union was to enhance economic cooperation and integration between the states. This was initially due to the shared interests in the oil and gas industry but has expanded to include economic diversification priorities.



Much the same feeling is the motivating factor for Dubai's ruler, Sheikh Rashid, quickly to develop his state to maintain its status as the major commercial centre of the Lower Gulf.

In Dubai, now the main transshipment point for goods arriving along the Trucial coast, Rashid is building a modern international airport capable of handling jumbo jets, an airport hotel to accommodate 400 guests, and one of the largest duty-free shops in the world. Because the facility is being built to the specifications of the major airlines, he hopes that Dubai will be a stopover point for around the world air traffic.

Port Rashid, which is capable of handling ocean going vessels and which has dockside loading facilities has been in operation for about a year. Dubai town has 14 foreign banks and representatives of major businesses.

Figure 5.1 1971 Article on Sheikh Rashid's Industry-Building Ambitions, Source: The Guardian Newspaper Archives

Dubai in the Literature

Although not much has been published on the Gulf context with regards to RIS, it is important to outline the existing literature and contextualize this study within the landscape of other regional studies on the Gulf. This section begins with an overview of the way the Dubai government has actively implemented innovation policies, and this approach is put into context in the literature with the key arguments of Josh Lerner and Mariana Mazzucato presented in contrast. This is then followed by a discussion of David Flynn’s sponsorship theory, outlining the three primary preconditions necessary for innovation, with each explained within a Dubai context. The final sections include an overview of the limited research on innovation systems in Dubai, a discussion of the theory of late rentierism, the key components of the Dubai economic model, and the Gulf context on R&D, particularly a concept called the “R&D Trap.”

Government Innovation Policy

The most entrepreneurial of the seven emirates of the UAE, Dubai has built a global reputation for making the impossible happen. Building on a long history of trading, pearl diving, and, eventually, oil exploration, it most recently fashioned itself into a regional hub for entrepreneurship and innovation through a direct, government-led effort. If measured by certain outward results, this approach could be deemed quite successful, as the UAE emerged as center of the entrepreneurial ecosystem of the Middle East and North Africa (MENA) region based on the volume of local venture capital investment—45% of total 2022 MENA funding—and the sheer size of the resulting high-growth firms domiciled there.²¹⁴

²¹⁴ “UAE 2022 Venture Investment Report.”

Some critical infrastructure-type environmental conditions and government policies have no doubt contributed to Dubai’s impressive aforementioned result, such as high personal security in an unstable political region, 100% foreign-ownership of businesses coupled with 0% income and corporate tax, and a welcoming residency policy that allows for nearly anyone to immediately relocate there to work. This excellence in infrastructural support was recently acknowledged by the 2022 Global Innovation Index report on the UAE, recognizing the country as being the 6th in the world in terms of institutions supportive to innovation.²¹⁵ Especially in the context of the MENA region, these seemingly basic features are incredible draws for the top talent to relocate and start entrepreneurial ventures there. There is no doubt that providing these essential preconditions is of paramount importance and contributes broadly to the development of the economy as well as to the positive outcomes witnessed thus far.

The Dubai story is a complex one, however, with many lessons to learn from its journey towards building a knowledge-based economy. One of the seminal works on the topic of the efficacy of government policy in building entrepreneurial and innovation ecosystems is Lerner’s aptly named *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It*. In the opening pages of his book, he cites Dubai as an example of a government eager to encourage entrepreneurial innovation and Dubai Internet City (DIC) as a particularly relevant case study of public sector investment to build an industry from scratch in order to “diversify Dubai’s economy from its dependence on the emirate’s rapidly-dwindling petroleum supply.”²¹⁶ DIC’s plan was to invest in the

²¹⁵ See Appendix F for the UAE section from the full 2022 GII report, available: <https://www.globalinnovationindex.org/gii-2022-report>

²¹⁶ Lerner, *Boulevard of Broken Dreams*, 3.

real estate, services, and governmental infrastructure to build a home for global technology companies to leverage Dubai as a platform to innovate.²¹⁷

As more than a decade has passed since the publication of Lerner's book, it is clear that although tech companies did indeed come and set up offices in DIC, the reality of their operations has been primarily focused on localizing and distributing the products developed in other parts of the world to the Gulf Cooperation Council (GCC) and broader MENA region. As discussed in Chapter 8, DIC has been quite successful in supporting Dubai's first transition from a rentier to a service-based economy by providing real estate and ancillary support to its world-class technology industry tenants but is still trying to foster a full-fledged knowledge economy that develops local innovations anchored in R&D.

Mazzucato's 2011 *The Entrepreneurial State* serves as the counterpoint to Lerner's *Boulevard of Broken Dreams*, citing US and UK examples such as DARPA and SBIR where the "state has played a leading, entrepreneurial, role in achieving innovation-led growth,"²¹⁸ and arguing for a mission-oriented top-down role for the state in setting innovation policy. Challenging this viewpoint, Karlson et al. published a recent critique of Mazzucato's entrepreneurial state view, which they pointed out "confuses invention with innovation," is anecdotal at best (with several errors in those anecdotes themselves), and avoids presenting a causal argument when discussing the spending tradeoffs of government intervention "while nevertheless making bold claims about the government's positive net contribution."²¹⁹

²¹⁷ Lerner, 3.

²¹⁸ Mazzucato, *The Entrepreneurial State*, 115.

²¹⁹ Karlson, Sandström, and Wennberg, "Bureaucrats or Markets in Innovation Policy? -- A Critique of the Entrepreneurial State," 2; Potts, "Keep Your Friends Close, Your Enemies Closer," 2.

Besides the several flaws in the arguments surfaced by these authors, the most relevant limitation of Mazzucato's approach is its limited applicability. Her examples and entire theoretical premise are built on the case of the top leading regions of the world with respect to innovation. Gulf regions present a different context, and although it is true that their governments can sometimes be successful with top-down policies, the environment does not make it easy for the resulting ventures to survive.

Infrastructure Preconditions for Innovation

When evaluating the reasons for success of the government-led mission-oriented policies cited by Mazzucato, it is important to note that the infrastructure preconditions outlined in Flynn's sponsorship theory were already mature in the United States and UK economies at the time—*market demand*, a large existing *talent pool*, and *supporting infrastructure* like deep research institutions and savvy early-stage investors to name a few.²²⁰

These three infrastructure cornerstones are characteristics of a more mature innovation system, and, until they are established with respect to a new industrial path, it is unlikely for ventures built on radical innovations to survive after government sponsorship ends. Each of the three will be addressed in turn to illustrate the features of Gulf economies that make it difficult for radical innovation ventures to succeed locally.

First, ensuring there is real *market demand* for an innovation is critical. Although governments can provide temporary incentives to attract ventures that do not enjoy immediate natural market demand—oftentimes the case for radical

²²⁰ Flynn, "A Critical Exploration of Sponsorship, Infrastructure, and New Organizations," 130.

innovations entering into new markets—this strategy is likely to fail as soon as the period of sponsorship expires.

Iyer et al. present a compelling argument that “in emerging economies, incremental innovation may be more appropriate than radical innovation”²²¹ and “radical innovations are most effective when market potential is high and the sales volumes are sufficient to satisfy higher expected returns.”²²² The authors show that country-specific factors including infrastructure, trajectory of economic development, market size, and business culture impact whether radical or incremental innovations should be pursued.²²³ Although they take the perspective of an established firm rather than an entrepreneurial venture, the insights that they draw from the Indian market provide validation to the point of view proposed for this study. In fact, Iyer et al. conclude by noting that “the most practical contribution of academic research would be the study of how specific forms of innovations contribute to the firm's performance in developing countries,”²²⁴ practically an invitation for this research into the efficacy of different innovation types in this context.

Second, a specialized *talent pool* with experience in the given domain is essential. When a radical innovation venture has little connection to the industries already present in the local market, it is difficult to find talent that is readily available with practical experience in a related field. The venture can import talent for a certain period, but that quickly becomes expensive and unsustainable. The Gulf states present a unique human capital environment with the large proportion of expatriates and relatively less-qualified local nationals.

²²¹ Iyer, LaPlaca, and Sharma, “Innovation and New Product Introductions in Emerging Markets,” 381.

²²² Iyer, LaPlaca, and Sharma, 379.

²²³ Iyer, LaPlaca, and Sharma, 381.

²²⁴ Iyer, LaPlaca, and Sharma, 381.

Finally, the *supporting infrastructure* is a multifaceted bucket that includes having a robust network of research universities from which many technological and theoretical advancements emerge and early-stage investors with appetite to invest in these types of ventures. Although Saudi Arabia is a relative outlier in the Gulf when it comes to the quality of research universities and the absolute number of patents produced,²²⁵ the region is weak when compared to others globally—especially when considering the IP that is commercialized locally. While venture capital investment risk is present in all environments, in emerging market economies those risks are compounded by market risks, making it frontier innovations a difficult pitch for local venture capitalists to accept.

Due to these three requisite infrastructure pillars for radical innovations to thrive in a given market context, it is extremely difficult to import radical innovations directly into Gulf markets that are less mature in their economic diversification journey. Indeed, taking a closer look at the even the incredible Dubai success stories cited by Lerner, such as Emirates Airline and DP World,²²⁶ it becomes clear that they carefully maneuvered around many of these pitfalls. These two examples were investments into sectors with deep historic roots and clear local competitive advantage, as Dubai has always been a vibrant shipping and trading center. Other successes, such as that of taxi-hailing app Careem, which was acquired by Uber for over USD 3bn in 2019, minimized their exposure to risk by implementing a business model that was already tried and tested in many other markets. Local e-commerce marketplace Souq.com, acquired by Amazon in 2018, also minimized their risk using an already proven business and technology model. It is interesting to note that both

²²⁵ “UNESCO Science Report: Towards 2030 - UNESCO Digital Library,” 443.

²²⁶ Lerner, *Boulevard of Broken Dreams*, 2–3.

Careem and Souq were bought by the source of their business model innovation—Uber and Amazon—and, as imitative innovators, stand as two of the biggest success stories among venture-backed firms in the entire MENA region.

Innovation Systems in Dubai

Ferretti and Parmentola published two articles on innovation systems in Dubai and then incorporated their main findings into a book on Local Innovation Systems published in 2015.²²⁷ This has been the only academic treatment of the development of Dubai's RIS that I was able to find in the literature, and although the empirical evidence presented from the Dubai case is quite limited and dated, the insights they presented are important building blocks upon which this study rests.

An important finding from their research when discussing the innovation system in Dubai is the “lack of local companies that have the sufficient competences to start knowledge-intensive activities.”²²⁸ This is particularly important because it reflects the weakness of the industry as well as academia pillars of the Triple Helix, and, as shown by numerous empirical studies,²²⁹ learning absorption is a critical component of a functioning RIS. In light of this challenge, the government in Dubai steps in to try to bridge the gap: “One of the problems in emerging economies is the absence of local actors, in the form of companies and research centres that would have the size and capacity to activate a bottom-up development process. In these cases, a national government ... can intervene.”²³⁰

²²⁷ Ferretti and Parmentola, “The Creation of Regional Innovation Systems in Emerging Countries”; Ferretti and Parmentola, *The Creation of Local Innovation Systems in Emerging Countries*; Ferretti and Parmentola, “Technological Learning and Innovation Systems in Developing Countries.”

²²⁸ Ferretti and Parmentola, “The Creation of Regional Innovation Systems in Emerging Countries,” 148.

²²⁹ Viotti, “National Learning Systems A New Approach on Technological Change in Late Industrializing Economies and Evidences from the Cases of Brazil and South Korea”; Florida, “Toward the Learning Region.”

²³⁰ Ferretti and Parmentola, *The Creation of Local Innovation Systems in Emerging Countries*, 57.

In the conclusion to their first article on the topic, Ferretti and Parmentola argue that there is a “lack of social interaction mechanisms that contribute to increasing the level of social embeddedness among the actors [of the Dubai RIS]... The next development stage must be targeted towards an increase in the level of interaction of foreign and local firms supporting the generation of knowledge spillovers in order to allow the creation of a network of local firms that will be able to trust each other.” This key finding, from 2007, seems to be dated as exemplified by the cases examined in this study, particularly the way foreign firms have been integrated within the DIC and DMCC free zones. That said, it is clear that embeddedness, which is a critical component of a thriving RIS, is still in need of further strengthening within the Dubai context, and the openness of the system to foreigners—while incredibly powerful as a tool to import specialized knowledge workers—creates cultural distance within society.

In their 2015 article, Ferretti and Parmentola argue that contrary to the traditional static analysis assumption, innovation systems in emerging markets follow a predictable path of development, starting from duplicative imitation, evolving into creative imitation, and finally leading to true innovation. The configuration of the IS itself also evolves over time from a fully government centered system to one which is MNE centered, then local firm centered, and finally research centered.²³¹ Although the basic premise of this path development argument is compelling, and, in fact, a phased approach features in the conceptual framework of this study, the details of the phase divisions they propose are problematic. Furthermore, the Dubai empirical evidence they cite is based on the government’s published strategic plans and takes a

²³¹ Ferretti and Parmentola, “Technological Learning and Innovation Systems in Developing Countries,” 48.

surface-level view of three entities—Dubai Internet City, Dubai Biotech, and Dubai Enpark—to argue that no “true” innovation systems exist in Dubai.²³²

This study’s case analyses provide deeper data across four cases spanning industry and government to examine the nature of Dubai’s RIS and eventually argue, contrary to Ferretti and Parmentola, that Dubai has a functioning RIS that is producing innovation, albeit one with significant gaps hindering a full transition into a knowledge economy. Furthermore, the implicit assumption they make that a research-centered RIS is the ultimate goal and a government-centered RIS is the least developed phase of the system’s development is challenged in this study. That said, integrating an active research pillar of the Triple Helix is an important goal, and will be described in further depth in the upcoming chapters.

Late Rentierism

Since the region being researched empirically as part of this study is part of what is termed a “Late Rentier” state in the literature,²³³ and this categorization can play a helpful role in understanding their individual political and economic dynamics related to innovation policy, a brief discussion on Rentier State Theory (RST) will follow. The term “rentierism” first appeared in the academic literature in 1970 in very simplistic terms to explain the unique relationship between oil-rich countries and their populations,²³⁴ which exemplified first phase RST in which “the rentier state is supposedly autonomous from society.”²³⁵ This then developed into a more sophisticated second phase RST, in both “conditional” and “specialized” flavors, which present more nuanced versions of the theory, but nevertheless still has been

²³² Ferretti and Parmentola, 54.

²³³ Gray, “A Theory of ‘Late Rentierism’ in the Arab States of the Gulf.”

²³⁴ Cook, “Patterns and Problems of Economic Development in Rentier States,” 428–67.

²³⁵ Gray, “A Theory of ‘Late Rentierism’ in the Arab States of the Gulf,” 6.

labeled as “overambitious”²³⁶ by Gray, the author of what he calls third phase RST—Late Rentierism. According to Gray, “Late rentierism creates a particular type of state that is more responsive, globalised and strategic in its thinking”²³⁷ and is a form of “entrepreneurial state capitalism.”²³⁸

The theory of Late Rentierism was further extended by Lang and Aldori in 2020 to account for the most recent evolution of the political and economic climate in the Gulf, presenting a new measurement called the Comparative Compound Diversification Index (CDDI), meant to quantitatively show the progression of states along the late rentierism continuum towards a diversified, knowledge-based economy.²³⁹ The study highlights the UAE and Saudi Arabia, two countries that “have clearly exhibited the highest degree of stability in their patterns of diversification, measured by [...] the CCDI. The speed and rate of change has however been faster and greater in degree in the UAE, when averaged over the 2014/18 period under scrutiny.”²⁴⁰

In her study on “Top-Down Entrepreneurship Promotion in Oman and Qatar,” Ennis shows how these two Gulf states are perpetuating the rentier model through “entrepreneurship promotion, although cast in the language of private sector development, has thus far become another vehicle of state patronage.”²⁴¹ Late Rentier Gulf states present an instructive case study as they are doubly incentivized to promote entrepreneurship—both as a vehicle to diversify away from a hydrocarbon-

²³⁶ Gray, 24.

²³⁷ Gray, 24.

²³⁸ Gray, 21.

²³⁹ Lang and Aldori, “An Extension to Late Rentierism, Using a Comparative Compound Diversification Index, to Show the Movement Towards Mixed Mode Economic Diversification and Development, in the GCC States,” 40.

²⁴⁰ Lang and Aldori, 51.

²⁴¹ Ennis, “Between Trend and Necessity,” 116.

driven economy as well as a channel increasing employment by the private sector as a whole, reducing dependence on government wages.

Dubai Economic Model

Hvidt presents the most comprehensive analysis of the “Dubai model” of economic development, citing nine key parameters of Dubai’s development path: 1) Government-led development, 2) Fast decision making, 3) Flexible labor force, 4) Bypass industrialization, 5) Internationalization of services, 6) Creation of investment opportunities, 7) Supply-generated demand (“first mover”), 8) Market positioning via branding, and 9) Development in cooperation with international partners.²⁴² These general observations on what has helped Dubai evolve from a pre-rentier to a rentier to a post-rentier economy are useful when investigating the way the RIS functions in the emirate. Many of these themes—or slight variations of them—surface in the empirical chapters 6-9 presenting the interview data from the four cases examined, as these parameters that guide the Dubai economic model are also quite important when understanding the structure of the Dubai RIS.

R&D Trap

In a recent study of innovation in the Gulf, Arman et al., present the concept of the “R&D trap” to explain why GCC country Kuwait has the 6th highest GDP per capita in the world but R&D spending at the levels of much poorer countries. Most of the insights they shared from the Kuwait example are applicable across the GCC and are highly relevant to the Dubai case being studied here. They define the trap as the situation in which “firms will not increase R&D investment because it is not economically rational for them to do so; in turn, it will not become economically

²⁴² Hvidt, “The Dubai Model,” 401.

rational until a wider set of actors, relationships, and institutions have evolved into a coordinated system.”²⁴³ As a result of this situation, simply pouring more government spending in the form of incentives to boost the R&D activity in the country will not work, as the lack of R&D is a systemic problem that cannot be unilaterally solved. It is a systemic problem that, logically, requires a systemic solution.

The authors lament the fact that a “mini-industry of foreign consultants has emerged, writing reports advising on diversification into innovation-intensive activities, science parks, and incubators. However, as stand-alone policies, these initiatives, although well intentioned, have little chance.”²⁴⁴

Although economies in the GCC have been able to attract significant FDI, “low levels of educational attainment have prevented the absorption of technical skills and competencies from foreign companies in non-oil industries.”²⁴⁵ This knowledge absorption challenge is one of the most critical factors limiting the effectiveness of the RIS and slowing the transition to a knowledge economy. Making matters even more challenging, “local R&D is needed to raise absorptive capacity, but research is almost non-existent.”²⁴⁶ Ewers and Malecki go on to explain that universities in the Gulf focus on basic education and training and rarely produce research of the type needed to achieve the knowledge absorption needed.

Triple Helix in Dubai

In this section, each dimension of the Triple Helix is taken in turn to explain the Dubai context, since the emirate is quite unique across all three elements, as

²⁴³ Arman et al., “Systems of Innovation, Diversification, and the R&D Trap,” 9.

²⁴⁴ Arman et al., 9.

²⁴⁵ Ewers and Malecki, “LEAPFROGGING INTO THE KNOWLEDGE ECONOMY,” December 2010, 501.

²⁴⁶ Ewers and Malecki, 502.

briefly discussed in the introductory chapter. This background information will help contextualize the research findings in the cases in the upcoming chapters.

Government

Dubai is a semi-autonomous constitutional monarchy within the federal United Arab Emirates, with its ruler, Sheikh Mohammed bin Rashid Al Maktoum serving as the Vice President and Prime Minister of the UAE. Its citizens elect representatives to the Federal National Council (FNC) and are also able to voice their opinions in the traditional open majlis council where government leaders take feedback directly from citizens. Dubai has a separate judicial authority from the rest of the UAE and has dozens of government entities responsible for administering everything from transportation to education to security within the borders of the emirate. The Crown Prince of Dubai, Hamdan bin Mohammed Al Maktoum, is the current head of the Dubai Executive Council, the government authority that sits atop of all of these entities. As discussed, the Al Maktoum family has been ruling Dubai continuously since 1833.

Despite how it looks on the surface, the functioning of the Dubai government is quite unique, particularly with respect to its role within the RIS. One of the most senior interviewees of this study, involved in many aspects of the Dubai government throughout his career, as well as serving as the founding CEO of Dubai Internet City, Ahmed bin Byat, explained the Dubai government in the following provocative, but quite astute, way:

Dubai doesn't have government. When you think of government, you think of structure, hierarchy. Dubai doesn't operate like that. And you know, the area, it's very, very fluid, very much highly influenced by private sector.

Let's put your examples of DP World, Emirates, or whatever—would you call this born in the government, but who owns it? It's the government. The treasury owns this. But from day one, the vision and the operating model were completely private. No standard, typical government can do anything like this. They don't and cannot do it, because of so many [reasons]: because of the horizon, because of constraints, because of mandates.

But in fact ... the local governments are very different. And Dubai government has a highly private mindset, if I'm clear about that. You know, the conversation, the aspirations, the hope, etc. It was built around the economy and this came through generations. Not new and certainly not with Sheikh Muhammed bin Rashid. It was with his dad and his grandfather. They all follow more or less the same [approach]. It just gets grander as it goes along. It's like a snowball.

Industry

Now that oil production contributes less than 1% of GDP, down from more than 50% at its peak, a diversified private sector operates in the emirate.²⁴⁷ Dubai invested the two decades of rentier wealth wisely and “adopted a strategy based on investing oil revenues on infrastructure and diverse industries, resisting the pressure to have a large, overstaffed public sector.”²⁴⁸ The resulting industry dynamic in Dubai is dominated by the four distinct pillars: 1) Large local trading families, typically bolstered through government-granted sole agency deals, 2) international firms that have expanded into Dubai and often base their regional headquarters from the

²⁴⁷ Winkler, “Dubai’s the Very Model of a Modern Mideast Economy.”

²⁴⁸ Faris and Soto, *The Economy of Dubai*, 2.

emirate, 3) state-affiliated enterprises such as DP World and Emirates Airline, and 4) the growing SME sector.

Local conglomerate family businesses, such as Majid Al Futtaim Holding (MAF), Al-Futtaim Group, and Al-Ghurair Group, each operate across multiple industries such as real estate, retail, automotive, etc. and are substantial economic drivers. These are the merchant families who built Dubai from its earliest days, and, “in fact, Dubai owed much of its prosperity and development to its merchants who played a key role in restructuring the economy and in the government decision-making process.”²⁴⁹

These local companies are complemented by some of the most recognized names in international business, as Dubai opened its borders for all to enter the market and opted against state intervention to protect local industries. This theme is explored in further depth in the story of IBM’s market entry, as recounted by Bashar Kilani in the DIC case in Chapter 8.

State-affiliated companies born in Dubai like DP World and Emirates Airline represent a class of companies that are supported by the government in their initial plan, infrastructure and, sometimes, modest seed funding. They then operate like fully private sector entities, driving dividend income back to the state. Hvidt, in his discussion of the “Dubai Model,” argues that “it would be more appropriate to call such ventures ‘state-initiated’ firms” because the “government makes a point of not sheltering government-owned firms from competition, as is often the case with traditional state-owned enterprises.”²⁵⁰

²⁴⁹ Al-Sayegh, “Merchants’ Role in a Changing Society,” 87.

²⁵⁰ Hvidt, “The Dubai Model,” 409–10.

Finally, the substantial SME sector represents 95% of all businesses in Dubai, produces 42% of all employment opportunities, and drives 40% of GDP.²⁵¹ SMEs are accommodated both onshore as well as in the 20+ free zones available in Dubai.

University

The least developed dimension of the Triple Helix in Dubai is academia. Universities are relatively new, do not output R&D that makes a tangible economic impact, and the caliber and quantity of graduating research students is still too low to fuel a full transition to a knowledge economy. Some indicators follow below to give a sense of where Dubai and the UAE stand today and the gap that needs to be bridged.

As of 2022, Dubai has 34 international higher education institutions actively teaching 29,168 students (28% of which come from outside of the UAE for the purpose of studying) across 609 programs.²⁵² This is in addition to mainly local Emirati students attending public UAE higher education institutions: UAE University (founded 1977), Zayed University (founded 1998), and Higher Colleges of Technology (founded 1988).²⁵³ All of these institutions are relatively new, compared to counterparts in Europe and the Americas, and research outputs are therefore quite low, particularly ones that are of a commercializable caliber.

Although the UAE has been second in the Gulf over the last decade with respect to patent filings, the gap between it and Saudi Arabia is more than 20x despite the fact that the population is only 4x more (approx. 36m Saudi Arabia vs. 9m UAE). The rest of the GCC is barely active on this front, with the notable recent exception of Qatar, surpassing the UAE in 2020 by double the patent filings. The table below

²⁵¹ “Why the UAE Government Is so Keen on Investing in SMEs - Arabian Business.”

²⁵² “KHDA - Dubai’s International Higher Education Institutions Register Annual Enrolment Growth of 3.6%, Accord.”

²⁵³ “United Arab Emirates Cultural Division | Higher Education.”

summarizes worldwide patent activity as reported by the World Intellectual Property Organization.²⁵⁴

World Intellectual Property Organization Patent Report: Statistics on Worldwide Patent Activity											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
United Arab Emirates	25	33	23	21	29	35	57	63	57	55	39
Saudi Arabia	288	347		491	652	715	1070	909	1078	1188	1294
Qatar			3	9	5		16	19		39	81
Kuwait							13		1		
Oman						5	3	4	16	30	
Bahrain		1	3	3	6	8	6	8	11	4	7

Table 3 GCC Patent Activity 2010-2020, Source: World Intellectual Property Organization

Furthermore, another important statistic that impacts the university dimension of the Triple Helix is R&D expenditure. The table below reports on these numbers on the level of the UAE as a whole, showing the relative levels of spend across industry, government, and universities as a percentage of GDP. Although the numbers have doubled since 2014, the latest 2020 figures still only show 1.45% overall R&D as a percentage of GDP, which is substantially lower than the OECD average figure of 2.74% in that same year.²⁵⁵

²⁵⁴ “WIPO IP Statistics Data Center.”

²⁵⁵ “Research and Development (R&D) - Gross Domestic Spending on R&D - OECD Data.”

Total Research and Development (R&D) Expenditure as Percentage of GDP per Sector, 2014 – 2020 (Unit: AED)					
Year	Private Sector (Business)	Government Sector	Higher Education Sector	Total R&D Expenditure	R&D as % of GDP
2014	7,628,323,013	2,640,573,351	...	10,268,896,364	0.69%
2015	5,596,571,623	4,807,199,700	1,368,280,261	11,772,051,584	0.90%
2016	9,679,321,671	858,437,995	2,097,933,627	12,635,693,293	0.96%
2017	9,524,775,370	699,741,040	2,948,495,142	13,173,011,552	0.94%
2018	12,275,945,581	5,039,556,362	2,506,568,213	19,822,070,156	1.28%
2019	12,742,809,395	4,580,434,131	2,796,076,841	20,119,320,368	1.30%
2020	11,069,305,500	5,042,109,233	2,990,087,734	19,101,502,467	1.45%

Table 4 UAE R&D Expenditure as % of GDP per Sector, Source: UAE Federal Competitiveness & Statistics Center

Finally, as Gulf countries send many of their nationals abroad for higher education, and the UK is a top destination and good proxy for the flow of such students, the tables below show the UAE’s relative position compared to other GCC countries.²⁵⁶ When assessing the university dimension of the Triple Helix, the most useful statistic is the number of research postgraduates, which increased from 320 in 2014 to 860 in 2021, although neither of those numbers is substantial. Saudi Arabia consistently sends over 2,000 students every year for postgraduate research degrees.

2021/22: GCC Domiciled Students Studying in the UK						
	United Arab Emirates	Saudi Arabia	Qatar	Kuwait	Oman	Bahrain
Undergraduate	5,245	3,395	2,090	5,055	1,825	1,065
Taught Postgraduate	1,980	2,510	600	1,250	365	300
Research Postgraduate	860	2,850	210	325	200	80
Total	8,085	8,755	2,900	6,630	2,390	1,445

Table 5 GCC Students Studying in the UK in the 2021/22, Source: UK Higher Education Statistics Agency

²⁵⁶ “Where Do HE Students Come from? | HESA.”

2014/15: GCC Domiciled Students Studying in the UK						
	United Arab Emirates	Saudi Arabia	Qatar	Kuwait	Oman	Bahrain
Undergraduate	2,135	3,385	1,175	1,720	1,260	1,015
Taught Postgraduate	1,020	2,885	415	570	805	230
Research Postgraduate	320	2,400	95	325	360	85
Total	3,475	8,670	1,685	2,615	2,425	1,330

Table 6 GCC Students Studying in the UK in the 2014/15, Source: UK Higher Education Statistics Agency

Digging deeper into the data, almost half (45%) of UAE research students are enrolled in part time programs, compared to 2.3% of Saudi students. This seems to indicate a higher level of commitment from the Saudi researchers compared to those coming from the UAE and another datapoint to reinforce why the university dimension in the UAE is relatively weak, even when considering internationally educated postgraduate researchers.

2021/22: GCC Domiciled Research Postgraduates Studying in the UK						
	United Arab Emirates	Saudi Arabia	Qatar	Kuwait	Oman	Bahrain
Full Time: Research Postgraduate	470	2,785	140	300	150	55
Part Time: Research Postgraduate	390	65	70	25	50	25
Total	860	2,850	210	325	200	80
Percent of Part-time Students	45.3%	2.3%	33.3%	7.7%	25.0%	31.3%

Table 7 GCC Postgraduate Students Studying in the UK in 2021/22, Source: UK Higher Education Statistics Agency

2014/15: GCC Domiciled Research Postgraduates Studying in the UK						
	United Arab Emirates	Saudi Arabia	Qatar	Kuwait	Oman	Bahrain
Full Time: Research Postgraduate	220	2,330	60	300	325	60
Part Time: Research Postgraduate	100	70	35	25	35	25
Total	320	2,400	95	325	360	85
Percent of Part-time Students	31.3%	2.9%	36.8%	7.7%	9.7%	29.4%

Table 8 GCC Postgraduate Students Studying in the UK in 2014/15, Source: UK Higher Education Statistics Agency

Chapter 6 |

DP World: Expanding the Ports & Logistics Industry

Introduction

It is fitting to begin this study with the DP World case as it is both historically the first major business established in Dubai to diversify from its oil wealth as well as one of the key engines behind Dubai's modern economy, adapting over time to become a leader in its industry globally. What began as a simple industrial path extension, expanding the scope of port operations from a single location at Port Rashid to dozens around the world, became a story of successful industrial path upgrading when DP World started diversifying its business up and down the logistics value chain. Throughout the journey, this company has been an engine for innovation in Dubai, both contributing to the RIS as well as benefiting from its unique characteristics, which this case explores in detail based on the feedback of the subjects interviewed.

Interviewees

Case 1 Interviewees: DP WORLD	Title (Terminal)	Tenure at DP World
HE Sultan bin Sulayem	Group Chairman & CEO	1982-Present
Dr. Mohammed Sharaf	Group CEO	1992-2016
Yousif Almutawa	Chief Information Officer	2009-2016
Rashid Abdulla	CEO and MD for Europe	1995-Present
Anwar Wajdi	SVP Corporate Strategy	1992-2016
Franco Bosoni	Product Development Manager	2020-Present

Table 9 DP World Interviewees

I was privileged to interview a range of past and present senior leaders at DP World for this study, including its current and former CEOs. His Excellency Sultan bin Sulayem, the current Chairman and CEO of DP World, is a prominent Emirati business figure who has been an advisor to the ruling family for decades. Besides his role running DP World, he launched and led several other cornerstone entities in Dubai such as real estate firm Nakheel (famous for Palm Jumeirah, the world's largest man-made islands), global investment house Istithmar World, and DMCC, the fourth case examined in this study. His interview was arranged through the Group Chief Communications Officer of DP World, Daniel Van Otterdijk, who attended the interview and provided some follow-up clarifications.

Two additional members of the current DP World team, Rashid Abdulla and Franco Bosoni, were interviewed to ensure the study's findings are up-to-date with the latest activities of the company. Rashid Abdulla is the current CEO and MD for Europe and has been with DP World since 1995. He is based in the UK, and provided an international lens, as the other subjects were all Dubai-based. Franco Bosoni is a recent addition to the DP World team and was selected as his role is focused on innovation through new product development, and he used to work at DMCC in a similar capacity, offering the unique opportunity to have a single subject contrast two cases in this research.

Complementing this set of three currently active employees, I had the opportunity to speak with the last senior management team represented by ex-Group CEO Dr. Mohammed Sharaf, ex-SVP of Corporate Strategy Anwar Wajdi, and ex-CIO Yousif Almutawa. Almutawa maintained a formal link with DP World for several years after he left his CIO role in 2016, as DP World anchored the TURN8 startup accelerator fund he co-founded. Wajdi and Almutawa were part of Sharaf's

core team, and the three of them were involved in all innovation-related activities during the period they were managing the company. It is important to note that Sultan bin Sulayem was at DP World throughout this earlier period as well, in his capacity as Chairman of the Board.

Historical Context

Although the current corporate entity known as DP World was established on September 28, 2005 as a merger between Dubai Ports and DPI Terminals,²⁵⁷ the organization's roots extend far back into Dubai's history. In fact, the case of DP World is one of the oldest commercial stories in Dubai, when viewed in its full historical context. It is a story of the development of the entire logistics sector from a minor local port operator to a global logistics powerhouse that currently handles 10% of the world's container traffic across ports in 40 countries.²⁵⁸

The direction of Dubai's history changed in 1900 when the ruler at the time, Sheikh Maktoum bin Hasher, took a decision that would transform Dubai's sleepy port on the creek into an international player, albeit a tiny one at the time. Iran was the most powerful economy in the region, and its ports at Lengeh and Bushehr were the most important trading hubs on the Gulf. When the Iranians decided to increase tariffs in 1900, Sheikh Maktoum seized the opportunity to take the exact opposite approach, establishing Dubai as a free trade port with no customs duties. In fact, he went even further by attracting Iranians based in their key port cities to Dubai through offers of free land, direct government support, and a welcoming business environment. Traders, such as the ancestors of this case study's interviewee Anwar Wajdi, took up the offer and relocated their families from Bastak in Iran to what became known as

²⁵⁷ Jacob, "Dubai Ports and DPI Terminals Merge," 1.

²⁵⁸ "DP World Investor Presentation April 2021," 10.

the Bastakiya neighborhood of Dubai, a thriving seaside port and trading hub operational to this date. The link with Iran, forged through these immigrating traders who settled and eventually became citizens of the United Arab Emirates, has persevered to this day, with Dubai serving as one of Iran's largest trading partners.

Anwar Wajdi reflected on his own family background and the composition of overall Dubai society, sparked by this defining moment in the region's history:

Most of the traders in Dubai during the early days, they came from the south of Iran. So, most of them emigrated early, and they inhabited Dubai. My father used to do business with India; my grandfather did also. And Dubai was a stopping point for him. And that's why most of the older traders, they even speak Urdu and Hindi very well because of their exposure to the Indian community from early days.

If you look at Dubaian society, we are divided into three categories. You have the Bedouins... and then you have the sea people who were pearl divers and the fishermen. And then you have the traders and the businesspeople. So, we came from that business segment, so did [former DP World Group CEO and interviewee] Mohammed Sharaf and so did many other colleagues.

With this single move welcoming the trader segment from Iran, Sheikh Maktoum signaled that Dubai was open for business and welcoming to foreigners in a way that was quite unique for the time. This was a foundational decision that planted the seeds for the essential RIS ingredient of learning through specialized human capital flows and set in motion an economic strategy based on an international port that would be accelerated by Dubai's later rulers, most notably, Sheikh Rashid bin

Saeed. It was Sheikh Rashid, who, while he was still crown prince under his father Sheikh Saeed bin Maktoum, commissioned a study to dredge Dubai's creek which was quickly filling with silt and becoming difficult for ships to enter. The cost to remedy the situation was £600,000, an impossible sum for Dubai to independently produce at the time, so he decided to raise the money from a combination of contributions from the local merchant families benefitting from the creek (£200,000) and borrowing from neighboring Kuwait (£400,000).²⁵⁹ The project was a huge success, and Dubai was able to repay its loan to Kuwait early and handsomely reward the local families that contributed through allocations of exclusive import licenses that eventually made some of them billionaires today.

This anecdote of Dubai's port industry history is important not only for the DP World case; the same spirit of following a vision to create something out of nearly nothing against improbable odds propelled Dubai forward during the launch of all three of the other cases—Emirates Airline, DIC, and DMCC. Each of those genesis stories will be taken in turn in the following chapters, but the earliest foundation was laid by Sheikh Rashid as he modernized the creek and fueled the Dubai economy through trade at a scale never experienced prior to his rule.

Buoyed by the success of the newly dredged creek and the growing volume of large ships doing trade there, Sheikh Rashid decided to undertake an even bigger project of building a new deep-water port on the sea in 1967. Against popular advice, he expanded the design mid-construction from a modest four berths to an ambitious sixteen, believing in the large-scale potential of Dubai as a shipping hub. Even this four-fold increase wasn't ambitious enough for him in the end, and by the time the

²⁵⁹ Krane, *City of Gold*, 69.

drawings had been updated, he ordered a re-doubling to 35 berths in the final design.²⁶⁰ In 1970, Gray Mackenzie and Company established an entity to operate this port under a decree from Sheikh Rashid himself. The formal history of DP World begins that same year with the creation of a new company called Dubai Port Services. This modest single port operator is the entity that, after several mergers and much growth over the following 35 years, would become the international player known as DP World.²⁶¹



Figure 6.1 Port Rashid in 1972, Source: Gulf News Archive

Perhaps that would have been enough for one ruler's contribution to the ports industry in Dubai, but Sheikh Rashid had an even more ambitious plan that he hatched less than ten years later—one that made everyone from local citizens to the *Wall Street Journal* doubt him.²⁶² He decided to build a massive, entirely new deep sea port far away from the center of town in a desolate patch of land that had to be completely dredged from the shoreline. The plan for Jebel Ali port was so outlandish on every dimension—cost, location, and size to name a few—that hardly anyone

²⁶⁰ Krane, 78.

²⁶¹ "Who We Are | Global Trade & Logistics | DP World."

²⁶² Vicker, "Is Dry Dock in Dubai to Be High and Dry and Pie in the Sky?"

believed it would be economically viable. When even his son, current ruler of Dubai, Sheikh Mohammad bin Rashid, joined the local businessmen in challenging his father's risk taking on such a grand scale, Sheikh Rashid simply explained, "I'm building this port now because there will come a time when you won't be able to afford it."²⁶³ The fire he felt under him as the oil wealth was surely drying up to secure the financial future of Dubai and diversify the economy through establishing core industries that compete globally propelled him to take this big bet, which paid off beyond anyone's imagination.

When his father became ill and he started managing the affairs of the state directly, Sheikh Mohammad renegotiated terms with Gray Mackenzie from a profit share to a performance-based operator agreement under the Port Rashid Authority, which eventually became the Dubai Ports Authority (DPA), the entity that managed all local ports in Dubai. In 1999, Dubai Ports International (DPI) was founded to export port operation knowhow beyond Dubai, with the first project undertaken in Jeddah. DPI was led by interviewee Mohammad Sharaf. In 2005, DPA and DPI merged to formally create DP World, one of the largest port operators globally.

Reflecting back on the vision of Sheikh Rashid now that the oil has indeed all but dried up in Dubai and DP World has become a global powerhouse, his insistence on developing the logistics industry through these bold moves and risky infrastructure investments is even more impressive. In the words of current DP World Chairman and CEO, HE Sultan bin Sulayem:

Many people bet against Dubai, and they lost. We ... are developing because it's our survival—we have nothing else. We have no oil; we have no gas. If

²⁶³ Maktoum, *My Vision Challenges in the Race for Excellence*.

anybody today in the world, if they have oil and gas, even when they're sleeping at night, they make money. We don't. That's why we work hard. We work harder than everybody... So, for us, we're in a survival mode.

Over the years, DP World has developed into a global organization, operating 295 business units across 78 countries in 6 continents. In its 2021 annual financial report, DP World announced revenues of USD 10.8bn, with an EBITDA of USD 3.8bn. Importantly for Dubai, the principal owner of the company after state investment vehicle Dubai World acquired outstanding shares and delisted the company from Nasdaq Dubai in 2020,²⁶⁴ DP World reported dividends to its owners of USD 1.1bn in 2021. These profits attributable to the owners of the company has been around the USD 1bn mark (from 0.9bn to 1.3bn) since 2015, so this is a critical, consistent source of state income.

When the direct management of the company transitioned from Sharaf to bin Sulayem in 2016, one of the key shifts that occurred was the expansion of the strategy from pure growth as a port operator into an integrated logistics provider across the value chain, fueled by an acquisition strategy. Simply put by bin Sulayem, “I don't want to be the biggest port. I want to be the most profitable company.” He explained that this strategy is realized by providing high margin, value added services on top of the existing port management activities, and by being very selective with which ports to operate. Whereas Sharaf took the company from a Dubai-based port operator into an international player, first through his leadership of DPI and eventually as Group CEO, bin Sulayem re-focused the company on vertical integration and high profit operations.

²⁶⁴ “DP World Returns to Full State Ownership, Takes on \$8.1 Billion Debt.”

One major pillar of DP World history remains: the establishment of the Jebel Ali Free Zone, the first free zone in the UAE and the largest one in the world, offering companies based there shelter from the 5% duties imposed in the rest of the country and exemption from the 51% local ownership law. For the first time, 100% foreign-owned companies could ship, manufacture, store, and trade their goods tax-free. This became a much-needed magnet, as in the early 1980s the Jebel Ali port was underutilized—traders were preferring to remain closer to the city at the Rashid Port and saw no incentive to migrate. Jabal Ali is currently home to 8,700 companies from 130+ countries, accounting for 130,000+ jobs and attracting approximately 24% of Dubai’s FDI.²⁶⁵ JAFZA is wholly owned by DP World and is a cornerstone of its strategy to provide global connectivity through Dubai. DP World has successfully exported the JAFZA model to other countries, currently operating five economic zones across the UAE, UK, Djibouti, and the Dominican Republic. Seven more are currently under development.

With this background on the development of the critical ports industry in Dubai and DP World’s evolution within that context, the next section begins examining the data provided by the interviewees on what this case says about the RIS in Dubai. The data are divided into four sections based on the sub research questions under the central question: understanding the roles of government, industry, universities, and the level of innovativeness within DP World itself.

²⁶⁵ “About Jafza.”

Corporate revamp puts Dubai ports and free zones under new authority

RESTRUCTURE AIMS TO CREATE A POWERFUL GLOBAL PLAYER

By KOKILA JACOB
Staff Reporter

Dubai A major restructuring of Dubai's ports and free zones under a new independent authority with a new corporate identity and logo was announced yesterday. The move aims to create a powerful global player.

The commercial operations of the ports will be handled by the new DP World, established through the merger of the Dubai Ports Authority (DPA) and DPI Terminals (DPI).

The Jebel Ali Free Zone Authority (Jafza) and its international arm, Jafza International, have been fused into a single organisation — the Jafza and Business Parks.

New regulator

The Dubai Ports and Jebel Ali Free Zone Authority has been formed as a new regulator to oversee the ports and free zone operations.

A Board of Ports and Free Zones has also been formed to supervise the development of the ports and free zone businesses.

All these will report to the Ports, Customs and Free Zones Corporation (PCFC), which is the present informal umbrella organisation.

"The tremendous success and growth of our port business in recent years have led us to make significant changes to the organisation of the whole Dubai Ports group," said Sultan Ahmad Bin Sulayem, executive chairman of PCFC and chairman of the board of the Ports and Free Zones.

Addressing a press conference held to unveil the new structure, corporate logo and rebranding, Sulayem said the rationale for the reorganisation was to put in place a more effective and focused organisation.

"The aim is to have a transparent legal structure and clearer corporate governance rules and policies, increased delegation of authority and responsibility within the businesses so that they are able to move and act quickly in accordance with DP World's strategy and vision," said Sulayem.



HADRIAN HERNANDEZ/Gulf News

New identity

From left: Mohammad Sharaf, Chief Executive Officer of DP World; Jamal Majid Bin Thaniyah, Vice-Chairman of the Board of Ports and Free Zones and CEO of Dubai Ports and Jebel Ali Free Zone Authority; Sultan Ahmad Bin Sulayem, Executive Chairman, Ports, Customs and Free Zone Corporation, and Salma Hareb, Chief Executive Officer of Jafza and Business Parks, at the unveiling of the new logo of DP World at the Madinat Jumeirah hotel yesterday.

FINANCE

No plans to raise funds via IPO

'We do not get into ventures unless they are financially viable'

Dubai Dubai Ports Authority is not considering an IPO (initial public offering) to raise finance for its global ventures, said its top official. "Not yet," said Sultan Ahmad Bin Sulayem, chairman of the board of Ports and Free Zones, responding to questions on the financing of its global investments.

"Finance could be raised naturally through banks and they are always willing to offer good terms considering

the solid track record of Dubai ports performance and economic viability," he said.

DP World's near term investments in nine of the 18 ports it operates in countries outside this region will top \$550 million over the next three years, said Mohammad Sharaf, the former managing director of DPI Terminals, and chief executive officer of the new DP World.

The finance is raised internally, he said. "The

projects finance themselves. We do not get into ventures unless they are financially feasible," said Sharaf.

DP World, formed in a merger of DPA and DPI, is one of the largest port operators in the world.

DP World's growing regional and global operations and its increasing challenges necessitated the creation of a new unified structure and brand to support its growth strategy, he said.

— K.J.

Dubai ports and free zone restructuring



Source: DP World

Gulf News

Figure 6.2 Announcement of DP World Launch, Source: Gulf News Archives

See Appendix B for other Gulf News archive articles on DP World

Interview Data on Research Questions

Role of Government

The interviewees highlighted six themes with respect to the role of government in fostering an environment conducive to innovation from DP World's perspective: 1) Infrastructure Investment, 2) Predictable Regulations, 3) Empowering Leaders, 4) Setting the Innovative Agenda, 5) Cross-Government Coordination, and 6) Fostering a Diverse Society. Each will be taken in turn below with comments from the subjects to better contextualize their perspectives on the importance of these themes. These findings, along with the other interview data relating to the other research questions, will be summarized in the conclusion at the end of the chapter. A cross-case analysis will be conducted and put in context of the academic literature in Chapter 11.

Infrastructure Investment

Perhaps more than any other organization in Dubai's history, DP World benefitted from the government's extensive investment in enabling infrastructure and bold vision as to how big the once-modest ports sector could become in the future. As explained in the historical context section above, Sheikh Rashid's insistence on spending the state's limited oil wealth on developing this sector was a critical ingredient to DP World's success.

As a wholly owned subsidiary of a Dubai state investment vehicle, DP World is technically an SOE but operates as a private enterprise does in terms of its commercial ambition and drive to innovate. Franco Bosoni reflected on the early history of DP World and how this spirit of innovation was built into the company from its beginnings:

[DP World] has always been a very, very big innovator. You know, we forget now that at the time when DP World started developing Jabal Ali port, it was huge; it was seen as a bit of a crazy project in the sense that there were no real indicators that would suggest that the kind of capacity and the sort of the magnitude of the project that they were building was warranted, given the trade volumes, and of course, the growth and the size of the city at the time. So, from its early days it was a company that made big bets on [the] future and their own sort of point of view about what's going to happen.

Anwar Wajdi viewed the government's role more broadly across industries to create an environment that would draw people to Dubai, a once-desolate place disconnected from the rest of the world. Connectivity and the resulting exchange of ideas could only happen with the right infrastructure, which Sheikh Rashid and his son Sheikh Mohammed boldly invested in, seeding the anchor industries of logistics and aviation, as well as tourism, finance, real estate, and retail. Wajdi reflected on all of these factors of government investment into the city infrastructure and how important it was to the creation of a thriving innovation ecosystem in Dubai:

The airport, Emirates Airlines, the port. At the same time, Sheikh Mohammed created an attraction for the tourists. This is a desert area. Why should tourists want to come here? So, we had to create something to attract people to come here. Today, everybody's fighting to come to Dubai.

From his international lens, Rashid Abdulla echoed the same sentiment, “The [Dubai] government creates unbelievable infrastructure ... for people to start work and production.” It was his perspective that without this necessary infrastructure precondition, innovative companies such as DP World could never have been built in

Dubai, and few governments have shown a willingness to invest as boldly into the infrastructure that facilitates innovation as Dubai.

Predictable Regulations

The next theme that emerged in the discussion of the government's role in developing an effective RIS in Dubai was its regulatory power. Although this is a common pillar of government involvement in supporting innovation systems globally, the angle unique to DP World's experience is developing its own jurisdiction called the Jabal Ali Free Zone (JAFZA), with the expressed goal of enhancing investor confidence in regulatory stability and predictability. The interesting point raised by Sultan Bin Sulayem, architect and first leader of JAFZA, was that despite its name as a "free zone," the key was not only in the tax-free status afforded to companies conducting business within its bonded borders; rather, it was fostering a predictable regulatory environment which would encourage companies to invest in longer-term innovative activities:

A free zone is basically a place where people within a certain area have certain rules or regulations that are agreed between the user and the authorities. And they enjoy that these rules will be respected. One of the problems with people investing is they always worry about the government ... you don't know what is happening in the mind of the government. Today there is no tax, tomorrow there will be tax... The rules [in a free zone] have been agreed from the beginning. *It doesn't matter if there is tax, no tax, how much tax—as long as they know it, they have no issue. Then they can invest, or they can make decisions.*

As explained in the section above, JAFZA now is a major contributor to the Dubai economy, attracting almost a quarter of Dubai's FDI. Businesses registered in JAFZA generate \$104.2 billion in trade value year on year.²⁶⁶ Not only was Dubai successful itself in implementing the free zone concept at JAFZA, but there are also now over 40 such free zones in the UAE (two examples of which are DIC and the DMCC, the third and fourth cases examined in this study), and other countries learned from the Dubai free zone concept pioneered at Jabal Ali and implemented their own. Bin Sulayem gives an example:

The UK was actually one of the countries that looked at Jabal Ali and now has adopted eight free zones, what they call "free ports."

Empowering Leaders

The third theme that emerged across several of the senior leaders at DP World was that of empowerment and trust by the government. The leadership teams over decades of successful operations were neither royal family members nor politicians; they were technocrats and traders, chosen for their competence above all else. Mohammed Sharaf reflected on the trust that taking on such a role entailed and the way the government viewed its direct involvement in the operations of the companies:

Whether it's Emirates, whether it's DP World or Emaar, whatever it is, you were given a clean sheet of paper. If you were given a port, you were given a clean sheet of paper. Figure it out. Given an airport? Figure it out. And don't come for money. *That's the best part. That's the best part.* Because then you have to figure it out. I'm trusting you to give my capital to you, asset to you

²⁶⁶ "About Jafza."

and run it, but don't come for money because I've already put money into it.

And we never went to the government for money.

The fact that Sharaf repeats “that’s the best part” when addressing the lack of government financial support is telling; the core of the government’s role is beyond serving as a mere funding source or regulatory enabler. To him, the most important contribution from the government is raising the bar on what is perceived to be possible and enabling the leadership of the organization to take risks to make it happen. When asked where in the government this mindset comes from, Sharaf explained:

The big boss, Sheikh Mohammed [bin Rashid Al Maktoum]. I think he has a leadership style where he says, okay, go and make mistakes and learn from it. I'll take the blame. If you make a mistake, it's my mistake. You do good, it's yours.

This theme of empowerment has been consistent over the years and is cited by other researchers in the context of DP World. For example, Martin Hvidt interviewed Geoff Taylor, CEO of Dubai Dry Dock, a DP World subsidiary, in 2006:

If I want to spend 40 million dollars on an extension of the repair facilities here at the Dry Dock, I will pass the request to the head of Dubai World, Mr. [Sultan bin] Sulayem, who is right under Shaykh Mohammed. Usually I will get an answer within thirty minutes... Here they are much more forward thinking, dynamic, and a lot more trusty. They trust that the person who runs

the businesses generally tends to understand the business and as such [is] in the best position to see business opportunities.²⁶⁷

The themes of urgency, empowering trust, and financial self-sufficiency stemming from the most senior leadership—Sultan bin Sulayem and Sheikh Mohammed himself—show that these are foundational principles that guide the government involvement in the RIS.

Setting the Innovative Agenda

A theme that runs throughout the cases and is a hallmark of the Dubai government's contribution to the RIS is how explicitly involved it is in setting the bar when it comes to the ambition to innovate. Sultan bin Sulayem recounted a concrete example of how the leadership was often a few steps ahead of the private sector when it came to promoting innovative technologies and predicting trends:

In the early 2000s Sheikh Mohammed introduced the electronic government. And at that time, we didn't know what he meant by it. And then after he spoke, I went to him and asked him, "What do you mean by electronic government? You need the public." *He said, "I can't force the public to use it. But if the government communicates [electronically], then everybody else will have to adapt." And he's right.*

And in 2010, he came back and said, "Electronic government is obsolete. Now we're going to have smart government." Imagine 2010, even apps were advanced at the time. This is early. And he said, "We're going to

²⁶⁷ Hvidt, "The Dubai Model," 403.

use it so you can fulfill all what customers want from a smartphone.” And that was a smart government.

Not only was the government aware of the next technological trends on the horizon, they used savvy techniques to guide the public and private sector towards taking advantage of these trends, leveraging the sphere of influence they could directly control. As bin Sulayem mentions, Sheikh Mohammed knew that he could not top-down force the entire society to adopt electronic channels in the early 2000s, but he could use government services as a way to show the private sector what is possible. This public sector leadership on innovation is an important defining factor of the Dubai RIS which will be explored in further depth in the following cases.

Cross-Government Coordination

Another important dimension discussed was the easy collaboration across government entities to facilitate innovative process improvements that made Dubai and DP World more competitive on a global level. One of Sultan bin Sulayem’s many previous roles within the Dubai government was the Chairman of Dubai Customs, giving him unique insights into the entire logistics sector from regulations to on-the-ground execution. Wajdi reflects on how this unique Dubai formula of centralizing the roles affected his job when trying to solve problems or come up with and implement innovative solutions:

This was brilliant, you see, because Sultan bin Sulayem, he was the chairman of both the port customs and the free zone. So, that made our life easier. If we were having a problem with them, we can always go to the chairman and say, Abu Ahmed, we're having problems with the customs. They are not

cooperating or they are not helping us. So, he would intervene. So, that was the beauty of it.

Sultan bin Sulayem takes this point another step and highlights how the entire Dubai government acts as a single machine, and a factor that gives Dubai a competitive advantage is how seamlessly the various government organizations work together towards the common goal of efficiency.

Customs have a very big responsibility. If there's a container today in Jabal Ali, when it arrives, if it has food, it must be cultured. If it has medicine, it needs Ministry of Health approval. So, the ship, [in] 20 days it will arrive. So, what we do [with] preclearance [is that] we are proactive as customs—we go to all the people who give the permits, to talk to them so that by the time the container comes, it has all that.

Although technically pre-approvals from other government regulatory bodies were not part of DP World's scope as a logistics player, they realized that the ability to do so was a competitive advantage that few other jurisdictions could replicate and so invested in making the experience seamless. This saved precious time for shippers and added to the Dubai value proposition. Sharaf echoed a similar sentiment reflecting on his past role as a liaison between customers and the myriad Dubai government entities they had to interact with. He commented that this teamwork approach to solving challenges across government entities is a factor that adds to Dubai's competitiveness globally.

So, if you are doing business with me as DPA, you're importing and exporting. Whether you're an Emirati, you are Indian, you're British, you're American, doesn't matter. You're my customer. We had in our head that our customers

are paying our salaries. So, if you have a problem with Dubai police and your license renewing or municipality to renew your license or your health department, your healthcare is not being renewed, immigration, *your problem is my problem.*

Wajdi, reflecting on the role DP World played in developing the ports and broader logistics industry in Dubai, highlighted the key importance of government collaboration:

It was not an easy thing to do. But the beauty of it is that we had everybody working at it. Everybody, I mean the ports, the customs, because they had to work in symphony. They had to work together so that the music doesn't stop. And so, it's beautiful music. This is what I tell people. The free zone had a lot of support from everybody, from different entities in Dubai, from the port management, from the customs, the free zone management. They were all working together, traveling together as one team to make sure that it pays off.

Fostering a Diverse Society

More than most places, the Dubai government has a direct hand in setting the composition of society and overall culture, and the historical context of the DP World case shows how this first began. When Sheikh Maktoum bin Hasher welcomed the Iranian traders to Dubai in 1900, he set in motion an openness to foreigners that would define Dubai's culture over the next century. The government has taken the proactive decision to open its doors to an extremely diverse array of people in numbers not typically seen elsewhere. Today, 92% of Dubai's 3.5m residents are citizens of other countries, a unique societal composition which plays a major role in the RIS itself.

Population Estimated by Nationality Emirate of Dubai (2019 - 2021)			
Nationality	2019	2020	2021
Emarati	263,450	271,050	278,785
Non-Emarati	3,092,450	3,140,150	3,199,515
Total	3,355,900	3,411,200	3,478,300

Table 10 Dubai Population by Nationality, Source: Dubai Statistics Center

Anwar Wajdi highlighted this aspect in his assessment when asked about what factors distinguished Dubai with regards to its innovation ecosystem, reflecting on the cultural element:

People used to come—foreigners, visitors—they used to come and visit Jabal Ali and ask, “What's your formula? Tell us your formula.” I always say, okay, the formula is not only the port. It's a combination of things. Everybody has a port. Everybody has land. It is the way Sheikh Rashid created the culture. The right culture for Dubai. It's the composition of society. We had the Indians, we had the British, we had the Iranians. The diversity.

With this diversity comes subject matter expertise that is essential to fostering a learning environment conducive to innovation. As one of the weaknesses of the Dubai RIS is locally generated research, being so open to bringing foreigners to become a part of the society is a critical ingredient to the success of the system.

Role of Industry

Within the context of the Dubai RIS, DP World plays an important leading role as a representative of the industry component of the Triple Helix. To this end, subjects shared examples of the ways the company has collaborated with leading international equipment manufacturers to devise radical innovations leading to efficiency gains. Sharaf and Almutawa provided a balanced assessment of the

successes and failures of DP World's attempts to integrate into the burgeoning startup ecosystem that serves the logistics industry as a whole. The role of other companies operating in the sector, particularly customers, is highlighted as a focusing mechanism to identify the areas that are in highest need of innovation. Finally, this section outlines the perspectives of the interviewees on industrial path development, as it pertains to the logistics sector and DP World's experience expanding the scope of what was the historical path.

Innovating with Manufacturers

One of the advantages of running the largest port under consolidated ownership and management was the ability to attract top equipment manufacturers to co-develop bespoke solutions to enhance efficiency based on the challenges highlighted by the DP World operational team in Dubai. DP World compensated for a lack of internal R&D capacity (further explored in the next section on the role of universities) by partnering with specialized global firms to build radically innovative solutions to very traditional problems. Mohammad Sharaf explains how he consciously designed for manufacturer engagement and preferred that model over an independent in-house R&D center:

Now, as a lab, we didn't have that. I used to call Jabal Ali our lab because Jabal Ali was our largest [port]. Any manufacturer, whether it was equipment or IT technology, Jabal Ali was for them the world's largest lab in ports, under single operation. Nowhere in the world did you have that.

A great example of a manufacturer collaboration was recounted by Sharaf when asked about how he engaged with other leading firms in the same industry to innovate together:

In the shipping and container business ... innovation technologically has not happened much. The traditional way of lifting the container is to lift one container from a crane, bring it to the ground and drop it, one by one. And it takes days [to unload one cargo ship], depending on the size and configuration of the ship. What we did in collaboration with the crane manufacturers in Jabal Ali, we created what we call a Spreader, which could carry two or four containers at the same time. *That was the first in the world.* And that was in collaboration with Emirati engineers from Jabal Ali and the manufacturer [to] improve our efficiency performance by 50%, immediately.

The drive to be constantly improving service levels and competing on a global market encouraged DP World to take such steps, co-developing new technology when others were content to remain limited by whatever solutions were already available in-market. Another example of a DP World innovation developed with industry partners, this time to solve a challenge more specific to the Dubai geographic context, was shared by Sharaf:

In 2010-2011, technology was playing a major role ... in the terminal business [but] automation was very expensive, number one. Number two, it was not accurate. Performance was not as good as when you're doing it manually.

In Europe, they [fully automate]. Why? Because the cost of labor is too high, and labor's performance is worse than automated terminals. So, they would rather have a slow automated terminal than laborers. So, they did that at a very expensive cost.

What we did, we said, okay, listen, we have a different issue here. Our issue is that we want to employ Emaratis, and Emaratis would not work as

blue-collar workers. You go to Jabal Ali in the old days, if the number of people we had was 1,000, 900 would be blue collar workers. And that's an issue; it's a social issue, number one. Number two, it's a burden on the government because the salaries are low, but the government has to give them health, safety, everything. So, we were thinking, what can we do now?

If I do [fully] automated, I don't need people, so I'll do something which is cheaper and faster than manual even. I'll do in between: a hybrid, I do semiauto. In other words, I'll be operating my terminal from distance, remotely. So, we brought these manufacturers and said, this is what we want to do.

DP World became a pioneer in remotely operated terminals through technology developed at Jabal Ali to solve the exact challenge Sharaf described. This enabled them to become significant employers of Emiratis, and especially Emirati women, who would have never worked as manual crane operators portside. The unique constraints DP World faced pushed them to develop innovative solutions that, counterintuitively, led to efficiency gains beyond what could have been achieved through a fully technology-driven automated system at the time.

Engaging the Tech Ecosystem

One would not expect that one of the earliest corporate-backed technology startup funds in the Middle East—if not the first—would be launched by ports management company. DP World was clearly ahead of its time in 2012 under the leadership of Mohammed Sharaf, when he decided that engaging with the broader technology ecosystem was the best way to change the culture internally around

innovation. He reflected on the need for such a radical move to expand what his team considered was possible:

People were within their own narrow port industry thinking... How can I improve what I have? Not coming out of the box. We said, okay, let's create a kind of a fund. Instead of just focusing only on the people within DP World, let's open it to the world and say, okay, we want innovative ideas within transportation, and we are willing to invest—not only money, but we'll bring you here, we'll get you the visa. Those days, visas were not easy. We'll give you the place, no charge. You'll come, we'll give you the lab and we put in \$30,000 [to cover your costs].

Almutawa was serving as CIO at this time, heavily involved in the operations of this startup funding initiative. He recounted a comical moment that illustrates how far ahead this fund was relative to the team internally as well as their overall industry ecosystem in Dubai at the time. When he drafted a quote for the press release that the communications team was preparing about DP World's first seed investment into a startup, the head of PR made an unexpected change:

He edited it and instead of “seed,” he put “germ.” I said, “Just a minute ... listen ... remove, it. It's a disaster.” He said, “Yeah, but what's ‘seed’? Nobody understands it. We are germinating ideas.” I'm like, “No, bro, this is not how it is. ‘Seed’ is a term used in the Silicon Valley. It's known.” So, they had zero idea. They thought maybe it was a problem with my English... So yes, it was unique. Mainly because the top management bought into this from the CEO level.

This internal startup funding initiative eventually birthed the independent TURN8 accelerator, anchored by DP World, and run by ex-CIO Yousif Almutawa starting in 2016. Although it seemed like a brilliant idea to take a leading role in developing the industry dimension of the RIS and infuse DP World as well as the broader environment with the most innovative technology-based companies, the practical results of the program were not what was expected. Sharaf, Almutawa, and Wajdi struggled to recall an example of a startup that came through TURN8 and made a measurable impact on the business. Sharaf reflected on why there weren't more success stories and why DP World eventually stopped funding the accelerator:

In some areas, we didn't really see much. We did not because I think we were a little bit early. We didn't have what you call angel investors or what you call venture capital people. They were not looking at Dubai at the time. So, we are ahead of our time a little bit.

Although timing was undoubtedly a factor, Almutawa pointed to an additional concern that made it extremely difficult to integrate startup technology into DP World's operations, particularly after 2016 when he transitioned to running TURN8 on a full-time basis. With a major change in the management team at DP World at that time, interest in spending time with startups waned, leading to an eventual end of the TURN8 engagement:

They didn't cancel anything, but they had their own priorities ... no one owned it. You don't have somebody really fighting for it... There's no one to talk to in DP World. [The startups] don't know who to talk to.

Almutawa also explained that the disappointing outcome was also partially due to the design of accelerator—namely, which technology companies were selected.

The portfolio was quite early-stage, meaning that they typically did not have direct experience working with large organizations like DP World, and because the scope was quite wide to include any technology related to transportation and logistics, many of them did not necessarily have technologies that could be directly integrated into DP World's business. What seemed like a compelling concept in theory did not drive the intended results of introducing innovation within DP World, leading the organization to focus more on internal technology development. Furthermore, broader systemic benefits could not be realized as the financial backer and potential first customer to these early-stage companies no longer saw the value in engaging and effectively ended the entire endeavor.

Franco Bosoni shared his views on where the company stands today when it comes to engaging the broader industry on its technology needs. Similar to what will be discussed in the Emirates Airline case next, DP World began adopting an in-house development mindset, preferring that over working with others:

[DP World has] a huge technology team that is growing in India, because one of the things I guess that they want to do is to really own a lot of the things that they do and create the solutions that they want to basically suit the requirements. So instead of buying or contracting some of the solutions, they're directly developing and customizing everything they want.

This theme of in-house development will be further explored in the university section below as a way to compensate for a less-developed R&D ecosystem in Dubai. Self-reliance, although a powerful tool for large companies that have enough money to invest in building the requisite teams, can weaken the overall RIS and disadvantage SMEs who need a strong, integrated industry pillar to thrive.

Learning from Customers

When asked about the way DP World collaborated with the broader industry to drive innovation, Sultan bin Sulayem highlighted the role other businesses who are customers of DP World provide feedback and push the organization to improve. He structurally encouraged customers to give negative feedback as those pieces of feedback would highlight areas that the team could improve:

Many of the innovations came from the customer. So, we have an award for the people who complain about the customs every year. And that means whoever keeps complaining— “You delayed me here, you did this!” —it's really good because they give us information.

Industrial Paths

Finally, several of the interviewees commented on the nature of DP World's industry itself—namely that the ports sector is one of the deepest-rooted parts of the economy—as an important ingredient to the success of the company in Dubai. Yousif Almutawa contrasted building a company like DP World with newer initiatives such as developing a drone economy that has no history in the region, no specialized talent to support its development, nor the requisite private sector industry ecosystem to ensure its longevity. An appreciation for the fact that DP World has been an example of industrial path extension and upgrading, not creation, led Almutawa to comment:

Be who you are. Be proud of who you are and capitalize on the strength that you have. I wish I want to be maybe a center of manufacturing drones. But look, you never been. And go back to your roots and your core. You are a trader.

Why are you running away from yourself? Just be who you are. It doesn't matter if somebody he thinks about you this way, that way. So same thing with a society, same thing with a country. And I think as the sooner you realize who you are and this is your strength and don't be ashamed of it, don't be shy of it, it will grow because this is your strength.

Anwar Wajdi made a similar point about being in a stronger position to innovate because DP World was operating in an industry that was authentically linked to Dubai's historical competitive advantage. In that context he advised, "If you are a leopard, you're a leopard. The leopard does not shed its spots."

Almutawa went on further to warn about the unsustainability of government-funded new sector development without having a diversified private sector to support it, a common strategy in cash-rich Gulf economies that are in a rush to spur new industries, particularly knowledge-based ones:

If you have only government, the government can push as much as it can, but it's not infinity money, right? So they would push, they will sponsor, they would give grants, they will help. But then if there is nothing feeding back to support, then until when? For drones, you need an industry. It's really an industry to manufacture drones. It doesn't exist.

These comments link to the academic discussion outlined in Chapter 2 on innovation typology, advancing the argument that supporting incremental innovations is a more appropriate government strategy in the Gulf than focusing on ways to spur radical innovations. Furthermore, the market precondition identified by Flynn in his sponsorship theory reinforces the fact that government programs like the ones

Almutawa references will struggle to succeed in the long term without a sufficiently developed market.

Role of Universities

Common across all six interviewees was the recognition that neither Dubai nor the broader UAE had research institutions that directly contributed to the innovative activities at DP World. In fact, I could not uncover any local university collaborations besides talent recruiting, which was mainly centered on hiring junior Emirati talent, not specialized technical expertise. Interviewees recognized this as a large gap in the RIS, and, when asked about the solutions DP World pursued to close the gap, their responses can be summarized in three approaches: partnerships with international universities, developing solutions in-house, and global recruiting to find the necessary talent. Each of these areas will be taken in turn to better understand how DP World remained innovative despite being in an environment that lacked direct local research institution inputs into their corporate innovative process.

Local vs. International Universities

Although the same sentiment was shared across the interviewees, Yousif Almutawa characterized the local university system gap most directly:

When it comes to academia, a very important component ... here, it's a weak link in the UAE, and that's why we don't have a lot of good talent. You need PhDs. I mean, now we talk about innovative things that relate, for example, to AI ... if you want to really talk about deep AI, you need mathematicians, you need people with deep, deep scientific knowledge about putting these algorithms and neural networks ... you wouldn't find it here. You don't have these universities that actually create this research.

When asked about steps taken to bridge the gap left locally, Almutawa pointed to two international university partnerships that were attempted during his tenure as CIO of DP World. Although these were structured collaborations with some of the world's top research institutions, they unfortunately did not result in measurable outcomes with regards to innovation at DP World:

We had to do partnerships with universities outside [the UAE]. So, we did with Oxford in the UK. We went to MIT Media Lab in the US. And we even bought a subscription with them to participate. Now, whether they participated actively or not, that's another question. But the intention and the move took place.

This same question is explored in the Emirates case with similar outcomes. Although an alternative approach to a local research university relationship is looking beyond the borders of the UAE, the practical challenge is turning that long-distance relationship into one that fuels actual innovative activity in Dubai. It is an instructive data-point that DP World's experience was that such partnerships were not worth the investment, if measured based on the R&D output that filtered into the business.

In-house R&D

Without research inputs from universities, neither locally nor internationally, DP World had to compensate by building in-house R&D capabilities and by partnering with specialized industry players, such as the manufacturers discussed in the previous section. Mohammed Sharaf reflected on this challenge and the steps he took to ensure his team continually upgraded their capabilities and discovered ways to introduce innovative solutions that increase efficiency:

We didn't have a ... structured lab. What we used to do was have competitions globally. What we would say is that anybody who would come up with any kind of innovative ideas, they would be rewarded based on the savings that they're going to bring in and efficiencies.

When we do our budgeting, what we would do is we say 10% of your profitability must come from the efficiency that you're going to be introducing. Now, what kind of efficiency you're going to be introducing, whether it's reducing usage of diesel, electricity, water, whatever you do, it's open.

Sultan bin Sulayem has kept this mantra alive in the current operations of DP World, expecting innovation to come from every part of the organization, and not from some centralized corporate innovation function:

We never had any innovation department... You face a problem in your business, and you find a solution. Necessity is the mother of innovation... If there is no need, then no matter if you have the most innovative people—I am not going to innovate something that I don't see any benefit.

If a centralized innovation team did exist in DP World, according to Franco Bosoni it would be the technology team. He reflected on the importance of building technology in-house and why DP World has become more self-sufficient over the years, a necessary reaction to the lack of a broader university-supported innovation ecosystem:

But the biggest push right now is ... transforming the company from a port, logistics, free zone and an infrastructure company into a technology company ... and they want to build it themselves. They want to ideate in combination

with their own customers, and then they want to have something that is fully bespoke, and ideally something that then they can continue to innovate.

Finding & Developing Talent

The final area that was raised during discussions with the interviewees about the role of universities in the Dubai RIS was centered on talent; namely, finding specialized talent from beyond the borders of the UAE as well as developing existing talent through long-term capability building initiatives. In his comments, aligning with his perspective as the company's senior leader in Europe, Rashid Abdulla focused on the fact that the talent pool increasingly became international as DP World expanded its global footprint. That fact gave him and his team access to specialized talent from beyond Dubai:

From an HR perspective, we started to look of course for new talents ... from different industries and from different parts of the world as we expanded as a company. And this also gave us access to different tools from all—we started to transfer and create work experiences for our people [so] that they can ... move in a horizontal way or trade the competencies in different geographies and environments.

Franco Bosoni supported that same point when reflecting on the ways DP World has addressed not having a deep enough talent pool locally due to the state of the local university systems. On technical talent, he said:

I can see that a lot of the operations are being developed in India, in Bangalore, where you have ... coding, technology, digital solutions, etc. It is a lot stronger than what Dubai or anywhere else is. [International hiring is a]

benefit of DP World [as] it is a truly global company; we have offices virtually everywhere.

Sharaf outlined two programs that he assessed to be quite successful in developing talent at DP World: sponsoring their own employees to work at international partners in the same sector and sending some employees, particularly local Emiratis, to universities across the world to take specialized courses to build their skills. He began by explaining how the first program worked and shared one of the most prominent success stories that emerged from it:

What we would do is we say, okay, you can work for me. However, the first two years, I am going to put you with a shipping company. You work with them under their rules, regulation policy. But I'll pay your salary ... the current CEO of JAFZA & the UAE Region, Abdulla Bin Damithan, is one of those examples.

The knowledge spillovers, work ethic, and industry connections that such a program generated for the participants made the investment more than worth it for DP World, especially considering the fact that the host companies were high priority customers who greatly appreciated the subsidized high-potential labor they were given. It was a smart win-win arrangement.

Not everyone could be posted in such secondment roles at shipping companies in Dubai, and the training needs were substantial, particularly amongst the Emirati hires. Complementing the first program was a larger-scale training initiative that invested in the skills of the team:

The rest, we would be slow and trained them abroad. Universities, specialized colleges for shipping, we would send them. Some of them would go to

Singapore, some of them would go to Southampton, some of them would go to Rotterdam. So, they would go abroad and be trained, developed for two to four years. All Emiratis. Building the talent pool. So, it was multiple areas or multiple channels.

Innovation Examples

Several interviewees commented that the logistics industry isn't where one may typically expect to find innovation, particularly in port operations which have only experienced incremental enhancements over the years as volumes increased and efficiency needs prompted new approaches to loading and unloading ships. Despite that fact, DP World maintained a view that innovation was core to the business. As mentioned earlier, Sultan bin Sulayem started his remarks by making the controversial statement, "we never had any innovation department" at DP World, proceeding to explain that innovation is core to the business and the responsibility of each employee. He also highlighted that innovations are not the product of teams sitting and ideating in a closed room; rather, they emerge from necessities, real pain points or opportunities experienced by the business.

Four examples of innovations developed at DP World are highlighted in this section, adding to the collaborative innovations with manufacturers that were already shared in the industry section above. The first two are process innovations, examining DP World's expanded scope of responsibility beyond the port itself as well as the digitization of manifests during the time Mohammed Sharaf was CEO. The second two innovations are new products requiring varying levels of technical expertise: a world-first vertical container storage solution called BoxBay and the introduction of the first cruise terminal in Dubai.

An important process innovation that Sultan bin Sulayem shared was how DP World proactively decided to expand the scope of its responsibility beyond the traditional limits of the basic port management service—loading and unloading of ships—to solve the biggest pain points suffered by customers after their traditional scope ended. Whereas in Dubai the experience was highly controlled and integrated, internationally DP World was at the mercy of local authorities to make the overall experience a positive one for its customers, and this was not yielding the desired results. The process innovation pursued here leveraged DP World’s expertise in stakeholder management and government relations from running an exceptional experience in Dubai, along with a keen understanding that the most important driver of growth is customer satisfaction with the entire experience. Bin Sulayem illustrates this through the case of Dakar port at the time DP World was considering a substantial infrastructure investment to increase the size of the port:

And that started in the setting of Dakar. So we started to really invest, rather than in the port [itself], in logistics abilities... So we changed our definition of our responsibility [to include what happens beyond the gate] ... once the cargo leaves out the gate, we have no more revenue... And that means we are blind to what happens in the supply chain.

So we decided that we should be involved. And I'm glad we did, because now we have more visibility. We have more ability to help and fix this problem before it comes because of our knowledge. So we leverage it on our accumulated knowledge of the supply chain and the issues and customer experience is way better. That improved our profitability, allowed us to have a

sustainable business, but we invested ... instead of expanding the port we spent them in acquiring logistics ability, so we are good at handling cargo.

Bin Sulayem thereby reallocated what would have been an obvious port expansion investment into the more strategically important, but not traditionally considered, capability to make the importing process itself smoother for customers. This served to further distance DP World from its competitors and deepened the relationships with its clients.

Digital Manifests

An early example of technological innovation that vastly improved an essential process core to DP World's business was converting manual paper manifests to digital equivalents. Considering the development of the technology infrastructure and the industry in which they were operating, it is impressive how early DP World was able to deploy digital manifests successfully. This required both technological development, process optimization, and hard work to change the way people across the industry did things at the time.

The fact that this change happened during Mohammed Sharaf's leadership did not surprise Yousif Almutawa at all. He reflected on the culture of innovation at DP World while he was there and how it started from the top:

And the good thing was that the CEO of DP World at that time, Mohammed Sharaf, he was himself a believer in innovation. He knows that just because we are doing good now, and everything is changing around us. We cannot be constant. In the end, some theme is going to disrupt us. What? We don't know.

Mohammed Sharaf recalled the journey of converting a manual process of reading and verifying line-by-line hundreds of pages of faxed paper received when a ship was approaching Dubai into a fully digitized process back in the 1990s in Dubai:

We started this project in 1994. We worked very closely, pushed Dubai customs, brought them on board. And in 1997, we started receiving all our manifests from the shipping companies or shipping lines online... In fact, everybody in town, in Dubai, all the agents, they were against this project. Because they would have to buy a computer.

It took us about three years to put everything together, train all the shipping agents in Dubai. Everybody, one by one. And from year one, the first year we had from the beginning, I would say over 90% of the cargo would come or the information would come over the internet, basically online.

When asked about developing this technology, Sharaf was very proud to report that this product was conceptualized entirely

in-house. We had basically our own team and of course we gave the development part to a third party to do it. But all the requirements, all the steps and documentation, everything was our own. Because we knew what is required, how many steps a customer takes, what kind of steps they take, how do they submit and after submission, what happens? How to link it with the tariff, with custom tariff, with our tariff, how to charge that, everything was done in-house.

BoxBay Container Storage

An example of a high-tech product innovation developed in Dubai and planned for expansion across the world is the new system DP World created to

optimize the utilization of the limited land portside. Franco Bosoni explained the concept well:

A vertical shipyard operating system, which is called BoxBay, is something that we have installed. It's a new technology that allows for containers to be stored [vertically], very similar to ... those car parks that work basically like an elevator and store your car in a box. [It] just won an innovation award in Germany.

The system's technological development and proof of concept implementation happened in Dubai, in partnership with German industrial engineering specialist SMS Group. The first BoxBay storage system was completed in 2020 at Jabal Ali and less than three years later a contract was signed with South Korea to implement it commercially at Pusan Terminal.²⁶⁸

Sultan bin Sulayem explains the logic of developing BoxBay and the impact this innovation has on port operational efficiency:

It came [about] because we had a problem ... if I run out of space, I need to build another port or expand, which is costing billions. So, is there a way that we can reduce [the cost]? So yes, this will reduce the use of the land by 70% and [increase] the speed and all that. So, it's a system, we invented it. We're going to start it in Korea, and it will help us. With this system. I don't need to expand. This is a massive racking system, purely robotic, AI driven.

This is a rare example of a significant innovation in a very mature industry, made possible because of the depth DP World developed in terms of talent within the

²⁶⁸ "DP World's Pusan Terminal Is World's First to Implement BOXBAY High-Bay Storage System."

company and industry partnerships, as well as the full support of the government to implement the working proof-of-concept in Dubai.

Cruise Terminal

Finally, Mohammed Sharaf reflected on the challenge of building the first cruise terminal in Dubai at a time nobody believed this would be possible. The issue was not one of physical infrastructure; rather it was developing an entirely new product that solved issues across stakeholders, enabling the arrival of hundreds of passengers from around the world. Sharaf recalled the early discussions with the cruise ship operators:

They put all their demands on the paper. “This is what we want,” [they said]. “You ready for it? One, two, three, four, five—it's done.” One of the problems was visas [which would take seven days to issue back then]. So we went to immigration and said, “Listen, we are promoting cruise ships to Dubai. This is the list. I've got the names of the passengers, the nationalities, passport number, expiry date, issue date. This is it. And just all you have to do is stamp on it. And every passenger will leave. I will give them a card with the name and passport number. I'll keep the passports, so they don't run away.” That was the first step.

He continued by explaining how DP World offered immigration officers a ride onto the vessel using a speedboat before the ship would arrive to dock so that all passports could be physically checked against the passengers themselves and then locked in a safe onboard while they were out visiting Dubai. They came up with creative solutions to facilitate the introduction of this new product in Dubai and aligned the stakeholders around the common vision of increasing tourism and footfall.

The collaborations extended beyond UAE immigration to other local entities such as real estate company Emaar and even other countries like Oman and Bahrain, with whom visa agreements were signed enabling cruise ship passengers going to any of these destinations to enter the other ones without further paperwork or additional visas. All of these steps were made possible in a short period of time due to the unique nature of the Dubai RIS, linking all components together tightly with a strong government push towards the common goal of economic growth. This is doubly impressive considering the fact that this all occurred in the late 1990s.

Conclusion

The DP World case study offers valuable insights into the development of Dubai's RIS and the role of each part of the Triple Helix within a Gulf state context. An overview of the themes discussed by the interviewees across the dimensions of the Triple Helix, as well as examples of the innovations created at DP World are summarized in the tables below as context for this concluding section of the chapter.

Role of Government	Role of Industry	Role of Universities
Infrastructure Investment	Innovating with Manufacturers	Local vs. International
Predictable Regulations	Engaging the Tech Ecosystem	In-house R&D
Empowering Leaders	Learning from Customers	Finding & Developing Talent
Setting the Innovative Agenda	Industrial Paths	
Cross-Government Coordination		
Fostering a Diverse Society		
Innovation Examples		
Logistics Beyond the Ports		
Digital Manifests		
BoxBay Container Storage		
Cruise Terminal		

Table 11 Summary of DP World Themes

Government

The role of the Dubai government and its supportive policies have been instrumental in DP World's success as a company and its ability to innovate. The government's extensive infrastructure investments laid the “unbelievable infrastructure” foundation for DP World's growth, as Rashid Abdulla noted. By creating a business-friendly environment, offering incentives, and fostering a climate of collaboration, the government has encouraged the growth and development of the logistics sector. The close relationship between DP World and the government has facilitated the company's expansion, both locally and internationally, allowing it to capitalize on new opportunities and strengthen its position as a global leader in the industry. The case highlights the importance of strong government-industry collaboration in driving innovation in Dubai. Exploring the nature and effectiveness of these collaborations in the upcoming case studies can provide valuable insights into the factors that contribute to the success of the Triple Helix model in the region.

Industry

Regarding the role of industry, DP World has been proactive in pursuing innovation and has compensated for the lack of external research support from local universities. The company has developed new technologies and processes in-house, which demonstrates the importance of industrial players in fostering innovation within the RIS. Additionally, DP World's collaborative efforts with specialized industry partners, such as manufacturers, contributed to its innovative capabilities and resulted in what ex-CEO Mohammad Sharaf called “first in the world” products like the Spreader container moving technology that improved port efficiency by 50%. The emphasis on innovation as a core value has enabled DP World to remain competitive

and continuously evolve within the rapidly changing landscape of the global logistics industry.

University

The university component of the Triple Helix, however, has been relatively weaker in the Dubai RIS according to this study's interviewees. Almutawa called it the "weak link" and CEOs Sharaf and bin Sulayem re-directed their comments when discussing this component to how they tried to compensate for a lack of deep research institutions. The interviewees were unanimous in explaining that local universities have not been able to provide the necessary specialized technical expertise or research collaboration required for innovative activities at DP World. This gap has led the company to explore alternatives, such as partnerships with international universities, in-house R&D, and global talent recruitment. Although these alternatives have had limited success in directly fueling innovation at DP World, they demonstrate the company's commitment to addressing the R&D gap and seeking external support. These experiences underscore the difficulties of forging meaningful, long-distance partnerships and the challenges involved in translating external research into tangible innovations within the company.

The case emphasizes the importance of internationalization in overcoming local constraints, accessing global talent and expertise while also considering the challenges faced by companies in Dubai in attracting and retaining specialized talent. It also highlights the limitations of local universities in providing technical expertise and research support. Identifying alternative approaches to R&D, such as in-house development, partnerships with specialized industry players, or international collaborations, in other case studies can help understand how companies in the Gulf region address these gaps and maintain their competitive edge.

Innovations

Finally, the ways DP World has innovated over the years is quite impressive given how traditional the ports industry is and the pace of change usually seen within the sector. From its early days under CEO Sharaf, integration across government entities was achieved and digitalization of previously manual processes such as cargo manifest processing for customs was done before such advances reached other countries. DP World worked with equipment manufacturers to realize their technical development goals, resulting in innovations such as the BoxBay vertical container storage system, dramatically increasing the efficiency of ports. They realized that the technical expertise to develop solutions like this and like remote controlled port operations were not available in-house due to the relative weakness of the research dimension of the RIS and so bridged the gap by working with industry players to build world-first solutions in Dubai.

Chapter 7 |

Emirates Airline: Launching an Aviation Industry

Introduction

This chapter examines the case of Emirates Airline, a company representing another foundational industry in Dubai, which has enabled the flow of people and goods into the market in a way that has fueled other vital non-oil sectors like tourism, retail, and real estate. In fact, Dubai's port and aviation industries were both founded on the same premise that the city could serve as a global connection hub, moving goods and people through a geographically strategic stopping point. The difference in the case of Emirates was that aviation represented a new industrial path without a deep local tradition, unlike the familiar path extension pursued in modernizing and internationalizing Dubai's port operations through DP World. The challenge was even greater to build the know-how and to achieve global dominance in a completely new industry.

The interviewees shed light on how Emirates has been a vital part of the Dubai RIS, their experiences with innovation within the company, and their reflections on the region's Triple Helix dynamics from the vantage point of another leading Dubai organization from a different sector.

Interviewees

Case 2 Interviewees: EMIRATES AIRLINE	Title (Terminal)	Tenure at Emirates
Adnan Kazim	Chief Commercial Officer	1992-Present
Dr. Nejjib Ben-Khedher	Chief Information Officer (Interim)	2012-Present
HH Sheikh Majid Al Mualla	Divisional Senior VP, International Affairs	1996-Present
Keenan Hamza	VP Technology Futures & Innovation	2019-Present
Neetan Chopra	Senior Vice President, IT Strategic Services	1995-2018
Saleh Makouk	Head of Innovation	2008-2022
Abdul Aleem	Senior Sales Executive	1985-2020

Table 12 Emirates Airline Interviewees

The seven interviewees selected for this case study cover the full lifespan of Emirates, from its origins in 1985 to today, across a variety of functions, primarily focusing on innovation. Adnan Kazim, current Chief Commercial Officer, has a broad portfolio including the entire sales engine (online, retail, etc.), strategy, planning, and cargo reporting into him. His mandate of driving revenue into Emirates gives him a uniquely wide vantage point to reflect on the questions for this research, and he's the case's most senior interviewee. Abdul Aleem, the longest tenured subject of this study, started at sister company dnata in 1979 and then transitioned to Emirates the year the company was launched, building a 35-year career at the airline. His Highness Sheikh Majid Al Mualla, a member of the UAE royal family, started in 1996 and today is one of the senior leaders in the organization, directing international affairs. His journey included a variety of commercial roles across the markets in which Emirates operates, giving him a wholistic perspective on the business.

More specialized insights were anchored by the current acting Chief Information Officer Dr. Nejjib Ben-Khedher, as well as the former SVP of IT, Neetan Chopra. These two technology leaders of Emirates have played direct roles in setting

the company-wide innovation strategy and understand the challenges and benefits of building an innovative company in an environment like Dubai.

Finally, Salah Makouk, former Head of Innovation, managed the internal innovation function that Keenan Hamza, current Vice President of Technology Futures & Innovation, inherited when Salah left the company in 2022. These two leaders complemented Ben-Khedher and Chopra's strategic vantage-point by each sharing insights into what tactics have worked, where they failed, and what can be gleaned from this experience. As the ones responsible for operationalizing the innovation strategies, Makouk and Hamza have the practical data from firsthand experience that enriches this study across the three dimensions of the Triple Helix.

Historical Context

Although aviation was a new sector in Dubai without a locally born historical precedent, Emirates Airline did not emerge from a vacuum. Dubai had experienced some infrequent air traffic in the form of boat planes stopping through the city since the late 1930s, landing on the creek, paying landing fees, and unloading travelers who spent time on the ground during the layover. Neighboring Sharjah had an airport since 1932, serving as the landing base for Imperial Airlines and subsequently the Royal Air Force until 1971. As it became increasingly clear that the extension of the port story was going to play out in the air, the visionary Sheikh Rashid wanted to make sure that Dubai was well positioned to become an international player in this growing industry. He moved swiftly to build the infrastructure to attract the world's planes to Dubai.

The closest local predecessor to Emirates Airline was born in 1959 in the form of an airport operator originally called the Dubai National Air Travel Agency, today

known as dnata. The following year marked the inauguration of Sheikh Rashid's airport, the city's first, which still serves as Dubai's primary aviation hub to this day after many expansions and modernization projects over the years. As this study's interviewee Abdul Aleem pointed out, Dubai had everything to run a world-class aviation industry entering the mid-1980s except an airline. Aleem began his journey at dnata, a recruit from neighboring India with strong cargo shipping experience and experienced firsthand the best practices this organization had developed over the previous 20+ years of airport and cargo operations. When the opportunity presented itself for him to join the founding team of Emirates Airline, he jumped at it and didn't look back. The ex-British Airlines executive at the helm of dnata, Maurice Flanagan, became Emirates' first operational manager, under the leadership of Sheikh Ahmed bin Saeed Al Maktoum, the young uncle of Dubai's ruler Sheikh Mohammad bin Rashid. Aleem said that he wanted to be part of something new and was inspired by the vision coming from the leadership about what this company could become on a global scale.

The year was 1985, and it was now Sheikh Mohammad's turn to follow in the footsteps of his father, Sheikh Rashid, and launch an ambitious project with very modest means that would take the world by surprise. The founding story is well-documented: Flanagan was called to a meeting with Sheikh Mohammad and Sheikh Ahmed to lay out the vision for a new airline that would use Dubai as its base to connect people flying across the world. The most surprising fact was just how little financial support would come from the government. The seed funding was modest: a cash contribution from the government of \$10m with an explicit warning not to come back asking for more. Without much money to invest into the project, Flanagan asked at least for protection from competition to give the project a fighting chance. He was

denied even that, with Sheikh Mohammad establishing an open skies policy that would govern the industry to this day, much in the same vein as Sheikh Maktoum bin Hasher had slashed customs duties and removed tariffs as a way to jump-start the ports industry in 1900. Furthermore, just as the Iranian decision to increase their shipping tariffs at the height of their power invited Sheikh Maktoum to take his bold move, Gulf Air's decision to reduce service to Dubai in the mid-80s sparked the idea in Sheikh Mohammad's mind to take matters into his own hands and launch his own rival airline. History repeated itself.

Within five months of the initial meeting in March 1985, Emirates Airline was officially born. It started operations flying a fleet of only two planes, both wet-leased from Pakistan International Airlines. Known by callsign EK, homage to the first route flown on Emirates to Karachi, Pakistan, the airline grew to serving 14 destinations within the first five years of operations.²⁶⁹



Figure 7.1 First Emirates flight prepares to depart Dubai for Karachi in 1985, Source: Gulf News Archive

The 1990s were transformational at Emirates, a decade characterized by the airline's bold moves to become a top global player. In 1992 alone, the airline

²⁶⁹ "History Timeline | About Us | Emirates United Arab Emirates."

pioneered a technological leap in in-flight entertainment with video screens on every seat of the aircraft, opened a new, fully modernized terminal at Dubai International Airport (DXB), and made global headlines purchasing seven new Boeing 777 aircraft.²⁷⁰ By the end of the decade, the two initial planes they launched with had grown to a fleet of 32 aircraft, serving 50 destinations around the world. The platform was built, but Emirates was still a relatively minor player on the global stage. The next decade would change that.

The year 2000 was marked by the opening of another new terminal at home airport DXB, increasing passenger capacity to 22m passengers a year. In the same year, Emirates became the first airline to order the Airbus A380, a massive upgrade in aircraft technology, boosting both the capacity and functionality of the fleet. By 2005, Emirates made the largest Boeing 777 order in history: 42 planes with a total deal value of \$9.7bn. Three years later, in 2008, Emirates opened its own Terminal 3 at DXB, serving as its exclusive hub of operations to this date. The decade ending in 2010 saw Emirates adding 46 new destinations to its map, now serving nearly 100 cities around the world. The world started paying attention.

The rapid growth of Emirates Airline continued into the 2010s as it became an increasingly significant player on the global aviation stage. The airline's expansion was fueled not only by its strategic geographic location, but also by its focus on customer experience, cutting-edge technology, and investment in state-of-the-art aircraft. The airline continued to expand its routes, adding more destinations in Asia, Africa, Europe, and the Americas. The growth of the airline also brought significant benefits to the local economy, with the aviation industry becoming a major driver of

²⁷⁰ “History Timeline | About Us | Emirates United Arab Emirates.”


Dubai's economic development. The accolades started flowing in, and by 2016 Emirates had earned the industry's highest recognition: Skytrax World's best airline of the year.

The airline's success did not come without challenges. As the airline industry became increasingly competitive, Emirates had to find ways to differentiate itself and maintain its market position. This involved investing in customer service initiatives, such as the introduction of private suites and shower spas on its A380 aircraft and enhancing its in-flight entertainment system. The airline also focused on sustainability, investing in fuel-efficient aircraft, and taking steps to reduce its environmental impact.

Emirates continued to make headlines with its ambitious orders for new aircraft. In 2018, the airline signed a contract with Airbus for 36 additional A380 aircraft, worth \$16 billion. This deal not only demonstrated Emirates' commitment to expanding its fleet but also helped to extend the life of the A380 program itself. In parallel with the airline's growth, DXB continued to expand and modernize its facilities, becoming one of the busiest airports in the world.

Emirates' rapid growth and global reach have been made possible by a combination of factors, including the vision and ambition of its leaders, the airline's focus on customer experience and innovation, and its ability to adapt and thrive in a highly competitive industry. The airline has shown the world what is possible when a bold vision is combined with strategic investments and a relentless pursuit of excellence. This journey, which began in the mid-1980s with just two leased aircraft, has transformed Emirates into a global aviation powerhouse and a symbol of Dubai's rise as a leading international hub.

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Sheikh Maktoum launches Emirates UA It's a national project says Sheikh Mohammed

By A Staff Reporter
 Dubai's brand new national airline, Emirates, was formally launched by Sheikh Maktoum bin Rashid, Deputy Prime Minister of the UAE and Crown Prince of Dubai, at the Dubai International Airport yesterday.

Also present at the inaugural ceremony were Sheikh Tahoun bin Mohammed, Abu Dhabi Ruler's Representative in the Eastern Region and Chairman of ADNOC, Sheikh Mohammed bin Rashid, Minister of Defence, Sheikh Saud bin Rashid al Mualla, Crown Prince of Umm al Quwain, a number of other Sheikhs, senior Government officials and local business leaders.

Accompanied by Sheikh Tahoun, Sheikh Maktoum cut the ceremonial ribbon tied to the Emirates Airbus-300 to mark the inauguration of the new air service.

Sheikh Maktoum and other guests then boarded the aircraft with the other guests and inspected the interior. The Airbus, which has been repainted in gold with the Emirates logo and the tricolor prominently marked, is fitted out to carry 300 passengers.

The A-300 will be used on the Dubai-Karachi and Dubai-Bombay sectors while the second aircraft, Boeing 737, will be used on the Dubai-Dehli route as well as on the short-haul Gulf routes which are expected to be served by the airline shortly.

The inaugural ceremony, which preceded two special flights over Dubai for invitees, was also attended by Sheikh Hamad bin Saqr al Qasbi, Head of the Office of the Ras al Khaimah Crown Prince and Deputy Ruler, Sheikh Mohammed bin Ali al Nuaimi, President of the

Courts in Ajman, Sheikh Ahmed bin Rashid al Maktoum, Head of the Central Military Command, Sheikh Ahmed bin Saeed al Maktoum, Chairman of the Emirates Airline, a number of Ministers and members of the diplomatic corps.

WAM reported that Sheikh Tahoun conveyed the congratulations and blessings of President His Highness Sheikh Zayed bin Sultan al Nahyan to Sheikh Maktoum on the establishment of the airline.

After the inauguration ceremony, Sheikh Maktoum and Sheikh Tahoun as well as other Sheikhs went on a tour of the Dubai Airport's main terminal and other facilities. Sheikh Mohammed escorted the visitors.

In a statement after the ceremony, Sheikh Mohammed expressed his happiness over the establishment of this national economic project, and affirmed that Emirates Airlines will be morally supported by the UAE's President, Government and the people. "That support will enable the company to reach the standard of big companies in providing best services to passengers," Sheikh Mohammed said.

He expressed the hope that the new airline would become a source of income that would support the national economy.

Sheikh Mohammed affirmed that the company would give a chance to all national cadres to participate in developing the civil aviation sector in the country.

Emirates Chairman Sheikh Ahmed bin Saeed al Maktoum, in an interview to Emirate in-flight magazine, described the establishment of the airline as a natural stage in the evolution of Dubai. "It is a major development in terms of communication. Our aim has always been to do the best for the UAE and to provide the best possible services for the people."

Sheikh Ahmed agreed that it was

an ambitious project to set up an airline in only seven months, but it was also a necessary project. "We believe that the people of the UAE need their own airline and it was our intention to provide it as quickly as possible."

He explained that the travel trade's business year is divided into two distinct seasons: the summer season which starts at the beginning of April, and the winter season at the end of October. It was for this reason that October 23 was chosen as the best time to launch Emirates. "In fact, there have been no unexpected, major problems," he said. "We were fully aware of what would be required and have been prepared to meet those requirements."

Sheikh Ahmed explained the major advantages of Dubai operating its own national carrier in terms of being able to create an airline specifically to serve UAE. "Emirates is our own airline and we have been able to plan according to the known requirements of the business community and of private individuals," he said.

There was more to the creation of this airline than simply transportation needs. Emirates has been brought into being to serve the people in many different ways: it will also serve the economy, and will create jobs. Sheikh Ahmed explained that he will continue to work towards the fastest reasonable growth, and that his own office in the Airline Center was currently being completed. It will be from there that the development of the world's newest airline will stem.

"Our plan is to consolidate our base in the Gulf and to serve all GCC countries within the course of the first half of 1986."

"We are looking for vigorous expansion, not only throughout the Gulf. Probably within the first year, we will be operating scheduled flights to Europe," he said.



Sheikh Maktoum bin Rashid cutting the ceremonial ribbon to launch Emirates Airlines in Dubai yesterday. More pictures on P 2

Qaboos cites Moscow's 'new attitudes'

BAHRAIN (Reuters) — Sultan Qaboos of Oman said the recent decision to exchange diplomatic ties with Russia followed what he called Moscow's new attitude over regional developments.

The official Oman news agency (ONA) quoted him as telling a news conference in Muscat Tuesday night: "Oman and the Soviet Union have been able to reach a common ground of understanding, especially following new attitudes taken by Moscow and its sincere desire to establish relations with Oman based on principles of mutual respect and equality."

Pakistan committed n to have N-arms: Zi

UNITED NATIONS (UPI) — President Mohammad Zia ul-Haq of Pakistan said yesterday he has an "irrevocable commitment" not to possess nuclear weapons and urged India to join him in making south Asia a nuclear free zone.

Zia ul-Haq met Indian Prime Minister Rajiv Gandhi, the third meeting between the two, to try to improve their relations and a Pakistani aide said the meeting was "cordial and in friendly atmosphere." "I suggest that United Nations should

The issue of whether Pakistan has nuclear weapons was raised by its neighbour India on several occasions as the two countries — now compete in the nuclear field.

The two leaders met for about an hour at the Waldorf Astoria hotel amid tight security as world leaders congregated to New York to attend the United Nations' 40th birthday.

"The meeting emphasised the need to improve bilateral relations," one aide said. "Prime Minister Gandhi articulated the great concern by

ABU DHABI (W) has urged the intensity to shoulder their world peace and to abide by the UN Charter. This came in a Rashid Abdullah, for Foreign Affairs television on the anniversary of the anniversary of the UN. Abdullah called near members of Council to bear in mind towards world peace and respect the UN recommendations. Abdullah also U.A.E's adherence to UN resolutions from a belief in realising world peace.

Abdullah noted Highness Sheikh Zayed bin Sultan al Nahyan had assented to his country's commitment to UN resolutions. He said the U.A.E. regional and

Prime Minister Zia ul-Haq said that Pakistan's nuclear program was a cultural and religious issue. He said the U.S. has been in raising glassware in raising glassware.

The host for the meeting in the delegates' highest security was UN Secretary General Perez de Cuellar. He said that the meeting was a success.

Figure 7.2 Announcement of Emirates Airline Launch, Source: Gulf News Archive

See Appendix B for other Gulf News archive articles on Emirates Airline

Interview Data on Research Questions

Role of Government

In this section, the role of the government in Dubai's RIS is examined through the lens of Emirates Airline. Drawing from interviews with Emirates executives, five themes emerged with respect to how the government has fostered an environment conducive to innovation: 1) Empowering Leaders, 2) Opening the Market to Competition, 3) Driving Innovation KPIs, 4) Cross-Government Coordination, and 5) Consistency of Long-Term Vision. The first and fourth themes are shared with DP World, and the rest present new angles not explored previously. These findings will be combined across all four cases for an integrated analysis in Chapter 11.

Empowering Leaders

As explained in the history section above, what is not commonly known about Emirates is that the airline was founded by the government with a meager USD 10m grant and a mandate to become the world's best. What enabled this vision to become a reality was the degree of trust placed in the company's leadership and the expectation to run Emirates like an efficient private sector company, not what one may expect from a typical SOE. From the most senior leaders to the front-line staff, the same theme emerged during the interview discussions about factors leading to this unprecedented success from such humble beginnings. Abdul Aleem was an entry-level sales executive at the time, recalling the tone that was set when he first joined the new airline from dnata:

Dubai was open-minded. And from the beginning, it was drilled into us—we need to be the best. So, go all out. Whatever you want to do, do it. This is back from '85, '86... Sheikh Mohammad is a visionary.

The government empowered Emirates and other entities to make their own decisions, and this approach has been consistent until today. Instead of imposing directions, the government provided support and allowed the organizations to study and evaluate their options, ensuring they took responsibility for their choices in a way that prioritizes the commercial viability of the airline.

To this point, Majid Al Mualla recalls multiple cases where, as a flag carrier of the UAE, Emirates Airline was brought into presidential-level delegation discussions. The diplomatic priorities at the highest levels of government are sometimes removed from the operational realities of running a profitable airline, and, to this, the direction has always been consistent. Al Mualla shares the typical case:

The message comes from Sheikh Mohammed's office to us that there is a discussion happening between the two presidents, and the President wants Emirates to fly to this station. It's up to you. Study it, and it's up to you. Doesn't happen in many countries like this... I'm going back to my statement of the government doesn't force us to do things.

I've been in the company right now for 27 years. I don't remember any direction coming to us from the government: open this route! Always—prioritize this route, study it. So, we do have our own study to look at the route, profitability. It might take one year to build the route.

Adnan Kazim, from his vantage point as CCO, aligns with Al Mualla's perspective, and sums up this point on top-down vs. bottom-up government involvement well:

We don't have any dictation coming from top to say you need to be part of it. That's not there in our DNA. Emirates was always run independently in terms of how we conduct our business, how we bring in the innovation.

Therefore, Emirates has benefited from the support of the government in setting an ambitious vision for the company and providing its seed capital, but it has been expected to operate independently towards the aim of becoming a globally competitive airline that generates dividends for Dubai. Substantial leeway has been given to the management of the airline to make their own decisions, without government intervention micromanaging operational details. This approach has served as the model used to manage other entities such as DIC and DMCC, which, despite being formally a part of the government as free zones, are viewed in a similar way to Emirates Airline with empowered leaders, as will be seen in the two upcoming chapters.

Opening the Market to Competition

When Maurice Flannagan, Founding CEO of Emirates Airline, found out that he would only be provided with limited startup capital and had a massive mandate to deliver upon, his first simple request to Sheikh Mohammed was to protect the airline from competition in its home market, particularly during its formative years. Interestingly, his request was swiftly declined. One of the interviewees for the DIC case, HE Mohammad Al Gergawi, commented on this point in his current capacity as UAE Minister of State: “Sheikh Mohammed always was saying we believe in an open sky policy because we believe in an open or free economy.”

The government's open skies policy encouraged competition from day one and compelled Emirates to improve its services continually. The policy was a strategic

move that benefited Dubai as a whole, as passengers flying with other airlines would still spend money on local services and infrastructure. The open skies policy encouraged competition and fostered a mutually beneficial relationship between Emirates and Dubai. As a result, the success of both entities is closely intertwined. Keenan Hamza put it succinctly, “The thing about Emirates is, without Emirates, Dubai wouldn't be where it is.” Al Mualla framed the same concept as one of mutual dependence, commenting that “the vision of Dubai helped a lot and we also helped Dubai.”

Indeed, the success of Emirates Airline and Dubai is closely intertwined. The government's support and progressive policies played a crucial role in Emirates' growth, which in turn contributed significantly to Dubai's development as a global hub. Al Mualla added:

Dubai Airport was—they said to all the airlines—open sky, you can come over here. It's a challenge for us at Emirates because I'm selfish about my airline. So, if [a] country doesn't give me [access], I should not give her. Saudi comes over here [with an] unlimited number [of flights, but] I'm not restricting Saudi. No, but when you go to His Highness Sheikh Ahmed [bin Saeed Al Maktoum] and talk about this, he said, “Negotiate. For me, it's important for this passenger who comes on a Saudi airline or other airlines spends the money on the taxi, spends the money on a visa, spends the money on the hotel, spends the money on infrastructure. So, I will make more money than the ticket.”

It's not only Emirates Airline... There's no protectionism [in Dubai].
As an airline, I see that I want to protect my product. But when you look into

the bigger picture, I think [open competition benefits us and Dubai] because the only way to survive is to enhance your product.

The general theme attributed to Emirates CEO Sheikh Ahmed by Al Mualla comes up again under the “One Dubai” theme in the DIC case; namely, Dubai’s RIS has benefited from a unique willingness to view the success of each entity at a higher level than the P&L of that individual entity. The question is always asked, “What impact does this have on Dubai?”

In conclusion, the importance of this openness to real market competition cannot be overstated, particularly in the context of other well-financed Gulf countries pursuing similar economic diversification paths. Even though Dubai could have protected its fledgling airline and potentially could have invested more money into it from the beginning, the decision was made to ensure it could stand on its own and compete with the best. The willingness to empower the leadership, as previously discussed, and trust that they could handle the global competition, resulted in a company with stronger foundations than one born in plenty, hand-held through decisions, and protected from all potential market dangers. Taking this unique approach became a hallmark of the Dubai government’s contribution to the RIS.

Driving Innovation KPIs

As time progressed, and Emirates started reaching its initial goal of becoming a world-class airline, attracting people from around the world into and through the emirate, the government’s involvement evolved. The same ethos of staying out of day-to-day operations was maintained, but new Dubai-wide innovation objectives were set, with entities such as Emirates being assigned concrete key performance indicators (KPIs) to deliver in order to achieve the broader government vision. This

unique approach of setting up KPIs linked to innovation programs helped measure the impact of innovation and ensured continuous progress in various sectors.

Salah Makkouk was managing innovation initiatives during his tenure at Emirates and recalls meetings he had with various Dubai-wide government entities on KPIs:

I've never seen KPIs linked to innovation programs before that ... we literally had KPIs for every piece of the process: Where are we attracting from? Where's the best quality we're taking to the next stage? How is our selection looking? Where are we selecting the most? The cohort we're graduating, what's happening to them? Are they raising funding? Are they setting up here in Dubai? Are they creating jobs?

Neetan Chopra, now Chief Digital and Information Officer at India-based IndiGo Airline, recalls his time as SVP of IT, ultimately responsible for all innovation programs at Emirates:

I think at one point, Sheikh Muhammed said, I want “x” percentage of revenue on innovation. And let's say if the Indian government was to say it, nobody will respond. But the beauty of Dubai is that, for whatever reason, everybody just does it.

The concept of government setting stretch KPIs to reach innovation goals across the emirate—and companies actually following through with activities that work toward realizing those KPIs—is a distinguishing aspect of Dubai’s RIS and one that has accelerated technological change.

Cross-Government Coordination

The Dubai government facilitated cross-sector collaboration and information sharing. One way was just described above, setting joint KPIs and convening all of the relevant entities to ensure the right collaboration could happen to achieve these objectives. A recent example of this approach was setting a target of 25m visits to Expo 2020 Dubai, a stretch goal by any measure. Emirates played an important role in achieving that figure, alongside other Dubai tourism companies and government entities. By aligning strategies and focusing efforts, over 24m visits were recorded, with participation from 192 countries.

This coordination was most recently showcased during the COVID-19 pandemic when Emirates, Dubai Tourism, and the Ministry of Health worked together to ensure Dubai remained a popular destination despite the significant challenges faced. Ben-Khedher recalls the critical role played by government partners:

Dubai Tourism. Again, extremely progressive. We've seen what Dubai Tourism has done during COVID how they position Dubai... One of the things I witnessed myself is this integration that you have across government entities like Dubai Tourism, Emirates, the Ministry of Health during all of this—very, very good coordination ... taking steps in terms of making Dubai a destination.

Dubai has absolutely succeeded—if anything, during COVID it became truly a destination. And today, if you see what's happening with Dubai and people coming here and even people settling here or working remotely from here, it's amazing. All of that is, I think, the work of Dubai Tourism, but

working with entities like us to make that happen as well. So, that level of coordination exists.

Keenan Hamza reflects on the difference between the innovation ecosystem in Dubai and that of the UK along this dimension of coordination, spanning both governmental and private sector entities:

But in the UK, the concept “ecosystem” doesn't [really] exist—it exists almost as a cloud of independent entities. Here, they work together in a way where traditional barriers to working with each other don't exist. You don't have to justify why you're going to go have a meeting with the Ministry of AI or even Emirates NBD Bank or whatever it might be. Whereas in the UK, to get Thales or an Airbus or all these guys together, if Britain tried to do that, I think they would struggle.

The Dubai government wields substantial convening power and uses this power to great effect. Again, this is not a command-and-control approach, but rather one of inspiring disparate entities to achieve a common vision that they may not have set as high if it were not for the government pushing the limits of what is possible. The examples of Expo visitors and COVID-19 coordination are both clear examples of this in action. Emirates achieved more in collaboration with the government than they would have been able to as an individual corporate actor, showing the proactive role of the government in the Dubai RIS.

Consistency of Long-Term Vision

The Dubai government maintains a long-term vision and consistently works towards achieving it. This consistency allows companies to align with the government's goals, facilitating effective collaboration between public and private

sectors. Keenan Hamza again compares to his experience trying to push similar innovation agendas in the UK, lamenting the shortsightedness typically found in government:

The biggest problem in the UK is you spend so much time doing policy papers—it takes about minimum two years to introduce legislation.

Sometimes, if you're doing consultation, six years. The problem is that the election cycle is four or five years. So, by the time you start, someone comes in and then it's out with the old and in with the new. So, it's a lot of wasted effort. What you get here is consistency of vision. So, the context that comes down, that is top down. But it's never how; it's always what we what we want to achieve.

This is the vision; here is the context for you. This is why it's important that we are in the top ten globally for robotics and automation, which is the robotics program they've just launched. This is why we want to do 9% of GDP by 2030. That [approach] seems to me quite unique here. What's also unique is how they then galvanize both public and private sector to deliver to that.

Ben-Khedher summarizes the dynamic well in his comments about the government “pulling,” echoing comments by government representative Al Malik that will be shared in the DIC case about the government being the “horse that drives the private sector”:

This is one of the few countries in the world, probably the only one I can think of ... where the government is pulling. Usually, the government is really lagging. In this case, the government is pushing all the entities ... putting that pressure for us to adopt some of these new technologies, whether it's

blockchain or metaverse, because the government is there and looking for some of these big companies that exist here to be able to adopt these things.

Adnan Kazim makes the point that the Dubai government oftentimes sets innovation targets so far ahead of the industry, that Emirates needs to take a cautious approach and meet them halfway:

When it comes to technology, maybe we're taking a little bit of a more cautious step. But, again, we haven't been dictated by anyone. We're trying not to be like the industry. Industry, they are watching and doing nothing. But we said, let's take one step ahead from our side. I think we're sitting in a middle point between what the industry is doing around the innovation ... and what Dubai is doing. Maybe Dubai is two steps ahead, particularly in this domain, compared to what we are trying to do.

In summary, the stability of Dubai government has enabled a long-term view that cannot be achieved in contexts such as the UK where government itself shifts regularly, along with priorities and associated programs. The combined effect of an ambitious vision paired with this long-term consistency on innovation priorities feeds the Dubai RIS in a way that is not typically seen in other contexts.

Role of Industry

The trend Emirates has shown over time with respect to its interaction with the broader aviation and supporting industries has been a movement from relative independence and self-sufficiency to one of collaboration and partnerships. The clearest example setting Emirates aside from all other airlines of the same size is explored in the first theme, “Partnerships Over Alliances,” which discusses its avoidance of joining a formal airline alliance. Although this principle has not changed

since inception, the willingness to forge deeper partnerships has grown, particularly in recent years. The same trend can be seen on the technology side in the second theme of “Balancing In-House with External Technology;” Emirates boasts one of the largest in-house tech teams in the industry and built its core systems from the ground up, preferring that approach to relying on outsourced software or service providers. This, too, has been gradually shifting to take advantage of the specialization of aviation technology companies’ latest offerings, keeping Emirates at the cutting edge.

Along the same point, the third theme shows that there is more and more appetite to work with startup companies through incubator programs launched in-house, despite the challenges of integrating their solutions into the complex Emirates machine. All of this is summarized in the fourth theme of “Knowledge Sharing,” reflecting the spirit of the airline to be as helpful as possible to others in the industry while still maintaining its product superiority.

Partnerships Over Alliances

Emirates’ relationship with the broader aviation industry can sometimes be misconstrued based on the single decision of remaining independent from the three major global airline alliances, a unique strategic decision compared to its peers.

Although the topic of airline alliances came up a few times in discussions with the interviewees, Al Mualla summarized the Emirates perspective best:

It's not that we don't have partners. We have so many partners through interline, code share but we decide ourselves if I don't need this partner, I can discontinue with him. This agreement whenever you come to alliances ... it's not up to you to decide. It's the whole entity...

With all these alliances, you see the service difference when you enter one aircraft, then via one of the hubs, then you go to the other airline. The crew is different, service is different, the meal is different. But yes, the ticket you paid is the same. That's what we feel shouldn't be.

The deciding factor when it comes to alliances has been the primacy of product under Emirates President Tim Clark's leadership. As Al Mualla points out, the concern of selling a customer an Emirates plane ticket that includes non-Emirates legs, which are typically inferior in terms of quality of service, and what that does to the brand is something that has kept them away from fully integrating into an alliance.

Although Emirates has kept an arms-length distance from competitors in this regard, the airline has doubled down on partnerships and codeshare agreements in the past years. The most notable recent announcement was a codeshare partnership with former rival United Airlines, opening up the entire US market beyond the handful of locations Emirates accessed directly in the past.

Balancing In-House with External Technology

Despite being based in a region with an underdeveloped technical talent landscape, Emirates chose to build an entirely in-house IT department, a rarity in the industry. Furthermore, core services, such as the reservations system and online booking, were built from the ground up in-house instead of relying on a third-party software provider that specializes in that function. These are incredibly difficult technical implementations that are costly and time consuming, but the fact that all services were built at Emirates meant that the team had ultimate flexibility in deploying new features to create an unrivaled customer experience, in the same spirit as their in-air product. This ability to maintain control and independence meant that

they were less reliant on other firms in the industry for technical innovation, a path that served them well until recent years. When asked about the source of this legacy attitude and the nature of the current shift, Ben-Khedher responded:

There is always a thinking within the company and within management that we are a bit different from every other airline. For example, we're not part of an alliance, and we need to keep that freedom to design things, to do things our own way and not have to be forced into following everybody else. This is what kept us doing things internally, even from a technology perspective; we want to allow ourselves to think differently from others and not have to take on systems or applications that have been serving other airlines and do our own.

It is telling that Ben-Khedher explicitly connects the in-house IT decision with the decision to avoid joining an airline alliance; self-reliance was part of the culture at Emirates, affecting all aspects of the operations. From his side, Kazim felt the positive impact of this independent approach commercially and describes this in-house logic and the benefits therein:

We're quite unique in our IT department where we have 2,700 people, they're all in-house. We hardly deal with external people. When you deal with many other IT departments, they always have 70% to 80% sitting in India or sitting in different places. They are not in Dubai. But for us, we want to have full control over the situation in-house in terms of the thinking, the innovation, the technologies, and how we [move] at the speed that we want into what we do.

As helpful as building completely bespoke solutions was, Kazim followed these comments with an explanation that the company has now started a migration

away from this staunchly independent, in-house approach that has governed the IT department to date. He shares the example of Emirates Delivers, a new service offered in partnership with a 3rd party technology service provider, which has shown much promise and is fueling a strategy to compete with FedEx and others on express deliveries on e-commerce. This example is explored in further detail in the Innovation Examples section below.

Hamza, a newer addition to the Emirates team overseeing all innovation activity, saw the sole reliance on the internal team to be a handicap from an innovation perspective, as other major players in the industry were able to move more quickly developing new solutions in partnership with others. He recalls:

I had a conversation with our CTO at the time... He just felt like the only way to scale innovation was through partners... we will never have the resources to scale innovation up in the way that is meaningful for us [only internally].

Acting CIO Ben-Khedher reaffirms this view here, explaining the reasoning for the change in approach that he is currently overseeing across Emirates Group:

Our approach to technology has always been one of trying to build it in-house in some way. So, we only started opening to the external world and working with others lately simply because we didn't have the bandwidth internally to continue to be able to drive some of that innovation and progressive thinking in IT.

Ben-Khedher explains that the pace of change happening in the industry is accelerating, and by working with firms that have specialized expertise, Emirates can have the best of both worlds—agility in core systems combined with the latest in innovation through partners:

Our internet booking engine is in-house. A lot of the customer interfacing is in-house. But now we're reflecting on all of these things again because technology is advancing so fast, and it's very difficult for us to keep on upgrading our talent. So we have to rely a bit more [on external providers].

Today, the technology stack we have is 50-50. Also, we always left everything on premises. We have two data centers, which again, we now are thinking about moving to the cloud because it offers us some scalability as well. So, we're in this transition mode where now we're looking at the outside world and seeing how best can we work with this outside world.

Like DP World, Emirates has come from a legacy of building technology in-house and electing not to be part of a local or global ecosystem, for many reasons. In both cases, this legacy is currently shifting. The transition integrating Emirates into an ecosystem of technology partners has strengthened the Dubai RIS, converting a successful silo organization into one that is making an impact across the broader industry. Emirates' spirit of customer-focused excellence is driving innovations not only internally but with partners who are willing to customize their solutions. This is particularly the case for startups, which are discussed in the next section below.

Working with Startups and Incubators

Although the interviewees recognize the many challenges of integrating startup technologies into Emirates' operations, the company acknowledges the importance of collaborating with startups and incubators to drive innovation and has established partnerships with various entities to support this approach. Ben-Khedher picks up the last theme about working with external technology partners and extends it to the startup world:

We are now also acknowledging the fact that we cannot just innovate on our own. So, we have to work with startups, with other companies, for us to innovate.

Ben-Khedher continues by outlining the reasons why these programs were so challenging and why more startup collaborations were not successful:

One of the things I noticed myself, because I have always just been involved with [startup incubator] Intelak in the last year in my role of CIO, being on the board and coached a number of startups. First of all, it's very difficult for any startup to work with an organization like ours. We're huge, big, very complicated from a process perspective...

So, if the idea is not mature and has at least proven itself maybe through a proof of concept even in another industry, then it's very difficult for us to be very effective in this process with these startups.

Despite the challenges, Emirates established two incubator programs as a way to formally engage with technology startups. Dr. Ben-Khedher introduces them and the partners that were involved in each one:

We've created these two incubators... One is called Intelak. Salah [Makouk] was part of the journey. And the other one is called Aviation X. They're based in Dubai and they are with partners. So Intelak is with Microsoft, Accenture, Dubai Tourism and Amadeus. And then Aviation X, I think it's with GE, Airbus, and Thales... And then we're working with startups around on the travel ecosystem in some way because Dubai Tourism and ourselves act as more of the business anchors for these incubators and accelerators. Microsoft,

Accenture, and Amadeus help with supporting the technology side of things for these startups.

Intelak is the early-stage tech startup incubator focused on the region, and Aviation X is a research-based, global incubator that targets startups with aviation-related R&D that can be brought to the market through Emirates. All interviewees with knowledge of these programs were in agreement that neither has yet been as successful as hoped, but that such initiatives can take years of hard work to bear fruit.

Hamza explains that these types of programs need to drive business results in the end, leading to some healthy pressure from senior management on ROI, especially when the first batches only had one memorable success—Dubz, a baggage services company acquired by Emirate Group company dnata in 2018, and member of the first cohort at Intelak. Hamza says:

Some of the challenges we have with the CEO right now in terms of this perception of startup programs... I don't mean it in like a negative way—it's actually a really positive thing—because it just pushes you to focus on outcome and practicality. And some of the challenges with the startups is that it could take them a year to mature, certainly their products or their POC [proof of concept].

Knowledge Sharing

Emirates Airline executives emphasize the importance of sharing knowledge, expertise, and information with other stakeholders within the industry. Despite a strong preference for operational independence, as explained in the sections above, the message from senior management at Emirates was clear regarding the importance of generous knowledge sharing within the industry. This willingness to collaborate

and support others is seen as a critical component of building strong relationships and fostering growth.

Al Mualla highlights this point on knowledge sharing and gives a recent example of when he openly shared information with a competing airline in the region:

We help without getting anything because the industry required this—Dubai required this. The government’s vision is that you share knowledge and information with everybody. We are [an] open book...

In fact, yesterday I got a call from one of the airlines in this region. They want to know how we roster our crew and [manage] buses. And so, we said, okay, we can share it. Honestly, I didn't go through the channels. I said, should we? Because we've got open direction from that you share this information. We share this through our team. I think this is one of the pillars that builds relationships and trust... I think this is the vision of the whole of Dubai and the UAE.

Role of Universities

The major themes surfaced regarding the role of universities in the Dubai RIS from the Emirates vantage point are largely the same as what was discussed in the DP World case. Interviewees commented that local universities have not been a meaningful source of R&D and to cover this gap attempts have been made at international university partnerships with varying levels of success. Ben-Khedher put it succinctly: “From a research perspective, we don't have a lot going on with universities.”

Functionally, most R&D has been happening in-house, even though building external collaborations with startups and research institutions is an area that has been

identified as a priority and funded through the two incubator programs cited in the industry section above. The final theme addresses the fact that the main touchpoint with local universities has been to recruit junior talent, as was mentioned in the case of DP World. Overall, the consensus was that universities play an insignificant role in the RIS to date and that this is a concern going forward which the company is proactively trying to address through its own efforts.

Lack of R&D Collaborations with Local Universities

Adnan Kazim summarized the concerns raised by all the interviewees with regards to research and development activities stemming from local universities into the innovation activities of firms such as Emirates:

Dubai ... is not too advanced when it comes to R&D, unfortunately. I think definitely you need more of these universities to be more and more active.

This point was reinforced by Keenan Hamza, as he compared the situation in Dubai with other more advanced regions:

Our academic institutions aren't set up in the same way. They don't have the kind of depth of history and industry, but also because the startup market regionally is not the same as where it is in the US or even Israel.

Chopra had direct experience building collaborations in the heart of Silicon Valley and reflected on the differences between the most mature ecosystem with respect to academic collaborations and Dubai:

One of the things that makes the Silicon Valley tick ... is the founders would tell us—it's not written down anywhere—they would say ... I was facing this issue, that issue, then I just walked up to Stanford from Palo Alto, had a

discussion with my professor and he gave me a great idea. That's a comparative advantage... So, my view is Dubai and UAE needs to do that.

Salah Makkouk cited a single story of a collaboration with a local university that led to a short-lived product (recyclable trays), but he made it clear that this was an exception to the usual rule as most projects coming out of the universities were neither viable nor were the teams committed to see them through to commercialization:

On the university side the problem was the seriousness of commitment ... I think we had one really successful story... They created these trays that were recyclable. A lot lighter and they literally started from a presentation and university. They were out of Aviation University, and they literally came with a PowerPoint... But unfortunately, that was one out of many, right? The others would take it more as a side project ... you wouldn't touch.

In sum, the interviewees were unanimous in their perspective that the local universities have not contributed to the innovation activities at Emirates and that any limited examples of collaborations were not large enough to make a measurable impact. This has left a wide gap which will be explored in the following sections on attempted collaborations with international universities, in-house R&D activities, and working with universities to source talent.

Attempted R&D Collaborations with International Universities

To bridge part of the gap described above, Emirates partnered with premier international academic institutions, such as MIT, Carnegie Mellon University, and Oxford University, for research purposes. These collaborations involved students working on use cases, participating in competitions, and developing new products and

ideas. Although these approaches were more successful than the local university engagements, none of them endured as a long-term collaboration for various reasons explored below. Currently, the entire model is being reassessed, and none of these international university collaborations is active.

Neetan Chopra explains that the lack of local R&D is what pushed him to establish collaborations with institutions in the United States and UK:

That's perhaps one area that Dubai has not fully built: the local research universities. But let me tell you how we dealt with it... if you see the Emirate's innovation journey, we have had a lab with Carnegie Mellon next to Singularity University at the heart of Silicon Valley for about ten years. I built it. We built a lab with Oxford. We built these global relationships with universities.

Although Chopra speaks highly of these collaborations, Keenan Hamza explains that with time, Emirates decided to discontinue the relationships. Here he discusses one of the flagship collaborations with Carnegie Mellon and why it was not continued. The theme of one-way benefit, even when working with what ostensibly should be the top universities in the world, caused Emirates to reevaluate these arrangements and stop investing time and money into them:

We used to have a partnership with Carnegie Mellon, number three, I think, globally for computer science. And the feeling was that [the partnership] was benefiting them much more than it was us, that they were getting all our use cases, they get a trip to Dubai, and they were running a hackathon with their students in year three. But how was Emirates actually benefiting from that? In fact, we were paying them. So, in the end we cut that off.

Ben-Khedher also takes a realistic approach to assessing impact and recognizes that despite the impressive brand names of the institutions, the impact on innovation at Emirates is limited by their own internal team commitment level. Some logistical challenges such as time zone difference, long distance, and competing business priorities made it difficult to maintain momentum and rally enough support around continuing to renew these collaborations going forward:

Going back to when I started [working with] MIT as well with Carnegie Mellon University in the US ... I myself went a couple of times to the US where I pitched use cases to some students where they worked on them as part of their curriculum and then presented back to us as well... That lasted for a while. I think the contract ended just last year, and we didn't renew it.

We worked with Oxford Labs on data science use cases. And again, it was a contract that we signed for a little while, and then [we realized that we didn't have] people in the organization who are going to maintain that and really get something out of it.

The Emirates experience with international university collaborations, especially when taken alongside that of DP World, shows the real challenge faced when trying to bridge a local university gap with international university partnerships. Despite the appeal of working with more mature university ecosystems to accelerate innovation activities stemming from this third dimension of the Triple Helix, the reality is that executing successful cross-border university collaborations that result in real R&D outputs is not easy. The shortcut approach has not proven to be successful, and so the only alternative seems to be building the long-term local university capacity or investing further into in-house R&D, as explored below.

Prioritizing In-House R&D

The source of most innovations born at Emirates was from in-house R&D efforts, sometimes in collaboration with industry players, but rarely ever with academic counterparts. In this section, two of Emirates flagship R&D programs are outlined—Aviation X Lab and the yet-to-be-announced Emirates Aviation Lab. These initiatives were both born from a realization that the RIS does not have deep enough R&D resources organically, so Emirates undertook investing in building the capabilities they need to continue to be at the forefront of their industry.

Keenan Hamza explains the logic for Aviation X Lab:

I think the high-level context for all of that is because the Aviation X Lab interested me—[it] was a COO-driven project before he had it in innovation. It launched in October 2019. So just a couple of months after I joined and a couple of months before Covid, but it's the first of its kind because it has our ecosystem partners in aviation. So, it's got Airbus, Collins Aerospace, GE and Thales... So, the idea is they are equal partners on this startup program. And it was specifically designed for moonshots... So, it made sense that these industry partners came together and said, right, let's create a program whereby every challenge we put out there has to impact a billion people.

So, that's the kind of scope of it. And in order to respond to these challenges, we know it can't be the kind of traditional startups. We'll need the policy think tanks, we'll need the R&D departments in whichever university, in whichever country. It's a fascinating model because it really expands the kind of definition of what an ecosystem is from an innovation perspective.

Although this program is quite promising, because of its launch around the time of COVID, it had a stunted start and has not yet been able to show the value that was imagined. This is particularly the case as programs like these require a longer time horizon investment and patience to realize commercial results. In summary, the net impact of this initiative is not yet clear.

Despite this fact, Emirates has decided to double down on innovation lab spending and is planning for a much larger scale program. Going forward, Adnan Kazim shared that the Emirates strategy is to manage innovation in-house with strategic industry and university partners at a new purpose-built lab:

We're building a new innovation lab, which is going to be in EXPO [at the] Emirates Pavilion... We're turning that pavilion into an innovation lab for Emirates, where we bring in companies from different entities and signing agreements with many supply chains whom they are dealing with us today. And we're dealing with many entities as well, likes of Thales, likes of Microsoft, likes of Airbus, Boeing, GE. There are so many companies whom [are] more advanced in term of R&D.

These are all industry [players], but even academically, they'll be part of the whole chain that will come in. And then that platform will be the platform of throwing things at us in terms of how you drive the change. So rather than you drive these changes through initiatives that will come in some time from Government of Dubai or through different, maybe entities will come in with ideas, that will be the platform of change, of innovation, of new things.

Universities as a Source of Talent

The one area Emirates actively collaborates with local universities is to recruit technical talent, particularly UAE nationals. By maintaining close links with the universities in the UAE, Emirates maintains a consistent pipeline of new employees coming from direct recruitment or through sponsorship programs. Ben-Khedher explains this phenomenon:

We work with universities on recruiting people... We also sponsor students in universities for them to complete studies actually on the tech side, and then we hire them after that, and we bring them into Emirates. We're one of the biggest recruiters of tech talent from universities here in the UAE.

These technical recruits then fuel the in-house innovation engine at Emirates, so, in this way there is a second-degree impact of the universities on R&D at Emirates. This impact of the university dimension of the Triple Helix is consistent across the cases—serving as a source of talent, not of actual R&D. Much of this talent is non-specialized, coming from undergraduate institutions, not wielding research degrees. That said, it is a starting point, and an area upon which more can be built as the university system is further developed over time.

Innovation Examples

Emirates has established itself as a leader in innovative product and service offerings within the aviation industry. This experience-first competitive positioning is championed by Emirates President Tim Clark and has become a hallmark of the airline since its early days. In this section, four innovation examples are selected to illustrate this spirit, starting with the concept that Emirates got involved into design adjustments with the airplane manufacturers themselves. Ben-Khedher shares, “I

know Tim was involved in the design of the A380. We're the largest operator of the A380, and that gives us a right somewhat in terms of having to interject our thoughts when it comes to the design of the airplane.”

Kazem shares two stories about the re-imagining of the retail experience and the introduction of a new service, powered by a partner, called Emirates Delivers. Finally, metaverse technology is examined from the vantage point of recruiting and training flight crew.

Collaboration with Airplane Manufacturers

Ben-Khedher shares how Emirates leverages its size and influence to work closely with airplane manufacturers in the design of products, influencing the layout and features of airplanes:

I think the DNA of the company is one of continuously and incrementally enhancing the product. And we work very closely with the airline manufacturers ... in the design of the product itself. So if you take, for example, our [Boeing] 777 “Game Changer,” which has this fully enclosed suite in first class, even the leather grain is something that we go into the level of detail in terms of designing what we want.

So, we don't take something off the shelf, we think with them. And we're very tough as a customer to some of these [suppliers] because we're very demanding on what we do—the layout of the airplane, all of that. We influenced [design] a lot. The “Lounge in the Sky” in business class or the spa in first class, which a lot of these the manufacturers have pushed back on saying, “Can't do, you are wasting space, you are doing this. The aircraft cannot handle this.” But we push, push, push the boundary.

Re-Imagining Retail

Kazim decided to revamp the entire Emirates retail experience in the last years, realizing that the online experience was far superior to the experience customers were having when visiting one of the Emirates physical stores around the world. He explains the situation and some of the most important changes he instituted:

Retail shops of Emirates [were] very traditional. You just walk in, and sometimes they take your business, sometimes they don't take your business. It wasn't really bringing the wow factor to it. So what I did, I created a completely new world. We call it Emirates World. And through the Emirates World we tried to blend the innovation, the technology with the selling. So we revamped the entire look and feel of the place to have more like an Apple environment.

We brought in virtual reality. If you want to buy a ticket, for example, on Emirates A380 and you want to see what the 380 looks like on board, there is a screen sitting there. We'll take you through the entire look and feel of that seat. You can do your online booking while you're sitting and waiting in the queue.

First time we're moving into this domain and we try to bring in more digital screens for the marketing ... If I want tomorrow to run a campaign or run a product awareness, I click my button here. It reflects 100 outlets outside with the same message.

Emirates Delivers

As mentioned in the Role of Industry section, Emirates has been transitioning from a fully in-house technology and product development mindset to one of

leveraging expertise partners, much in the same way DP World has been pursuing a similar transition. Adnan Kazim shares an example of a new product introduction that was made possible because of such a collaboration with a third-party provider and has enabled Emirates to enter into a new product market:

So, what we did lately, we're moving the airline towards bringing innovation from outside, because the industry is moving very fast, and we don't have time to create things in-house. And we did that with Emirates Delivers. I don't know if you have heard about that product. It's part of Sky Cargo that we create for you an address. And we have started in Miami so that you have a virtual address in the US. We ship you everything within, I think, three days. You get your shipment in Dubai, anything that you want to order, tax free... So, we're trying to adopt more like FedEx of the world or maybe UPS of the world where we enter into the domain of express deliveries.

Metaverse for Cabin Crew Onboarding

One of the technologies being actively promoted by the Dubai government in the last couple of years has been the metaverse. Each company is challenged to find a way to leverage this new technology to enhance its offerings and become more globally competitive. Kazim explains that, although sometimes these Dubai government pushes are too radical to integrate into the core revenue product at Emirates, they often lead to opportunities to test new solutions internally to improve operations. An example of this is how metaverse technology has been deployed to facilitate faster and more efficient onboarding of flight crew, from recruiting to training:

We did that for the cabin crew training—rather than ... bring in the entire 20,000 cabin crew to come in, all of them to the training college, we tried to put some of that training through the metaverse environment.

The second thing we're trying to do, on recruitment, [is] how to use the metaverse as a way to recruit people. That's another channel of innovation that we're trying to take in from the metaverse thinking into what we do.

Ben-Khedher highlighted the same challenge and how metaverse technology is enabling higher volumes of crew onboarding during a period of increased recruiting:

We're onboarding 120 crew every week. Thousands last summer. It's very massive every week. These are your younger generation crew that is coming in that are used to a different way to onboard them. It usually takes about eight weeks to train the crew and get them ready to go in. So, one of the ideas when this whole discussion about metaverse came in is for us to say how can we leverage metaverse to train the crew in the most effective way possible and get them ready in a word that they're all used to because they're a younger generation.

Conclusion

The main themes raised by the subjects interviewed, along with the innovation examples they cited, are summarized in the table below and will be examined in further detail in this concluding section.

Role of Government	Role of Industry	Role of Universities
Empowering Leaders	Partnerships Over Alliances	Lack of R&D Collaborations with Local Universities
Opening the Market to Competition	Balancing In-House with External Technology	Attempted R&D Collaborations with International Universities
Driving Innovation KPIs	Working with Startups and Incubators	Prioritizing In-House R&D
Cross-Government Coordination	Knowledge Sharing	Universities as a Source of Talent
Consistency of Long-Term Vision		
Innovation Examples		
Collaboration with Airplane Manufacturers		
Re-Imagining Retail		
Emirates Delivers		
Metaverse for Cabin Crew		

Table 13 Emirates Airline Summary of Themes

Government

Unsurprisingly, the government played a prominent role in supporting the RIS that saw Emirates flourish from a mere concept to a top global airline. That said, despite being initiated by the government through a mandate and modest \$10m grant, Emirates operates much more like a private sector company than an SOE. Kazim reinforces this noting that Emirates “was always run independently.” The government’s role, as described by the interviewees of this study, included providing physical infrastructure like the airport and the first leased planes, placing the right leadership in place that could realize a very ambitious vision, enabling cross-government collaboration, and ensuring that Emirates operates in an open,

competitive market. This last point is particularly important and was reiterated by multiple interviewees across cases, including senior government representatives Al Gergawi and bin Byat, as well as Emirates' Al Mualla. This theme of placing constraints is explored in further detail in Chapter 11, but the fact that Emirates and others have had to compete in an open market is one of the key ingredients to their success and the government's restraint in providing more financial or protectionist support helped ensure that the airline could build the discipline needed to become a leading global player.

Chopra sums up the sentiment of the symbiotic relationship between the government of Dubai and Emirates Airline, in terms of the effect being in Dubai had on the team's belief of what was possible:

I think that human belief that you can do anything just transpired through or filtrated through the whole of Emirates... Everybody has this deep belief in Dubai that we can do everything. And then, of course, you cannot say this enough. *Emirates without Dubai maybe wouldn't have been successful.*

Industry

Emirates has had an evolving relationship with the broader industry, starting from a position of near isolation to now embracing deeper integration and partnerships across the spectrum from technology development to strategic code sharing and other agreements with complementary airlines in other geographies. Furthermore, Emirates has realized the importance of working with startups and incubators as a source of new product and service offerings, complementing their in-house lab and any academic relationships. As with other firms in Dubai, Emirates has had to conduct research in-house or convene specialized startups themselves, since the

broader RIS is not mature enough to provide such expertise organically, as described above.

University

Finally, the university dimension of the Triple Helix is characterized by a lack of successful collaborations with local universities, despite attempts, and mixed results of working with international institutions on R&D priorities. Emirates has discovered the practical challenges associated with these cross-border university partnerships while trying to bridge the local university gap and largely stopped pursuing the model, despite having worked with top institutions such as Oxford University and Carnegie Mellon. Geographic proximity, as highlighted in the RIS and Triple Helix literature, is clearly a critical factor to the success of such collaborations, not just the raw academic potential of the partner institution.

Innovations

Reflecting the constantly innovating spirit of Emirates Airline, CCO Adnan Kazim, closed his comments reflecting on what the 2030 vision is for Dubai International Airport:

You don't need to really go through anything, any check. You just bring your bag, you drop it, and you carry on until you get into the aircraft ... and all will be monitored by various cameras... Some of the tools are available, some are not, maybe even today, but that's the thinking. That's how we're trying to raise the bar for the way forward.

The entire team is constantly looking for ways to provide a globally leading customer experience and has brought world-first innovations to the market in a typically slow-to-innovate airline industry. The four innovations cited in this study are

merely examples that the subjects recalled during the interviews and are by no means meant to be an exhaustive list. They do, however, show the quality of innovations brought to the market by Emirates, such as the deep product collaborations with airplane manufacturers to bring reimagined first class experience onboard the A380, launching Emirates Delivers as a way to enable eCommerce shipments through the Emirates network, competing with the likes of FedEx, and completely changing the in-store retail experience to better reflect the way the Emirates product itself feels.

Emirates has shown itself to be a highly innovative company with ambitions to continue its impressive trajectory. It is an important contributor to, and beneficiary of, the Dubai RIS. Along with DP World, these two cases of government-initiated firms building entire sectors for Dubai and, through their experiences, the strengths and weaknesses of the RIS are clearly shown.

Chapter 8 |

Dubai Internet City: Building a Technology Sector

Introduction

While the two first cases examined this study's research questions from the perspective of leading state-owned enterprises that directly participated as firms in the industries they were building—logistics and aviation—these next two chapters investigate government-run free zones tasked with cultivating new sectors in Dubai by attracting the right community of companies and providing them with services they need to be successful. As the cluster approach is central to Dubai's economic diversification strategy, selecting two examples for in-depth research complements the previous two cases and provides another lens through which to view Dubai's unique RIS.

Dubai Internet City (DIC) is the first case representing Dubai's attempt to explicitly build a knowledge economy, planned and executed during a time of great turbulence in the global technology industry, on the heels of the dot-com bubble of the late 90s. But as with many other pivotal moments in Dubai's history, change opens opportunity, and the leadership of the emirate seized on the chance to catapult Dubai into the international technology landscape while everyone else was pulling back.

This chapter is particularly important because of the deep insights it reveals into the way the government views its role within the Triple Helix, made possible by interviews with a range of senior government stakeholders who set the policy agenda

in the emirate and were the architects behind and first functional operators of the DIC project. An overview of their profiles, as well as the other interviewees, follows.

Interviewees

Case 3 Interviewees: DUBAI INTERNET CITY	Title (Terminal)	Tenure at Dubai Internet City
HE Mohammad Al Gergawi	Chairman	1999-2004
HE Ahmad bin Byat	CEO	1999-2002
Malek Al Malek	Group CEO	2002-Present
Majed Al Suwaidi	Managing Director	2006-Present
Hasnaa Kebouri	Senior Consultant	2001-2007
Bashar Kilani	Region Executive - Middle East (IBM)	1995-2021

Table 14 Dubai Internet City Interviewees

The six subjects interviewed for this case hold the entire DIC history between them. From pre-inception through to today, they shed light on the role DIC has played in fostering a technology ecosystem in Dubai. The first subject interviewed for this case was the architect of the entire idea—alongside Dubai’s Ruler Sheikh Mohammed—and served as DIC’s first Chairman. His Excellency Mohammad Al Gergawi is one of the most senior members of the Dubai government, currently acting as the Chairman of the Executive Office of Sheikh Mohammed bin Rashid Al Maktoum, as well as Minister of Cabinet Affairs on a UAE federal level, a post he has held since 2006. He has influenced almost every aspect of Dubai’s shift towards a knowledge economy and his comments often spanned across cases, as he reflected on the “open sky,” pro-competition mindset that guided Emirates Airline during its early days as well as the historical context for all innovation in Dubai.

HE Ahmed bin Byat was appointed by Al Gergawi as the first CEO of DIC, where he led the operational team that took the project from announcement to launch. As with Al Gergawi, bin Byat has worn multiple hats, giving him unique insights into

the functioning of Dubai's government. Among the most important of these roles include Founding Chairman of Emirates Integrated Telecommunications Company (du), CEO of Dubai Holding, and Secretary General of the Dubai Executive Council. He has run or advised dozens of organizations across the spectrum of Dubai's economy, from education to real estate to telecom. Hasnaa Kebouri worked on bin Byat's team as a senior consultant starting in 2001 when DIC was first launched. She was responsible for the finance function and was an important part of the small core team that took DIC to market.

Malek Al Malek comments based on his role as TECOM Group CEO, having been with TECOM Group, the holding company above DIC, since its early days in 2002. Majed Al Suwaidi is the Managing Director, leading day-to-day operations at DIC today. These two Emirati businessmen represent the next generation after Al Gergawi and bin Byat who inherited the initial platform and vision, expanding it over the last 20 years.

Finally, Bashar Kilani gives an outside perspective to DIC through his experience leading IBM's presence in the Middle East from its early days. He made the decision to shift IBM from its onshore domicile to DIC at the launch of the project and has been close to the leadership since the early days. His comments shed light into the perspectives of a resident anchor firm in DIC, an important datapoint to directly capture the private sector perspective in this case, since the firm-level survey discussed in Chapter 10 was only conducted for DMCC companies.

Historical Context

As DP World's Jebel Ali free zone became a successful cluster for the import of raw goods, manufacturing, and re-exporting to the broader region and world,

Sheikh Mohammad wanted to extend this free zone model to further diversify Dubai's economy to include the latest internet boom. The early mandate of DIC came from Sheikh Mohammed himself, in a pattern typically seen in the most ambitious of Dubai's projects. Ahmed bin Bayat reflects on the broad-stroke instructions he was given at the time of taking over as CEO:

It was very simple. The direction from His Highness was at 100,000ft—diversification of the economy and catching the digital wave. At that time, it was called information technology.

The closest historical corollary to the DIC project was the establishment of Emirates Airline, anchoring a completely new aviation sector that had no local precedent. This was no easy task, but if there was one moment in Dubai's history that signaled the explicit shift from focusing on an exclusively service-based economy to striving towards a knowledge-based economy, it would be with the establishment of DIC. Al Gergawi explains how the project changed the entire character of Dubai government to act more like an ambitious private sector player, almost becoming part of the industry itself instead of just building some tech-enabled real estate and waiting on the sidelines for companies to come. This case most directly shows the raw determination and leadership of the public sector in Dubai's RIS. Al Malek characterized this aspect of the government's role explicitly:

We are the horse that drives the private sector. We will do what the private sector will not do, and we'll make them follow.

The initial vision for the project was perhaps too ambitious for the time. The announcement included plans for “an R&D centre for new technology initiatives and a state-of-the-art science and technology park that will support all residential e-

enterprises”²⁷¹ and the goal was to be the catalyst for the development of local technology talent. This proved to be more challenging than initially expected, as most companies elected to locate their regional sales offices in Dubai instead of any technical teams.

Hasnaa Kebouri reflects on this shift from replicating all the components of Silicon Valley, with its research institutions and tech development, to a more focused version that leveraged the strengths of what Dubai had to offer:

The concept that Sheikh Mohammed wanted to duplicate was the Silicon Valley concept. [DIC] evolved into a value-added real estate [project] ... which means that you are facilitating quality real estate, but then you're offering everything around it.

Announced on October 29th, 1999, and officially opened 364 days later, beating the one-year launch date promise, DIC began as a one million square foot technology park, designed to provide state-of-the-art infrastructure, business-friendly regulations, and a collaborative environment for ICT companies. Through the persistent tactics described below in the “Role of Government” section, DIC was successful in attracting the most influential technology companies in the world at the time to establish their regional headquarters there, including Microsoft, IBM, and Oracle. The presence of these multinational corporations not only bolstered DIC's reputation but also catalyzed the growth of local ICT firms, setting Dubai up to become the region’s technology hub.

²⁷¹ Owais, “Cyber City Plan Announced: Global Free Trade Zone for e-Business.”



Figure 8.1 HE Mohammad Al Gergawi and Microsoft's Regional CEO laying the foundation stone, Source: Gulf News Archives

Figure 8.2 Sheikh Mohammed Bin Rashid Al Maktoum, opened Microsoft's new regional headquarters at Dubai Internet City, Source: Gulf News Archives

As DIC grew over the years, it played a pivotal role in shaping Dubai's RIS. The successful clustering of ICT companies within the technology park facilitated knowledge spillovers, collaborations between rivals towards building regional projects, and the development of localized innovations. The concentration of talent, resources, and ideas within DIC created a virtuous cycle of innovation, stimulating the growth of related industries, such as digital media, e-commerce, and fintech. One initiative that helped galvanize these factors and spur the start-up ecosystem in DIC was the establishment of the in5 business incubator in 2013, a specialized center aimed at incubating high-potential tech start-ups.

DIC was the first entity in what would eventually become TECOM Group, a subsidiary of Dubai Holding. It was the test case—Al Gergawi termed it as “the child that gave birth to its parent”—and an example of the Dubai government’s entrepreneurial approach of testing solutions in market to see what works. Once the model was established as successful, further investment was directed towards knowledge economy free zone initiatives. Today, TECOM Group runs many more business communities across the emirate, including Dubai Media City, Dubai Knowledge Park, Dubai International Academic City, Dubai Production City, Dubai

Studio City, Dubai Outsource City, Dubai Science Park, Dubai Design District, and Dubai Industrial City.

Reflecting on its 20+ year journey, DIC has been successful in attracting a wide range of technology companies from around the world, expanding its physical footprint 50% from the time of its launch and is currently home to more than 1,600 companies, including start-ups, SMEs, and multinational corporations. It has undoubtedly become a pillar of the Dubai RIS and a critical lens through which one can understand the unique elements of the system.

Internet City opens

In the race for excellence there is no finish line, says Mohammed

By Rasha Owais

Dubai
The Dubai Internet City project – completed in just 364 days – was yesterday declared open by General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Defence Minister.

While declaring that “in the race for excellence there is no finish line,” Sheikh Mohammed reiterated that development is an ongoing process. He said all the infrastructure is ready and several global majors are set to move in.

“On October 29, 1999, I announced the creation of Dubai Internet City. My vision was clear – transform the local economy and make Dubai the New Economy hub,” he stated.

“My commitment was fourfold: provide world-class infrastructure; create the ideal environment for e-business in Dubai, irrespective of size or origin of business; create a culture and attitude that is business-friendly; and make sure businesses get competitive advantage by operating from Dubai.”

He pointed out that over 190 companies have registered with DIC, with the next two months set to see over 3,000 qualified professionals functioning from the complex.

“So, has my vision been realised?” he asked, while pointing out the strides made in the past year. “But as I keep telling my team, in the race for excellence there is no finish line.”

Sheikh Mohammed observed that in the New Economy, one needs to work harder – and smarter – with most developed countries and cities trying to attract ideas and capital.

“Entrepreneurs and companies will move to where they get the best combination of infrastructure, environment, attitude, talent, legal framework, market and exit options,” he stressed. “(And) this amalgamation will lead Dubai to become a world-class hub for the New Economy.”

He noted that over 40 years ago, the dredging of the Creek by his late father, Sheikh Rashid bin Saeed Al Maktoum, was the first important step taken to convert Dubai as a regional business hub.

“Today, Dubai Internet City is the first important step undertaken in creating an e-creek in Dubai,



Sheikh Hamdan and Sheikh Mohammed view a scale model of one of the government projects during the opening of Gitex 2000 at the Dubai World Trade Centre. – GN picture by Joseph J. Capellan

a place around which e-business can flourish,” he declared.

Earlier, after inaugurating Gitex 2000 in the morning, Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and the UAE Minister of Finance and Industry, stated: “Government departments in Dubai are adopting the e-government initiative... the UAE is not aloof from the global digital economy.”

Sheikh Hamdan was accompanied by Sheikh Mohammed.

Touching upon a range of domestic financial issues, Sheikh Hamdan confirmed that the UAE telecommunications sector will remain closed to foreign companies, but pointed out: “Dubai Internet City’s strengths in Internet and telecommunications media provide a gateway for other national firms who want to enter the sector.”

Foreign industrial investments, he added, are given the green light

only after due feasibility studies are conducted to determine the likely value added to the local economy.

He also denied that the UAE is going through a recession, observing: “A number of empty flats in some buildings does not mean there is recession.”

He also said the decision of mergers among local banks lie solely with their boards of directors.

Gitex Special – Page 33

Put pressure on Israel – Hamdan

By Rasha Owais

Dubai
Arab and Islamic countries should use all political and economic methods of pressure to force Israel to recognise the legitimate rights of Arabs, said Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and UAE Minister of Finance and Industry, during the opening of Gitex 2000.

Sheikh Hamdan hoped an Islamic and Arab team would be formed to face Israeli violations,

and that the world adopt a humane stance towards Palestinians.

“We feel really sorry about what is happening to Palestinians. The world has not seen crimes like the ones committed by the Israelis against Palestinians,” he added.

“Stones cannot be compared with aerial attacks and weapons.” Sheikh Hamdan called upon the Arab and Islamic world to support Al Aqsa Intifada

On the Arab Summit in Cairo, he said: “It gave Israel a clear message that Arabs unanimously reject its Zionist policies.”

He, however, added that during the summit some Arab countries had called for demands that cannot be fulfilled by Arab nation.

When asked whether the UAE would submit to international calls for Israel’s participation at IMF/World Bank meetings scheduled in Dubai during the year 2003, Sheikh Hamdan said: “It is too early to discuss its participation.”

“We cannot define now the sort of developments that will happen in the future as well developments on this particular issue.”

Figure 8.3 Announcement of Launch of Dubai Internet City, Source: Gulf News Archives

See Appendix B for other Gulf News archive articles on Dubai Internet City

Interview Data on Research Questions

Role of Government

As mentioned in this chapter's introduction, the DIC case was the most revelatory of the full extent of the government's role in the RIS. This is because DIC itself is a government-driven entity and the interviewees, particularly Al Gergawi and bin Bayat, are some of the most senior government representatives in Dubai, with deep knowledge across the economy. For this reason, the section below is the most detailed across the four cases and a higher number of quotations from the interviewees are shared as, in many cases, they are the ultimate government decision makers, and hearing their insights directly is enlightening and a unique element that this research presents. To the author's knowledge, no other study has captured these kinds of insights across the dimensions of the Triple Helix from such senior Dubai government representatives.

This section will address the topics which characterize the Dubai government's role in developing the RIS through the DIC lens, summarized in the following six themes: 1) The concept of "One Dubai," allowing the government to make strategic long-term bets that benefit the city's innovation potential, 2) Regulation and Infrastructure, 3) Deep Engagement with the Private Sector, 4) Agile Portfolio Approach, 5) Open, Diverse Society, and 6) Trust, with respect to the relationship between government leadership and the operational management.

One Dubai

As described in the case of Emirates Airline, Dubai has benefitted from a unique advantage of assessing a project's viability based on its aggregate impact to the emirate's economy. In the previous case, more people landing in Dubai's airport

benefits the ultimate shareholder—the Dubai government—because of all the ancillary spend beyond the plane tickets which ultimately feeds the region’s economy. Hasnaa Kebouri explicitly links this mindset to the approach taken when financing DIC in its early days, a role she managed firsthand, commenting:

Sheikh Mohammed's vision [for DIC] was similar to the airport vision, where the airport is there to support the economy of the whole city. So, it does not necessarily make money, but then it facilitates the whole city to grow.

The guarantor was Sheikh Mohammed. My first business plans were at zero interest. And that's why it was—I don't want to say profitable—but then it made sense. But the thing is that *it wasn't profitable to one person; it was profitable to the whole of Dubai.*

This “One Dubai” approach allows for longer-term investments that have broader aims than the profit maximization of a single firm. In the case of the difficult task of diversifying an economy, this flexibility is essential. At the same time, although Sheikh Mohammed was the loan guarantor to enable the team to kick-start the project, there was an understanding that the government is not a source of funding going forward; the project would need to be commercially viable and attractive for financial institutions to want to extend loan facilities based on its own merits.

It is in the combination of these two factors—a government-supported single view of the impact on the overall economy and an insistence that each project quickly reach commercial viability in the eyes of the private sector—that Dubai’s RIS gains its competitiveness and is distinguished from other Gulf attempts. Neighboring GCC country government attempts at diversifying their economies may have a common vision with Dubai, but generally, counterintuitively, suffer from government over-

funding and a disconnect from the real market. This important theme is explored in further depth, analyzed across cases, in the conclusion in Chapter 11.

Deep Engagement with the Private Sector

Some of the most revealing insights about the functioning of Dubai's government with regards to building the RIS came from Al Gergawi when he explained the approach:

We don't deal as a government. It's a partnership. At the end of the day, you want them to be successful... You work for them. It's a different way of thinking. But this is also the DNA of Dubai ... [over] 100 years, Dubai became very much a global city. It's not a regional city... It's really based on: Collectively, we can do much better.

This refrain of government truly serving the private sector emerged across cases and can be traced back to Sheikh Mohammed himself and his predecessors before him. What sounds like an aspirational government slogan somehow permeates the operational team culture, partially stemming from the trust factor outlined at the end of this section. It is one of the distinguishing factors of Dubai's unique government role within the RIS. Bin Byat mentioned this important dynamic of setting policies and establishing an environment conducive to innovation, saying, "In fact, industry, it drives; the main driver of policy is industry here."

Bashar Kilani, representing IBM in the Middle East at the time, shared two stories that show this partnership spirit in action. The first was before DIC was announced; IBM was looking for a location to host their annual global conference, and Dubai was being considered. As the head of the region, Kilani wanted to make it

happen to put Dubai on IBM's senior leadership radar, but there were some significant challenges:

We started at His Excellency Al Gergawi's office, just to kind of put them in the picture. And they were very welcoming. 5,000 people in Dubai at that time—it was difficult for Dubai to host 5,000 people. They didn't have enough hotels; they didn't have enough facilities.

So, they gave us access to at the airport, there was a big auditorium... We got support from embassy, we got support from the police, we got support from everybody in the government to make this happen... Royal treatment, honestly, it was a great story... And the icing on the cake was that His Highness Sheikh Mohammed came to the opening.

The second story encapsulates the Dubai government's deep engagement with the private sector perfectly. Less than a year after impressing IBM's senior leadership and hosting a flawless global conference, DIC was announced as a project, and Al Gergawi was personally seeking the first anchor tenants. Kilani recalls the experience:

Then we get people from His Excellency Al Gergawi's office saying we need IBM, Microsoft, Cisco, Oracle as the founding partners of the Internet City—we'll build offices, we will brand the building with our name. But we are very comfortable, close to the airport, in the middle of town... [It was] hard to sell [internally]. But they were very personal, "What do you need?" *They were so persistent.*

We wrote them a letter of intent. It says *inshallah* [God willing], one day when the weather is good and the sun is shining, we will move. Of course, they made it very easy and so on. But I was amazed that three weeks later, on

the way to Abu Dhabi where the construction site of Internet City was, [I saw signs for] Oracle and IBM; if some executive comes by from IBM, I will be fired! Because it was a very loose LOI. But we wanted to move. They helped us. They made it so easy.

October 2022, one year later, His Highness is there, opening the IBM office. We had built a data center, so it was a good investment also. Great story in one year, but it shows you how persistent they are and the fact that they are keen to make it happen.

In summary, the government took it upon itself to deeply understand what are the factors that would make IBM want to move (some of those details are shared in the next section on regulation and infrastructure), quickly worked on practical solutions, and then were relentless in pursuing them to join the inaugural anchor tenant group. After convincing IBM to sign the LOI, they impressed them with the speed of execution of the project and awarded them a financially lucrative contract to deploy the DIC data center, a core part of the IBM regional business. This cemented a relationship that has endured for over two decades and demonstrates the tenacity of Dubai's approach to hands-on RIS building.

To conclude, I asked Kilani to reflect on his experience at DIC since the launch of the project and share what makes Dubai different when it comes to the government's role in building an innovation system:

The Dubai and the UAE governments have always been more supportive and forward coming than other governments around the world because they had a vision. They really wanted to create a hub for technology in Dubai. So, they were close to us. Whenever we needed something, it was an easy conversation

to have, and they would reach out for advice and support and ideas and so on.

It was a two-way street all the time.

This combination of a strong top-down vision with the openness to engage with the private sector in the spirit of learning and providing the best possible experience encapsulates one of the important unique elements of the Dubai government's approach to RIS building. Traditionally, these are conceptualized as opposing approaches, and it is unusual to see a single government simultaneously adopt both top-down and bottom-up methods.

Regulation and Infrastructure

When planning the new free zone, the team was keen to establish the right foundations that would attract top global technology companies to Dubai, both in terms of the regulatory elements as well as the infrastructure available for them to use. Malek Al Malek, a 20-year veteran of TECOM Group, summarizes these two important pre-requisite ingredients to ensure DIC's success:

You need to have the infrastructure from the air connectivity to even the implementation of the ultimate solution for this company. We were the biggest implementer globally of Cisco IP Telephony system, when IP telephony came.

Secondly, the whole regulatory framework. In order for you to be attracting and nurturing and actually hosting this creative system, you need to have the proper framework that actually makes these individuals and companies protected and feel safe to operate in the right legal framework.

Recounting his early attempts at convincing companies to relocate their regional headquarters to DIC, Ahmed bin Byat shares his approach and the factors

that consistently came up in conversations with business leaders with decision making authority:

We really didn't offer anything. In fact, we were not talking; we were letting them talk, meaning we asked them ... what will it take for you to come to there? So, then they said, "Listen, I need to own 100% of my business. I need very good technical infrastructure. I need a data center. I need good broadband... I need some laws to protect [my] IP." Ok, fine, so if we do this, you will move. Ok, then we'll come back here and do our homework.

Bin Byat understood that it would take much more than just attractive real estate to convince these companies to move. One of the regulatory initiatives he was involved with during the first years of DIC was instituting Dubai's first cyberlaw. The request for clear regulations governing the sector came from the industry players themselves. He recalls the journey of establishing this early regulation:

We worked on the first cyberlaw in 2003, e-commerce law—nobody even knew what this was... This was the response to cover the concerns or requirements of these global companies who wanted to have all this investment.

Kilani was actively engaged in conversations with Al Gergawi and others about what would be needed for them to move their presence from an onshore office in partnership with a local trading company to DIC. Besides all the usual elements raised by others about regulation, taxation, and technical infrastructure, when he was asked for his inputs, Kilani chose to highlight "ease of doing business" factors that were still missing in Dubai at the time:

The discussion started with, “You need to simplify your government processes. You need to make them streamlined. You need to give investors assurance that they can work in the environment here.” That's why they created the free zones.

Continuing this theme, Majed Al Suwaidi recognized the right steps that were taken before he assumed leadership of DIC to set the foundations right through listening to the requests of early tenants like Kilani and always striving to provide an enabling ecosystem far beyond the physical buildings being leased:

A lot of the merit goes to the government's clear vision of what the project has to do in making sure that your customers are heard ... and [making] quick and swift changes in the legislative infrastructure. Today, for instance, if you take this project somewhere else where these three main factors aren't there the project will be just a real estate project.

Picking up on this point with a concrete example from her own professional experience, Kebouri recalled a Moroccan government project that was aiming to replicate the DIC model—a Casablanca technology park she was asked to advise during its formative stage:

They created nice offices, nice greenery, and that's it. What they failed to reproduce was the one-stop shop for government services so you can get all your paperwork, licenses, all of that done... If you want to invite investment, you make it easy for them to come and do business in your country.

Fully integrated, streamlined government services, backed by the right regulatory frameworks, is the part of the equation that is much more difficult than building physical offices and is the area in which Dubai excelled relative to other

regions. The government knew from the outset that solving for the customer experience of investors establishing in Dubai is a critical prerequisite to the success of the project and so invested as heavily in the “software” of process optimization as the “hardware” of physical real estate. Kebouri knew this was special from her days launching DIC and Al Suwaidi echoed this sentiment, bringing it to the current day operations of DIC:

All the zones that we have today play more of a catalyst role. We moved from only the location, logistical components, to more of the strategic components. So, when we talk to companies, we talk from a strategic point of view, not only this is your location, this is for your logistics and that's all. So, people see all of that together.

Al Malek took one step back and looked at what makes Dubai different. When asked what would stop other Gulf or other countries from replicating the Dubai model, he felt that it was the integrated nature of the city:

You need this complete city setup and the government setup, which is very hard to do. If your airport doesn't have an open sky policy, you will not have similar hundreds of destinations that travel daily from the city to the rest of the world. This immediately hits your business... We built it small, but we built it over decades. And a lot of learning.

The physical infrastructure needed beyond office space was substantial and, in many cases, not yet available across Dubai. One concrete example shared by bin Byat was the telecommunications infrastructure, still in its infancy in Dubai and lacking the broadband capacity as well as VOIP capabilities required by the prospective DIC tenants. Instead of trying to reform the existing player, in true Dubai fashion, a new

telco was spun up called du, and bin Byat himself would eventually lead that company for many years. He reflects on that journey:

At that time, telecoms were a monopoly. There was only one company running the show... Technical infrastructure was very important for these companies to operate, and it was impossible to provide through the incumbent operator. So we had to carve out this free zone and we built our little telco [du] inside it.

Here another important dimension of the Dubai government's role in the RIS is highlighted; namely, its willingness to establish companies to plug gaps that are slowing down the adoption of the vision. Other successful companies were born from a similar impetus, such as Empower, a district cooling company initially established to serve the free zone, and eventually went public in November 2022. Du has emerged as a major telecom player in the market, rivaling the incumbent Etisalat in ways that couldn't have been predicted when the company was first established to serve the early DIC community.

This section concludes with reflections by Al Gergawi that take a macro view of the role of government when building an RIS, one step above the legislation and services described thus far. His comments are reproduced in full as they are quite instructive regarding the driving factors important to the senior-most policymakers in the emirate:

The job of government is to create an environment for talent to thrive. What does talent require? That's our job as a government: *We unleash human potential* and then welcome them and make it easy for them. From regulation to lifestyle, from visas, from family, from health, from why people have

moved here in the past two years. [For example, during COVID] we kept the country open, which is important for international business, for talent, but we made sure that health-wise we are the best, globally. So everybody is safe... Food security was important. Food was abundant.

For us was that showed the flexibility and the agility of the nation. So, it's not about technology, it's about human beings. Nowadays, our job is talent because people make things happen, not the government. Our job is to create the regulation, the framework, the environment but people will make things happen.

Open, Diverse Society

The theme of people and talent that Al Gergawi ended with was Ahmed bin Byat's starting point; he viewed the radical diversity of Dubai as its principal fuel for innovation. In the end, societal composition beyond the native community is a government decision as they control who is granted residency visas. No other region in the Gulf, not even the other emirates of the UAE, come close to the percentage of foreigners found in Dubai. Bin Byat reflects on the importance of this statistic:

The city [has a] very good mix [of people]; this is rich with innovation. People who come here start their own companies like yourself, from other places and 95% of the people here are like that. They come for opportunity ... having this mix is what fuels [innovation], and people don't understand this. This is what fueled America then.

Today I can confidently say that Dubai is probably the only global city in the world. Global in the true sense—the people, the way they think and work, the interaction with society.

Such a reliance on talent is a double-edged sword, though. As quickly as they all relocated to Dubai, talent can migrate away if the conditions change. Bin Byat shared the implications for this dynamic, which preoccupy the government:

[Talent] can pack a suitcase and go. So, we understand that we are 95% them and 5% us, meaning they create this economy. Most of the companies in the city are owned by everybody else—businesses, innovation, sales, you name it. This keeps the policy makers on their toes. We are not relaxed. We saw the Gulf War, what happened. You know, and the worst thing is when people get scared. Focus on security.

There are few places where security is as important since many people have a plan B that they can pick up and leave back to in case the security situation deteriorates. At the moment, security is one of the biggest draws for many people relocating to Dubai with families, but this dynamic could change overnight and so there is a very active security apparatus always operating under the surface to protect the city.

The spirit of extreme openness embodied in the immigration policy is also reflected in the business sphere. One factor that distinguishes Dubai is the commitment to open competition even when it comes to the assets that other countries may choose to protect, like the flag carrier airline. Al Gergawi explained that this was instituted by Sheikh Mohammed from the beginning to build stronger companies and to encourage more commerce to flow through the city:

Sheikh Mohammed always says, “We believe in an open sky policy. We believe in an open, free economy.” This is very important. We don't believe in

protectionism. You compete with the best. To be fit, you need to compete with the best.

Dubai combines a diverse society of people bringing their experiences from around the world (over 200 nationalities living in the emirate) with a spirit of open competition, serving as a fertile ground for innovative ideas to be born and tested. These ingredients led to the DP World, Emirates, and many other success stories launched in Dubai and scaled to the world.

Agile Portfolio Approach

Not only is the Dubai government entrepreneurial in its method, but it also follows a portfolio approach, betting on the aggregate performance across all initiatives vs. a single entity, much like a venture capital investor. Ahmed bin Byat explains this phenomenon:

Policymakers here are very well aware, and they are on top of trends... If it works, it works. If it doesn't work, then we learn... Not every startup succeeds. Dubai has a sort of startup mindset. And size matters—because we are small, we are agile, we can move, we can change direction.

To this point, Al Gergawi listed several of the recent Dubai government initiatives around frontier technologies and explicitly said that they expect the vast majority of them to fail:

You are moving to the knowledge economy. But since that day, 29th of October 1999, things were happening almost on a yearly basis. From moving to E-government to Smart Government to the Museum of the Future to the Blockchain strategy, to virtual assets, to the Metaverse Committee. We've

been evolving with time. *We'll do ten things. Three might fail... Our job at the end of the day is to create the environment.*

The government's approach to pushing the RIS forward is characterized by a willingness to ride the latest frontier technology waves knowing full well that they may be too early, there may not be a good match with the Dubai economy, or the underlying technologies themselves may not survive the initial hype cycle. When viewed from a portfolio approach lens, the strategy makes sense, particularly for a relatively small and centrally controlled region like Dubai, where pivots are easier to make.

Trust

The topic of trust by the government granted to the various project leaders was implicit in many of the interviews, but Kebouri outlined it explicitly in the case of DIC. This factor is Dubai-specific because of the deep familial connections linking the Emirati families, the small size of the local population, and the willingness of the leadership to liberally grant wide mandates to entrepreneurial leaders to execute in their own ways after being generally directed by a high-level strategic vision. Kebouri explained:

The leadership is very important... The team has to be smart, loyal, invested and uncorruptible. Because there are examples of people who [were caught for impropriety], whether they did it knowingly or just ignoring the rules or not knowingly ... but they were changed. It didn't matter if they were the nephew of the Sheikh or whatever. They were just asked to leave... Once you've done something like this, you're stigmatized forever, you and your family, because

it's still tribal. And that's what I like as well. There's loyalty and trust that's beyond just the corporate.

And also, the trust that Sheikh Mohammed endows the people and the trust that they give back to him. That you can't buy, you can't find, you can just try to duplicate the concept as creating a culture and values and all of that, but this is as authentic as it gets. Very important. For me, that's the number one critical success factor of any project, especially at this size. And that's why most of the Arab countries, or Gulf countries, are not able to go beyond 0.1—because they're missing that factor.

By bestowing such high levels of trust in entrepreneurial leaders in government, Sheikh Mohammed established a high-performance culture unique in the Gulf and quite rare globally. Operating in a broader region that is plagued with governments that are paralyzed due to corruption and low aspirations, Dubai has broken free and shown what a highly efficient, trustworthy government that prioritizes its people and stakeholders looks like. This has led it from strength to strength.

Role of Industry

Examining the role of industry in the DIC highlights the impact of the government strategy in assembling globally leading technology companies all in one physical location, serviced to their needs. The cluster dynamics played out in a textbook fashion with knowledge spillovers regularly crossing between neighboring firms in the form of shared projects as well as talent mobility from one firm to another. Talent would also spin out of these firms to form new local ventures, further feeding the RIS. And the fact that the large brands chose to locate their regional headquarters out of DIC gave birth to a supplier ecosystem that did not previously

exist, with local firms serving as implementation partners, gaining both business as well as critical skills. All of this was made possible by the explicit cluster economy strategy anchored by the world's most respected brands in technology.

Knowledge Spillovers

Once leading technology companies were assembled at DIC through the deep engagement and custom regulatory frameworks and infrastructure investments described in the section above, an important outcome was the concentration of specialized talent in one geographical area. The employees of these companies shared lunches together, met up socially at the DIC campus, and flowed from one company to another when progressing through their careers. Bin Byat mentioned that this dynamic was a critical component of the success of DIC in reaching its broader goals of building the knowledge economy in Dubai:

Microsoft, Cisco, Sun, Oracle, all these people, they see each other and they're all next to each other because they have lunch together in the food court. So, there is this competition, but also at the same time ... they share information. People move from one company to another company.

What we notice over time is two or three of these individuals, you know, I'm thinking of setting up my own company. Would you like to join me? So, they do that, then they move, and they set up their own company... After the first six years, we noticed a lot of babies being born. And most of them are from these ex-employees of these big giants.

Kilani recounted his own experiences working in DIC with a smile, as if he were recalling the environment of a beloved college campus, bridging between

competitors in ways that would not be possible in their home markets where every company occupies its own tower in a different part of town:

A lot of deals were done in the Internet City, in the coffee shops or in meeting rooms because IBM was working with Oracle, with Microsoft, one and the other, and so on. Sometimes we were discussing deals for regional projects. They were probably discussed in Dubai before being discussed in other places. Having everybody in one place created a community, created a culture, created a pool of talent. People were also moving from one organization to the other. At one point, if you were not in the Internet City, you were missing out on the scene—you're not in!

Al Suwaidi highlighted the aspect of talent mobility within the firms of DIC, bringing along with them their learnings from their past roles:

The beauty of it was most of the people that came stayed, so even if he was relocated again, he would prefer leaving his company and staying [in Dubai]. So, this created a secondary talent market available here.

In his position overseeing all of TECOM, Malek Al Malek recounted many examples of people across DIC coming together to form new companies, bringing with them the knowledge and experience from their previous roles. This is augmented by the fact that Dubai Knowledge Village and Academic City both sit under the broader TECOM umbrella; although they are not sources of commercializable R&D, as discussed in the next Role of Universities section, they definitely serve as a source of talent. Al Malek recalls:

... an example of an AI company, I remember there were three individuals.

One came from one of the university campuses, [the second was] ex-

Microsoft, and the third is from another sector. I don't recall. But they met in a [DIC] business activation event with a brilliant idea; they formed a company.

These types of knowledge spillovers from one company into another, or from one company into the formation of a new company, are hallmarks of a well-functioning RIS, and are ways that firms at DIC have contributed to bridging the talent gap in Dubai.

Quality Brings Quality

Knowledge spillovers were even more effective because of the quality of the firms attracted to DIC. Selectivity on tenants, particularly in the founding years, was critical to establishing the kind of community that would drive the knowledge economy forward. Kebouri brought up this point from her time working on the business plans of the early DIC community, commenting, “The anchor clients were invited. They were given special deals.”

Al Malek explained the importance of what he called “pillars” of the sector and how much focus was placed on attracting them. For DIC, as well as other free zones that emerged later under the TECOM umbrella, the examples he gave were:

IBM, Microsoft, the pillars of that industry. And each industry, if you go to media, it was NBC, CNN, BBC—the same philosophy is followed across industries.

If the goal were to merely fill the real estate with technology companies and maximize rent income, the team could have targeted much easier companies to convince, but bin Byat and his team were adamant about establishing credibility with anchor brands that signaled the quality of the project to the world. He outlined the tenant strategy from his days as founding CEO of DIC:

India was serving as America's back office, right? We could have approached India, but they are very low value for us. We didn't at all. So, in the first five years, we didn't have a single Indian company. We didn't want, we wanted to go get the best, the biggest brands and bring them here, because that's how you get noticed, right?

And this is what Dubai does all the time. We build the Burj Al Arab, not because it's such a revenue making hotel, you understand what I mean? Imagine if Dubai built five little hotels on the beach ... at the same price as Burj Al Arab; nobody would know. But you build something crazy which will never make money, right? Look what happens to the industry. Burj Khalifa, whatever, we want to bring the icons. I went personally, and I met with each one of them in Seattle.

The fact that bin Byat used the examples of the Burj Al Arab hotel and Burj Khalifa was quite telling. This strategy of physically marking the aspirations of the city through iconic projects has been part of the Dubai playbook since the establishment of the world's largest port at Jebal Ali under Sheikh Rashid. The result was attracting high quality firms that would speed up the development of the industry dimension of the RIS, instead of waiting for the progression towards quality to happen naturally over time—and if the first tenants anchor the industry far below the aspirations, it may, in fact, never break free from that perception.

Supplier Ecosystem

One of the challenges bin Byat recalled from the early days when attracting the world's best technology companies to DIC was the concerns of local trading families that bringing in this kind of competition was going to hurt their potential in

the market. The widespread perception was that it was a zero-sum game and that global players would be taking a larger slice of the economic pie, leaving less for the Emirati companies that had been working hard to develop in the nascent technology industry. To this concern, the leadership was adamant that more competition is better for everyone, and definitely for Dubai, as previously explained by Al Gergawi. Bin Byat comments on the initial push-back he received and the eventual outcome of these companies entering the market:

In the beginning, there were a lot of people who were skeptical. And some were against it, [concerned that] one of these big companies is going to come and, you know, take the market. But they realized that these companies actually created opportunities for a lot of people to become resellers for Microsoft solutions, for Cisco. They created so much more business and that concern just took a few years and dissipated after that.

Many more onshore companies got created in partnership. The reason was all of these big companies built the boxes. But their interest was really in selling these boxes and they were not so much into installing the boxes, not so much into fixing the boxes.

The robust supplier ecosystem that formed not only opened up more sources of revenue for the local firms serving as implementation partners, but it also accelerated the technical development of these firms by exposing them to the latest innovations in the field and raising their competitiveness in the local market, as well as farther afield. Bin Byat recalled the example of a local company that started only serving Dubai and ended up becoming a certified Oracle partner across the African continent, along with other geographies—a scope that would have never been possible

without the entry of a high quality, global leading firm like Oracle into the market. Therefore, the Dubai RIS was enriched by not only the top firms' entry, but also the effect this entry had on local firms in the same sector.

Cluster Economy

The final theme under the industry dimension of the Triple Helix was the unique type of cluster economy DIC created, mixing top technology firms from the private sector with a proactive, engaged public sector in one setting for the first time. Al Suwaidi summarizes this well:

It's always about this Porter theory of clusters and culture... You see the difference of how government plus private work together to make it happen. Because you know it is not only the private part of the equation that makes it work; it's both.

Al Gergawi delves deeper into this point and the impact the DIC cluster had more broadly, especially on the very functioning of government. It is interesting to see the impact of the industry on the way government ran; because of the high ambition that came with this project, Al Gergawi's office adjusted its entire operating model to deliver results:

We were building a cluster economy. From that cluster economy, products came, commercial products. Du, for example, as a telecom company came from the Internet City. Empower as a district cooling company came. Today, Empower is the largest district cooling company in the world. We need to build infrastructure.

I used to go to work at eight until one then take a break. I would go to my home for lunch or a nap or shopping. So, DIC changed this paradigm. The

methodology has changed in Dubai... It was based on something that happened in 1999. It was a pivotal moment and that was your talent. Silicon Valley was established on rocket programs and microchips. Whatever we see impact that happened after over 20 years was based on that. That was the base actually. When you look at the story, the story started from those four buildings in Internet City, such as we took the \$200 million loan to build it. But we needed to deliver 100 companies in 365 days. We needed to build the smart infrastructure, and we needed to go from idea to delivery in one year. It paid off because it changed the thinking and took Dubai to the future, future mode thinking. Dubai became a future city.

Role of Universities

The themes in this section address how the interviewees view the Dubai university environment as it relates to developing the RIS and how any gaps have been managed. The most common refrain was that the R&D being produced at local universities is not at a quality level that would be applicable to commercial usage by firms in the RIS, and that the extent of the industry-university relationship was one of recruiting junior talent. These topics are explored in further depth with comments from the interviewees below, along with the attempts to shore up the local university system vs. leveraging global resources.

Short-term Prioritization

Part of the challenge of cultivating a thriving university dimension of the Triple Helix in Dubai is that the journey of developing research institutions that produce commercializable R&D is a long one, and Dubai is always looking for solutions that can be implemented immediately. Although some tactics can be taken to bridge the talent and research gap in the short term, the missing element of a

university system commensurate with the knowledge economy aspirations of Dubai is a theme that all interviewees shared in their own way.

Ahmed bin Byat is best placed to reflect on this question because, besides his role as the founding CEO of DIC, he has held many posts related to education, among which are serving as the Founding Chairman of the Dubai Education Council and several board of director appointments at leading UAE universities. When asked what caused the wide gap between the knowledge economy aspirations and the state of the local university system, he explained what has guided the government thinking on the topic thus far:

One of the main drivers of how Dubai does things, it will always look at doing anything that it likes to do in the shortest possible time. [Producing world-class research universities requires] a lot of government funding. We wanted to come at the end [of the process] and wanted the people who sell the solutions to come to us. I didn't want to develop the [R&D]. That's not the game for us. We just don't have the size or the mass or the deep pockets to think so long term... For us, it's much better to hire the best engineer and bring him here to work than to develop an engineer. From a time and money point of view.

Although the strategy of importing talent has been successful throughout the first transition phase from a rentier to a service-based economy, the question remains whether this same strategy can lift Dubai into a knowledge-based economy. Returning to Kebouri's earlier comments about DIC's original objectives:

Initially it was meant to be the Silicon Valley... That kind of dropped or changed as a concept because it's very expensive to recreate that, because you need to invest a lot more as a government into R&D and into so many areas.

There were other things that really didn't make sense financially to invest in them, like research and development, like building microchip factories. Basically, the model of the Silicon Valley cannot be reproduced the same way because it's not the same [environment].

Al Suwaidi also reflected on the timeline challenge, explaining why the development of the university ecosystem was not the priority in the first years. That said, he opens the door to the fact that these conditions are changing currently and expects this to become more of a priority going forward:

This kind of mentality takes decades and there are priorities. And I think research is something that comes when stability and good business and good commerce is happening. You don't start researching when you're still in your growing time. You only start getting into this when you have the luxury of time and the luxury of looking at least a little bit further down the line, which at least now I think we've just reached at that point where people are coming, businesses are growing, the kind of business is getting better.

Al Suwaidi's point on phasing priorities is well-taken. Had Dubai channeled all of its focus and funding on R&D in the first phase of the development of its RIS, they would have likely failed in building such a successful service economy. The challenge will be in shifting focus and igniting the R&D capabilities now that the service-based economy development has been successful. This is explored in further detail in the concluding chapter, with examples across cases.

Attracting Long-Term Talent

Kilani joined a Dubai government-led delegation to Silicon Valley where the initial ambitious DIC objective Kebouri mentioned was resurfaced. He explains:

The mission was: What does it take to make Dubai the Silicon Valley of the region? This was in 2016. We went there; we visited Tesla, IBM, Microsoft, Google. And we came up with recommendations. For you to become Silicon Valley, you need talent at scale. You don't have it today.

Why do they have talent? For two reasons. They have universities at scale. We don't have them today. But they also have easy visa regulations. All these Chinese and Indian programmers could immigrate into San Francisco, get their green card. They see San Francisco or Silicon Valley as their home. They make investments. They become Americans. And that was an important thing. And that's the birth seat of the [UAE 10-year] Golden Visa which gives people longer-term commitment.

Although granting citizenships is a sensitive matter that is decided on a federal level and impacts the delicate relationship between the government and its local Emirati citizenry, opening the door to longer-term residencies was one of the concrete recommendations that came from this delegation's trip. Upgrading from a two to three year residency visa sponsored by the hiring company to a 10-year self-sponsored residency was a substantial improvement to the regulations in place to attract top talent to the emirate.

Global Links

When asked about the role of universities in Dubai's RIS, Al Gergawi acknowledged that the landscape is underdeveloped and quite nascent, but, at the same time, he thinks a localized view of R&D is limiting:

In Dubai you don't have that. I look at the whole region's universities as your university. I wouldn't say you need or it's good to have, but you have to look at the whole region and the whole world as your platform.

Education is being disrupted, being disrupted alone for them to say, what do you need, actually? Do you need university? Really? Because education is changing, and it will change whatever. In five years, ten years will be totally done, whatever we are talking about. So, I believe that it's good to have university, but if you don't have university, and we didn't have, we looked at the world as one university.

Al Malek reiterated this point in his own words, believing that the main objective should be creating an environment that attracts the best people from around the world:

The city can attract any talent from anywhere... Due to the attractiveness of the city, if you look at the indexes, we are probably number one in the Arab world, number one probably even globally in certain domains.

Although these points have undoubtedly guided Dubai's policies to date, and the lack of substantial R&D has not had a tangible impact when transitioning into a service-based economy, the challenge remains in the current transition into a knowledge-based economy. A well-functioning RIS can adjust for a weaker university leg of the Triple Helix through such measures, which Dubai has done in

ways other regions would struggle to replicate due to the openness and international nature of society.

Kilani contributed with an example from IBM's experience, leveraging talent and research from other countries in the region, such as Egypt, to benefit the team's work in Dubai:

It's a global play. I think COVID, and even before COVID it was becoming clear that you can do a lot, across borders. We had a development center in Cairo as IBM. We had most of the developers there, but most of the interesting projects came out of this region for these people to work on.

Building a Local University Ecosystem

Although the local university system has not yet developed to a stage where R&D is being leveraged by firms in the RIS, building the education sector was always part of the broader DIC strategy. Kebouri recalls from the early days:

Universities were part of our strategy of creating a knowledge economy. Initially the effort was just made in the same way—Knowledge Village or Academic City were given land. This was for universities and then for the anchor clients we would have to work out special deals. Because you want them to be there for ten years, twenty years. So, you would help them with the rental, with whatever.

Every anchor client had a special deal for the universities, [but] I don't recall Dubai doing any agreements like the same way they did with Qatar, etc. I'm not sure if Dubai has done this. My experience with Dubai is that because it has more limited resources, it wasn't really always investing.

The Qatari approach Kebouri refers to is one of attracting top foreign universities like Carnegie Mellon, Cornell, and Northwestern to open campuses in Doha through very generous grants by the government. As explained elsewhere, the Dubai strategy is rarely one of public financing, and the time horizon to see impact from such initiatives is too long for there to be enough political will to spur a hefty investment.

Al Malek does cite an example which departs from the norm, in the shape of a partnership with the University of Birmingham. Having such an institution within the TECOM portfolio has enhanced the RIS and created opportunities for practical research based on the unique environment in Dubai. He says:

I can use the example of University of Birmingham, which we brought from UK, built the full campus for... The curriculum developed was based on, of course, their own academic curriculum, but with the extension of the innovative activities that happen within this region. You can look at RTA [Roads and Transport Authority of Dubai] and the University of Birmingham. So why would University of Birmingham partner with a city like Dubai on transportation? Because the city invested in the unmanned metro. The high scale investment of the city actually started to bring the academics.

Al Malek and others strongly believed that the lack of deep R&D locally did not impact Dubai's trajectory thus far; however, the current knowledge economy focus is making this a priority. To that, he is optimistic about what the future of higher education means for a place like Dubai, as universities are understanding the importance of being closer to growth markets:

The absence early on of universities, it was not a big issue. Today, however, what I see is that the academic sector is going through a restructuring where a lot of them are trying to create campuses outside—satellite campuses due to immigration policy, talent attraction, population growth. You're coming closer to the population that's actually forming the main pipeline of talent. These are things that are happening now.

Innovation Examples

Disrupting Government

A notable aspect of Al Gergawi's comments, especially considering his broader government role, was his perspective on the impact of DIC on the functioning of the Dubai government itself. This was partially addressed in the "Deep Engagement with the Private Sector" theme above, but it is worth noting how he views the Dubai approach as distinct from other Gulf regions:

When we first established Internet City and Media City, we did not have enough money... It was painful to compete in a region where other countries were pumping money: You want to do a free zone? Take this billion, do a free zone. This is commercial for the first time... For the first time, we had people working from nine to five, weekend became two days. [It] disrupted the way you operate. There's a new model for government. There is a new way.

You need to commercialize and think in a different way. When talking about innovation, I will always say, it's out of necessity, but also you need to take the risk, and you need to operate in a different model than your usual model. Sheikh Mohammed is sharp. He says, "You guys believe in the

concept, okay. Convince the bank.” Based on that you need to change the whole thing.

Kebouri gives an outside perspective that aligns, and shares the comments below based on her view of DIC’s role impacting the Dubai government itself:

Dubai Government was the only government that would unceasingly promote new products, launch new initiatives, where all teams were involved in making sure Dubai was a pioneer. Programs like the DGEP [Dubai Government Excellence Program] ... were launched to encourage the showcase of best practices in a race for excellence and set the benchmark for an innovative and efficient public administration practice.

The city is treated as a company so everything that was done was done in complementarity with all areas so it wasn’t just the urban development that was happening. All vital sectors were working together to create the dream. Sheikh Mohammed encouraged healthy competition among his team and the launch of new projects and ideas. The strategy was evolving with the market and global trends and the new people joining the founding team was growing.

This innovative government operating model enabled Dubai to move with bold agility. The outcome of this change to government is best explained through examples. Al Gergawi cited two—first, the unique operating model that the city of Dubai inked with Uber, and, second, the way Amazon was invited into the economy:

For example, I remember I went to Trevor, CEO and Founder of Uber, because we wanted them to operate, but we want to have a model with them as a city. Back then, they were facing a lot of problems. [Other cities] were closing them down. So, I flew to San Francisco and said, let's have a deal

between Uber for the first time and a city—Dubai. And this deal can be replicable somewhere else.

I got a call a couple of years ago... Jeff Bezos wants to meet. So, he came, we met actually on this floor. We met. “I’m interested in buying a company in Dubai.” Amazon also was facing difficulty in the capital markets back then, but he was very sincere, “I want to see if government will be okay.” So, he gave us a month or something to think about.

So actually, I stepped out of the room. [He was probably thinking] maybe to the washroom or something. I called my boss and said, “I have Jeff Bezos here who wants to buy a company in Dubai, for a couple of billion dirhams. And he asked if the government is okay with it.” Sheikh Mohammed told me, “Tell him if it's good for him, it's good for Dubai.” So, in one minute, I stepped back in. I told him. You know what? It was Souq.com.

The Amazon acquisition of Souq for \$580m in March 2017 was one of the most important moments in the Middle East startup ecosystem. Souq was founded in 2005 and was the largest e-commerce player in the region at the time of its acquisition. Attracting Amazon to the market, and specifically to base its regional headquarters in Dubai, was a clear win for Dubai, and, as shown above, one of the reasons the deal happened was the quick decision making and warm welcome from the highest levels of government.

As illustrated from these examples, Dubai itself is an innovative model for government operations, and although some of the seeds for its unique approach were no doubt planted throughout its early history, as explained in previous sections, the

DIC project launch marked a clear turning point. Al Gergawi mentioned that a new model began with DIC that has persisted and been built upon until today.

From the Gulf to the World

Kilani's vantage point representing global powerhouse IBM was telling, as the perception of Dubai as an innovation center evolved from some software localization efforts in the early days to being a test-bed for technologies that could be deployed around the world. This was made possible by the regulatory frameworks combined with large market opportunities in the Gulf, driven by government spending. He explains how the environment has evolved in the last several years toward higher levels of participation in IBM's core innovation function:

Dubai government was also very forward thinking in that they had this "reg lab" where you can actually test out technologies in a regulated environment, which was much more difficult in Europe or in the US... So, you started to work with the likes of ADNOC, Emirates, Etihad, Saudi Arabian banks or something on things that are cutting edge, unique coming out of this region, but have a lot of value for everywhere else in the world.

I think the World Cup in Qatar showed how much technology we've put into this. For the first time, we have digital twins for the stadiums and the players. And this is now going to come out of Qatar or out of this region to the rest of the world. Out of Expo, we had many, many of these digital assets that were developed for [Dubai World Expo 2020] but are now being used in event management around the world. And the nature of these complex initiatives today is that you have to get teams from all over the world. You have to get

your R&D in Europe, R&D in America to work on these assets and then of course, you build them and you provide them.

Telco Capabilities

The ambition to serve the world's best technology companies in the DIC environment pushed the team to innovate beyond the capabilities of the incumbent telecom operator in Dubai at the time, launching a competing provider that would provide the necessary bandwidth and array of services demanded by DIC clients. Bin Byat explains that this not only led to a new telecom operator but also lifted the capabilities available in the market and market a breakthrough in VoIP services:

And it was impossible for us to get because technical infrastructure was very important for these companies to operate and it was impossible to provide through the incumbent operator. Right. So, we had to carve out this free zone. We built our little telco inside it. We were the largest VoIP network in the world at one stage when we built this.

Data Center

From its first years of operation, DIC was home to an important innovation for the region—a local IBM data center. This bolstered the technical credentials of the new DIC community and, as described earlier, was an important sweetener to the deal attracting IBM to become an anchor tenant. As exciting as the offering was, it proved to be too early for the rest of the Dubai private sector, as sometimes is the case when the government accelerates adoption through its own push. Kilani reflects on the journey:

We opened a data center. Of course, talking about 2002. If I was to talk about it today, I would say this was “cloud.” It was a data center to host workloads

from customers in the region. I would say it was 5 years ahead of its time. Because people were still not very open to giving away their workloads and putting it somewhere else and having a company look after this and so on. So that was a bit ahead of its time, but it was at that time an innovation to have a data center in the Internet City. It was state of the art. It had all the facilities for computing bandwidth, cybersecurity, everything around it.

Al Malek recalls the story from his perspective representing DIC through TECOM:

We established a data center with IBM in 2000. That was part of the launch of Internet City. It was earlier than anticipated. It did not become successful back then because it was too early. The government ... was brave to take the risk. It took time for it to happen.

NFC Technology

Finally, Al Malek shared a case of partnering with another international company to deploy a world-first technology, namely Near Field Communication (NFC) on a bracelet for payments:

Another example of an innovative implementation and endorsement by the government. Mastercard had Tap and Go—NFC on a bracelet. [We told them,] if you came up with this technology, we have the community... We said we'll do it in ICT cluster. Probably the technology guys would love it. And will adapt it immediately so we can showcase this. We deployed the terminals.

I always use this as one of the examples of taking ten steps ahead. And technology was a bit complex because we needed to activate this NFC with

the bank. It did not fit the technology back then, the implementation. But probably we were the biggest user or probably any trial for such technology.

Conclusion

Before concluding this chapter, the summary of the major themes discussed by the subjects of this case are presented in the tables below, across the dimensions of the Triple Helix and followed by examples they cited of innovation at DIC.

Role of Government	Role of Industry	Role of Universities
One Dubai	Knowledge Spillovers	Short-term Prioritization
Deep Engagement with the Private Sector	Quality Brings Quality	Attracting Long-Term Talent
Regulation and Infrastructure	Supplier Ecosystem	Global Links
Open, Diverse Society	Cluster Economy	Building a Local University Ecosystem
Agile Portfolio Approach		
Trust		
Innovation Examples		
Disrupting Government		
From the Gulf to the World		
Telco Capabilities		
Data Center		
NFC Technology		

Table 15 Dubai Internet City Summary Themes

Government

As DIC is a government entity itself, the reflections of the interviewees on the state’s role in the Dubai RIS were quite insightful and complemented the data collected from private sector firms DP World and Emirates. The theme of deep integration between government entities towards a single common goal set by leadership at the highest levels—Sheikh Mohammed and his office—shows a dimension that is substantially different from other government contexts, especially

when coupled with the flexible and quickly reactive regulation and infrastructure provided by the government. The agile portfolio approach cited by Bin Byat and Al Gergawi shows how Dubai's policymakers operate like entrepreneurs, in some ways as envisioned by Mazzucato in her conception of the "Entrepreneurial State."²⁷² Finally, the repeated theme of trust placed by government leadership in the administrators of each government entity to do right by the private sector and create the environment most conducive to innovation has clearly succeeded, with operational leaders such as Al Suwaidi and Al Malek clearly proud of the direct role they have played in making this DIC vision become a reality and energized by the authority bestowed on to them to make swift decisions to continually ensure that DIC is a place where innovation thrives.

Industry

DIC is a free zone that was formed based on the concept that a cluster of firms in a similar industry could benefit from one another and create an environment conducive to innovation. This "cluster economy" theme was raised by the architect of DIC, Al Gergawi, as well as one of the anchor tenants from its opening days, Kilani from IBM. As fostering embedded learning is essential to the performance of an RIS, engineering knowledge spillovers becomes an important priority. Kilani's recollections of his time in the café at DIC, speaking with other firms and planning collaborations in ways that would have never been possible in a different physical environment with each company separated. Examples shared by Al Suwaidi and others of companies formed by people from different firms within DIC, as well as

²⁷² Mazzucato, *The Entrepreneurial State*.

employees shifting from one company to another, reinforce the fact that the cluster has succeeded on the knowledge spillover dimension.

The supplier ecosystem anecdote shared by bin Byat shows how DIC contributed to the development of the Dubai RIS at a critical moment in its history. Local families that were benefitting from the absence of global players in the market fought against allowing competitors in, but the government followed the same playbook as Emirates and others, promoting an open, competitive environment that would lead to more favorable outcomes for all. This birthed a robust supplier ecosystem and partnerships between international brands like Cisco and local technology implementers, who saw their business grow dramatically after the entry of these global players. Today, Dubai's economy is an extension of this philosophy with local firms thriving alongside the largest global players in a symbiotic way.

University

Although DIC realized the importance of specialized talent from its inception and took steps to build an education ecosystem that complemented the existing local university system, the projects at Knowledge Village and Academic City in Dubai have been more successful in developing training institutes and basic undergraduate education institutions, not research institutions capable of producing patentable R&D.

Al Suwaidi lamented that it “takes decades” to achieve the type of higher education institutions needed to produce R&D of a high enough caliber that it can be commercialized by firms in Dubai and that Dubai did not historically have this kind of patience. The same urgency comments were raised by bin Byat and Al Gergawi, who both opted to view the world as a source of talent and research, not worrying as much about where the institutions are based geographically. Their priority became how to

develop an environment that is as attractive as possible to the top talent from around the world, which is a much faster way to build this dimension of the Triple Helix. Although this strategy has been successful when building a service-based economy, firms such as the two cases examined in this study, DP World and Emirates, have experienced the challenges of working with non-local universities in developing the components of a knowledge-based economy.

Innovations

The innovations brought to market by the government entity DIC are excellent examples of the entrepreneurial spirit, discussed previously, actualized. The team at DIC was so driven to attract the world's best technology companies that they realized any gaps in their offering would need to be creatively closed and the fastest way to achieve that would be to launch their own offerings or products in partnership with future tenants, such as the region's first data center brought to DIC by anchor tenant IBM. When it became clear that the existing telecommunications infrastructure available in Dubai was not advanced enough to encourage global giants like Cisco to choose Dubai as their regional headquarters, a parallel telco was launched with region-first technologies and upgraded bandwidth. When DIC tenant Mastercard was looking for a launch partner for its world-first wearable NFC payments technology, Al Malek and team were able to quickly facilitate a pilot within the free zone in a way that Mastercard would have struggled to achieve in any other geography. These few examples show the agility, entrepreneurial mindset, and closeness to the market that contribute to the functioning of the Dubai RIS.

Chapter 9 | DMCC: Trading Commodities & Beyond

Introduction

The Dubai Multi Commodities Centre (DMCC) is the most recent case presented in this research, a leading free zone announced after DIC was officially opened in 2001 and represents the traditional commodities industry, much in the same way that DP World represents the traditional shipping industry. Just as DP World evolved into an integrated logistics player with a global mandate, DMCC increased its initial scope far beyond gold and diamonds to become the first free zone that can license any business activity allowed in Dubai, breaking from the sector-exclusive precedent set by others like DIC with technology. This increased scope, along with a very ambitious management team, has led it to being the largest and fastest-growing free zone in the UAE, and it has been recognized for 8 years running as the Global Free Zone of the Year by Financial Times' fDi Magazine. This chapter investigates the DMCC story in-depth through the lens of its decision makers since its inception and provides a second example of a Dubai free zone to complement the study of DIC presented in the previous chapter.

Interviewees

Case 4 Interviewees: DMCC	Title (Terminal)	Tenure at DMCC
Ahmed bin Sulayem	Executive Chairman & CEO	2001-Present
Gautam Sashittal	CEO	2009-2019
Malcom Morris	CEO	2009-2014
Ahmed Hamza	Executive Director Free Zone	2012-Present
James Bernard	Director of Business Development	2006-2022
William Skidmore	Consultant	2018-Present

Table 16 DMCC Interviewees

As I had privileged access to the DMCC through his prior business relationships, explained in the “Researcher’s Background” section of Chapter 4, I was able to interview three CEOs throughout the entity’s history as well as three other key operational managers to give an extremely comprehensive picture of the DMCC and its contribution to, and impact on, the Dubai RIS.

Ahmed bin Sulayem has been with the DMCC since its pre-launch planning phase in 2001. He was Executive Chairman throughout the tenures of the previous CEOs, and, in 2019, with the departure of Gautam Sashittal, Ahmed bin Sulayem took over as both CEO and Executive Chairman of the DMCC. Ahmed bin Sulayem comes from the influential Emirati bin Sulayem family; his father is Sultan bin Sulayem, CEO of DP World and interviewee of this study. Ahmed bin Sulayem’s full name will be used throughout this study to ensure he is not confused with his father, who is often referred to by his last name alone.

Malcom Morris and Gautam Sashittal overlapped during the 2009-2014 period, when Sashittal eventually served as COO under CEO Morris. When Morris left, Sashittal assumed the operational leadership of the free zone and remained in the post until 2019, making an eventual transition to Saudi Arabia as CEO of the King Abdullah Financial District (KAFD). They both steered the DMCC to a new direction that was focused on delivering real value beyond the real estate and set the foundation that led to the strong position it has reached today. Sashittal’s unique view as the leader of a similar government-backed entity in Riyadh is helpful to reflect on the differences between Dubai and other Gulf regions.

The second set of interviewees are part of the operational team. Ahmed Hamza is an Emirati leading the operations of the free zone as its Executive Director

and spearheaded much of the digital transformation of the registration process as well as the value-added services that were offered to DMCC member companies. James Bernard, a veteran of the free zone since 2006, only recently left to become Chief Commercial Officer of RAKDAO, a new web3-focused free zone in neighboring UAE emirate, Ras Al Khaimah. He was responsible for business development and served as the engine behind the massive growth experienced in the last decade. Finally, William Skidmore has worked closely with Ahmed bin Sulayem as a consultant and provided an outside perspective to many of the questions posed.

Historical Context

The story of the evolution of the Dubai Metals and Commodities Centre from its launch in 2002 to the modern DMCC over the span of 20+ years begins farther back in Dubai's history. Trading in commodities is one of the oldest businesses in Dubai, which began as a pearling harbor and then became an outpost for gold trading. After the free zone concept was validated in Jebel Ali, several other clusters were conceptualized and launched in the following years. One was DIC that launched in 2001, as discussed in the previous chapter, and the following year, in April 2002, DMCC was announced as a hub for commodities trading and related industries in Dubai. The strategic location of Dubai, at the crossroads of Europe, Asia, and Africa, offered a unique advantage in terms of connectivity and access to emerging markets.

The DMCC began its journey by focusing on four core commodities sectors: precious metals, diamonds, tea, and energy. To attract businesses and investment, the free zone offered a range of incentives, such as 100% foreign ownership, a 50-year tax holiday, and a streamlined regulatory framework. In addition, the DMCC invested heavily in state-of-the-art infrastructure, establishing specialized facilities, such as the

Dubai Diamond Exchange, the Dubai Gold and Commodities Exchange, and the DMCC Tea Centre, to cater to the needs of the various industries.

The early success of the DMCC can be attributed to its ability to create an ecosystem that nurtured collaboration, innovation, and value addition across the commodities value chain. For example, the establishment of the DMCC Tea Centre in 2005 transformed Dubai into a major tea trading hub, attracting traders, blenders, and packers from around the world. Similarly, the launch of the Dubai Gold and Commodities Exchange in the same year enabled the city to emerge as a leading center for gold trading and facilitated the growth of related industries, such as refining and jewelry manufacturing.

Over the years, the DMCC has played a pivotal role in shaping Dubai's RIS. The clustering of commodities businesses within the free zone has fostered knowledge sharing, collaboration, and the development of localized innovations, driving the growth of associated industries, such as logistics, financial services, and consulting. Moreover, the DMCC's success in attracting global commodities giants, such as Glencore, De Beers, and Rio Tinto, has further bolstered Dubai's reputation as a global trading powerhouse. The success of the Tea Centre led to the establishment of the DMCC Coffee Centre in 2019, which now serves as an important hub for global coffee trading through Dubai.

In recent years, the DMCC has continued to evolve and expand, diversifying its offerings to cater to a broader range of industries and businesses. Today, the free zone is home to more than 20,000 companies, spanning various sectors, such as agribusiness, metals and minerals, and technology. The DMCC has also introduced several initiatives aimed at fostering innovation and entrepreneurship, including the

DMCC Innovation Hub and the DMCC Crypto Centre, which seek to support the growth of start-ups and disruptive technologies within the free zone.

In conclusion, by creating a supportive ecosystem, investing in world-class infrastructure, and fostering collaboration and innovation, the DMCC has attracted global investment, nurtured the growth of diverse industries, and contributed to the ongoing development of Dubai's economy. As the global trading landscape continues to evolve, the DMCC remains committed to enabling the growth of the commodities sector and supporting the region's innovation ecosystem.



Figure 9.1 Almas Tower under Construction in DMCC, Source: <https://www.alabbargroup.com/portfolio/dmcc-al-mas-tower/>



Figure 9.2 DMCC after Construction Completion, Source: <https://www.dmcc.ae/about-us>

Metals, commodities centre to be set up

Aim is to acquire 50pc of global gold production – Mohammed

By Rasha Owais

Dubai

Dubai is establishing three gold refineries and a metals and commodities centre that will provide a full range of facilities for trading in gold, diamonds and key commodities like tea and sugar.

The announcement was made yesterday by General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Defence Minister.

Through the establishment of Dubai Metals and Commodities Centre (DMCC), the emirate aims at acquiring 50 per cent of the annual 2,300-2400 tonnes global gold production, during the coming few years, said Sheikh Mohammed.

"We have the will power and the determination."

Gold traders are also optimistic that DMCC will enable Dubai to recover part of its share lost when India went direct to producing centres after relaxing its gold import rules.

Hamid Kazim, DMCC financial advisor, said work on the refineries had started and expected production would begin towards year-end. The DMCC, he added, will be a free zone offering 100 per cent ownership and a 50-year tax holiday to resident companies.

A precious metals pricing index could be established in the future, but only if justifiable, he added.

Coordination is currently on with Emaar Properties for its participation at DMCC and how can it be deemed part of it.

"This does not only involve Emaar but we are in collaboration talks with various parties. The DMCC and Emaar complement each other. Manufacturing can be done here and retailers can rent at the Gold and Diamond Park," said Kazim.

Gold companies will be offered full services including physical trading facilities, storage, hall-marking/assaying as well as package and delivery facilities available on-site.

Trading facilities, a convention centre, a training centre and a gems laboratory will be available to DMCC resident companies in



Sheikh Mohammed making the announcement at the Emirates Towers. – GN picture by Joseph J. Capellan

the diamond trade, noted Kazim.

The commodities industry will be provided with world-class trading, storage and logistics divisions to support the resident companies at the DMCC.

The regulatory framework is currently being developed. Transparency and flexibility are key objectives in establishing a regulatory environment that is of international standard, stressed Kazim.

"We want to have regulations that will enhance Dubai's credibility on a global and not on a local level."

Strategic partners for resident companies in the gold sector will include banks, refineries, jewellery/coin dealers, and central banks, he explained.

Those from the diamond industry will partner with banks, jew-

ellery dealers and other international centres, while commodities organisations will work with trading companies and international exchanges.

The DMCC, said Kazim, will have the broadest possible geographical reach working with organisations and companies throughout Asia, Africa, Europe, the U.S., South America and Australia.

"The DMCC will provide a superb proposition for global players in the gold, diamond and commodity business," said Kazim.

Strategic location, world class facilities and a secure, regulated environment are qualities that will be available to companies that decide to base themselves at DMCC, he noted.

See also Page 29

Figure 9.3 Announcement of Launch of DMCC, Source: Gulf News Archives

See Appendix B for other Gulf News archive articles on DMCC

Interview Data on Research Questions

Role of Government

Many familiar themes emerged from the discussions with DMCC stakeholders with respect to the government's role in Dubai's RIS. These can be summarized in six categories: 1) Leading the Private Sector, 2) Collaboration Across Government, 3) Government Operating Like Private Sector, 4) Setting Global Standards, 5) Regulation and Infrastructure, and 6) Flashing Amber, which is the way an interviewee characterized the government's preference to neither stop nor give an overt green light to operational priorities. The data from the subjects below captures the dual layer nature of government in Dubai; strategic vision is set at the emirate-wide leadership level by Sheikh Mohammed and entities such as DIC and DMCC operationalize that vision, acting much like private sector companies, with the same speed and ambition. Each of the themes is examined in turn below, with supporting comments from the six subjects interviewed.

Leading the Private Sector

When asked about the origin story of the DMCC, Ahmed bin Sulayem recalled the mandate set by Sheikh Mohammed at the launch and the urgency with which he wanted to further diversify Dubai's economy:

His Highness was looking at ways of making Dubai a commercial and touristic hub. The discussion was along the lines of ... we're happy with where these two projects [JAFZA and Dubai Internet City] are, and we need to develop more in Dubai, multiple projects. There was a big name in the US that talked about clustering industries, [Michael] Porter from Harvard.

The one thing that His Highness said at the time is, I don't have 20 years to spend on each of these projects. So, we will put a target for every project that we're trying to develop of four years. Now, he understands some of them may finish in four or five years, others may take 15 years. But if the target was four years, then you're doing it as fast as you can.

This is the same urgency with which DIC was launched in under a year after announcing the project and seemingly all other government-driven Dubai projects operate. Accelerating the speed to market has become a hallmark of the Dubai government's involvement in the RIS, driving the private sector and other government entities to move faster than they would have otherwise moved.

Morris addressed another aspect of government leadership in the RIS, sharing a military analogy to show how all the parts of the innovation system come together under the stewardship of the government. His comments further cement the theme of top-down leadership through setting an inspiring vision, not by setting the individual entity priorities or micromanaging operational tactics, a theme that was explored in-depth in the Emirates Airline case. Pairing the right talent with such an inspiring mandate can, in the words of Al Gergawi, "unleash human potential." Morris explains his analogy:

My view is that leadership in Dubai operates in a very military way; you have His Highness, who operates as Field Marshal, and he'll have very clear views, but he'll not necessarily appreciate or be interested in the detail of how it's going to be executed.

As the CEO of the business, you're effectively the platoon or company commander. So, effectively, you have to become incredibly entrepreneurial

and think way beyond the theme or the instructions—how you're going to win, how you're going to deliver on that. So, “take the town” is the ultimate goal for Dubai to become the center of commodity trade, but how do you get there? And how you get there is very much down to different layers of the leadership to think about how to do that in the quickest way possible, in a sustainable way possible and is most meaningful. And that is that entrepreneurial spirit is something that I don't know how you can replicate anywhere else.

The case of DMCC is similar to DIC as there are two layers of government at play, senior leadership at the emirate level and the DMCC entity itself as a representative of the government. Hamza shares his thoughts on how the layer above DMCC impacts them practically, particularly when it comes to championing more innovative technologies:

Look at the Dubai government and UAE government—a strong advocate for all the latest kinds of trends and innovation. The government is very forward looking, right? And they always try to be, if not ahead of the private sector, moving at the same pace as the private sector, which is really nice because you don't see that much in other countries.

We're blessed to have that leadership that gives us the direction and the support to help government entities. Then to build up and deliver the vision of the top leadership—as the DMCC this is our role basically. When the government talks about AI and blockchain, they kind of send a message and all these government organizations have to pick that and then come up with ideas and initiatives to achieve that vision. So, when something was

announced by either Federal or Dubai government, DMCC says, okay, what can we do in order to make this a come to life?

The government leadership of the private sector, therefore, spans two layers: emirate leadership setting an ambitious vision that is continually renewed with the latest global trends, and the DMCC as a representative of the central government, pushing for its own growth in market and striving to offer member companies the best platform for innovative growth.

Collaboration Across Government

The DMCC focused on developing government collaborations that reduced bureaucratic burden on member companies and enabled them to pursue innovative activities across the economic spectrum. To the first point, since the free zone company also serves as the sponsor for expat residencies in Dubai, streamlining the immigration process was a big concern for members. Hamza recalls the impetus to fix what was a poorly functioning process at the time by convincing immigration to come in-house at DMCC:

Way back, I mean seven years ago maybe, we realized that immigration is a very strategic partner to us and that we needed to have them very close by. So, we did the collaboration with them where they set up their own DMCC branch to just process our members' requests. And that helped us a lot because we had a lot of operational issues. We used to send our passports to Jabal Ali Free Zone ... so, once they came into our community things became much faster and easier for both of us, and that really fueled our growth as well. There's so many of those collaborations across government.

As specialized talent is one of the most important drivers of a thriving RIS, and the vast majority of this talent in Dubai needs a residency permit since they are not locals, streamlining the immigration process is a vital facilitator of innovation. The results of these measures can be indirectly seen in the firm innovation survey findings in the following chapter.

Bernard picks up the same theme but, due to his vantage point leading business development efforts, he discusses the challenges and successes of working with regulators in the UAE to make it easier for DMCC companies to operate in some of the more regulated sectors that were growing quickly in the market:

Some of the more challenging ones were where there was a regulator. So, health, education, media, these kinds of things ... they'd say, show us your Royal Decree—you are a commodities free zone. And we were like, no, so we spent years on discussions with the Ruler's Court lobbying this. And eventually, as recently as a couple of years ago, we got the National Media Council approval for having media companies in DMCC. There, I spent a year with letters from Ahmed [bin Sulayem], and everyone going down to Abu Dhabi and trying to get them to understand that we could have media companies.

Again, through the tenacity and persistence of government representatives such as Bernard, with the full support of Ahmed bin Sulayem, barriers to growth were lifted and the unique cross-sector free zone environment of the DMCC could be fostered. This cross-pollination between industries is one of the unique elements of the DMCC and an important contributing factor to the RIS.

Government Operating Like Private Sector

Not only does the DMCC play a leadership role vis-à-vis the private sector, but it also operates in the same competitive, ambitious spirit, unlike many other government entities. Ahmed bin Sulayem said it clearly: “I deal with DMCC as private sector.”

The same initial tenacity that drove the establishment of DIC has lived on in DMCC for over two decades, with their current ambitions seemingly no less lofty than their initial ones. When asked about the origin of this spirit, Sashittal started by commenting on the ownership structure of DMCC itself, leading to a unique dual set of conditions—they needed to prove themselves in the eyes of the broader government as an independent entity and they had cash available to re-invest into even bigger objectives. He starts by outlining the structure:

And now DMCC is overseen by ICD [Investment Corporation of Dubai]. At that time, we were an orphan, or we were independent, so we didn't upstream dividends to anyone. That cash was left for us to be able to redeploy.

But the original structure was that there were no dividends that were going back up to Dubai because we were not supported. The only capital that DMCC had ever was the land. That was presold way before when DMCC started. So, the only real revenues that you could garner was through registration and licensing of companies, which were used to create the uniqueness of trade and facilitation.

Skidmore gives more details on the original financing, interestingly the exact same amount of money DIC raised from HSBC as a loan, but DMCC issued its own bonds, which it paid back on schedule over the 2005-2010 period:

[DMCC] actually raised itself up financially and it did this by raising a sukuk [Islamic bond] for \$200 million, which was oversubscribed ... and with that money, they basically financed the construction of the Almas tower, the Gold tower and the first cluster, just next door to Almas... I think that was definitely the first pivotal thing now you look at the two sort of key core industries now to be DGCX and the Dubai Diamond Exchange. Both were totally nascent, from scratch. They were literally established from nothing.

The bond issuance benefited from the fact that DMCC was a Dubai government-owned entity, securing the paper a Standard & Poor's "A" rating, and leading to an oversubscription of over 2x. Again, the extent of the Dubai government's direct support was in granting the land for the free zone and guaranteeing the loan, just as in the case of DIC. Furthermore, the DMCC experience repeated the theme of a lofty vision and international announcement followed by high execution expectations by Sheikh Mohammad's office.

These high expectations permeated through the team at DMCC, which did not operate as typical government entity bureaucrats. A clear example of such a persona is James Bernard, who, across his 14 years working in the free zone, always pushed the organization to think bigger and grow faster, culminating in his role as Director of Business Development. Here, he discusses the thinking behind expanding the scope of the DMCC beyond its base in commodities trade into a range of supporting sectors, also reflecting the commercial ambition of the management of the free zone:

DMCC has a mandate, you know, set out by the government, and initially, that was commodities. And that was great, you know, because we were the commodities free zone, but that then became a sort of hurdle...

We had to rebrand ourselves. But also, we had to tell the other free zones and the government that it was okay, that we were going to have a lot of other companies in here that had other activities. One reason, you know, was that the commodities industry needs to be serviced... And then, we thought, well, we need to open that door even wider because, why not? We're trying to fill a free zone. How many commodity companies can we have in two square kilometers?

The first DMCC CEO, David Rutledge, is the only top leader that was not interviewed as part of this study as he passed away prior to commencing this research. Bernard had a close relationship with him, as well as the other leaders, and shares his views on how ambitious the whole team was over the history of DMCC while he was there:

We weren't part of a Dubai holding company back then. And we were very ambitious to grow, I think all the leaders we've had were—well, there's Ahmed [bin Sulayem], there's David Rutledge, and there's Malcolm [Morris]. And Malcolm was very ambitious, very driven. And when we came out of when we went into the recession, we basically, were building a free zone.

And me, you know, while I don't like blowing my own trumpet, back then I was very, very ambitious. It was just such a challenge. We really, really wanted to be successful.

Bernard reiterates the theme of self-driven ambition and compares the DMCC to DIC and other free zones that were content to remain restricted to one sector:

DMCC changed the decree into being a sort of self-governed free zone. So, it can make decisions itself, which was quite clever. For instance, back then they

were like okay, well, you do commodities. Internet City, they do internet, and then the DIFC is doing finance, whatever. And that was very clever in terms of getting the sort of industry sector branding out there and not polluting for everyone just saying, yeah, we do everything.

We were the only real free zone that had an issue. Everyone else seemed to be just getting on with what they were doing and their activities. But we were very ambitious. I mean, I think we were the most commercialized free zone that there was, and we just wanted a bit of everything. We knew we had to have those elements of service industry. But then we realized, well, why shouldn't we have all these other companies?

This theme is picked up again in the next section on the role industry plays in the RIS, under the topic of “Cluster Economy,” as the DMCC’s approach evolved into a unique one which defined the industry cluster much more broadly than any other free zone in Dubai, and companies benefitted from collaborations across industries. The risk, however, was to lose focus on priorities and become spread thin across sectors, without providing measurable deep value to any single sector. Under the leadership of Sashittal, the DMCC started centralizing disparate efforts in priority sectors, setting KPIs, and executing on a coherent multi-sector strategy:

Ultimately, it's about focus. So basically, take gold—lots of initiatives, but there was no focus... It was about setting targets such as saying, “What do you want to be?” You want to convert the city, for example, from a city of gold, which was jewelry primarily, into a bullion center.

Setting Global Standards

One of the government-driven initiatives Sashittal championed during his tenure as CEO was a focus on developing international standards that would make the DMCC more attractive to top companies in the commodities industry globally. This is an indirect RIS strategy, linked closely to the next theme of regulation and infrastructure, mainly established to gain credibility in the eyes of the types of companies and talent that the free zone was trying to attract in its early days. Here Sashittal talks about the genesis of the “Responsible Gold Standard,” which was an important standard he personally pushed forward while CEO:

We became the refinery, working with multilaterals, developing standards for conflict-free gold, for example, that raised the profile of DMCC internationally. So, we worked with the OECD, the LBMA [London Bullion Market Association], the World Gold Council and so on, at the same time created that nucleus of an industry that got a lot more active.

New refineries came in and they were given a DMCC standard. It was called the “Responsible Gold Standard.” And when you gave that, then you created the legitimacy. So, it was about creating these standards, creating the enabling factors for an industry or for DMCC to become the magnet and be recognized globally.

Bernard recalled a similar case in the diamond industry, where DMCC became part of the Kimberly Process, the global governing body that regulates the trade of diamonds and ensures responsible practices. Ahmed bin Sulayem served as its chair in 2016, and the UAE is slated to re-assume chairmanship of this influential body in 2024. Bernard explains the importance:

The Kimberley Process, the Dubai Diamond Exchange, becoming part of the global scene, becoming one with the industry—I've always said that you have to become interested in the industry. You can't fake it; you have to really be part of it.

These are examples of the point Sashittal made previously about focus and the importance of having priority sectors with credentials that build credibility on a global stage so that the free zone becomes attractive to the leading organizations in the sector. These are preconditions for an effective RIS, and the techniques DMCC pursued accelerated the pace of achieving this international credibility. These steps led to tangible results, with the DMCC reporting in 2022 that it has becoming the third largest diamond trading hub in the world as well as announcing that a quarter of global gold trade now flows through the emirate of Dubai, most of which conducted in the free zone.

Regulation and Infrastructure

Streamlining the company setup process was one of the first tasks the early team at DMCC undertook, a process that began by simplifying the existing bureaucratic process and eventually led to a complete digital transformation, which is explained by Hamza in the “Innovation Examples” section below. Bernard recalls the early days and the focus that they all had on making the basic foundations of setting up and utilizing the free zone simpler for their customers:

The workings of the free zone were very much old style, everything in paper files all about a foot thick, and about 20 signatures, including the Chairman for every single company that came in.

So that was the main mission back then—to make it the easiest process, make it simplistic, get rid of all the documents that didn't make sense and that we weren't checking and that had no value.

But what they did also is to build the infrastructure, so building the vaults ... [and] building the refineries ... because the type of alluvial gold that comes to Dubai needs to be refined. And so, there's a big market for it there.

As Bernard mentions, the DMCC invested into physical infrastructure like vaults and refineries in the same way that DIC built data centers, broad band connectivity, and specialized office facilities for its technology company tenants. These necessary preconditions made the free zone attractive to a companies in the commodities industry, and further accelerated growth.

Skidmore shared a point that was explored in-depth in the DIC case, namely the living environment that makes talent want to relocate to Dubai, and particularly the DMCC free zone. Within that theme, the most important point he highlighted was, “The security—if you have a family then there's a huge amount of peace of mind.”

Flashing Amber

Finally, as a variant to the theme on top-down vs. bottom-up government involvement in the RIS, Morris shared that the senior layer of government didn't get involved often after the vision was set and he and the team were executing. This is how he described the dynamic:

It's very rare that we would get a red light. Very, very rare that we're told stop. It's also increasingly rare that you get a green light, but you get a flashing amber. If you think it is a good idea to do one, two, three, then you should do it. Whereas in the Western world, we won't move until we've had a green light.

We don't move. Committee hasn't signed off. We haven't had the environmental study.

The flashing amber approach here is, well, we don't have all the answers, but we'll find them out. It's the belief that you will find the answers on the way, and that's very cultured and very interesting.

This approach sounds almost laissez-faire, which is quite a contrast to the top-down nature of the Dubai government's vision setting and prioritization. Being able to combine setting an inspiring vision with allowing enough room for exceptional managers to execute on that vision in their own ways, without micromanaging or suffocating with unnecessary bureaucracy, is one of the uniquely Dubai traits that has helped shape its RIS.

Role of Industry

The role of the industry in Dubai's RIS from the perspective of decision makers at DMCC is centered on two themes: Diverse Cluster Economy and Knowledge Sharing. Each is explained in turn below.

Diverse Cluster Economy

The experience of the firms in the DMCC free zone shows that a thriving cluster economy is more than just assembling a single sector into one geographical area. Hamza shares how the scope increased beyond commodities alone and the importance of having diversity within the cluster to boost the RIS's effectiveness:

We [initially] focused on our main mission of just bringing in the metal and commodities sector. But I think very soon, in the first few years, we realized that you can't really build a successful community if you just have companies of the same kind of business or sector in one place. Because it's kind of just

having your competitors around you and not having customers or service providers. So, that doesn't make sense, right?

From there on we realized that we have a bigger role to play in connecting them and helping them do business together because if you just put them in the same place, that doesn't always make them do business together. I think that's the secret recipe to our success.

Morris highlighted the same point from a different angle, showing that this spirit of building a truly integrated, multi-sector cluster in DMCC had its roots since the early years of the free zone:

The fact is that you may well have a diamond company and we class them as commodities, but they still need to have a telephone to hire somebody, they need a recruiter, they need somebody to come and clean the office, they need a firm of accountants, a firm of lawyers, etc.

And that was a big change. It was no longer saying, we have commodity companies who are crown jewels and everybody else is lucky to be here. It was a much more inclusive approach to say, actually, all these companies contribute to the ecosystem which has become the DMCC. And that was a critical, small but critical change.

Sashittal adds a layer of focus to this diversity, aligning a strategy towards specific sectors, with activations that could spark the players to build bridges between themselves for business opportunities. This is another angle of cluster development that the DMCC put in place so that the industry could be successful, and then the players in the industry leveraged these platforms to further strengthen the RIS.

Sashittal explains:

Clustering brings advantages. You listen to your industry because they already know what is missing and what is required to enable more of their players to come in, to enable them to be more successful.

So, we looked at all of the commodity clusters of sectors, you can call it, and said, let's focus on energy. We had an energy group. That meant that all the energy companies would meet up once a quarter, facilitated by DMCC. Most of these companies didn't even know, for example, that the others existed.

The Dubai Gold Group was about getting different actors—refiners, traders, jewelers—[to] sit down and say, okay, what can we bring here for the industry that's missing? We had industry focus groups all the time. All the groups I mentioned, which is where we used to get our ideas from, they would say, you need to do this, and then we would evaluate it and say, okay, do we need to do that? How do we do it?

Knowledge Sharing

Just as in the case of DIC, knowledge sharing across the DMCC is an important cornerstone of the RIS and a critical contribution of the industry. Bernard builds on his experience with the traditional gold and diamond industries, and shares how this type of community knowledge sharing was eventually extended to the energy sector:

The diamond and gold industry was much more of a sort of community back then as well. So, they came with their own communities, they did business face to face, and we sort of took from that. So then, one of the next ones was energy and ... we decided we set up a club for them. It was all about

knowledge sharing in the industry. You really need to be seen as being interested in the industry, and they can smell you if you're not.

Once we did that, it was quite successful. I think we spiraled to over 1,000 companies in the energy sector. We were looking very much at other sectors where we could do that as well ... so it all became about communities.

DMCC replicated the model in other sectors, such as tea, coffee, and even technology, recently launching the DMCC Crypto Center as a galvanizing point for web3 companies. The common thread among all of these efforts was a dual role of government with industry; DMCC establishing a club or physical venue with programming and the industry itself gathering and sharing knowledge, spilling over both people and ideas across firms.

Role of Universities

Unsurprisingly, the role of universities—and R&D more broadly speaking—in the Dubai RIS from the perspective of the DMCC is limited. In this section, interviewees comments are summarized into the following four themes: 1) Lack of Local R&D, 2) Attract Global Talent, 3) Partnerships for R&D, and 4) Local Universities Underfunded.

Lack of Local R&D

When asked about the role universities play in the Dubai RIS, Hamza summarized the views of the other subjects well, not only from DMCC, but, as has been shown, from across the four cases researched:

That's something which definitely has big room for development. Research and development—it does happen but it's not very structured. What I've seen

mostly to date is the expertise and the knowledge coming from abroad being used here.

Sashittal added his view that R&D rarely ended up in-market, and this is despite having some foreign universities with branches in Dubai. He couches his comments with the fact that he isn't sure if this is typical, but his experience is very consistent with that of other interviewees across cases in this study:

Yeah, I think academia in Dubai is mainly about foreign universities planting their roots there. I don't know how much research was done over there, how much collaboration with the industry, with government organizations happens, I don't know.

During my time, it was mostly internally driven by our own team... We didn't really have any deep research collaborations with any universities. And I don't know how much of that is because we were outliers or because it doesn't happen in Dubai. That maturity wasn't there.

Morris explains why he believes the level of university-driven innovation is lower in Dubai relative to markets that are much larger:

What's your upside? You talk about the region, everyone says, well, yes, Dubai is a great place to innovate and to deliver, but you have what population? Nothing, it's 9 million people, right, versus Saudi, you've got 40 million versus 350 million in the US. It's the same work to deliver a 9 million personalized solution as for 40 as for 350. So why on earth are you innovative here?

He continues to outline his view of the future of innovation, which aligns with Al Gergawi's questioning of the need for traditional universities placed in the same geography as the innovations being tested. Morris says:

And in fact, innovation is happening at a very different level ... what you're seeing now is the larger groups is that they convert their R&D labs into validation [labs], where they come to you and say, oh, Mohammed, you've invented this cup of tea that you say tastes better than anybody else's. We will validate whether we agree with you. So, I allow everybody else to innovate, and then I will validate, and I will take the products that I want into command.

In my time at the DMCC, I never saw Dubai, the DMCC, or this region as innovators. They were incredibly strong at taking conventional wisdom from somewhere else and a model that worked elsewhere—an individual would bring that model here or concept here, and then they would translate it and be able to implement it locally.

Morris' comments connect to the idea that the Dubai RIS has been most successful in supporting the diffusion of existing innovations and is not as well-positioned for radical innovation development. This is partially due to the weakness of the university dimension of the Triple Helix but is also a function of the multiple factors cited by Flynn in his sponsorship theory, from market readiness to quality of talent to infrastructure preconditions.

Attract Global Talent

Hamza believes the solution to a lack of R&D rests in focusing on attracting top talent to Dubai, another common theme raised across cases. He cites government

actions such as long-term visas as factors to convince innovation-producing talent to choose Dubai:

You find it's very easy for talent to migrate and move to other places. So, you would have seen in the last few years, especially post pandemic, the government has come up with a lot of reforms like Golden Visas to try to make the UAE a more attractive place for talent.

So, from that foundation, if you have all the smart people, the doctors, the scientists, the lawyers, staying in the UAE, then for sure you're going to see all of that R&D happening and developing more in this country as opposed to us importing it from other countries, right?

Bernard compares the environment in Dubai to that of the UK, highlighting aspects of talent and funding with their relative strengths:

If you look at ecosystems such as incubators and accelerators in the UK, a lot of companies struggle from the very beginning because they can't get the talent that they need. Dubai has been great overcoming that, and you can pretty much easily get a visa, but in the same breath, it's more difficult for you to get money to get grants if you're not an Emirati.

Partnerships for R&D

Although Sashittal previously mentioned that university collaborations were not commonplace due to the lack of applicable R&D being generated on local campuses, this did not stop the DMCC from seeking out opportunities to bring research to the market. Here he explains an important partnership with an organization called the Future Agenda:

I don't remember how we were introduced to the Future Agenda, but, basically, they were looking at ten years hence. They were working on the future of telecoms, on the future of medicine, on the future of various things. And they came to us, and they said, "Hang on, have you looked at the future of trade?"

Now, why was it of interest to us? Basically, it gave us a global reach and the legitimacy that we so importantly needed in terms of trade and commodities. And then we did various workshops all over the world. So, you're pushing a brand in these workshops, for example, and you're talking to academia.

So, what we used to do is that the Future Agenda guys would actually bring in people, audience everywhere in these workshops. They'd be university professors, there'd be people from government, there'd be captains of industry. So, all of these people would sit together in a room and say, how's trade going to change over the next ten years? What did they see in terms of trends?

And we published this report, which gave us access to television across the world. And I remember this was downloaded over 100,000 times, I think, because nobody had done something called the Future of Trade anchored in a report. It's an innovation that the DMCC pushed with this partner.

This is a tactic employed by the DMCC to cover the local university gap and still develop R&D, interact with academics, and gain some of the benefits of a more developed university ecosystem while it has not yet been established in Dubai.

Local Universities Underfunded

When asked why universities have had such a limited role in the development of Dubai's RIS, Bernard focused on the funding priorities of government, noting that local institutions do not get the same type of long-term grant funding that is found in other countries:

If you look at other countries, the government very much supports universities with grants and finances and scholarships ... but I mean, Dubai, as far as I can see, doesn't have that yet. There needs to be a lot more finance and support of these universities or educational establishments, more monetary terms, but also ... how easy it is to be in Dubai, how cheap it is to be in Dubai and to attract scholars to be in Dubai.

Bernard continues by comparing the situation in Dubai with his home country of the UK, suggesting more funding should be mandated in order to drive results:

Maybe they should be mandated to do much more in this space in terms of providing grants and funds, because it doesn't come for free ... but in the UK, there's a big thing of where you have talent from universities that may not have finished degrees or anything, but they're still experts, semi-experts in their field.

Innovation Examples

Because of the private sector style of the DMCC leadership and the ambition they have brought to the market over the years to be the leading free zone, not just in Dubai, but in the world, they have championed many innovations to market. Five are highlighted in this section as a representative sample: 1) Unified KYC, 2) Digitized Onboarding, 3) Flexi-Desk Offices, 4) Made for Trade, 5) Coffee Centre. The first

three innovations all related to the onboarding experience of new clients setting up in the DMCC, the fourth relates to DMCC's positioning, and the fifth is a representative example of a successful new sector added to the portfolio.

Unified KYC

DMCC participated in a cross-government collaborative effort to develop an innovative Know Your Customer (KYC) process that incorporates blockchain technology into the process and integrates all of the necessary entities so that information only needs to be received one time from any company setting up an entity anywhere in Dubai. One of the biggest challenges with setting up a new company is the bureaucratic burden, especially when it comes to working with the local banks to set up a corporate account for the newly formed entity. Hamza has been personally working on this initiative and shares the concept here:

We started working with Dubai Economic Department (DED) about trying to do a unified KYC for all companies who are setting up [in Dubai]. And so, there was this kind of consortium of free zone and onshore licensing authorities to help improve the whole journey for investors to not just set up their company, but also open a bank account because you know the challenges the companies are facing with bank account opening. So, the first stage of this was to develop a centralized blockchain where all information about companies will come into this one repository.

Although this project has not yet reached completion, it is an example of the assembly power of the Dubai government, through the DED arm, to bring all of the relevant players to the same table and spark a solution based on frontier technologies not yet widely deployed in market. Creating a private blockchain ledger is a secure

technical solution for this challenge, but such a technology solution requires the participation of many entities across Dubai. DMCC is one of the leaders of this drive.

Digitized Onboarding

Looking more internally, Hamza shares the digital transformation journey that he led within the free zone to convert an entirely manual, paper-based company registration process into one that is done online in way that had not been done in other free zones at the time:

I thought the first thing we need to do is to smooth things out and make life easier for companies, and this applies to large companies too, not just startups and SMEs. We've come a long way from the days of using an Oracle system with a limited client-facing portal, lots of manual paperwork, and fragmented processes. It took us quite a number of years to go through the transformation journey, and we're still trying to improve and develop.

We used to be behind other government entities and free zones in terms of technology adoption, but today, I can comfortably say we're one of the leading free zones, not just locally but internationally. We do benchmarking and comparisons with other competitors around the world, and there aren't many innovative free zones.

Morris shares his take on the same digitization and simplification mandate, taking away as much of the unnecessary paperwork burden from the member companies as possible. Here he gives the example of what led to separating free zone operations (now led by Hamza) from property, which is concerned with leasing real estate:

Bulgari is in the DMCC free zone. What is their business? Their business is luxury, high-end goods. Is it setting up a company? Is it making sure they fill out the right form? Is it leasing space? Is it getting a telephone operator in place? Is it understanding VAT? Whatever it is. It's not.

So, we had this very clear view. Let's separate real estate from the free zone and let the free zone become a service business in entirety. Property still reported into the management, but property became a separate animal, and we invested very heavily on service and saying our role is to facilitate at the highest possible standard in terms of governance and banking relations and everything else. So, we just completely looked at that shift of business model and shifted to service, which was a huge cultural change for effectively a semi-public and government entity, which is used to processing forms.

In this way, digitized onboarding became a piece of a broader re-prioritization that was put into place during Morris' tenure as CEO, shifting from a focus of merely filling real estate and increasing license numbers to being a service-oriented organization that does everything possible to make the member experience as positive as possible. This echoes the insights heard from DIC stakeholders about the importance of the experience in driving growth of the free zone.

Flexi-Desk Offices

DMCC introduced an innovative real estate concept to the market, conceptualized by Bernard as a way to unlock a second stream of revenue alongside the traditional license setup and renewal fees, focused on small companies that do not need to lease an entire office. The Flexi-Desk concept was taking a large unused office owned by the DMCC and portioning it into small areas, each of which could be

leased to companies for part-time use. This gave small companies an official address, a requirement for any business license in Dubai, without the high fees associated with opening an actual office. Bernard explains:

It helped us a lot in being an incredible use of space. But at the same time, it generated an awfully incredible amount of revenue—you know, you're talking [AED] 30, 40 million upwards. And today it's even bigger, you know, huge animal of a business, but it also gave companies the flexibility of not having to have an office at that time.

The Flexi-Desk product became a hallmark of free zones in the UAE, with other zones replicating what the DMCC had first brought to market as a true product innovation. This was a precursor to the coworking space trend that took off in the following years.

Made for Trade

The genesis of a new market positioning, under the leadership of Sashittal, is described in his own words below:

We had a tea factory which was losing money. So, it was about looking at, what can we do to make this profitable? Why is the tea industry, why is the tea business there? It's not to make money. It's to bring the trade in. So, you shift gears and say, it's not about making money... You need to bring the physical trade through Dubai. And that's where this whole idea of DMCC “Made for Trade” emerged, because we created that as a brand.

Here Sashittal discusses how the Made for Trade brand anchored the Future Agenda collaboration that was previously discussed in the “Partnerships for R&D” section:

We created a brand. We called it DMCC Made for Trade. And then we collaborated with this organization called the Future Agenda in London, to create the report on the future of trade. We became the anchors of that ... it got all the big players in commodities coming to the free zone. So, we used trade as the facilitator to bring in companies into the free zone, whereas previously it was more of a real estate play.

The recurring theme of adding value beyond the real estate and the license is echoed by Sashittal in this case, with the new brand being a signal to the global market that the DMCC is the place to conduct trade and the reports being produced with the Future Agenda establishing further credibility.

Coffee Centre

Although the DMCC has launched many successful products in the last couple of decades, the one representative case chosen here is the Coffee Centre, opened in February 2019, as an extension of the already successful Tea Centre concept. Sashittal recalls the development of the idea:

We had an entire team, a very small team, which was looking only at innovation, new products, new commodities, new initiatives, I would call it initiatives, new physical, financial supporting infrastructure that we could create that would make Dubai amongst the top three for a particular commodity. Now, if you asked me to identify which one really crystallized, coffee is probably one. Coffee also came out of Ahmed's passion for coffee.

The story from Ahmed bin Sulayem's perspective shows how he took a bold bet on an industry that was new to Dubai, which consultants and others were wary to back as it seemed too risky:

We just had Starbucks and Nescafe; I didn't drink proper coffee. I told him, keep me posted. The plan was to bring in the coffee, roasting, and packaging—but [local] distributing was out as Dubai wasn't really a specialty coffee market in 2011, this is when Gautam and Malcolm are there.

Literally, I [told the consultants], “I want to do coffee.” “What do you mean, coffee?” “You know our tea center?” “Yes, we've seen it. What do you mean?” “Use your resources to bring experts to create a coffee center. Whatever makes sense, and we'll take it from there.” “No, Ahmed, we advise you not to use us, because if it goes wrong, you can blame us. You can protect yourself.” “No, I'm happy to be blamed. It's okay.” And they look at each other, they're like, no, this is not how it's supposed to work. And they're looking at my CEO. Gautam [Sashittal] is sitting on the left, and they're looking at him to interject.

Sashittal did not interject; in fact, he supported the Ahmed bin Sulayem vision of coffee trade in Dubai, and the Coffee Centre ended up launching successfully. Today it is a fully-integrated center that provides storage, processing, roasting, packing, and delivery of coffee in a way that was not previously available in the Middle East.

Conclusion

The case of DMCC, in a similar manner to DIC, shows how a driven government entity with a large mandate and ambitious team was able to create a thriving business community. Below the main themes raised by the interviewees are summarized and what follows are some concluding remarks across each of the

dimensions of the Triple Helix as well as an assessment of the innovations brought to market by the DMCC.

Role of Government	Role of Industry	Role of Universities
Leading the Private Sector	Diverse Cluster Economy	Lack of Local R&D
Collaboration Across Government	Knowledge Sharing	Attract Global Talent
Government Operating Like Private Sector		Partnerships for R&D
Setting Global Standards		Local Universities Underfunded
Regulation and Infrastructure		
Flashing Amber		
Innovation Examples		
Unified KYC		
Digitized Onboarding		
Flexi-Desk Offices		
Made for Trade		
Coffee Centre		

Table 17 DMCC Summary Themes

Government

More so than any other government entity I have encountered in Dubai, DMCC plans and operates like a private sector company. Ahmed bin Sulayem explicitly shared that he deals with the DMCC as if it were private sector, and this mindset made its way down from the Chairman’s office through to the operational team, from the CEOs to the heads of departments. This mindset pushed DMCC to continually expand its remit from commodities to all activities, as described in the “industry” section below. It also spurred some of the innovations, such as the revenue-generating Flexi-Desk concept, which helped fuel further growth of the free zone.

In the experience of the subjects interviewed at the DMCC, in Dubai, the government leads the private sector by setting a vision, facilitating regulations, and rarely ever enforcing a red light on the strategic direction of other entities, as explained by Morris in his “flashing amber” concept. The conception of government in Dubai is therefore quite different from the statist view of the Triple Helix, anchored by top-down societies such as China, thereby opening up a space to conceptualize a different role for the state within the Triple Helix. This is discussed in further depth in Chapter 11, as findings across cases are integrated and presented in response to the research questions of this study.

Industry

The most important theme raised in the role of industry within the DMCC was building a cluster economy. This started as being focused exclusively on a segment of the commodities industry—mainly gold and diamonds—and expanded first to a much broader definition of commodities, including tea and coffee, to eventually becoming the free zone where any activity recognized by the Dubai Economic Department could be licensed. This is a unique aspect of the DMCC, as other free zones in the UAE are sector-delimited, and this is a departure from the classic conception of a cluster.

Interviewees such as Hamza, Morris, and Sashittal all touted the importance of this change since an entire ecosystem of companies that serve each other much be allowed to operate in the same physical location, and, according to Bernard, this facilitated an even more ambitious expansion strategy for the DMCC, which was extremely commercially driven, even more so than other free zones.

The question of why DMCC is so competitive is an important one to address, especially seeing that other entities such as DIC described in the previous chapter were extremely ambitious, particularly in their founding years. One of the elements

that was surfaced through the interviews was the fact that the DMCC was an orphan entity for many years, not part of one of the Dubai holding companies, meant that they did not dividend up their profits and were able to re-invest into growth, according to Sashittal.

The ambition of the leaders themselves also played an important role in this. Morris and Sashittal were both first time CEOs, trusted with a large mandate and wanted to show what they could achieve.

University

The findings from the university dimension of the Triple Helix were very similar to the previous three cases. Subjects all lamented the lack of local R&D and Bernard honed in on the fact that local universities are underfunded relative to what they would need to produce the kind of commercializable research companies in the DMCC would actually utilize. The discussions shifted quickly from research to talent, with Hamza and Bernard highlighting the fact that Dubai in general has become a global talent magnet, which helps reduce the university gap.

Innovations

Similar to the case of DP World, digitalization of previously manual processes was a major achievement of the DMCC team and differentiator compared to other free zones in Dubai and globally. Digitized onboarding was achieved before other free zones, and now DMCC is participating in a consortium of entities, both government and private sector, to achieve unified KYC, making the entire process of setting up a company, from the license to the bank account and everything in between, much faster and easier.

On the product offering side, DMCC introduced a new cost-effective approach to meeting the legal requirement of a physical office tied to each registered company—Flexi-Desk offices. This allowed for new companies that did not need a full-time office to rent a fractional share in a shared office space, reduce their rent burden, and speed up their entry into the market. This is one example of the DMCC taking actions to reduce bureaucratic burden on their member companies, making it easier for them to focus on their core business and facilitating a more effective RIS.

Finally, the success of the DMCC Tea Centre prompted Ahmed bin Sulyem and his team to embark on a first-in-the-region coffee center that serves as both a trading hub as well as value-added service center for storage, sorting, roasting, packaging, and shipping coffee beans from around the world. The team took the financial risk, investing in the infrastructure needed to offer a world-class facility, and, as a government entity, this venture has turned out to be quite successful.

Chapter 10 | Community Innovation Survey Results

Introduction

As explained in the section introducing the mixed methods research design in Chapter 4, the decision to add a quantitative survey was taken after commencing the qualitative research, which was initially meant to be the sole source of data. When I learned of the Community Innovation Survey (CIS) and considered the academic benefit of adding a dataset from a Gulf region, as well as the complementarity of the data to help answer the research questions posed in this study, I made the decision to pursue this new approach and convert the study into a mixed methods design.

Despite having privileged access to the directory of companies active within the DMCC free zone and full cooperation from the government entity, getting full responses from firms was more challenging than expected. One of the primary reasons for this is that firm surveys—both private as well as ones sent by government entities—are uncommon in Dubai. For this reason, despite multiple follow-ups by both email and phone calls across all companies in the target population, the response rate was under 10%. As described in the introductory chapter, survey data is generally difficult to find in the Gulf, and this is one of the driving factors behind conducting the CIS.

The population of firms analyzed in this survey is defined as companies with five or more employees based in the DMCC free zone, which amounted to 1,131 companies. Even with a relatively small sample size of 105 full responses, assuming a 95% confidence interval and an overall population of 1,131, the study carries a 5% significance level with a +/- 9.1% error margin. Keeping the error margin in mind when analyzing the survey data, the results are significant and can be used to compare

Dubai to other geographies, as well as point out areas of strength and weakness. This chapter covers the development of the survey, the surveyed population, highlighted results, and key comparisons to the United Kingdom, a more mature market that has also conducted this survey.

Customization of the Survey for Dubai

The CIS, as defined by the Oslo Manual, is flexible enough to be customized by each country deploying the survey, while maintaining the common factors that enable cross-country comparisons. When the decision was made to follow the CIS format for this study's questionnaire, the first priority was to customize the form used in a European context to make it relevant to Dubai. The decision was taken to focus primarily on the required questions so as to make the survey as brief as possible, given the fact that firms in Dubai are not accustomed to completing academic surveys.

After being drafted, the questionnaire was reviewed by a scholar with experience in running innovation surveys. She added insightful suggestions for changes to the survey itself as well as shared guidance on strategies to obtain the best response rate possible from her experience managing similar studies. Once her comments were incorporated, the final version was loaded into the DMCC's online survey platform and the first round of emails were sent from the DMCC explaining the importance of the survey and requesting selected companies to fill in their responses. The full form of the survey is available in Appendix C, and this is followed by a summary of the results of each of the questions in Appendix D.

Surveyed Population

One of the unique characteristics of the DMCC free zone is the fact that the companies registered are so diverse. The sample surveyed reflects this diversity and

ensures that the results speak for the entire emirate of Dubai, not just a single priority sector as would have been the case if the survey were run within an environment like Dubai Internet City or other sector-specific zones. The pie chart below gives a sense of this wide diversity of business activities reported by the companies who completed the full survey.

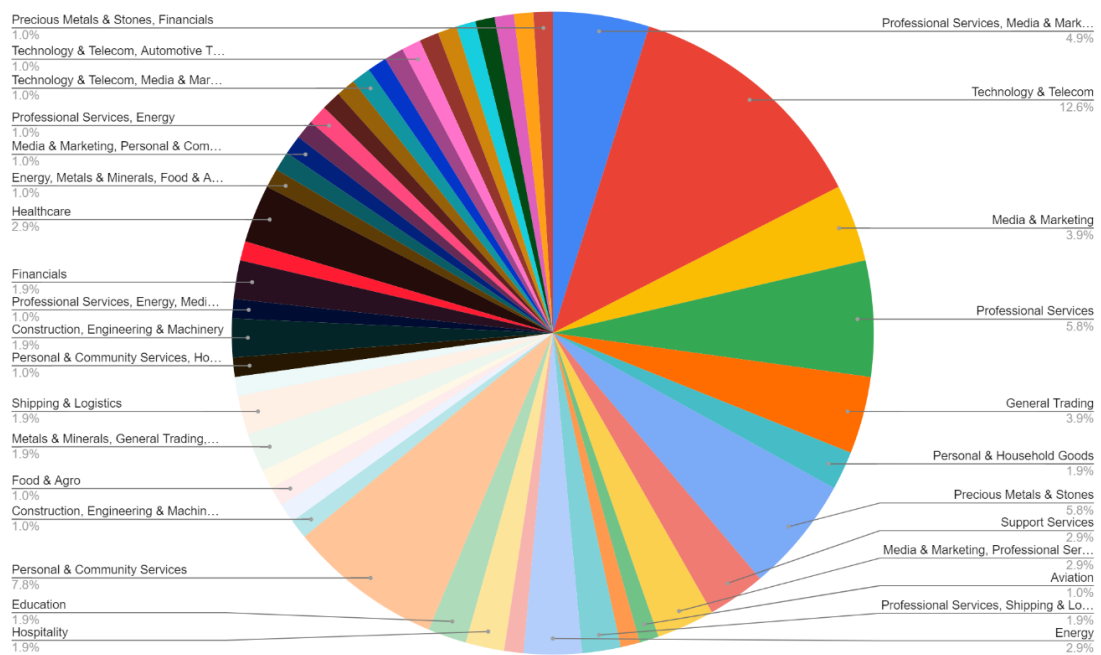


Figure 10.1 DMCC CIS Survey Participants by Business Activity

Results

The most important result from the survey is the overall percentage of innovation activity across all companies surveyed. 82% of the companies surveyed (86 companies) engaged in at least one innovation activity in 2019–2021. A majority (55%) of the companies introduced new product (goods or services) innovations during the same period. Of these companies, 77% introduced new services, while 39% introduced new goods. Although the majority (56%) of these product innovations were developed in-house, a substantial portion (44%) involved collaborations with other businesses or organizations.

Revenue figures reported by surveyed companies in 2021 were divided into three categories: 26% came from goods and services new to the market in 2019–2021, 23% from goods and services only new to the business in the same period, and 55% from goods and services that remained unchanged or marginally modified.

A substantial 77% of the respondents developed process innovations during the 2019–2021 period. These new processes included methods for producing goods or providing services, logistics, information processing or communication, accounting or administrative operations, business practices for organizing procedures or external relations, work responsibility or decision making, and marketing methods.

A total of 82% of the companies engaged in innovation activities such as internal R&D, acquisition of R&D, machinery and equipment, computer hardware and software, training, design activity, market introduction, product changes, market research, marketing changes, and launch ads (a full list is available in Appendix D). Investment in R&D increased over the three years, with 26% of the companies investing in 2019, 27% in 2020, and 44% in 2021. Only 11% of companies invested in R&D in all three years, reflecting the fact that even firms that do invest in research do so sporadically. That said, financial pressures during COVID could have contributed to this reduction in R&D spend. The total investment spend in 2021 was reported as AED 25.6m (equivalent to USD 6.97m), with the largest portion (43%) allocated to internal R&D. The fact that the majority of R&D spend was focused internally reinforces the findings from both the DP World and Emirates cases, which followed this same pattern. This was explained by the interviewees as stemming from the lack of local R&D and the logistical challenges with working with international universities.

About 39% of the companies cooperated with other businesses or organizations for innovation purposes. Their cooperation partners included private businesses outside their enterprise group, consultants, commercial labs or private research institutes, suppliers, clients or customers, competitors, businesses within their enterprise group, universities or other higher education institutions, government or public research institutes, clients or customers from the public sector, and non-profit organizations. Details of the percentages of each are in Appendix D, but it is interesting to note that universities were among the last likely collaboration partners, further reinforcing the study's qualitative findings about the weakness of the R&D outputs from Dubai's academic institutions.

Comparisons to the UK

Due to a variety of factors, including some of the same reasons that motivated the present research into the Gulf context as distinct from other regions in the world, it is exceedingly difficult to compare innovation survey results across countries. Differences in the relative stages of economic development and varied cultural understandings of the definition of innovation itself are two examples of factors that can impact results substantially, and, as such, any comparison should be treated with caution. That said, the reason the CIS was chosen specifically is that a rich historical dataset exists from a variety of other countries around the world, so making some directional observations about how Dubai compares with other geographies is in order. For the purposes of this study, the UK was selected as a representative country from a European context to make some of these comparisons. It was outside of the scope of the present research to develop a full cross-country comparative analysis, but this is surely an area for potential future research.

The most surprising finding when comparing results is that Dubai had a substantially higher percentage of innovation-active businesses (82%) in 2019-2021 compared to the UK (45%) in 2018-2020. Upon deeper investigation, this headline finding can be explained by the difference in the types of innovations each location primarily produced, a possible difference in the understanding of what constitutes innovation among the surveyed population (the UK may be anchored on patent-based product innovations whereas the R&D environment is less developed in Dubai), and the difference in the surveyed populations, with the UK including the entire country and the present study focusing on firms located within a free zone context.

On the types of innovations reported, Dubai-based businesses were more likely to be process innovators (77%) than product (goods and services) innovators (55%). In contrast, UK businesses in 2018-2020 were more likely to introduce new products (20%) than new processes (16%). This is a logical finding given the fact that most Dubai-based companies are branches or subsidiaries of other entities around the world, and new product development may be handled by the headquarters or other geographies where the research environment is more developed.

The top three innovation activities engaged in Dubai were internal R&D (53%), computer software and market research (45% each), and market introduction, computer hardware, and training activity (42% each). In the UK, the top activities were computer software (24%), computer hardware (23%), and internal R&D (16%). Both Dubai and UK businesses allocated the largest portion of their investments in innovation activities to internal R&D (43% and 50%, respectively); however, Dubai had a higher percentage of investments in the acquisition of machinery (31%) and design activity (9%) compared to the UK (29% and 7%, respectively). The contrast in citing internal R&D as a top activity (53% in Dubai vs. 16% in the UK) reinforces the

findings from the DP World and Emirates cases, which surfaced in-house and manufacturer-supported innovation as the necessary alternative to university R&D engagement.

Along the same lines, Dubai-based businesses were more likely to engage in innovation partnerships with private sector entities, with 85% partnering with private businesses outside their enterprise, 83% partnering with clients or customers, and 74% partnering with suppliers. In the UK, 77% of broader innovators partnered with suppliers, 69% with clients and customers in the private sector, and 52% with other businesses in their enterprise group. This further reinforces the findings above, as firms in Dubai rely on the broader industry more heavily to compensate for a lack of R&D coming from academia.

The COVID-19 pandemic was the most significant barrier to innovation in both Dubai (36% rated it as 'high' importance) and the UK (37% rated it as 'high' importance). In Dubai, the high cost (26%) and lack of internal finance for innovation (24%) were also major factors constraining innovation.

Conclusion

The CIS survey is an important data source to help answer RQ 2: How effective has Dubai's RIS been in fostering local innovation? By taking a subject-based approach and surveying firm-level innovation activities, this study was able to determine that Dubai has been quite effective in fostering an environment wherein firms are innovation active. 82% of firms reporting innovation activity in the 2019–2021 period, even considering the 9.11% margin of error and the more innovation-friendly free zone company population surveyed, points to an overall environment supportive of innovation.

The second important insight derived from the CIS survey linking to the goals of this research is a better understanding of the innovation typologies most supported in the Dubai RIS. Although the absolute percentage of innovation activity was much higher in Dubai than in the UK (82% vs. 45%), Dubai-based businesses were more likely to produce process-based (77%) over product-based (55%) innovations. This finding aligns with the general weakness of the science base in Dubai and relatively less commercialized local R&D compared to more mature markets. As process improvements are generally easier to develop than new or significantly improved goods and services, Dubai's RIS is better suited to support these types of product innovations. Although these statistical indicators are important directional signals, the quality of Dubai's innovation activity is better gauged in a qualitative way, which was examined through examples in each of the four cases of this study and will be further discussed in Chapter 11.

Finally, the fact that 53% of firms surveyed in Dubai invested in internal R&D activities vs. 16% in the UK shows that Dubai-based firms have been trying to bridge the research gap caused by a weaker university dimension of the Triple Helix. This figure reinforces the findings from the interviews across the four case studies, showing that companies are taking it upon themselves to produce research internally because they cannot rely on the local universities and international university collaborations are challenging to structure in a way that bears commercializable fruit.

Chapter 11 | Conclusion: RIS Applied to Dubai

Introduction

This study set out to research the Dubai RIS as a distinct model, representative more broadly of a set of regions in the GCC making a transition from rentier to service- to knowledge-based economies. As Dubai is the most advanced Gulf economy along its innovation system development path, examining the emirate's journey in depth offers a unique contribution to the literature and a practical guide for other similar regions to consider when setting innovation policy. This concluding chapter of the study presents the key findings on Dubai's RIS as abductively derived from the four case studies—DP World, Emirates Airline, DIC, and DMCC. The study's five research questions are taken in turn, with evidence presented from across the cases and put into context of the academic literature. After examining the main findings, key contributions to the RIS literature are outlined and policy recommendations for similar regions to consider are listed. These are put into context within the limitations of the study and areas for further research. The chapter concludes with an epilogue wherein I present a self-reflection on how conducting this study has impacted and developed me as a researcher.

What is clearly evident from the case analyses is that Dubai does not neatly fit into an existing box in the literature on RIS or Triple Helix, despite the numerous studies conducted on peripheral regions and emerging markets.²⁷³ Whereas government is typically thought of as the slowest moving actor in the RIS, in the case of Dubai, the government is the driving engine, insisting on such a forward-looking

²⁷³ Ferretti and Parmentola, "The Creation of Regional Innovation Systems in Emerging Countries"; Isaksen and Trippel, "Regional Industrial Path Development in Different Regional Innovation Systems: A Conceptual Analysis"; Almeida, Figueiredo, and Rui Silva, "From Concept to Policy."

innovation vision and high level of urgency that even the private sector has a hard time internalizing, as explained by Adnan Kazim, CCO of Emirates Airline.

To this point, Ahmed bin Sulayem, Chairman and CEO of DMCC, recounts hearing from Dubai's current Ruler, Sheikh Mohammed bin Rashid Al Maktoum, "I don't have 20 years to spend on each of these projects. So, we will put a target for every project that we're trying to develop of four years." Even though the target may be unrealistic in some cases, it clearly signals to the government leaders that they need to be moving as fast as possible, that there is no time to waste. Intriguingly, this urgency has been both the source of Dubai's incredible success as well as what has been holding it back from fully realizing its goal of transitioning into a knowledge economy.

The insistence on rapid development, coupled with a mandate that all government-initiated projects be immediately subjected to the pressures of the private sector through open competition and self-financing, set up these projects for success in the market, thereby practically contributing to the state's income and diversifying its economy in the short term. This entrepreneurial government approach is an accelerator and strengthener for the industry dimension of the Triple Helix; however, properly developing the university dimension to include institutions developing innovative R&D requires a completely different approach and a much longer time horizon.

To date, Dubai has had little patience to wait for an academic system to mature, and, instead, the emirate designed an open immigration system that welcomes foreigners in a way that is unheard of elsewhere in the world, with over 90% of Dubai residents being non-citizens. As explained by HE Mohammad Al Gergawi, the

importing of skilled labor enhances the learning component of the RIS much faster than trying to improve local higher education institutions to a caliber of producing world-class research.

This strategy served Dubai well when building its service-based economy after the era of oil. That said, the depth of specialized knowledge needed in that transition period was not nearly as intense as what is needed today as Dubai is attempting to fully transition into a knowledge-based economy. Emirates and DP World interviewees have attested to the fact that local universities are not providing research that is commercializable, so they are bridging the gap by building their own research labs and trying to partner with international institutions instead. Both strategies have not come close to having a robust local R&D ecosystem feeding the RIS. DP World and Emirates have ended almost all their international institute research collaborations and are reassessing the entire model. The need to take a long-term approach towards building a stronger local university pillar of the Triple Helix is a key finding of this study.

This primary finding of the biggest gap in the Dubai RIS is complemented by the appreciation of what Dubai has been able to achieve, against all odds, in building a successful RIS despite missing key ingredients readily available in more developed regions. The government-led Triple Helix has set a tone that achieving the seemingly impossible is not only possible but can be done faster than imaginable with much less government support than one may expect necessary. In fact, the very financial and open competition constraints placed by the government has led to a breed of leaders and entities that embody the entrepreneurial spirit of making something out of nothing, innovating to survive, which is an unexpected finding from this research.

In the words of one of the most respected Emirati business leaders, DP World Chairman and CEO, HE Sultan bin Sulayem:

Many people bet against Dubai, and they lost. We ... are developing because it's our survival—we have nothing else. We have no oil; we have no gas. If anybody today in the world, if they have oil and gas, even when they're sleeping at night, they make money. We don't. That's why we work hard. We work harder than everybody... So, for us, we're in a survival mode.

Summary of Triple Helix Themes Across Cases

The following table summarizes all the themes presented in the four cases studied in this research, divided by the Triple Helix categories of the roles of government, industry, and universities. These will each be taken in turn in the following section, responding to the study's research questions in an integrated way across the cases.

	Role of Government	Role of Industry	Role of Universities
DP World	Infrastructure Investment	Innovating with Manufacturers	Local vs. International Universities
	Predictable Regulations	Engaging the Tech Ecosystem	In-house R&D
	Empowering Leaders	Learning from Customers	Finding & Developing Talent
	Setting the Innovative Agenda	Industrial Paths	
	Cross-Government Coordination		
	Fostering a Diverse Society		
Emirates Airline	Empowering Leaders	Partnerships Over Alliances	Lack of R&D Collaborations with Local Universities
	Opening the Market to Competition	Balancing In-House with External Technology	Attempted R&D Collaborations with International Universities
	Driving Innovation KPIs	Working with Startups and Incubators	Prioritizing In-House R&D
	Cross-Government Coordination	Knowledge Sharing	Universities as a Source of Talent
	Consistency of Long-Term Vision		
Dubai Internet City	One Dubai	Knowledge Spillovers	Short-term Prioritization
	Deep Engagement with the Private Sector	Quality Brings Quality	Attracting Long-Term Talent
	Regulation and Infrastructure	Supplier Ecosystem	Global Links
	Open, Diverse Society	Cluster Economy	Building a Local University Ecosystem
	Agile Portfolio Approach		
	Trust		
DMCC	Leading the Private Sector	Diverse Cluster Economy	Lack of Local R&D
	Collaboration Across Government	Knowledge Sharing	Attract Global Talent
	Government Operating Like Private Sector		Partnerships for R&D
	Setting Global Standards		Local Universities Underfunded
	Regulation and Infrastructure		
	Flashing Amber		

Table 18 Summary of Triple Helix Themes Across Cases

Responses to Research Questions

In the following section, sub-research questions RQ2-RQ5 will each be taken in turn, and then the central research question of the study, RQ1, will be explored in light of these findings.

	Research Question	Topic
RQ1	How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems in a Gulf state context?	Central Research Question
RQ2	How effective has Dubai’s RIS been in fostering local innovation?	Assessment of Dubai’s RIS
RQ3	What characterizes the Dubai government’s involvement in developing its RIS, and how successful has this approach been?	Government Role
RQ4	What role does the industry play in developing Dubai’s RIS?	Industry Role
RQ5	How has relatively lower local R&D intensity impacted the development of Dubai’s RIS?	Academia Role

Table 19 Overview of Research Questions

How effective has Dubai’s RIS been in fostering local innovation?

Before addressing the effectiveness of the Dubai RIS as a measured outcome, it is important to begin with this study’s findings regarding the types of innovations that are most likely to thrive within the region. This foundational question integrates insights from sponsorship theory, the field of industrial path development, and innovation typology. As outlined in Chapter 5, the question of whether government sponsorship should focus on supporting radical or incremental innovations rests on infrastructure preconditions and focusing support on radical innovations prematurely before the market, talent, and underlying infrastructure is ready can be not only a waste of money but actually counterproductive.²⁷⁴ This research has shown from both qualitative and quantitative dimensions that the most fitting government policy strategy has been to focus on supporting incremental innovations and industrial path extensions. Even the path creation cases of Emirates and DIC were actually taking

²⁷⁴ Flynn, “A Critical Exploration of Sponsorship, Infrastructure, and New Organizations.”

established models from other markets and implementing them locally. To this point, interviewee Malcolm Morris contended that he did not see much radical innovation at DMCC; rather, he believed Dubai's core strength was "taking conventional wisdom from somewhere else [as a] model ... and then they would translate it and be able to implement it locally."

The question of how to best measure the effectiveness of an innovation system has evolved over time. Just as the view of innovation development itself has largely changed from a linear "research lab to market" perspective to a non-linear iterative process, the methods of measuring innovation have changed over time. The traditional science, technology, and innovation (STI) approach has been to measure indicators such as R&D data, patent applications, and bibliometric data to gauge the level of innovation inputs. The challenge with this approach is that it discounts non-research-based innovation and does not take into account firm-level activity, a gap closed by introducing innovation surveys which focus on a "subject" approach which is outputs-based instead of an "object" approach, which is based on inputs alone.²⁷⁵

This study takes both a subject- and object-based approach to measuring innovativeness within the Dubai RIS. The Community Innovation Survey is a standardized subject-based approach, governed by the Oslo Manual, and tested with decades of cross-country data. As explained in the previous chapter discussing the results from the survey, the percentage of firms engaging in innovative activities in Dubai is 82%, compared with 45% in the UK. Even accounting for a high margin of error of just under 10% owing to the smaller relative sample size of 105 full

²⁷⁵ Fagerberg, Mowery, and Nelson, *The Oxford Handbook of Innovation*, 152–62.

responses, the results are significant (see the Chapters 4 and 10 for a full treatment of the sample size and resulting statistical significance).

The object-based approach takes examples of actual innovations at the four studied entities as examples of what the Dubai RIS has been able to produce over the years. Highlights across the cases include introducing digital manifests for cargo shipping and BoxBay robotics-controlled vertical storage of containers (DP World), collaborations with plane manufacturers to offer first-in-world onboard experiences like an onboard spa and flight crew training using the metaverse (Emirates Airline), launching the region’s first local data center and implementing NFC technology (DIC), and fully digitizing customer onboarding to the free zone and developing the region’s first integrated coffee trading and preparation center (DMCC). Although it is by no means meant to be a comprehensive list of all innovations developed by the entities researched, the list of innovations highlighted by this study’s interviewees during their remarks on Dubai’s RIS is reproduced here:

	Innovation Examples
DP World	Logistics Beyond the Ports
	Digital Manifests
	BoxBay Container Storage
	Cruise Terminal
Emirates Airline	Collaboration with Airplane Manufacturers
	Re-Imagining Retail
	Emirates Delivers
	Metaverse for Cabin Crew
Dubai Internet City	Disrupting Government
	From the Gulf to the World
	Telco Capabilities
	Data Center
	NFC Technology

DMCC	Unified KYC
	Digitized Onboarding
	Flexi-Desk Offices
	Made for Trade
	Coffee Centre

Table 20 Innovation Examples Across Cases

Combining subject- and object-based datapoints leads one to the conclusion that Dubai has managed to develop an RIS that outputs levels of innovation that are commensurate with, if not higher than, some of the most advanced economies in the world, such as the UK. This is a surprising finding given the weakness of the local research institutions, but the findings reflect the fact that innovation levels are not limited to an STI view and can encompass a much broader definition of innovation, including new processes, etc. This result challenges the view presented in the literature by Ferretti and Parmentola that Dubai does not have a “true” innovation system.²⁷⁶

A second theoretical lens through which to address this research question is outlined by RIS scholar Philip Cooke in his “Regional Innovation Systems, Clusters, and the Knowledge Economy” study of what systems warrant the RIS label and how to measure the effectiveness of a given RIS. In his conditions and criteria for RIS, he first cites infrastructural preconditions such as “regional financial competence,” “regional public budgets,” “decentralized ... [or] autonomous spending,” and the “competence regional authorities have for controlling or influencing investments in hard infrastructures such as transport and telecommunications and softer, knowledge infrastructures such as universities, research institutes, science parks and technology

²⁷⁶ Ferretti and Parmentola, “Technological Learning and Innovation Systems in Developing Countries,” 54.

transfer centres.”²⁷⁷ Each of these will be examined in light of the data from the cases in this research on Dubai.

Furthermore, the infrastructural issues are complemented by what Cooke terms “superstructural issues,” which can be looked at across the “institutional level, the organizational level for firms and the organizational level for governance,” all of which “help to define the degree of *embeddedness* of the region, its institutions and organizations.”²⁷⁸ He defines embeddedness as the “extent to which a social community operates in terms of shared norms of co-operation, trustful interaction and ‘untraded interdependencies’ as distinct from competitive, individualistic, ‘arm’s length exchange’ and hierarchical norms.”²⁷⁹ The most effective RISs are the ones that show the highest level of embeddedness, which is the overriding culture.

According to this conception of RIS potential, Dubai as a region is strongly positioned against both infrastructural as well as superstructural dimensions. Starting with the infrastructure side, although taxation is collected at a federal level, all other elements of financial influence are controlled at the emirate level. In any case, in the context of Dubai, regionally administered fees are more important than taxes since the taxation burden on corporations is low, and personal income taxation is non-existent.

Regarding the availability of private finance, as discussed in Chapter 5, almost half of all MENA regional venture capital funding in 2022 came from Dubai, which is almost exclusively driven by private sector funds. Innovative companies from across the region and beyond flock to Dubai to raise funding after they have reached sufficient scale in their home markets and are looking to access growth capital.

²⁷⁷ Cooke, “Regional Innovation Systems, Clusters, and the Knowledge Economy,” 958–59.

²⁷⁸ Cooke, 960.

²⁷⁹ Cooke, 960.

Finally, as was shown in the DIC case in particular, Dubai has full autonomy in building infrastructure such as telecommunications (e.g., the establishment of du as a second telco in the UAE, described by bin Byat in his remarks) and developing the necessary transportation infrastructure, as managed by the Dubai Roads and Transport Authority. Furthermore, universities and training institutes are governed in the emirate of Dubai by the Knowledge and Human Development Authority (KHDA), which was overseen by bin Byat in the past, and projects such as Knowledge Village and Academic City near DIC and under the TECOM umbrella are examples of attempts Dubai has made along this front. Despite not having built deep research institutions yet, partially owing to the time it takes to achieve such an objective and partially due to the short time horizons of projects generally undertaken by the Dubai government, the important question from Cooke's perspective is whether or not the region has the capacity to undertake this priority, which in the case of Dubai is clearly affirmative.

On the superstructural level, Cooke divides the conditions into three dimensions, as described above. On the institutional dimension, the degree of cooperative culture is quite high in Dubai, a precedent set by the government in its own internal interactions and in the attitude of government representatives in supporting the private sector. Across all four cases, examples of cross-government collaboration were cited as a critical characteristic of the government's role within the RIS (in the case of DIC, the theme was called "One Dubai"). This manifests itself in a smooth regulatory regime, less bureaucracy, and an attitude of cooperative support from the government that permeates into the private sector and all of society as a standard set in Dubai.

And as for the supportive relationship between government and industry, nowhere was this more clearly illustrated than in the case of IBM anchoring the DIC

project. Al Gergawi said, “We don't deal as a government. It's a partnership.” Kilani, from his vantage point representing IBM at the time, called it “royal treatment” and reflected on “how persistent they are and the fact that they are keen to make it happen.”

The second superstructural dimension, the organizational level for firms, concerns itself with the degree to which firms themselves are engaging in interactive innovation vs. standalone R&D and the extent to which the labor market is healthy from a variety of perspectives (e.g., labor relations, skill acquisition, etc.). Dubai's performance on this dimension is mixed, since the cases of DP World and Emirates have shown that most R&D is conducted in a standalone fashion and attempts to collaborate with research institutions are limited and rarely successful. Furthermore, collaborations across industry, although more prevalent now than was historically the case, are still not the norm. On the labor front, the extreme openness of the market to welcoming highly skilled talent into an environment that is designed to give them the best life possible, as Al Gergawi insisted in his remarks, “I'm not government. I'm a designer. I design life.” Although labor relations for skilled workers choosing Dubai as their home are generally harmonious, because of the high proportion of foreign workers and the inherent transience that brings to the society, this dimension is relatively weaker compared to the others.

The final superstructural dimension is concerned with policy, differentiating between regions that are authoritative and hierarchical vs. consultative and networking in their approach. The level of embeddedness is highly impacted by the tone of policy decisions, and, in the case of Dubai, despite the centralized nature of the government, there is a balance struck that was mentioned by several interviewees where operational decisions are never pushed top-down from the government. Adnan

Kazim from Emirates and Malcolm Morris from DMCC explained the dynamic as one where the government sets a bold vision at the level of Sheikh Mohammed but does not mandate a path to be taken to achieve that vision. Furthermore, the importance of consultation is again set as a priority by the government through the convening power it wields in Dubai, a process that was described in detail in the DIC case when Al Gergawi and bin Byat explained how they worked closely with the world's largest technology companies to meet their needs and convince them to relocate their regional headquarters to Dubai and DIC.

The dimensions Cooke outlines are a useful secondary lens through which to view the RIS potential of Dubai and to reinforce the findings from the subject- and object-based analysis of the CIS survey results and interview data on innovation examples from the four cases. Across both of these methods, it is clear that Dubai has achieved a high level of innovation and that the potential for the RIS to continue thriving is firmly in place; what is needed is a strengthening of the weaker dimensions of the Triple Helix, as will be discussed in the following sections below.

What characterizes the Dubai government's involvement in developing its RIS, and how successful has this approach been?

As it has been previously established that the Dubai RIS is characterized by a government-pulled Triple Helix, this is likely the most important sub-question in the study to understand what makes the Dubai regional system different from other regions. Organically, almost every interviewee spent at least half of the time addressing the government's role in some fashion, despite the fact that the two other dimensions were given equal weight in terms of the questions asked and time was devoted to broader questions on innovation examples, etc. The table below

summarizes the themes raised by the interviewees across the four cases with respect to the role of government in the Dubai RIS.

	Role of Government
DP World	Infrastructure Investment
	Predictable Regulations
	Empowering Leaders
	Setting the Innovative Agenda
	Cross-Government Coordination
	Fostering a Diverse Society
Emirates Airline	Empowering Leaders
	Opening the Market to Competition
	Driving Innovation KPIs
	Cross-Government Coordination
	Consistency of Long-Term Vision
Dubai Internet City	One Dubai
	Deep Engagement with the Private Sector
	Regulation and Infrastructure
	Open, Diverse Society
	Agile Portfolio Approach
	Trust
DMCC	Leading the Private Sector
	Collaboration Across Government
	Government Operating Like Private Sector
	Setting Global Standards
	Regulation and Infrastructure
	Flashing Amber

Table 21 Role of Government Themes Across Cases

One of the hallmarks of the abductive approach to analyzing research data, as outlined in this study’s Chapter 4 on methodology, is the going back and forth between cases to find “surprises [which] are the fuel that powers research engines.”²⁸⁰

²⁸⁰ Timmermans and Tavory, *Data Analysis in Qualitative Research*, 1.

The exploration of themes across cases, overlaid with existing theories and questioning the ways they can be applied in this study, helps the researcher “systematically cultivate surprising findings.”²⁸¹ It is in these surprises that adjustments to theories are surfaced and new insights are derived.

Through this abductive approach to examining the data, the most surprising finding to me, despite my long history in the business community of Dubai, is the importance of government-imposed financial and operational constraints on the successful establishment of the most important entities in the emirate. After setting the vision and placing a team in place with a massive mandate, the government repeated the pattern of stepping back. This is counterintuitive, as the common perception of Dubai is that of a rentier state that pours public money into projects in support of the RIS. This perception persists despite the fact, as was discussed in Chapter 5, Dubai’s economy has fully transitioned from a reliance on oil to one in which oil represents less than 1% of GDP and diversified industries have taken its place.

Furthermore, it is interesting to note just how financially constrained Dubai was when founding the most iconic companies that have shaped the RIS. Emirates Airline was started with a \$10m grant and two wet-leased planes from Pakistan International Airlines. The government did not even provide protection against competing airlines in the home market. These self-imposed constraining factors are incredible when one considers the challenges of starting a successful airline. DIC and DMCC each started with \$200m to build massive infrastructure projects, neither of which was funded by the government directly beyond granting the land to be used.

²⁸¹ Timmermans and Tavory, 1.

Even in the case of the land grants, both free zones were in areas considered far away and not desirable at the time, as explained by Kilani in his remarks considering why IBM should move from central Sheikh Zayed Road to the desert project called DIC.

After gaining government approval to proceed, DIC secured a loan from HSBC and DMCC issued an over-subscribed sukuk, Islamic bond, which was repaid ahead of schedule. In essence, both projects had to build a case that would convince public markets of their financial viability and could not lean on free money with no strings attached from the government. Even DP World, which benefitted from substantial state investment into the ports infrastructure during the oil boom years, continued operating independently thereafter and became a profitable engine, consistently driving over \$1bn of dividends back to the government's budget each year.²⁸² This hustle and insistence on projects being commercially viable from their infancy is a neglected element of the narrative as to how the Dubai government has fostered a successful RIS despite starting with so little and having a missing component of the Triple Helix to compensate for.

Kebouri shared how she viewed working in Dubai vs. the potential to relocate to other Gulf regions that also had an active government dimension of the Triple Helix. She explained that the primary difference in approaches was how these other regions used public money:

I wasn't even interested in moving to Abu Dhabi for double my salary. They do it differently. They have more funding... There wasn't the same hustle.

Even Saudi now is trying to do the same by funding moves. And they want to

²⁸² "DP World Investor Presentation April 2021."

recreate what Dubai has created, in a way, with doing what failed with Dubai, which is funding directly the suppliers.

Along the same lines, Anwar Wajdi reflected on the evolution of Dubai and how unique the experience was relative to any other Gulf state:

[Sheikh Rashid] realized that Dubai is going to become a business center. He created the first port and the airport. And then he created the [Dubai World] Trade Center during those days, where Dubai was nothing. Actually, [it] is now one of the smallest buildings. It foreshadows a financial center. But during those days, that stretch of road, that connects Jumeira to Bur Dubai, it was empty. It was desert.

Now, Sheikh Mohammed, with his vision, you know, he pursued his father's vision. You know, he expanded on this business thinking. But really, the vision that was laid down came from his father, and then he took it, and then and then he ran with it. *Which Gulf states have done this? Although they had the resources, they had the money, they had the oil, they had everything.*

This finding and Wajdi's related comments are particularly important in light of other rentier GCC countries pursuing a similar path, trying to accelerate their progress by investing state money into massive projects and state-owned firms. Counterintuitively, more lavish spending could be a detriment to the long-term success of the projects and could stunt the effectiveness of the RIS. Perhaps Dubai's biggest blessing, which did not seem to be the case at the time, was the limited supply of oil that was clearly going to run out, necessitating quick planning and investment into building a diversified post-oil economy in a way other Gulf regions have not had

to worry about with such urgency. This, coupled with extremely ambitious and capable leadership, created a unique environment that defined the Dubai RIS.

The second defining characteristic of the Dubai government's role within the RIS is the extreme openness mandated across multiple dimensions—immigration policy, welcoming multinational firms, and mandating open competition even in the case of infant state-sponsored firms trying to build new industries, best exemplified through the example of setting an open sky policy at the launch of Emirates Airline.

Al Gergawi commenced his remarks noting that “innovation requires a couple of elements: the most important is talent, and talent requires openness.” As the government controls immigration policy and the decision to welcome foreigners to Dubai, the radical openness of the emirate and the seamless integration of 200+ nationalities representing more than 90% of the population is a defining characteristic of the Dubai RIS.

As discussed in the introduction to the DP World case, “the decline of Lingah and the subsequent emergence of Dubai as a port of call in the Gulf”²⁸³ in 1900 was a pivotal moment in the economic and political history of the emirate and marked a moment when a large influx of Iranian trader families made Dubai their home and had direct access to the ruler Sheikh Maktoum bin Hasher. These traders started some of the most powerful family conglomerates cited in Chapter 5 and today represent an influential segment of Dubai's society, alongside many other more recent entrants: “Dubai's merchant community has always been cosmopolitan. Indians and Persian

²⁸³ Al-Sayegh, “Merchants' Role in a Changing Society,” 89.

have traded freely on equal terms with Arab residents for centuries. So it remains to this day.”²⁸⁴

Asheim et al. argue that “differences across nations and regions are likely to persist across time and space in a path-dependent way ... because some types of knowledge and intellectual capital are less mobile than other resources and because the complexity of transferring knowledge from its basic form, into new product and process innovations ... is difficult to replicate and transfer across borders.”²⁸⁵ To some extent, Dubai has broken this path dependency due to the extreme openness of immigration policy, allowing for an unprecedented influx of talent into the country, but from another perspective, this argument is exactly why companies like DP World and Emirates have struggled with their international higher education partnerships and prioritize local hiring and training.

The third theme that was cited across multiple cases is the government’s role in making smart long-term infrastructure investments that build industries. As discussed in the section above addressing the second research question, Dubai’s has the budget and policy mandate to build its own infrastructure, a key determinant of a high-potential RIS. Despite its preference for leaving industry to self-finance, when critical enabling infrastructure of strategic sectors needed to be built, the Dubai government stepped in and made those bold decisions to invest state money accordingly. This was most clearly illustrated in the DP World case, with the massive port infrastructure investments by Sheikh Rashid, challenged by everyone from his own son, Sheikh Mohammed, to the *Wall Street Journal*. Emirates Airline benefited from a modern airport built during the same era. The background story of how the

²⁸⁴ Al-Sayegh, 88.

²⁸⁵ Asheim, Smith, and Oughton, “Regional Innovation Systems,” 883.

airport came to be clearly illustrates the difference in leadership between Dubai's Sheikh Rashid and his Qatari peer at the time:

Sheikh Rashid purchased the plans for the airport construction from the Ruler of Qatar who sanctioned a study to build an airport in Qatar, but after local disapproval, the plans weren't carried through.²⁸⁶

The theme of infrastructure came up in both DIC and DMCC cases. Bernard explained how DMCC made early investments into supporting physical infrastructure like previous metal vaults and refineries. Bin Byat and Al Gergawi recalled the way DIC built data centers and upgraded broadband connectivity by partnering with IBM and starting a new telco. In both of these cases, the government leadership knew that investments needed to be made to attract global innovative companies and so the decision was taken to spend on physical infrastructure. It is interesting to note that this mindset has extended beyond the Sheikh Rashid era of plentiful oil income to the modern diversified, and more cost-conscious, economy under Sheikh Mohammed.

The fourth theme of regulation as a tool to encourage innovation was often cited alongside infrastructure investments by the interviewees. These two can be thought of as the "hardware" and "software" of the government role in building the RIS and were surfaced through a true bottoms-up approach of consultations with industry. DIC championed this deep engagement with the private sector and Kilani's reflections on how all of IBM's needs were met by Al Gergawi's team at the time are a testament to that approach. Bin Byat recalled conversations he had with leading technology companies who would make their requests for infrastructure and regulatory protections: "I need good broadband... I need some laws to protect [my]

²⁸⁶ Matly and Dillon, "Dubai Strategy: Past, Present, Future," 2.

IP.’ Ok, fine, so if we do this, you will move. Ok, then we’ll come back.” He explained how he championed the first cyberlaw in 2003 and made quick regulatory changes to inspire confidence in the prospective tenants, convincing them to choose Dubai as their regional headquarters.

Finally, the fifth theme is one that is essential to the RIS formula in Dubai and not commonly found in the same way in other regional contexts: truly empowering and trusting leaders. Whether government administrators of projects such as DIC and DMCC or the CEOs and senior management teams of state-initiated enterprises like DP World and Emirates, the theme was repeated in every case by most interviewees—a high level of trust to operate these entities toward a common vision encouraged them to act more like private sector managers than public sector bureaucrats. Ahmed bin Sulayem said that he dealt with DMCC as private sector, and Al Gergawi even mentioned that DIC changed the entire tone of the government’s own operations, becoming much more ambitious and KPI-driven. Sheikh Mohammed set this tone from the top, as explained by ex-CEO of DP World, Mohammed Sharaf:

If you were given a port, you are given a clean sheet of paper. Figure it out. Given an airport? Figure it out. And don't come for money. *That's the best part. That's the best part.* Because then you have to figure it out.

The way Sharaf characterized this approach to leadership says as much about the head of government who set the tone as it does about himself and other similar leaders who accepted leadership roles with such high levels of ambiguity, an oftentimes impossibly large mandate, and extreme urgency with such excitement and ambition, highlighted by his repeating of “that’s the best part” with zeal.

In summary, the five most important themes surfaced across the cases analyzed in this study with regards to the role of the Dubai government in fostering the RIS are 1) Setting the Vision and Stepping Back, 2) Radical Openness, 3) Smart Infrastructure Investments, 4) Facilitating Regulation, and 5) Empowering and Trusting Leaders.

The findings of this study reveal that the Dubai government's entrepreneurial mindset is one of the RIS's main differentiators, and the multifaceted and surprising ways this spirit manifests itself is what has propelled the region forward beyond its Gulf peers. That said, the most surprising finding from this question is the extent to which the Dubai government "stepped back" from projects, particularly financially, requiring them to face the forces of the market and stand on their own feet from the beginning. This discipline, coupled with the radical openness of markets and people entering into the emirate, set the foundation for a unique government-pulled RIS that does not resemble other regions in the world. Whatever government spending is allocated is done in ways that build strategic sectors (e.g., Jebel Ali port for DP World or Dubai Airport for Emirates Airline) or support with critical infrastructure to grow the economy (e.g., du for DIC). Facilitating the regulatory environment, particularly across government entities, is another way Dubai government removes obstacles to innovation and enhances the business operating environment for firms. Finally, a hallmark of the Dubai government approach to building the RIS is selecting, empowering, and fully trusting leaders with large mandates, without micromanaging their operational strategies. This has resulted in shining examples such as Sultan bin Sulayem building DP World, Nakheel, and many other companies in Dubai—unleashing human potential, as mentioned by Al Gergawi in this context.

What role does the industry play in developing Dubai’s RIS?

The industry dimension of the Triple Helix is examined in this study from two vantage points through the four case studies: directly through the experiences of private sector firms DP World and Emirates and indirectly through the government entities managing the clusters of firms at DIC and the DMCC. The themes characterizing the role of the industry in the Dubai RIS raised by the interviewees are summarized in the table below.

	Role of Industry
DP World	Innovating with Manufacturers
	Engaging the Tech Ecosystem
	Learning from Customers
	Industrial Paths
Emirates Airline	Partnerships Over Alliances
	Balancing In-House with External Technology
	Working with Startups and Incubators
	Knowledge Sharing
Dubai Internet City	Knowledge Spillovers
	Quality Brings Quality
	Supplier Ecosystem
	Cluster Economy
DMCC	Diverse Cluster Economy
	Knowledge Sharing

Table 22 Role of Industry Themes Across Cases

DIC and DMCC are both free zones, and interviewees from both cases—Ahmed bin Sulayem from DMCC and Majed Al Suwaidi from DIC—explicitly reflected on Michael Porter’s cluster theory as an important driver behind the formation of these entities. This is exceptional because no other academic theories relating to innovation were raised by the 25 interviewees. Clearly, Porter had an impact at the highest level of policy in Dubai and his perspective on clusters ended up

shaping these two cases. The first theme under the role of industry in the Dubai RIS is cluster-based collaboration.

Interestingly, while both DIC and DMCC began as clusters in the traditional conception of “geographic concentrations of firms operating in the same or in related industries,”²⁸⁷ the DMCC evolved from a purely commodities sectoral focus to become a community of firms across many industries. Although one cannot prove that this decision to expand the sectoral focus led to higher levels of innovation, it is at least interesting to reflect on the results from the CIS survey conducted within the DMCC, which revealed an impressive level of innovative activity with 82% innovation active firms.

Cooke et al. explain that innovative regional clusters have access to 1) other firms, 2) knowledge centers, and 3) a governance structure of business associations, etc. These ingredients combined form a “regional learning system.”²⁸⁸ They proceed to note that “Porter’s most interesting, but rather neglected, insight is that cooperation is the key to much of the success of accomplished clusters.”²⁸⁹ The degree of cooperation with other firms varies in Dubai, as shown through the cases of DP World and Emirates, which started as staunchly independent companies and evolved into embracing cross-industry collaboration, as discussed below. Kilani shared anecdotal evidence of collaborations within DIC between multinational technology companies, but these seem to be pockets of success within the highly curated environment of DIC—a single-industry focused cluster of mostly multinational firms supported by facilitating infrastructure such as a central café and proximate offices.

²⁸⁷ Asheim, Smith, and Oughton, “Regional Innovation Systems,” 878.

²⁸⁸ Cooke, Gomez Uranga, and Etxebarria, “Regional Innovation Systems,” 484.

²⁸⁹ Cooke, Gomez Uranga, and Etxebarria, 484.

Based on these observations, the next phase of development of Dubai's industry pillar of the Triple Helix is further strengthening the concept of institutional learning, wherein "new levels and kinds of knowledge, skills and capabilities could be embedded in the routines and conventions of firms and innovation support organizations."²⁹⁰ Further embedding cooperation will enhance the RIS and lead to higher levels of innovation.

Cross-industry innovation was raised by many interviewees at DP World and Emirates, especially in the context of how much this type of industry collaboration has increased in recent years. Ben-Khedher mentioned the transition from all in-house technology to the current strategy of partnerships to enable Emirates to access product innovations being developed by specialized firms around the world. Emirates and DP World have worked with manufacturers to jointly create new product offerings in traditionally slow-to-innovate industries—Emirates co-creating a completely new seating and entertainment experience onboard the Airbus A380 and DP World launching the first fully remote operation of a port as well as an innovative vertical container storage technology called BoxBay. These are relatively new phenomena and are indicative of the new direction being taken with respect to collaborating with other industry players to innovate.

Finally, knowledge spillovers across individuals and firms came up as a repeated theme when discussing the role of industry in the Dubai RIS. In an emerging markets context, it is well documented that multinational corporations play an outsized role in developing innovation systems when compared to their relative role in developed markets.²⁹¹ Most new technology and knowledge created in developing

²⁹⁰ Cooke, "Regional Innovation Systems, Clusters, and the Knowledge Economy," 953.

²⁹¹ Diez and Berger, "The Role of Multinational Corporations in Metropolitan Innovation Systems."

markets contexts comes from foreign direct investment or technology licensing, making the innovation systems essentially international in nature.²⁹² In the case of Dubai, the extreme mobility of specialized talent from other countries as well as between companies helps facilitate these knowledge spillovers. Al Mualla shared how the spirit of sharing information, even with competitors, has been set from the CEO level of Emirates, and that this guides his approach to dealing with other airlines. The DIC and DMCC cases both show how the free zone management itself can help accelerate knowledge spillovers by providing a conducive physical environment, content-based programming, and formal associations for people and firms to join. Both entities actively engaged in building these industry groups that would lead to higher levels of knowledge sharing, which strengthens the RIS.

In summary, the three most important themes with regards to the role of industry in the Dubai RIS are 1) Cluster-based Collaboration, 2) Cross-industry Innovation, and 3) Knowledge Spillovers. Across all of these themes, the critical element, as discussed in the literature on RIS, is the importance of interactive learning within the system. Each of the three themes plays a role in fostering a learning environment that serves as an essential precondition to a thriving RIS. Dubai has begun its journey on this path in recent years, but this pillar of the Triple Helix requires further strengthening to fully activate the embedded learning needed to achieve levels of innovation present in a knowledge-based economy.

²⁹² Ernst, "Global Production Networks and the Changing Geography of Innovation Systems: Implications for Developing Countries."

How has relatively lower local R&D intensity impacted the development of Dubai's RIS?

It was clear at the outset of this research study that Dubai's weakness is in the university dimension of the Triple Helix. That said, it was still surprising to hear essentially the same message across all 25 interviewees with respect to how utterly absent local academia is from the Dubai RIS. The conversations shifted from the role universities play to ways to bridge this large gap, and discussions about international partnerships, in-house R&D initiatives, and talent attraction became the focus of the time spent on this pillar. The themes discussed across all four cases are summarized in the table below, and a further condensation and summary of the main points that define this pillar of the Dubai RIS will be analyzed afterwards.

	Role of Universities
DP World	Local vs. International Universities
	In-house R&D
	Finding & Developing Talent
Emirates Airline	Lack of R&D Collaborations with Local Universities
	Attempted R&D Collaborations with International Universities
	Prioritizing In-House R&D
	Universities as a Source of Talent
Dubai Internet City	Short-term Prioritization
	Attracting Long-Term Talent
	Global Links
	Building a Local University Ecosystem
DMCC	Lack of Local R&D
	Attract Global Talent
	Partnerships for R&D
	Local Universities Underfunded

Table 23 Role of University Themes Across Cases

As discussed in Chapter 5 on the Dubai regional context, research outputs such as patents are below regional and global benchmarks. Furthermore, evidence from the four cases examined in this study has shown that it is extremely rare for innovations born in university settings to be commercialized, and, even more concerning, collaborations of any type between local universities and the industry do not typically go beyond recruiting mostly junior talent.

Much has been debated in the literature about the role of entrepreneurial universities in an RIS, and studies on peripheral regions have cast doubt on the Triple Helix assumption that these types of institutions are essential actors, commercializing R&D and playing a foundational role in the innovation economy. Newer empirical studies have shown that “entrepreneurial spillovers from universities have been greatly exaggerated, especially in some peripheral regions ... [due to] substantive disconnect between universities and their surrounding local entrepreneurial and innovation ecosystems.”²⁹³ The Scottish case Brown examines shows that prioritizing the goal of research commercialization over “producing human capital and undertaking basic research” is a failed policy in peripheral regions without world-class specialized higher education institutions.²⁹⁴

Along the same lines of reasoning, the originators of the Triple Helix concept, Etzkowitz and Zhou, outline in their preface that the goal should not be replicating Silicon Valley, which is a nearly impossible task. They posit that a “triple helix dynamic” can be fostered anywhere that has the requisite ingredients of academia, industry and government, or “functional substitutes” for any of these. And they go even further by saying that “a double or even a single rather than triple helix” may

²⁹³ Brown, “Mission Impossible?,” 189.

²⁹⁴ Brown, 200.

serve the same role, spurring the same process, with other actors filling the gaps.²⁹⁵

This seems to be the way Dubai has operated thus far, with an extremely active government helix, a semi-active industry helix, and an almost non-existent university helix.

The most important insight gleaned from an abductive analysis across cases is that some of the very same RIS traits that propelled Dubai forward from a rentier economy into a service-based economy with powerhouses like Emirates and DP World taking the global stage have been holding Dubai back on developing the role of the university dimension of the Triple Helix. The urgency discussed in the introduction of this chapter, with Sheikh Mohammed telling Ahmed bin Sulayem that a 20-year project be delivered in four years, led to incredible physical infrastructure, successful businesses, and truly innovative policies to be implemented, but the same impatience is a handicap when it comes to the long-term planning and investment mindset to develop successful research institutions that are truly integrated within the RIS, producing patents that are ready to be applied in the market.

As discussed in the DIC case, Al Suwaidi believes that the time is now for Dubai to shift its mindset and strap in to invest for the long term, building and continually supporting the success of local research institutions:

This kind of mentality takes decades ... and I think research is something that comes when stability and good business and good commerce is happening. You don't start researching when you're still in your growing time. You only start getting into this when you have the luxury of time and the luxury of

²⁹⁵ Etzkowitz and Zhou, *The Triple Helix*.

looking at least a little bit further down the line, which at least now I think we've just reached at that point.

Almost every interviewee repeated the refrain that Dubai has a lack of local R&D. Yousif Almutawa gave his realist assessment of the strengths and weaknesses of the system, “Let's be honest. You will not quickly have universities, top academics, and PhDs ... but you have a smart government that is acting like a private sector.” As explained above, no matter how exceptional the government’s contributions are to the Dubai RIS, it can only go so far to compensate for such a gap.

Although R&D spend data are reported on a UAE country-wide level, this provides a useful proxy to understand one of the sources of the weakness in the university pillar. 42% of the R&D expenditures in the last reported year 2020 were driven by the public sector (government and higher education, which is primarily publicly-funded, especially research institutions). R&D as a percentage of GDP was 1.45% overall. A. Almeida et al. analyze follower regions in Europe to understand how their performance differs from leading regions. They noted R&D activities less than 1%, “The extreme weakness of the R&D activities in the business sector is accompanied by a very low level of patent indicators.”²⁹⁶

Total Research and Development (R&D) Expenditure as Percentage of GDP per Sector 2020 (Unit: AED)					
Year	Private Sector (Business)	Government Sector	Higher Education Sector	Total R&D Expenditure	R&D as % of GDP
2020	11,069,305,500	5,042,109,233	2,990,087,734	19,101,502,467	1.45%

Table 24 R&D Expenditure as Percentage of GDP Per Sector in 2020, Source: UAE Federal Competitiveness & Statistics Center

²⁹⁶ Almeida, Figueiredo, and Rui Silva, “From Concept to Policy,” 1334.

By taking a broader view of innovation, as defined in the Oslo Manual²⁹⁷ and in more recent academic typologies of innovation,²⁹⁸ the fact that Dubai has less R&D-driven innovation does not preclude it from having other types of innovations, such as process innovation. And this is exactly what this study's CIS showed, with 77% of Dubai firms reporting process-based innovation over the 2019–2021 period measured. This is one reason why relatively lower local R&D has not completely handicapped the Dubai RIS.

Dubai firms have compensated for a weaker university dimension of the Triple Helix by investing in their own internal R&D capabilities. The largest portion (43%) of total 2021 R&D spend reported by Dubai firms taking this study's CIS was allocated to internal R&D activities, and 53% of Dubai firms reported that internal R&D was in the top three innovation activities vs. 16% in the UK.

A surprising finding from this research question is the fact that the DP World and Emirates attempts to partner with top international institutions like Carnegie Mellon, Oxford University, and MIT were all unsuccessful in achieving the goal of bridging the university pillar gap and introducing useful R&D into the companies. The existing literature on this topic argues that “the ability of a region's and country's entrepreneurs and firms to tap into globally distributed knowledge networks, and use them productively (open innovation), will often be more important than the creation of new knowledge at home.”²⁹⁹ The empirical findings from this study show otherwise in the cases examined. That said, it is also important to note that the success of globally distributed knowledge networks are predicated on the ability of the firms

²⁹⁷ OECD and Eurostat, *Oslo Manual 2018*.

²⁹⁸ Garcia and Calantone, “A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review.”

²⁹⁹ Asheim, Isaksen, and Trippl, *Advanced Introduction to Regional Innovation Systems*, 9.

in the region to absorb knowledge, which requires a highly skilled labor market. The experiences of DP World and Emirates with cultivating international higher education partnerships also reinforces the importance of geographic proximity and investing in the long-term development of the university institutions, despite the difficulty of that approach.

Finally, the relatively lower local R&D intensity has led firms to focus their university engagement on talent recruitment. Although this is important, when exploring the reality of this recruitment in more detail with Ben-Khedher at Emirates and Bosoni at DP World, most of the recruits are junior Emiratis who do not have research degrees. Undoubtedly, recruiting fresh talent is important to the health of the RIS, but this theme does not help address the underlying gap with respect to R&D.

In summary, the three shared themes across the four cases studied with respect to the role of universities in the Dubai RIS were 1) Lack of Local R&D, 2) Attempted Partnerships with International Institutions, and 3) Talent Recruitment.

How do different actors of the economy—government, industry, and academia—interact to impact the development of Regional Innovation Systems in a Gulf state context?

The response to this study's central research question combines insights from the four sub-questions. By first establishing that Dubai has an RIS that has fostered high levels of local innovation in the response to RQ2 above, it becomes logical to use it as a successful case study region to better understand the Gulf context. The following sub-questions RQ3-RQ5 are analyses of the dimensions of the Triple Helix, so what follows below is a combined view across all three dimensions, with a reflection on the overall functioning of the RIS in the context of Dubai's current

transition to a knowledge-based economy. The table below summarizes the most important themes that were examined across the four cases, presented according to the Triple Helix organizing framework.

Role of Government	Role of Industry	Role of Universities
Setting the Vision and Stepping Back	Cluster-based Collaboration	Lack of Local R&D
Radical Openness	Cross-industry Innovation	Attempted Partnerships with International Institutions
Smart Infrastructure Investments	Knowledge Spillovers	Talent Recruitment
Facilitating Regulation		
Empowering and Trusting Leaders		

Table 25 Most Important Triple Helix Themes Across Cases

The reason why the Triple Helix is used in this study as an organizing framework is that the model accommodates a diversity of applications. Etzkowitz and Zhou acknowledge that the spirals of a Triple Helix in a given context are rarely equally weighted and that the traditional view of firms leading the innovation system is not necessarily the case in all environments. In fact, each of the spirals can act as the leading force, and “in a statist regime government plays the lead role, driving academia and industry, generating ‘government-pulled triple helix.’”³⁰⁰ The highly government focused RIS has its benefits, as Etzkowitz and Zhou rightfully point out: “government-pulled triple helix has the advantage of being able to promote large-scale innovation projects, create consensus and build platforms for regional innovation.”³⁰¹

Despite this existing typology in the Triple Helix literature that seems to describe the way the Dubai government takes a leading role within the RIS, the details of the role the government plays are substantially different from the model proposed

³⁰⁰ Etzkowitz and Zhou, *The Triple Helix*, 38.

³⁰¹ Etzkowitz and Zhou, 4.

by Etzkowitz and Zhou, which is anchored in the way the Chinese government operates.³⁰² The Etzkowitz and Zhou statist Triple Helix is modeled after the former Soviet Union, China, and many Latin American countries where the government is “expected to take the lead in developing projects and *providing the resources for new initiatives*.”³⁰³

Dubai offers a distinct statist model, which has achieved a high level of success building a diversified, innovation-driven economy. As far as I have been able to find, no existing typology in the literature further classifies types of statist triple helix models beyond the government-pulled conception described above. Dubai follows a different model from China—decisions are not as centralized, the state acts more entrepreneurially, and, most importantly, resources for new initiatives are not provided by the state. Borrowing from Hvidt’s “state-initiated”³⁰⁴ firm concept when distinguishing between Dubai’s dynamic government-owned companies and traditional state-owned enterprises, I believe a new statist typology should be introduced to the Triple Helix academic literature describing the Dubai model as a “government-initiated” Triple Helix. This theoretical contribution to the field will be further explored in the Key Contributions to the Literature section below.

Along this same thread of thinking, “institutions taking the role of the other”³⁰⁵ is a phenomenon well-documented in the Triple Helix literature, showing that the dominant institutions can bridge gaps by assuming the responsibility of others. For example, in the case of Dubai, the government enters the domain of industry by seeding firms, setting ambitious objectives, and establishing an

³⁰² Etzkowitz and Zhou, 112.

³⁰³ Cai and Etzkowitz, “Theorizing the Triple Helix Model,” 201.

³⁰⁴ Hvidt, “The Dubai Model,” 410.

³⁰⁵ Etzkowitz and Zhou, *The Triple Helix*, 40.

innovation-driven vision. Similarly, industry enters the domain of universities by developing their own R&D labs and staffing them by attracting top talent in-house.

Government has undoubtedly the most prominent role within the Dubai RIS, although this role is a delicate and deliberate balance between top-down vision setting and bottoms-up private sector engagement. The government launched Emirates but only provided the team with \$10m to build a world-class airline, forcing them to compete in an open market and prove to the world that they could be successful on their own merits. Dubai has excelled at leveraging financial constraints in a way to raise companies and government entities that have had to prove themselves in ways that typical state-supported enterprises never usually have to face, especially in the Gulf.

The role of industry has been evolving, with clusters playing a central role in facilitating knowledge spillovers and collaborations that are essential to a healthy RIS. Even the largest firms that used to opt to operate in a silo, separate from the industry, have now started the transition to collaborating with partners in the industry to bring innovative new products to the market.

The role of universities has been completely absent from the Dubai RIS and is the largest gap in the system, which is felt by firms such as DP World and Emirates. Their attempts to individually close this gap through bilateral international partnerships, in-house R&D, and recruiting talent have resulted in some positive innovative outcomes, but generally most of these attempts have not been very successful. This is a strong indicator that the time has come for the government to take a long-term investment perspective into developing an R&D ecosystem anchored

at local higher education institutions. This is a necessary precondition to achieving the full knowledge economy transition being sought.

Finally, although this study was structurally limited to the Triple Helix framework as explained in Chapter 2, the additional dimensions of civil society and the natural environment proposed by Carayannis and Campbell in their quadruple and quintuple helix models highlight two important issues that were absent from the interview data, which I would like to mention here.

Since quadruple helix civil society actors are quite loosely defined in the literature, I turned to the systematic literature review on the topic conducted by González-Martínez et al. in which they summarize the various groups of this dimension as being the “public.”³⁰⁶ Although an active and thriving white-collar expatriate public sphere was recognized as a key ingredient of the innovation system across interviewees, the blue-collar laborers at the bottom of the economic ladder did not have a voice in this study. These guest workers on the sponsorship of private sector companies come from across the broader region and are the force that has been building the physical and operating the infrastructure that has made Dubai’s RIS ascent possible, complementing the knowledge workers. The fact that this was not explored in depth is a limitation of this study, owing to the fact that I chose the Triple Helix as an organizing framework and did not ask explicit questions about this group of society. This is an area for future research, both in the Gulf as well as in other regions of the world in which laborers are an foundational part of the economy.

Regarding the quintuple helix, it is interesting to note that the impact of the development of the RIS on the natural environment in Dubai was never proactively

³⁰⁶ González-Martínez et al., “Systematic Review of The Literature on The Concept of Civil Society in The Quadruple Helix Framework,” 90.

raised by the interviewees. Although I did not ask explicitly about the environment independently, it is revealing to note that not one of the 25 interviewees reflected on environmental degradation or associated trade-offs when I posed open-ended questions about other factors to consider when developing the RIS. This indicates that the topic is not top-of-mind in the same way that it may be in the European Union, for example. Although I believe that societal awareness of sustainability and environmental impact has increased since the time of this study's interviews owing to Dubai's upcoming hosting of the UN Climate Change Conference, COP28, there is still much work that needs to be done to raise awareness about this topic among government and industry thought leaders in the country.

Key Contributions to the Literature

This study makes incremental contributions to the field of Systems of Innovation by examining Dubai as a region in more detail than previously presented in the literature and asserting for the first time, as far as I am aware, that Dubai has a successfully functioning RIS. The second major contribution is using this novel research on Dubai's RIS to propose adjustments to the Triple Helix model to account for the Gulf context. These two main areas of research with their resulting contributions are taken in turn below.

The first important contribution is showing that Dubai does in fact have an RIS, arguing against the only existing literature on the topic I was able to find by Ferretti and Parmentola, whose end conclusion was that Dubai does not have a properly functioning RIS.³⁰⁷ As explained in detail in the response to RQ2: "How effective has Dubai's RIS been in fostering local innovation?", this study argues

³⁰⁷ Ferretti and Parmentola, "The Creation of Regional Innovation Systems in Emerging Countries."

against their viewpoint both empirically and theoretically. Empirically, the primary method used to test the level of innovation activity in Dubai, and hence the effectiveness of the RIS, was by customizing and deploying the world standard Community Innovation Survey for the first time in the Gulf, as far I am aware. The findings were compelling: 82% of Dubai firms engaged in at least one innovation activity in the three-year period 2019–2021, significantly more than the 45% of firms actively innovating in the UK. Although this is just a benchmark comparison against a more advanced economy and the details of the balance of innovation types differed between the geographies (e.g., product vs. process weighting as described in Chapter 10), the top-level data are compelling enough to argue that, empirically, Dubai is successfully producing innovating firms and therefore has developed an effective RIS. The dataset from this survey is itself an important contribution, available in Appendix D for other researchers to build upon in the future.

The survey results are supported by further empirical evidence from the four organizations examined in this study, each of which highlight innovations brought to market by these organizations. Although the lack of university-derived R&D has weakened Dubai's RIS, the fact remains that some of the most innovative firms in their respective industries on a global scale were started and are headquartered in Dubai—Emirates Airline in aviation and DP World in logistics. The innovations that these firms have brought to their respective industries, summarized earlier in this chapter, are further evidence of a thriving RIS in Dubai.

From a theoretical standpoint, the same case in support of Dubai's RIS is made by building on foundational Innovation Systems scholar Philip Cooke's preconditions for what constitutes an RIS, split under infrastructural and

superstructural elements,³⁰⁸ and comparing these preconditions to the environment in Dubai. Infrastructurally, Cooke is clear that for a geographic area to qualify as an RIS region it should be a meso-level political entity with “regional financial competence,”³⁰⁹ meaning control over its budget to invest into institutions, hard and soft infrastructure, and universities. Dubai, as an emirate within the context of the federal United Arab Emirates, fits this classification perfectly, managing its own budget and even running some of its own independent infrastructure such as a second national telco provider, Du. On an infrastructural level, the conditions are easily met.

At the superstructural level, Cooke is most interested in the level of embeddedness within the region, as shared norms and trustful interactions between entities are the fuel that makes the RIS function. Although they did not link to Cooke’s superstructural preconditions explicitly, Ferretti and Parmentola seemed to be most concerned with this level when positing that Dubai does not have an RIS. In 2007, they were concerned about the “lack of social interaction mechanisms that contribute to increasing the level of social embeddedness among the actors,”³¹⁰ and their 2015 study did not add much in the way of empirical evidence to challenge this initial assumption.

Although one can make an argument that the downside of the openness of Dubai—bringing everyone from all parts of the world in a unique 90%+ foreigner population mix—is that the cohesion of society is less than in a region with a more traditional composition, the compelling empirical counterpoints from this study’s interview and survey data tell a different story.

³⁰⁸ Cooke, “Regional Innovation Systems, Clusters, and the Knowledge Economy,” 958–60.

³⁰⁹ Cooke, 958.

³¹⁰ Ferretti and Parmentola, “The Creation of Regional Innovation Systems in Emerging Countries,” 48.

The most telling interviews conducted on this topic were those relating to the DMCC and DIC, as they were explicitly designed based on Porter's Cluster Theory, and the topic of inter-firm relations was top of mind for the subjects. As shown in Chapters 8 and 9, the ecosystems built in these two clusters are a model of embeddedness, with frequent knowledge spillovers, an integrated supplier ecosystem, and direct engagement with the government. A representative story worth repeating here is that of Bashar Kilani, the first IBM employee in the region tasked with setting up operations and building a relationship with the Dubai government. Kilani explicitly says that the way interactions were happening between IBM and the Dubai government and the level of trust and mutual support was at a level IBM had never seen elsewhere in the world, even in places that would typically be thought of as having higher levels of embeddedness.

The Community Innovation Survey provided the quantitative data needed to triangulate these qualitative findings and show that the same spirit of cooperation and interdependence extends beyond the experiences of the interviewees. For example, 85% of Dubai-based businesses surveyed were likely to engage in innovation partnerships with private sector entities compared to 52% in the UK. If Ferretti and Parmentola were correct about the lack of embeddedness among the actors, then it is likely that these figures would have been flipped. Ferretti and Parmentola's studies on Dubai did not benefit from this kind of empirical data and are quite dated, leading to findings that can now be challenged. Therefore, on both an empirical and a theoretical standpoint, this study argues that Dubai has a functioning, successful RIS.

The second major area this study contributes to the academic literature builds on the understanding of the Dubai RIS described above and shows how it theoretically differs from the existing RIS models. Since the Innovation Systems

literature is overwhelmingly North American and European in nature, understanding the extent to which a Gulf region on a path towards economic diversification away from rentierism may differ theoretically is an important contribution and a clear gap in the academic literature.

Building on Etzkowitz and Zhou's statist configuration of the original Triple Helix framework,³¹¹ this study differentiates between a government-pulled model based primarily on the Chinese experience and the empirical evidence collected about the Dubai model. The differences between the statist view cited in the literature and the Dubai RIS are many, although the most important dimensions are: 1) financial constraints, 2) openness to competition, 3) empowerment and trust by government leadership, 4) lack of focus on building the university system. These are taken in turn below and a new "government-initiated" Triple Helix typology based on these differences is proposed.

In a government-pulled Triple Helix, the state is typically the source of all financing for new projects, protects the local economy from competition, exerts direct control over all the representatives of the government, and invests heavily in developing the local university infrastructure. Dubai's hallmark, as explained in detail earlier in this chapter, is setting an aspirational vision while enforcing financial constraint and extreme openness to international talent as well as competition. The founding story of Emirates Airline demonstrates both of these traits—not only did Emirates get limited to a meager \$10m grant from the government to begin operations, but its request to protect the airline in the home market during its infancy was also denied, with the government opting for an open skies policy from day one.

³¹¹ Etzkowitz and Zhou, *The Triple Helix*, 38.

Despite, or perhaps more appropriately because of, these challenges, the result is a world-class airline, leading the industry in innovation. The government's role at the inception of Emirates was more of a vision-setter and initiator, and then the company was left to operate much more like a highly efficient private sector player than a peer state-owned airline.

A repeated theme across interviewees is the trust and flexibility given by the government to leaders to operate in the ways they deem to be best for Dubai. Former CEO of DMCC, Malcolm Morris, called this the “flashing amber” approach, where leaders in governmental organizations are given broad leeway to make decisions without getting top-level approval. Young, ambitious leaders are given a big mandate and a “clean sheet of paper,” as former DP World CEO Mohammad Sharaf explained. This describes a state that is not interested in a command-and-control approach; rather, projects are merely set in motion by the state and other leaders pick up the mandate to execute.

As explained earlier in this chapter, the university dimension of the Triple Helix is the weakest component in Dubai, and this is a direct result of a strategic decision to focus more on importing talent and research instead of developing it locally. This approach was successful in moving Dubai from its dependence on oil to a diversified services-based economy but has become a roadblock on the path towards a knowledge-based economy. That said, the minimal investment into the university infrastructure beyond setting up of the zones, establishing regulations, and inviting universities to come is again following the same pattern of a government that is setting the initial conditions and then allowing the market to act.

Based on these four primary differences, the “government-pulled” Triple Helix presented by Etzkowitz and Zhou does not adequately describe Dubai, and by extension, other Gulf regions that plan to follow in its footsteps towards economic diversification away from oil. Just as the state-owned enterprises of Dubai are better thought of as “state-initiated”³¹² firms, the incremental contribution to the literature proposed as an outcome of this study is a new “government-initiated” Triple Helix typology, anchored in the experience of Dubai building its successful RIS. The strength of Dubai’s approach has been in setting an ambitious vision and then stepping back to allow strong institutions to be built.

In conclusion, this study on Dubai’s RIS has presented several incremental contributions to the academic literature on innovation systems. The four empirical cases presented are unique in the literature in terms of their depth, the seniority of the interviewees, the comprehensiveness of the data collected across the Triple Helix, and the timescale ranging from the inception of these entities until 2022. Furthermore, the Community Innovation Survey gathering firm-level innovation activity data from Dubai-based companies, is the first such survey deployed in the Gulf, as far as the author has been able to ascertain. The quantitative results of this survey constitute novel academic insights that can be compared across geographies. This study has put forward an incremental theoretical contribution to the systems of innovation field by applying the RIS theory to a new context, namely a post-rentier Gulf region. By examining Dubai as a specific case, this study presents a new “government-initiated” Triple Helix typology useful when applying the RIS concept in similar contexts, particularly other Gulf states such as Saudi Arabia and Qatar that are earlier in their

³¹² Hvidt, “The Dubai Model,” 410.

economic diversification path, and for whom the existing studies of RIS based on a primarily European and North American context do not apply as closely.

Policy Recommendations

The timing is critical for this study as the Gulf is rapidly changing with the global shift towards renewable energy and a realization that economic diversification is no longer merely an option. The current sentiment across Gulf governments is that fostering innovation domestically is the best way forward.

The link between theory and practice in the field of innovation systems is particularly strong, with theories presented in research papers often finding themselves rapidly adopted and legislated by policymakers, particularly in the case of the EU.³¹³ Even in Dubai's case, Porter's Cluster Theory was explicitly cited by Ahmed bin Sulayem and Al Suwaidi as the driver for developing DMCC and DIC in the way they did, for example. The literature on IS clearly outlines that different regions require different policies because the innovation environment and barriers to innovation are different across regions.³¹⁴ Furthermore, "the vagueness of the RIS concept poses the challenge of operationalizing it in terms of innovation policy,"³¹⁵ especially when attempting to apply policies across geographies as "they cannot be shaped following a standardized format."³¹⁶

The risk is that governments in the Gulf, in their quest for economic diversification, enact policies and follow playbooks that simply duplicate the approaches in countries that lead in global innovation indices such as the United

³¹³ Foray, David, and Hall, "Smart Specialisation from Academic Idea to Political Instrument, the Surprising Career of a Concept and the Difficulties Involved in Its Implementation."

³¹⁴ Tödtling and Trippel, "One Size Fits All?"

³¹⁵ Almeida, Figueiredo, and Rui Silva, "From Concept to Policy," 1332.

³¹⁶ Almeida, Figueiredo, and Rui Silva, 1334.

States of America, despite the significantly different contexts between them.³¹⁷

Unfortunately, as seen in many empirical studies across geographies with various political and economic contexts, these transplanted programs usually do not work.³¹⁸

Despite this fact, the same approaches are repeated, often within the same country, predictably leading to the same disappointing results.³¹⁹ This makes regionally contextualized research, such as the study presented here, even more critical.

Based on the empirical findings of this study of Dubai's experience developing its RIS, I propose six brief policy recommendations for Gulf governments pursuing similar goals:

- 1) *Set an ambitious vision but insist that projects reach financial self-sufficiency early.* Dubai's entrepreneurial approach to ensuring government-initiated innovation projects need to involve the private sector for funding has yielded powerhouses like Emirates and DP World, companies that defy typical SOE inefficiencies and have become leaders in their respective industries globally. Providing too much capital to projects in hopes of accelerating the transition to a knowledge economy can have the opposite effect.
- 2) *Open the economy to competition, top talent, and international firms.* An open environment brings in the best quality into the market and also subjects local companies and government projects to the real pressures of global competition, strengthening execution and forcing teams to find innovative solutions. Dubai took bold steps to open its economy even

³¹⁷ Schött and Jensen, "The Coupling between Entrepreneurship and Public Policy: Tight in Developed Countries but Loose in Developing Countries," 212.

³¹⁸ Schött and Jensen, 211.

³¹⁹ Lerner, *Boulevard of Broken Dreams*, 135.

when it was extremely difficult, such as the open skies policy that accompanied the launch of Emirates Airline.

- 3) *Focus on supporting industrial path extensions or path creations that are closely linked to existing economic strengths.* Government support should be directed towards industries with the highest chance of success, building on existing industrial strengths instead of building completely unrelated new paths. DP World is an extension of Dubai's oldest business and even Emirates builds on this historic strength and has taken it to the skies.
- 4) *Make smart, bold infrastructure investments to support the creation of new strategic sectors.* Once industries have been selected that have historic roots or a strong logic for local success, make sure they are supported with the right infrastructure. DP World was only possible in Dubai because of the vision of Sheikh Rashid Al Maktoum investing in the construction of Jebel Ali Port.
- 5) *Foster a culture of trust and empowerment within the government, giving broad mandates to leaders.* Finding high potential entrepreneurially minded leaders and trusting them to build entire organizations is the strategy Sheikh Mohammed bin Rashid and his father Sheikh Rashid bin Saeed followed, resulting in organizations like DP World led by dynamic leaders like Sultan bin Sulayem.
- 6) *Initiate long-term investments today into developing the local higher education system, with a focus on building R&D capacity and linking these universities into industry.* This critical component of a thriving RIS requires a 20+ year investment. Although there are some short-term strategies to cover for a gap in this dimension of the Triple Helix,

eventually the transition to a full knowledge-based economy will require a thriving local university ecosystem.

Limitations and Areas for Further Research

This research on the severely understudied Gulf context is crucial, not only for the UAE but for all neighboring GCC countries with similar economies and future diversification objectives. However, drawing broader conclusions about “Gulf RISs” from a single region like Dubai may be subject to the same generalization critique that motivated this research. Each GCC economy is unique, and even the regions within a large country like Saudi Arabia can differ so much that they need to be examined separately. Dubai's success in economic diversification and the development of a post-rentier economy sets it apart from other regions. Although a more comprehensive comparative study across all Gulf states undoubtedly would improve the understanding of regional variations in RIS development, the present study is a step in that direction and more helpful as a tool than studies anchored in the US or European contexts.

As discussed in the methodology chapter, this research project simultaneously benefits from and is constrained by the senior interviewees and prominent government-affiliated organizations studied. On the one hand, the unique insights from the interviewees have yielded rich data from the decision-makers and industry leaders themselves from across Dubai's development history, a valuable resource when investigating the RIS's characteristics. This comes with the challenge of filtering out positive bias and an ulterior motive of framing their own personal narratives of success within the academic sphere. An area of future research is to conduct a similar study but focused on less prominent organizations, targeting less-known individuals as interviewees and anonymizing their responses. Although this

may be difficult to achieve given the reticence of the industry to participate in academic studies, as explained in the methodology chapter, it is nevertheless an important endeavor for future researchers that would complement the findings of this initial study.

Due to time constraints, the geographic scope of the study has been limited to Dubai. In-depth comparisons with other regions, such as Singapore (a city-state with a similar economic makeup to Dubai) and Norway (a post-rentier, diversified economy), would be valuable areas for future research and could help validate or challenge the findings from the present study. Comparing to regions with a different economic makeup (i.e., non-rentier) but similar timeline of development, such as Spain post-Franco, could offer an instructive counter example to the Dubai model.

The Dubai Community Innovation Survey data gathered for this research could also be compared to regions beyond the UK to form a more complete quantitative picture of the differences between regions with respect to firm-level innovation. There is also an opportunity to broaden the survey to firms across the entire emirate, as the data from this initial study were limited to firms in the DMCC.

Finally, this study uses the Triple Helix model as an organizing framework, limiting the research to the roles of government, industry, and universities within the RIS. However, other actors and stakeholders, such as civil society, the natural environment, non-governmental organizations (NGOs), community organizations, or individual entrepreneurs, may also play a crucial role in shaping the innovation ecosystem in Dubai and the broader Gulf region. The study acknowledges that the data collected and analyzed in this research may not encompass all relevant factors, actors, or processes involved in the development of RIS in Dubai or the broader Gulf

region. Exploring the contributions of these additional actors could provide a more comprehensive understanding of the dynamics and complexities of the RIS in this context.

Epilogue: Self-Reflection

The conclusion of this study presents an opportunity to reflect on my journey as a researcher over the last several years and how I have developed throughout the course of the study. Conducting this research has not only deepened my understanding of the way Dubai has built its innovation system—a topic I had been exposed to as a practitioner for over a decade prior to deciding on making this the topic of my doctoral research—but it has given me the research tools and academic perspective that will serve me well for the rest of my career.

The mixed methods approach exposed me to both quantitative as well as qualitative academic research and gave me a deeper appreciation for the way academic research is designed and executed. I found the interviews to be fascinating opportunities to hear first-hand accounts from some of the most influential people in the Dubai genesis story, and learning about the abductive method and thematic analysis enabled me to take 25 very different conversations and distil from them coherent themes and conclusions. Running a survey in the Gulf was not easy, but I am glad that I added this challenge as the process itself of designing the survey, chasing for responses, and making sense of the imperfect quantitative data taught me much more than I could have learned from any book on the topic. I have come away from this experience with confidence in applying both research methods, which will serve me well as an academic in the future.

As described in the Researcher's Background section of Chapter 4, the pre-understanding with which I approached this study was both a source of strength as well as a potential liability. Importantly, I can now affirm that the pre-understanding did not limit the findings from the study; rather, it helped uncover new and surprising perspectives that were not apparent to me when the study began. For example, as cited in the response to the research question on the role of the Dubai government in its RIS, the theme of financial and operational constraints placed on government-initiated entities is a finding that emerged directly from the research, beyond my pre-understanding. That said, the pre-understanding did allow me to ask the right questions to uncover this consistent theme across the cases researched. Furthermore, highlighting the reflexivity issues addressed in Chapter 4 helped ensure transparency throughout the study and reduce the introduction of any bias into the findings.

I began this journey with the intention of gaining the academic toolkit necessary to either enter academia or continue my work in the private sector with a new lens, particularly useful when engaging in advisory work on how to best develop innovation systems in the Gulf. As shown in the key contributions to the literature and brief policy recommendations outlined earlier in this chapter, I believe that there are transformative lessons to be derived from the Dubai experience, and sharing these across countries in the GCC and beyond is an important outcome from this journey. I plan to publish articles that capture both the academic as well as the practical managerial aspects of this research so that the message can be more broadly received. I look forward to teaching, advising, and continuing to deepen the research on this topic in the future.

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Appendix A | NVivo Screenshots

All Nodes Coded:

Nodes			
Name	Files	References	
Comparing Cases		2	2
Dubai		11	21
Highlight Quotes		19	50
History		0	0
Airline Industry		2	3
Commodities Industry		0	0
Internet Industry		0	0
Ports Industry		4	7
Innovation Examples		19	66
Personal Context		16	19
Transition to Knowledge Economy		2	2
Triple Helix		0	0
Government		25	132
Industry		20	81
University		19	64

Example of Government Node Interview Data:

Nodes			
Name	Files	Referen	
Comparing Cases	2	2	
Dubai	11	21	
Highlight Quotes	19	50	
History	0	0	
Airline Industry	2	3	
Commodities Indus	0	0	
Internet Industry	0	0	
Ports Industry	4	7	
Innovation Examples	19	66	
Personal Context	16	19	
Transition to Knowledg	2	2	
Triple Helix	0	0	
Government	25	132	
Industry	20	81	
University	19	64	

<Files\DIC_Ahmed bin Byat> - 5 17 references coded [20.46% Coverage]

Reference 1 - 0.51% Coverage

Dubai doesn't have government. When you think of government, you think of structure, hierarchy. Dubai doesn't operate like that. And you know, the area, it's very, very fluid, very much highly influenced by private sector,

Reference 2 - 2.16% Coverage

Let's put your example of DP world, Emirates, or whatever, would you call this born in the government, but who owns it? It's the government. The treasury owns this. But from day one, the vision and the operating model was completely private. No standard, typical government can do anything like this. They don't, cannot do it, because of so many, because of the horizon, because of constraints, because of mandates. But in fact, whatever socalled our federal government is government, but the local governments are very different. And Dubai government is highly private mindset, if I'm clear about that. You know, the conversation, the aspirations, the hope, etc. It was built around the economy and this came through generations. Not new and certainly not with Sheikh Muhammed bin Rashid. It was with his dad and his grandfather. They all follow more or less the same. It just gets a "grand-ier" as it goes along. It's like a snowball.

Reference 3 - 0.48% Coverage

It was very simple. The direction from Highness was at 100,000ft, diversification of economy, basically, and catching the wave of the digital wave. At that time it was called technology, information technology.

Reference 4 - 2.35% Coverage

First we in Dubai at that time, the only free zone we had was more physical free zone for Jabal Ali. So that was the first one, then when we approach this American companies at that time. And instead of actually offering them anything beyond a potential regional presence or regional market we really didn't offer anything. In fact we were not talking we letting them

DP World Interview (Dr. Mohammed Sharaf) with Coding Stripes Across all Nodes:

PhD.nvp - NVivo 12 Pro

Code Auto Code Range Code Uncode
Coding

Case Classification File Classification
Classification

Detail View AZ Sort By
Undock Navigation View
List View Find
Workspace

DP World Mohammed Sharaf

Click to edit

and giving it a try? Like this question about an existing kind of industry or sector that was there, taking it to the next-next level versus trying to plant the seed is something completely different, completely new, that has no historical roots. What are your thoughts on that?

Mohammed Sharaf
Both because, again, whether it's Emirates, whether it's DP World or it's, I don't know, Emaar, whatever it is, you were given, again, clean sheet of paper. If you were given a port, you are given clean sheet of paper. Figure it out. Given an airport? Figure it out. And don't come for money. That's the best part. That's the best part. Because then you have to figure it out. I'm trusting you to give my capital to you, asset to you and run it, but don't come for money because I've already put money into it. And we never went to the government for money.

Mekki
Why do you think this was the case in Dubai vs. any other geography in the Gulf, or, for that matter, anywhere else in the world?

Mohammed Sharaf
It is in our roots as businesspeople, number one. Number two, it's the attitude of the government, the leadership. The leadership's attitude towards business, facilitating and Sheikh Mohammed always says that our job is to facilitate. Our role is not to be an obstacle but be a helper. "دورنا العون مش فرعون." And when a leader says something like this, imagine what the people underneath him would say, doing something. So it's a message. It's very clear. If you want to survive, you need to facilitate the flow of the river. Your job is to ensure that the river is flowing smoothly. Don't bring obstacles. We are the poorest in the region. Saudi is there, Qatar is there, Kuwait is there. Everybody has money. We use their money here, yes. So people say, okay, Saudi has woken up. Which means Dubai has to be more innovative and creative now. And we've always welcomed, we wanted Saudi Arabia. Sheikh Mohammed message was when we used to grow, the message he used to tell us, we want them to grow. We want them to be better. Because if they grow, we grow with them. The whole region grows with that. Today I'm just one small dot here in the region. When people come, show Dubai, okay, I'll go to Dubai, what will I do then? But when you come to the region, you have Dubai, you have Abu Dhabi, you have Riyadh, you have Jeddah, you have Doha, you have this, you have this, you have that region. Region is bigger.

Cruise ships. Who thought cruise ships will come here? Who thought that cruise ship will come to and when we started, we went after the cruise ship. They put all their demands on the paper. We want, this is what we want. You ready for it? 1,2,3,4,5. It's done. One of the problem was Visa. Tourists are coming and we had to have Visa. And this they had to apply visa, seven days, blah, blah, blah, all that. So we went to the migration and said, listen, we are promoting cruise ship to Dubai. This is the list. I've got the names of the passengers, the nationalities, passport number, expiry date, issue date. This is it. And just all you have to do is stamp on it. And every passenger would leave. I will give them a card with the name and passport number.

Coding Density

Mohammed Sharaf

Government
Highlight Quotes
Dubai
Personal Context
Ports Industry
University
Industry
Innovation Examples

Appendix B | News Archive Articles

DP World

Maktoum decrees on Ports Authority

HIS Highness Sheikh Maktoum bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, has issued two decrees abolishing the Jebel Ali Port Corporation and renaming Rashid Port Authority as Dubai Ports Authority.

The decree provided for transfer of all properties and rights of Jebel Ali Port Corporation to Rashid Port Authority.

All funds and rights of Jebel Ali Port Corporation are transferred to Rashid Port Authority, including all funds and rights regarding the establishment, operation, maintenance, repair and reconstruction of Jebel Ali Port as well as all rights and obligations of the Corporation prior to the issuance of the present decree.

Sheikh Maktoum also issued decree No. 5 of 1991 renaming Port Rashid Authority as the Dubai Ports Authority.

The Authority will be represented and managed by a president appointed by the Government.

Dubai Ports and DPI Terminals merge

New organisation formed to create one of the largest maritime operators in the world

By KOKILA JACOB
Staff Reporter

Dubai Dubai Ports Authority (DPA) and DPI Terminals (DPI) have been merged to form DP World in a move aimed at creating one of the largest port operators in the world.

“The merger, which came as a result of a boost in business, makes DP World one of the largest and most important port operators in the world,” Sultan Ahmad Bin Sulayem, chairman of the new group, said yesterday. A new independent authority, with a

new corporate identity and logo, was also unveiled.

The Jebel Ali Free Zone Authority (Jafza) and its global arm, Jafza International, have been fused into a single entity — the Jafza and Business Parks.

The Dubai Ports and Jafza has been formed as a

new regulator to oversee the regulation and administration of Dubai’s port and free zone operations.

A Board of Ports and Free Zones has also been formed to oversee the development of the ports and free zone businesses.

See also Page 39

Sheikh Rashid orders free zone in Jebel Ali

By A Staff Reporter

HIS Highness Sheikh Rashid bin Saeed al Maktoum, UAE Vice-President and Prime Minister and Ruler of Dubai, yesterday issued a decree creating a free zone in the Jebel Ali Port area, which already is the region's most active industrial complex.

The law provides that goods cleared from Jebel Ali Port or Port Rashid will be exempted from customs duties when stored in the free zone. These goods will also be exempted from duties when exported.

The legislation cancels the previous Port and Customs Act of 1966, and the amendments to it, to the extent they are not in conformity with the new law.

The text of the decree:

We, Rashid bin Saeed, Ruler of Dubai, have issued the following decree:

Article 1:

This law will be called the Law of Free Zone in Jebel Ali Port of year 1980 and comes into force from the date of its issue.

Article 2:

A free zone will be allocated — to Jebel Ali Port to store goods that arrive in the area. The location and extent of the zone will be according to the Ruler's directions.

Article 3:

Goods that were cleared from Jebel Ali Port or Port Rashid will be exempted from Customs duties when stored in the free zone. These goods will also be exempted from duties when exported.

Article 4:

This law cancels the previous Port and Customs Act of 1966, and the amendments to it, to the extent to which they are not in conformity with this law.

Article 5:

The Director-General of Ports and Customs has to execute the law.

DPA to play major role in Dubai's growth: Sulayem

THE joining together of Jebel Ali Port and Port Rashid Authority into Dubai Ports Authority creates not only by far the largest single authority in the region, but one with the largest number of berths and ship handling capacity in the world, according to Sultan bin Sulayem, Chairman and Managing Director of Dubai Ports Authority.

"Our confidence in the future of Dubai Ports Authority is most optimistic. In view of the excellent performance of the dedicated staff of Jebel Ali and Port Rashid this has been very evident in the growth of Jebel Ali in the recent years. They oversee the activities of both the port and the free zone. Jebel Ali container volume has increased by over five times since 1988 and general cargo will be more than tripled by the end

of 1991," he said.

"The employees of Port Rashid have continued to provide outstanding service while handling in 1990 close to 700,000 TEUs with very limited handling equipment. I am confident in the creation of DPA that the employees of both ports will now have a common objective of serving the shipping community with the continuing and ever improving level of service. All of that will be possible by large investment by the Dubai Government. In handling equipment and common information services the efficiency and the economy of single marketing operation maintenance and technical department will be evident in DPA," Sulayem added.

The chairman stated that DPA will have facilities of over 100 berths, 11

container cranes and tremendous cargo handling capacity. A major purchasing programme of new equipment to provide even better service for shipping lines as well as imports and exports will be announced in the immediate future.

Sulayem also spoke of Jebel Ali Free Zone Authority which now has more than 325 companies as clients. The free zone, while not part of the merger, will be closely associated with DPA and will benefit from the marketing and service effort of the staff.

"I am sure both the new DPA and the free zone will contribute greatly to the growth of the economy, and the strength of Dubai to make it a major industrial and shipping base and the most attractive business environment between the Far East and Europe."

WEDNESDAY, MARCH 8, 2000

DPA sees rosy future despite competition

Sulayem says Internet City will help it to stay ahead of rivals

By A Staff Reporter

Dubai

Far reaching developments in Salalah and Aden since 1998 will have its consequences in the future for local ports, according to Sultan bin Sulayem, chairman and managing director of Jebel Ali Free Zone and Dubai Ports Authority.

But initiatives such as the recent Dubai Internet City will ensure that international focus remains on Dubai and its facilities, and ward off regional competition, he added.

"Aden, which was still on the drawing board, is today a sobering reality.

Two years back "the planned operation in Salalah was still a dream. Today, the port is fully operational and proving itself a great success.

"The last two years have brought far-reaching developments throughout this region

with concurrent consequences associated with our own future."

Sulayem was speaking at the opening of the fourth Terminal Operations Conference and Exhibition in Asia — Toc Asia 2000 — in Dubai.

"We believe another contributing force behind our success, and one which sets us apart from surrounding competition, has been our continued good fortune to have so many exciting initiatives taking place in Dubai.

"The most notable project, and one which has great significance to me personally, is the Dubai Technology Electronic Commerce and Media Free Zone Authority. Located at our doorstep, it promises to provide unlimited opportunities."

On its part, DPA is "instigating many changes and our commitment to investment in infrastructure and superstructure — well beyond present needs — has been evident across the board."

And to ensure that it uses the Internet to manage its operations, DPA will open a dedicated portal — DPA Portal — by May.

"Our investment in this interactive site is designed to reduce overall manual handling of our documentation.

"Not only is this a natural progression from EDI, but it represents a regional benchmark in the automation of terminal operations, well beyond the limitations associated with Web sites."

Sulayem said this would be a pre-requisite in meeting the expected growth of container vessels.

"Two years ago we all spoke courageously about the advent of the 6,000 and 8,000 TEU vessels and the repercussions for terminal operations around the world.

"I have recently heard that we have bypassed the 12,000 and 14,000 TEU vessels, and are now discussing the 18,000 Malaca Max carriers."

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BAI THURSDAY APRIL 10, 1980

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Sheikh Rashid opens new port extensions

By A Staff Reporter

YET another of Dubai's giant development projects—the extension to Port Rashid incorporating a purpose-built container terminal—was formally commissioned yesterday.

The new facility was personally inaugurated by the architect of modern Dubai, His Highness Sheikh Rashid bin Saeed al Maktoum, Vice-President and Prime Minister of the UAE, and the Ruler of Dubai.

As a large gathering of foreign and local dignitaries cheered, Sheikh Rashid walked up a red carpet to the commemorative plaque and unveiled it, signalling the inauguration.

It was a historic happening and a particularly proud moment for Sheikh Rashid. Exactly the same day twelve years ago, the Ruler had initiated the construction of Port Rashid by driving in the turreted pile.

Yesterday, the newly-appointed Director-General of Ports and Customs, Colonel Abdullah Khalafan Abdulhadi, recalled the incident when he made a short speech welcoming Sheikh Rashid to the ceremony.

He said: "We are sure that many of you who are present here will recall that exactly 12 years ago, today His Highness Sheikh Rashid bin Saeed al Maktoum

EDITORIAL PAGE 6

graciously took part in a ceremony to mark the commencement of the construction of Port Rashid."

"The growth of Port Rashid from those four berths to the 35 berths and container terminal which we see before us today is a true reflection of the growth and prosperity of Dubai which has been created and developed under the wise and progressive leadership of His Highness," he added.

The new Director of the Port and Customs also thanked the consultants, contractors and the Port Management and the others who had contributed towards the timely completion of the extension within the period.

On hand to witness the historic ceremony yesterday were diplomats representing many countries around the world, ministers, senior government officers and Dubai's business elite headed by the President of the Chamber of Commerce and Industry, Saif Ahmed al Ghurair.

Sheikh Rashid as well as the dignitaries present had a glimpse of Port Rashid's spectacular growth when they toured the new terminal and some of the extensions.

The area of the terminal is 458,000 square metres offering a throughput capacity in excess of 200,000 containers per year. The terminal has capacity to accept 140 refrigerated containers.

The terminal is equipped with the latest facilities. These provide for all container movements to be recorded and controlled by computer using programmes developed by the port operator, Dubai Port Services.

The extension, it was pointed out, has made Port Rashid the biggest and the best equipped of its kind in the Gulf.

The facilities had increased to 7,100 metres of quay frontage providing for ships of 11.5-metre draft to discharge general cargo. There are also 175 acres of open storage and two Ro-Ro ramps within the area.

The fully integrated container terminal has 1,350 metres of quay and is equipped to handle ships of 13-metre draft. Four 35-ton quayside gantry cranes have been installed which enables the servicing of the latest third generation container ships.

While the opening function was going on, a giant container ship was being unloaded at the docks. The ship, Foss Dunkerous, had arrived in Dubai in the course of its maiden voyage to Singapore from Marseilles.



Sheikh Rashid, accompanied by Port Rashid's Captain Butcher (in dark suit) and other distinguished invitees tours the new container terminal yesterday.—Gulf News photograph.

Iran sanctions: U.S. urges wary allies to follow lead

THE United States stands alone in imposing sanctions on Iran while its allies cautiously discuss the implications of any action they may take. But President Jimmy Carter has warned that he too can shut off the Iranian oil tap.

In Teheran the militant students holding the U.S. Embassy yesterday renewed their threat to kill all the hostages if Washington tried to use force against them.

With Iran's diplomats ushered out of the United States amid cries they were treated like hostages themselves, the administration reportedly is considering a naval blockade of Iran's sea routes or the mining of its oil ports, which would block Iranian exports and cut off the oil revenues that sustain the Gulf country.

The militants occupying the U.S. embassy in Teheran threatened yesterday to kill all their American hostages if the United States takes any

measures that would help the United States isolate Iran.

The administration has begun efforts to isolate Iran "economically, politically and psychologically" to force the Iranians to release the American hostages held in Teheran for five months.

U.S. officials have said Carter has not ruled out military action, such as a naval blockade, if all else failed to secure the release of the hostages. After Iran said it would cut off oil

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Port Rashid completes 20 years' service today

By A Staff Reporter

TWO decades ago today the first commercial marine vessel docked at the newly-built berth No 3 at Port Rashid.

Since then the branchchild of the late Sheikh Rashid bin Saeed Al Maktoum — which bears his name — has come a long way to be universally recognised as the 'Gateway to the Middle East'.

On the first page of the original log book of 20 years ago, the *RMS Sirdhana* is registered as having berthed at the Port at 1300 hours with assistance from two Gray, Mackenzie tugboats *Al Jabbar* and *Rafiq*.

The vessel that found its way into the history books of Port Rashid and Dubai, arrived from India and Pakistan bringing the first commercial cargo and passengers, recalled Abdul Razzak Abdul Karim Kalantar, the then supervisor of berth No 3 and presently the assistant port operations manager.

"From Dubai, the vessel was on its way to Doha, Bahrain, Kuwait and Basra and back. It carried some 1,000 passengers who had a lot of baggage. Earlier on, the cargo and passengers used to be discharged in small launches out in the sea and ferried to Dubai. This was the first operation in which both passengers and their baggage were discharged alongside," added Captain Arthur Jarman, who was then the port manager.

The arrival of the British India Steamship Navigation Co vessel was recorded for posterity by its master, Captain R.O. Cunningham, who wrote: "*Sirdhana* was dressed overall for arrival and our pilot, Captain Jarman boarded off the Dubai anchorage buoy from a tug similarly bedecked with flags for the occasion."

"Once alongside, the disembarkation of passengers and discharge of cargo proceeded in good order."

"During the afternoon frenzied preparations were evident on the jetty, where some 700 chairs were arranged for the invited guests and carpets laid, and settees and sofas were set out for the more important dignitaries and sound equipment set up for

the ceremony of opening the new port.

"At 1900 hours the Dubai Police Band boarded the *Sirdhana* and settled themselves on the after end of the Promenade Deck to play musical selections.

"At 2030, His Highness Sheikh Rashid bin Saeed Al Maktoum arrived with his retinue and took his place in the front row. The official opening ceremony then proceeded with prayers, followed by speeches to mark the occasion by Sheikh Hamdan bin Rashid Al Maktoum, Sir Robert Taylor, chairman of Costain Civil Engineering, the building contractors of the new port and others.

"After the conclusion of the speeches, I escorted Sheikh Rashid aboard the *Sirdhana*, where the 'Serang' and 'Tindals' piped him aboard.

"I was honoured to receive a presentation from Sheikh Rashid to *Sirdhana* to mark her participation in the opening of the new port.

"The gift (was) a beautiful kunja, or Arab dagger, in a gold sheath with gold chasing on the hilt and a wonderful example of local craftsmanship."

"The (Scottish) custom (of a recipient on being presented a knife, in turn presents the donor with a coin to ensure that the gift does not sever friendship) must have appealed to the Ruler, because he readily accepted the shilling which I offered.

"After a visit of about half-an-hour, the Ruler and his party were escorted to the gangway," Captain Cunningham wrote.

Explaining about the history of the port, David Gibbons, the general manager pointed out that the first pile was driven by Sheikh Rashid on April 9, 1968. The original plan was to build a breakwater and four berths, but the number was very quickly extended to 15.

However, the port was officially opened on October 6, 1972 when there were actually 23 ships in port and working, he said.

The port became increasingly busy during the 1970s and an extension of a further 20 berths was commenced in January 1976 and officially opened

on April 9, 1980 — 12 years to the day from the driving of the first pile.

Presently, the port has five container berths, six container gantries, 30 general cargo berths and an oil terminal. Depth of water at the container berths is 13 metres and, at the general cargo berths, 11 metres.

The throughput in 1989 was a total of 10.58 million tonnes, 76 per cent of which was in containers representing 644,230 TEUs.

In 1989, Port Rashid overtook Jeddah as the busiest port in the Middle East and was rated about No 25 in the World Container Port League.

Throughput in 1990 would have been 700,000 TEUs and Dubai ports would jointly have achieved one million TEUs, putting Dubai up to No 18 in the World League, but for the Kuwait crisis.

For the past two years running, Port Rashid has won the Best GCC Sea Port award by *MEED*, Gibbons explained.

He said he would like to see Port Rashid provide the best port facilities between the western Mediterranean and Singapore. Keeping the crisis in mind, the future is obviously very good.

"Competition within the region is increasing. But we remain confident that the level of services and systems provided in Port Rashid and Jebel Ali Port would make it very difficult for other ports to make any serious impact on the trade of Dubai.

"Dubai has the ports, the international airport, one of the world's biggest drydock facilities, a free zone which will be unrecognisable in ten years going by its growth and an air cargo village coming up. It is difficult to beat that collection of services," Gibbons stated.

In terms of cargo handling, he pointed out that though containerisation appears to have levelled off, a slight rise in December is expected. However, general cargo handling has seen a downturn.

Gibbons also said the government plan to extend cover to ships coming to Dubai is progressing, and a favourable response is expected shortly.



Port Rashid Authority General Manager David Gibbons, Middle East Container Repair Co Director Captain A.J. Jarman, Assistant Port Operation Manager Abdul Razzak Abdul Karim Kalantar, and Port Operation Manager George Pass showing the log book entries of the *RMS Sirdhana* arriving in Port Rashid 20 years ago today. — GN photo

Abu Dhabi rents fall, prices up

By Linda Rout

ABU DHABI — The Statistical Section of the Abu Dhabi Planning Department has released its first ever yearly bulletin of retail prices — and revealed a few surprises in the process.

The yearly bulletin for 1989 lists the monthly average prices of 355 types of goods and services, plus 131 types of building materials. It includes prices for rented accommodation, where comparing the 1989 figures with those for the first eight months of 1990 shows that the average prices of both two- and three-bedroom flats have dropped this year to a level lower than the average for 1989.

The average price of a two-bedroom apartment requiring unit airconditioners was Dh25,166.67 in 1989, the annual statistics show, while a three-bedroom deluxe apartment with central airconditioner cost Dh47,000. These prices prevailed from January until December 1989, when the price of the two-bedroom

sources in the Planning Department Statistical Section said. "There were about 12 new buildings of around five floors with four to six flats on each floor. The flats were let by the Department for Social Services and Welfare (Khalifa Committee) with rents aimed at the lower end of the market, so their rents depressed the average figures," a spokesman said.

Rents have risen in the private sector, he said, but as 70 per cent of the flats in Abu Dhabi are controlled by the Khalifa Committee, figures for rents in the retail price statistics reflect that more than the prices in the private sector.

The 1989 figures also show that the prices of some basic commodities such as flour and sugar went up in 1989 over 1988 figures, while others, such as rice, came down.

The average price of grade one local flour was Dh1.74 in 1988 but rose to Dh1.87 in 1989, while recently monthly figures from the department show that it reached Dh2.08 in both July and August 1990. White sugar averaged out at Dh3.38 a kilo in

cost Dh24.25 and in August Dh3.13.

Other basic necessities listed include 50-pound bottles of butane gas, which maintained a steady price of Dh50 in 1988 and 1989 dropping to Dh45 in November 1989, and further to only Dh18 in January 1990, where the price remains.

"The figures for August 1990 reflect prices immediately after the beginning of the Gulf crisis but do not reveal any evidence of price hikes as a result. Any increases are likely to show up in statistics for later months, when existing stocks of goods will have been exhausted."

As for the future, prices of rice and sugar are likely to drop, said Mohammed Abbasar Hassan, Marketing and Sales Manager at Abu Dhabi National Foodstuffs, because of current surpluses on the international market. Meanwhile the price of cooking oil is going up because of increased freight rates for imports as a result of the Gulf crisis.

Rising fastest is the price of frozen chicken from Europe, forced up as a result of higher demand from Saudi

Innovation the key to Dubai's competitive edge

DP World chairman says an integrated approach is vital to a sustainable and diversified economy

DUBAI

Staff Report

Dubai "must continue [with] development and innovation" if it wants to maintain the competitive multi-sector edge it has developed, Sultan Bin Sulayem, chairman of DP World said yesterday.

"A sustainable and diversified economy is built upon an integrated approach and involves cooperation and coordination

across all sectors," Bin Sulayem said, reminding that innovation is key to growing "amidst such a competitive environment."

The remarks was made by Bin Sulayem in a statement handed to media at the annual Majlis Jafza (Jebel Ali Free Zone Authority) held in Dubai yesterday under the theme 'Collaborative Innovation ... Together for a Better Tomorrow'.

Bin Sulayem said that collaborative innovation has risen in importance amid global economic instability, open markets, ongoing technological developments and the ever-changing needs of the customers.



Ahmed Ramzan/Gulf News

Thinking ahead

■ The annual Majlis Jafza was held under the theme 'Collaborative Innovation ... Together for a Better Tomorrow'.

Hyperloop prototype in Dubai by 2020

DUBAI-ABU DHABI TRAVEL TIME CAN BE REDUCED TO 12 MINUTES

DUBAI
BY SHAFIAT SHAHBANDARI
Staff Reporter

Dubai will have a 20km prototype of the Hyperloop transportation system operating at a speed of 1,200km/h by 2020, officials said yesterday.

The network will eventually connect key parts of the city, while expanding to other emirates and beyond.

The plan to build the futuristic transport network that is set to change the meaning of time and space in the next few years was announced at a press conference in Dubai yesterday.

The Roads and Transport Authority signed an agreement with Hyperloop One, a US-based firm, to develop the high-speed technology. The agreement mandates the company to start a feasibility study on the construction and operation of the network.

According to Josh Geigel, president of engineering at Hyperloop One, this is the first such agreement signed between the Los Angeles-based company and a transportation authority anywhere in the world.

"We believe this is the first step towards making the technology a reality and we are looking forward to having the prototype ready by 2020," said Geigel, speaking to *Gulf News*.



Atiq-ur-Rehman/Gulf News

■ Rob Lloyd and Mattar Al Tayer at the signing ceremony for the Hyperloop at Burj Khalifa in Dubai yesterday.

Hyperloop has also signed an agreement with DP World to study the implementation of the technology in Jebel Ali port.

He said that the proposed network is spread across 200 kilometres, but the initial prototype will be built on a stretch of 20 kilometres. However, the location for the prototype has not yet been decided.

"That is what the study is all about, to determine where we will build it, what will be the cost and how we will build it," he said.

Connectivity

According to Geigel, the major idea is to connect the passenger and freight lines and extend them all the way to Abu

Dhabi and beyond. The plan is to smoothly connect self-driving vehicles with the Hyperloop technology and create a seamless network to provide end-to-end mobility.

Explaining the concept, Geigel said the system will have people ordering a trip through mobile apps and travelling on self-driving vehicles which will get on the Tube for the long distance travel.

Although not finalised, two major stations have been planned at Burj Khalifa in Dubai and Etihad Towers in Abu Dhabi that will cater to multiple routes, offering tailored services.

As part of the idea, Hyperloop stations will be spread all around the city, providing easy



Atiq-ur-Rehman/Gulf News

■ A model of a Hyperloop station on display during the signing ceremony yesterday. Hyperloop stations will be spread all around the city, providing easy and convenient access.

and convenient access. This would effectively reduce travel time between Dubai and Abu Dhabi to less than 12 minutes, between Dubai International and Al Maktoum International Airport to less than 5 minutes and between Dubai and Riyadh to less than 48 minutes.

Mattar Al Tayer, director-general and chairman of the Board of Executive Directors of the RTA, said: "In line with the vision of His Highness Sheikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, the RTA is collaborating closely with Dubai Future Accelerators to support innovative solutions for the future of mobility to explore fu-

ture mobility solutions."

"With Hyperloop One, we will create a new means of transportation, keeping our region at the forefront of transportation technology and innovation," he said.

Speaking to the media, Rob Lloyd, CEO of Hyperloop One, said: "Having signed an agreement with DP World in August to pursue a cargo-based Hyperloop One system at Jebel Ali port, our focus has now expanded to include connecting the emirates."

How it works

Hyperloop is system that integrates low pressure pipe linking two stations, enabling passenger and freight capsules on a transporter to travel at the speeds of 1,200km/h.

The capsules or pods travel in a low-pressure environment without friction, similar to the way Maglev high-speed trains travel without wheels along high-speed lines.

Hyperloop design was first conceived by Elon Musk, a South African inventor who helped build Tesla and SpaceX.

—S.S.

ON THE WEB
For a video, log on to:
www.gulfnews.com

Dubai set to become major hub of airlines

By Sudhakar Rao

DUBAI has a splendid opportunity of progressing from being a major transit point to an international airline hub, creating in its wake a number of spin-off benefits in several sectors of the economy, experts say.

And Emirates, the international airline of the UAE is in the unique position of forging the type of partnerships and alliances that are driving the growth of European and North American carriers.

At Emirates airline itself, the planning department sees an enriched role for Dubai in the field of aviation with hotel, tourism and service industries maintaining a proportionate rate of growth.

The much feared impact of the long-range B747-400 aircraft, which will fly direct between destinations in Far East, the Pacific Rim and Europe skipping Dubai, is vastly exaggerated, says Timothy Clark, general manager, planning, of Emirates.

He sees the 747-400 as a blessing in disguise and argues that major carriers are now forced to look at the immense potential of the Gulf in a new perspective.

"Too much weight is being placed on the adverse effect of the 747 aircraft. My view is that it will help the position of Dubai which has already established itself as a regional centre," Clark said.

Airline bosses and experts, who see global air traffic grow at an annual rate of seven to nine per cent, sideline the importance of Gulf and say South East Asia, the Pacific Rim and the Subcontinent will be the boom areas. Some carriers have already cut the size of their operations in the Gulf. But conversely this is leading to increased airline activity in Dubai.

Clark said that airlines were reviewing their role in the Gulf in the light of increased industrial activity in the area and the rebuilding efforts in Iran.

"The focus is once again shifting to the Gulf with the end of the war and the start of increased industrial activity. Dubai will serve as a gateway to the Gulf and the Middle East. "If airlines, not already flying here, chose to come to Gulf, where will they go? Dubai is the logical choice," he said.

The appetite of airlines for rich new markets has been whetted in recent months by the rebuilding plans in



An enhanced role for Dubai in the field of aviation.

Iran. They cannot fly there as yet because of the problem of repatriating their earnings in hard currency.

"Airlines see the importance of Iran. Until such time they start their direct operations, the choice is Dubai. The Gulf saw major growth rates some years ago but because of the war and then the drop in oil prices, traffic volume decreased. At the same time the Far East and the Pacific Rim countries were booming. So every airline wanted to get in there.

"But over the last 18 months there has been rethinking on the rule of the Gulf at many airlines," Clark observed. He said "Dubai is already a regional hub and Emirates has interline agreements with many carriers. Where we do not operate, we feed our passengers into the flights of others. They do the same with our services.

"The prospects of European carriers operating turnaround flights and feeding some passengers to Emirates for the Subcontinent is also very bright," he said.

KLM's HFA Hemmer, general manager for Gulf states who moved from Bahrain to Dubai when the airline's regional headquarters shifted, said: "The many years of the open skies policy which Dubai followed can be used to great advantage. It is a very good transfer point for the Subcontinent. Since many airlines are unable to gain fifth freedom rights of carrying passengers from Dubai to India for instance, Emirates can fly our passengers through an arrangement.

Similarly KLM can fly their passengers to Europe and North America." Emirates and KLM have already held talks on the possibility of closer cooperation.

"Iran will throw open many more opportunities. Korean Air, for example, has a strong interest in going there but there is the problem of repatriation to begin with. It now flies to Bahrain but has asked us if we would take their passengers from Dubai to Iran if they shifted their operations to Dubai," Clark said.

He also said that many U.S. carriers which had interest in the Gulf but did not have operations so far because of either the war or the risks would now think strongly of beginning services.

"If those carriers are going to be globalistic in their outlook, they will have to come to the Gulf, and if they are looking at a place which can offer good service and connections, Dubai is the answer."

But Dubai's role as a regional hub is becoming different from such well known European hubs as Heathrow, Frankfurt and Schiphol.

"Passengers going to Schiphol and catching a flight to New York for example want to spend as little time as possible in transit. But in Dubai it is quite different.

"Even if connections are available immediately, many passengers prefer to stay at least a day and shop. The benefits are many. Some already feel that more beach resorts are urgently needed to cope with the tourist boom," Clark said.

\$35b flight of imagination

MOHAMMAD OPENS AIRSHOW AS EMIRATES CREATES AVIATION HISTORY WITH LARGEST AIRCRAFT ORDER



Soaring high

Shaikh Mohammad leaves the A380 after a tour of the double-deck aircraft at the Dubai Airshow which began yesterday. This year's airshow has attracted 850 exhibitors from 50 countries and up to 40,000 visitors are expected at the five-day event.

By BABU DAS AUGUSTINE

Banking Editor
AND IVAN GALE
Staff Reporter

Dubai Emirates airline made civil aviation history yesterday by placing the largest ever aircraft order.

The \$34.9 billion (about Dh128 billion) order, made at the Dubai Airshow, comprises 120 Airbus 350s, 11 A380s and 12 Boeing 777-300 ERs. The Emirates' order book now stands at 246 aircraft worth \$60 billion (about Dh220 billion).

The airshow was opened by His Highness Shaikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai.

"Emirates has made aviation history today [Sunday] by committing \$35 billion for new aircraft. Our total order includes 93 aircraft on firm order and 50 options.

"This is a massive investment, which reflects our confidence in the future of Dubai and air transport," said Shaikh Ahmad Bin Saeed Al Maktoum, Chairman and CEO of Emirates group.

Expansion plan

"The new orders represent part of Dubai's ambitious plan to become a global destination. At Emirates we are trying to catch up with the multi-dimensional expansion plan of Dubai and the vision of Shaikh Mohammad," he said.

Emirates also announced the largest single order to Airbus by an airline. The \$31 billion (about Dh113 billion) deal includes firm orders

INSIDE

- Editorial comment Page 10
- Boeing gets \$3.2b Emirates order Page 54
- Emirates orders Trent XWB engines Page 54
- Hike in airport service charges and fees ruled out for now Page 54
- Qatar Airways signs \$13.5b deal with Boeing Page 55
- Middle East to buy 1160 planes in 19 years Page 55
- In pictures Pages 56 & 57
- More reports & pictures tabloid!

On the web

For updates and more pictures visit www.gulfnews.com/airshow

for 50 A350-900s and 20 A350-1000s plus 50 options for the A350-900s.

The first A350 will be delivered in 2014. It also announced firm orders for 8 more A380s, for which it signed letters of intent earlier this year. It also placed firm orders for an additional three double-deck aircraft bringing its total firm orders for the A380 to 58.

"Emirates is the largest A380 customer by far with 58 on order. We were the first airline to commit to the programme in 2001. The A380's capacity, range and economics all match perfectly with Emirates's business plans," Shaikh Ahmad said.

The contract with Boeing is for 12 firm orders of the 777-300 ERs valued at \$3.2 billion (about Dh11.75 billion). With this new order Emirates now awaits delivery of 57 Boeing 777s.

ASGHAR KHAN/Gulf News

Emirates set for debut flights next month

DUBAI (UNI) — Emirates, the new airline formed by the government of Dubai, would begin daily turnaround flights to Bombay and Karachi from October 25 as also to other Gulf destinations like Kuwait.

According to reliable sources, Emirates is likely to sign an agreement to wetlease one Airbus and two Boeing 737 aircraft from the Pakistan International Airlines (PIA), which is expected to send a team here shortly in this regard. The Airbus would be used for flights to India and Pakistan and the Boeings for the short-haul inter-Gulf operations.

Both India and Pakistan have already agreed to allow the new

airline to operate on bilateral routes although formal agreements are yet to be signed.

Kuwait has become the first country, from among the Gulf states to allow Emirates to operate and according to WAM, letters in this regard have been received from the Kuwaiti civil aviation authorities.

It may be recalled that the federal communication ministry of the UAE had recently submitted letters to India, Pakistan and other countries seeking permission for the Emirates Airline.

Sources said that both India and Pakistan had agreed to allow the Emirates to operate the same number of flights which they operated to Dubai although for the time being, Emirates was interested in only seven flights a week each to Karachi and Bombay.

Both Air India and PIA have about a dozen flights each a week to Dubai.

An important impact of the new airline's birth would be that the Gulf Air, which had so far claimed reciprocal rights from India and Pakistan for the operations of their national carriers to Dubai would have to forego this claim and reduce the number of its flights.

Pakistan's director general of Civil Aviation Authority (CAA) Khurshid Anwar Mirza made his country's stand known last month about flight reduction by Gulf Air while an Air India team is expected in Bahrain on Tuesday to discuss the issue with Gulf Air officials.

According to reports from Pakistan, Mirza said that the flight of Gulf Air from Dubai to Karachi would be cut down when the Emirates begins its service but Gulf Air would continue its normal operations to Karachi from other Gulf points.

The Bahrain-based Gulf Air is jointly owned by Qatar, Bahrain, Oman and Abu Dhabi.

It may be noted that PIA has

already been having disagreement with Gulf Air over the latter's claim for traffic rights from Duabi as so far, Dubai has had in internationally-declared "open skies" policy. The two airlines had been locked in discussions without result for over a year.

Due to the large number of Indian and Pakistani expatriates this side, the Dubai-Bombay and Dubai-Karachi routes offer lucrative markets.

Both India and Pakistan are reported to have told the Dubai Civil Aviation Authorities that they would also have to take up the matter of Gulf Air's flight reduction from Dubai with the Gulf Air so that flights under bilateral arrangements from Dubai are allotted to the new airline.

In this perspective, the Dubai authorities are still considering the winter schedule of Gulf Air for approval. The schedule is to be effective from October end.

The new airline meanwhile is going ahead with recruitment and advertisements have been placed in several countries, including India for crew and other staff. Dubai already has excellent ticketing and ground support facilities managed by the government run Dubai National Air Travel Agency (DNATA).

Cockpit crew for the planes is to be supplied by PIA under the wet-lease arrangements, which are likely to be finalised soon.

Senior appointments for the new airline have also been made with Sheikh Ahmed bin Saeed al Maktoum as its chairman.

It may be recalled that Sheikh Ahmed had visited India, Pakistan and Kuwait to seek traffic rights for the Emirates. While in India, he had met Civil Aviation Minister Ashok Gehlot, Secretary in the Ministry of Civil Aviation S. S. Sidhu and Director General of Civil Aviation C. K. S. Raje.

Industrial men steady

businessmen can help popularise India's non-traditional export items abroad, according to a study published by Delhi University.

The study, undertaken by Dr Sri Ram Khanna, a lecturer at Delhi School of Economics, says that the businessmen can pioneer new products in new markets and business organisations run by them can serve as important instruments of trade propaganda offensive.

The study is based on data collected from a sample survey of 140 leading export firms and some import organisations.

Dr Khanna has emphasised the need for continuous evaluation, review and policy improvement in exports and said the Indian experience can prove useful to other developing countries. The export boom of the seventies, he pointed out was due to the untiring efforts of some young entrepreneurs who had initiated export of new products in a big way.

FACT FILE

Some important milestones

May 1985: Emirates Airline is incorporated.

October 25, 1985: First flight takes off, marking a new era in commercial aviation in the Gulf.

July 1987: Emirates starts flights to London.

April 1, 1998: Emirates acquires a financial stake of 40 per cent and a management contract for Air Lanka, later rebranded Sri Lankan Airlines.

November 2001: Emirates stuns the world with a massive order for A380s.

December 18, 2003: Airline announces plans to launch a \$400 million international bond issue.

January 2004: Emirates starts flights to Accra, Ghana.

March 24, 2004: Dnata Agencies plans to launch operations in Saudi Arabia.

April 19, 2004: An Airbus A340-313X of Emirates runs off the runway when taking off from OR Tambo International Airport.

May 1, 2004: Emirates starts flights to New York.

December 8, 2004: Dnata says it plans to launch operations in Oman, Bahrain, Qatar and Sudan in 2005.

November 20, 2005: Emirates places orders for 42 Boeing B777s with 20 on options, worth Dh35 billion (\$9.7 billion) at list price.

March 2006: Emirates starts flights to Hamburg.

May 2006: Emirates starts flights to Dusseldorf.

September 2006: Emirates starts flights to Beijing.

October 27, 2006: Emirates says it has cancelled an order for 20 Airbus A340-600.

May 7, 2007: Emirates reaffirms its order for 43 A380s and commits to another four as well, bringing the total to 47.

June 18, 2007: During the Paris Air Show, Emirates orders eight additional A380s, bringing its total ordered to 55.

September 2007: Emirates launches flights to Sao Paulo, and in the process makes history by operating direct flights to all the six continents from its hub

October 29, 2007: Emirates launches flights to Toronto and Ahmedabad.

In business with just two leased aircraft

Airline has come a long way since inception

BY SAIFUR RAHMAN
Business News Editor

Dubai The Dubai Government launched Emirates in 1985 with \$10 million in start-up capital. When the airline took off on October 25, 1985, its fleet comprised just two leased aircraft — a Boeing 737 and an Airbus 300 B4.

The airline started off shuttling on the Dubai-Mumbai (then Bombay) and Dubai-Karachi routes, mainly cashing on the predominantly labour traffic.

“We were paid \$10 million to kick-start the airline,” Shaikh Ahmad Bin Saeed Al Maktoum, President of Dubai Civil Aviation and Chairman of Emirates Group, said at a press conference last year. “That’s it. We were told not to return to the government for money. We started the airline with that. We did not seek any more funding. We continued our journey and [have] remained profitable all the years thereafter, except one year.”

Gradually, Emirates added London, Paris, Frankfurt and other routes to its network. “Currently, 108 aircraft crisscross the earth to 97 destinations in 61 countries, while Emirates has evolved into a formidable travel and tourism conglomerate,” an Emirates statement says.

Excellence

“Owned by the Government of Dubai, Emirates has excelled through innovation and the boundless energy of its 30,000 staff, as they pursue the highest standards of customer care.”

Competition has been made all the more fierce by Dubai’s Open Skies policy, which allows more than 110 airlines to pass through the city’s busy airport.

“Although government-owned, Emirates is not subsidised in any way by the authorities. The airline has recorded a profit every year, except its second year of operation.”

Emirates statement

“Although government-owned, Emirates is not subsidised in any way by the authorities. In fact, the airline has recorded a profit every year, except its second year of operation. Growth has never dropped below 20 per cent,” the statement says.

For the financial year ending March 31, 2007, The Emirates Group announced record net profit of Dh3.5 billion (\$942 million).

Total group revenue increased by 28.8 per cent, to Dh31.3 billion (\$8.5 billion) compared to Dh24.2 billion (\$6.6 billion) the previous year.

Currently, more than 50 per cent of all flight movements in and out of Dubai International Airport belong to Emirates. By 2010, that figure is expected to increase to 70 per cent.

— See also Page 46

Cyber city plan announced

Global free trade zone for e-business

By Rasha Owais

Dubai A revolutionary global initiative to set up 'Dubai Internet City' was announced yesterday by General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Defence Minister.

Dubai Internet City is the world's first free trade zone enabling e-business related enterprises to operate globally out of Dubai. It will be ready in a year and will be personally supervised by Sheikh Mohammed.

It will be located opposite the Emirates Golf Club, and will cost Dh735 million (\$200 million) in the first phase. The cost of other phases will depend on the response of companies.

The city will offer companies 100 per cent foreign ownership, tax exemptions for corporate and personal incomes, land on renewable 50-year lease and single-window for all government clearances including those related to trade licences and work permits.

"Tomorrow's world will be driven by the Internet. It will be driven by innovative ideas and Dubai will be a significant global player in the 'dot com' world," said Sheikh Mohammed.

Dubai Internet City will also be home to the world's first Internet University, which will offer quality six-months to one-year courses in areas like e-business, e-finance, e-marketing, multime-

dia, e-design and e-management.

Sheikh Mohammed said the city will have an R&D centre for new technology initiatives and a state-of-the-art science and technology park that will support all residential e-enterprises and permanent exhibition and display facilities.

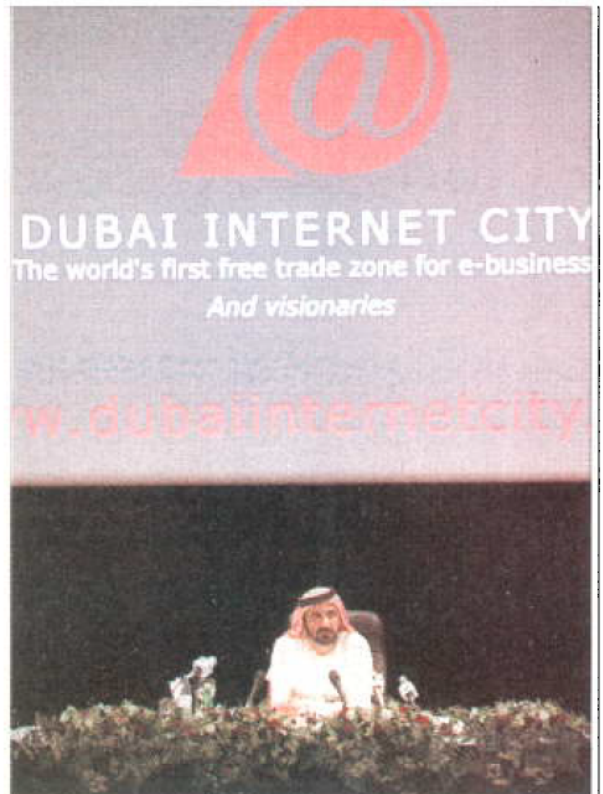
"The city's infrastructure is expected to attract the entire value chain in the Internet-related industry from venture capital and Internet strategy and implementation organisations to e-commerce, software and multimedia developers."

Natural home

Telecommunications, networking, CRM, call centre and other support organisations will also find a natural home at Dubai Internet City. The Dubai Government has already initiated work on content development and is in the process of developing a portal site and an e-commerce enabled site.

Sheikh Mohammed referred to recent business estimates of the consumer e-commerce industry which is currently around \$40 billion and expected to reach \$150 billion in a couple of years. The \$30 billion business-to-business e-commerce is expected to reach \$1 trillion in three to four years.

"In the past, we have proved to the world that we can dream ideas and deliver reality. Here is another opportunity for Dubai to take



Sheikh Mohammed addressing a press conference yesterday at the Jumeirah Beach Hotel. - GN Picture By Javed Nawab

a winning position in the burgeoning Internet world," said Sheikh Mohammed. "I believe that there is sufficient venture capital available in the region that would support such start-ups."

Dubai is the preferred destination for software, IT and e-commerce professionals and companies in this part of the world, especially the Subcontinent, he added.

Sheikh Mohammed said visits have been made to Bangalore -

India's IT capital. "We know where they are and we'll try and bring them here." Dubai is sitting between two major software development centres - India and Egypt, and will be able to draw upon their pool of specialists.

Sheikh Mohammed did not see any competition with other free zones in the country as Dubai Internet City would be a specialised one.

See also Page 21

Binbayat is DIC chief executive

By A Staff Reporter

Dubai

Ahmad Abdulla Binbayat, former Etisalat senior executive, is now Dubai Internet City's (DIC) chief executive officer.

"Binbayat was selected as CEO due to his wide experience in the field of Internet, communication and information," said Mohammed Gergawi, Technology, E-commerce and



Ahmad Abdulla Binbayat

Media Free Zone Authority director general and DIC chairman.

"Binbayat's excellent educational background, leadership qualities and high technology skills gained him many big achievements in Etisalat. His appointment falls in line with the Technology, E-commerce and Media Free Zone Authority's administrative strategy," according to a DIC statement.

"It is aimed at attracting talented and educated UAE national cadre to work at the free zone due for opening in October end," Gergawi said.

Binbayat is a U.S. graduate in IT and management and has been involved in network and IT planning and developing sales group throughout his work experience.

DIC free zone fully rented

180 companies licensed to operate

Dubai (Reuters) The head of Dubai Internet City (DIC) said yesterday the proposed free trade zone for electronic commerce had already fully rented its buildings and licensed 180 companies to operate there.

"Hundred and eighty companies are already licensed there, and these include companies such as Microsoft, Oracle, Compaq, Commerce One and Mastercard...all the big players are there (and) the buildings are already fully rented," Mohammed Al Gergawi, director of DIC, told a news briefing.

Officials said DIC currently covers around 25 square km of land. It is due to officially open next month.

The \$272-million Internet city initiative is part of Dubai's drive to become a regional hub for technology firms.

Gergawi also said that alongside the Internet city there were plans to create a complementary "media city" which would provide "a marketplace for the media in Dubai". The media city project is to be officially launched later this year.

Saeed Al Muntafiq, the chief executive officer of the planned media city, said they had identi-

fied seven segments within the media industry which they would focus on, but did not give further details.

Officials did not comment on government funding into the media city project.

"Dubai Internet City and media city are working very closely together. We will have the content and the technology next door to each other to make sure it is successful," Muntafiq said.

Asked whether he saw the government's use of a proxy to block certain Internet sites deemed to be offensive would act as a deterrent to foreign companies considering operating out of the region, Gergawi said: "The proxy is there to protect family values, but there will be no proxy for companies."

But he declined to comment on whether the monopoly position currently held by the Emirates Telecommunications Corp (Etisalat) would change any time soon. "We believe in competition, we believe it is healthy for the economy," he said.

Etisalat, which is 60 per cent owned by the UAE government, has a monopoly over the country's telecoms market and also runs its Internet services.

Internet City plan gathers momentum

International companies show interest

By Anupa Prathap Mathew

Dubai The Dubai Internet City project is gathering momentum as international computer companies express interest and make positive moves to further co-operation.

Mohammed Al Gergawi, Chief Executive Officer, Dubai Internet City, received a delegation from the global IT company, NCR.

The group was headed by Scott Schafer, Vice-President, NCR, along with Nidal Abour-Latif, Director, Middle East/Africa, and Hussein El-Gueretly, General Manager, Dubai.

Al Gergawi outlined the plans for Dubai Internet City, which will create an infrastructure that will enable Internet-related enterprises to operate globally out of Dubai.

The discussions centred on possibilities for co-operation and investment between two entities.

Schafer said: "Al Gergawi gave us an excellent overview of this very exciting new initiative." He added that the establishment of

Dubai Internet City has come at a time when the world is facing a technological revolution on a scale that mankind has never previously experienced.

He pointed out that the move is an ambitious one that illustrates the fact that Dubai is ready to face the challenges of the new millennium.

Dubai already plays a major role in the Middle East, he added, and is a strategic point for trade between Europe, North Africa and south-east Asia. This latest move, he said, is going to make Dubai a very important centre for global e-commerce and will ensure that Dubai Internet City becomes a base that attracts international computer companies which desire to invest in the project, particularly given the benefits such as 100 per cent foreign ownership, the arrangement for 50-year leases, a tax-free environment and a single window for all government clearances.

Schafer noted that this initiative is also of enormous value to Dubai, reinforcing both tourism and trade.

Dubai Internet City is multi-faceted, says Sheikh Mohammed

By A Staff Reporter

Dubai

General Sheikh Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and UAE Minister of Defence, said Dubai Internet City was multi-faceted and not just aimed at e-commerce companies.

"It will encompass all IT-related companies that are venturing into the field of electronic business. These will include such areas as e-finance, e-marketing, e-design and multimedia," he said.

In an exclusive interview to the Arabic edition of *PC Magazine*

Middle & Near East, Sheikh Mohammed gave more details of the billion-dollar project that he instituted last October.

According to him, in a year, the project will create three square kilometres of stand-alone free trade zone devoted exclusively to electronic business.

Sheikh Mohammed said global response to the project had been very positive.

"We are extremely encouraged with many of the big players listed on the Nasdaq exchange expressing interest in the project. We will invest as much as necessary," he said, "but the total outlay will run into a couple of hun-

dred million dollars over the next couple of years."

The Dubai Internet City will offer companies 50-year renewable land leases and 100 per cent foreign ownership. There will not be any corporate profit tax and personal income taxes, no hidden costs in the form of import/export taxes, and a single window for all government clearances, including those pertaining to trade licences and work permits.

It is expected that the entire value chain in the Internet-related industry will soon be at the Dubai Internet City. Venture capitalists, Internet strategy and

implementation organisations to e-business, software and multimedia developers will be there, besides telecom and networking companies to CRM call centres and other support organisations.

With the involvement of all these entities, the new age one-stop shop is expected to take Dubai's information services sector into the new millennium. In Dubai, a business and leisure hub for nearly two billion consumers in a region that stretches from Egypt to the Indian sub-continent, Africa and the CIS, software, information, technology and e-commerce companies can easily and cost-effectively access

the best of manpower from the region and in particular the sub-continent.

Companies can also look forward to a work environment with state-of-the-art networks, connectivity and global links for convergent information traffic.

Research on the innumerable aspects of information technology and their development into sustainable and profitable businesses will also be a key area.

"We will be actively encouraging companies to establish their own research and development centres," Sheikh Mohammed said.

"The Dubai government will set

up the entire infrastructure of the City and will provide the environment for development," he added.

These research facilities will form one of three key support areas of the City. The other two are a permanent exhibition and display facility, which will ensure that Dubai Internet City becomes a frequently-visited destination for all leading-edge companies, and the Dubai Internet University, with an international faculty and in co-operation with other international institutions: a mix of academia and commerce that will be a recipe for success.

"We have a lot of enthusiasm

and conviction for the establishment of the Internet university," Sheikh Mohammed said.

"Our strategy is to bring together a programme that goes beyond offering quality training courses to granting accredited university-level degrees in areas such as e-business, e-finance, e-marketing, multimedia, e-design and e-marketing."

"Organisations and individuals will need to move at Internet speed if they want to stay ahead," Sheikh Mohammed said. "And I want Dubai to stay ahead."

"Remember," he said, "in the race for excellence, there is no finish line."



Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and Minister of Finance and Industry, watches a demonstration at the Citex computer exhibition in Dubai yesterday. — CN picture by Joseph Capellan

Jumbo confirmed as IBM distributor

By A Staff Reporter

Dubai The Jumbo Group has been confirmed as IBM distributor for the UAE and the rest of the Gulf states, excluding Saudi Arabia, for the latter's range of Aptiva home computers, notebooks, monitors, and computer peripherals.

Jumbo also has responsibility for Yemen, Pakistan, and some other Middle East markets while an agreement was reached in September, shipments started reaching over the last few days.

"IBM saw Jumbo's investments and commitment to its principals, our strengths in distribution and retail networks, and after-sales. In fact, IBM has been evaluating an alliance for nearly two years," said M.R. Chahab, chairman of Jumbo.

It is only over the last two years that Jumbo has extended its interests into the IT segment. It started by selling Compaq home computer range, and has since then tied up with Acer and Packard Bell-NEC. It also markets the Supra range, which it owns.

"Now Jumbo is responsible for two of the leading international brands — Sony and IBM. IBM will eventually become to Jumbo, what Sony is to us right now. We have started off with IBM's personal systems to account for up to 30 per cent of the Jumbo group's turnover. We are hopeful that the way we are going, we will be responsible for IBM's entire range."

Chahab added: "We are now turning our attention to software, networking and e-commerce."

"One benefit of being in IT is that it is one industry which permits and approves multi-branding. Jumbo is just pursuing this philosophy."

IT-related sales are expected to account for up to 30 per cent of the Jumbo group's turnover during the next two to three years.

IBM's entire range, and has since then tied up with Acer and Packard Bell-NEC. It also markets the Supra range, which it owns.

Internet City project hailed

Everybody should work towards making the venture successful, says Sheikh Abdullah

By Rasha Owais and Manoj Nair

Dubai

The UAE's objective is to work in making the Dubai Internet City project succeed according to Sheikh Abdullah bin Zayed Al Nahyan, Minister of Information and Culture.

"We should work and all should work on making the project work. The coming challenges is how to benefit from developments in technology and the project," he said on the sidelines of Citex 99, which opened here yesterday.

The move is a "pioneering one, because the future is in Internet and e-commerce, according to Mohammed Alsharh, Dubai World Trade Centre vice-chairman and Dubai, Department of Economic Development director general.

The Dubai Department of Economic Development will support the project. It conforms with Emaar Properties' Millennium Tower. Both projects will cooperate together.

The Dh170 million Millennium Project was the first to be announced by Emaar over two years ago. It was designed as the first purpose-built commercial centre in the region to connect users and suppliers of information technology and the telecommunications industry. It was then supposed to be ready in two years' time.

"The response from e-business companies was high to the extent that I could not have my lunch. They were looking forward to such a move and, in fact, the size of the project was bigger than their expectations."

Abdul Basel Al Janahi of the Dubai Department of Economic Development and the person in charge of Dubai Internet City stand at Citex 99.

We also had enquiries from small companies. All their questions focused on the 100 per cent ownership, exporting, management and other issues which would be ready."



Other attendees at the stand said till afternoon, around 400 people were waiting to get into the 500 brochures were distributed. Forms with details on interested parties were also submitted.

The Dubai Government's decision to set up an Internet City could prove "extremely beneficial to the development of software solutions, particularly in Arabic, according to industry sources."

"What they are telling the world is to come and build the technologies here itself. And if it has to be here, it has to be in Arabic," said Fahad Alsharh of Sakhr Software, part of Kuwait-based Almaharrat Group.

This was a view echoed by other industry leaders, though they added that solutions development need not be restricted to the Arabic language alone.

"Such a project would be ideal for the small software solution houses. As the project is envisaged, it would offer the best in terms of infrastructure, research and development facilities, and tax benefits," said Dr. Walid Momeni, vice-president and general manager for the business development group at

Compag EMEA.

Microsoft is delighted at Sheikh Mohammed's announcement, and once again he has moved Dubai's IT agenda forward with his vision and innovative approach. "We will be watching developments in Dubai more closely than ever, and have every confidence in the success of Dubai's Internet City," said Bahran Mohamadzadeh, general manager for Microsoft's GEM operations.

Sakhr's Alsharh added: "What Dubai is doing is not only putting it on the world map, but the entire Arab world as well. And the efforts that went into it should be acknowledged by all world industrial leaders as a courageous step."

"I, on behalf of Sakhr and all Arab businessmen, thank the Dubai Government for taking such an adventurous step into securing a better future for the Arab world."

Sakhr has confirmed plans to have a presence in the Internet City, and its chairman — Mohammed al Alsharh — will meet Sheikh Mohammed shortly.

The Internet City announcement has also drawn favourable response from the Dubai-based Jumbo Group. The chairman, M.R. Chahab said: "We were there when Dubai announced the Shopping Festival, and have committed ourselves to the government's initiative of encouraging manufacturing. Now we will look at the Internet City and we are confident we will come up with some proposals very soon."

Meanwhile, Compaq and Microsoft have confirmed that they will be watching events in Dubai very closely before deciding about a presence in the Internet City. Incidentally, both

already have their regional operations based in Dubai. "We are reviewing the move with our contacts in the Dubai Government. We are also sharing this with Reg and other interesting news with Reg and other interesting news."

"That is all I can say at this moment in time. We will support Sheikh Mohammed."

"I really too early to say whether we will sign up for Internet City. We will have to look at all the details very closely since these are not very obvious today. Also, we already have an operation here at Jebel

The Internet City could prove extremely beneficial to development of software solutions, particularly in Arabic, say industry sources

All. But we are definitely enthused by the concept, and will provide all the support that it requires," Mohamadzadeh said.

Compaq representatives have been invited to meet Sheikh Mohammed, and the Internet City project will be one of the points which may be taken up.

IBM had a meeting scheduled with Sheikh Mohammed yesterday. However, no details were available from the company. It is also not known as of now whether IBM has evinced interest in signing up.

R&D seen vital to Dubai economy

Naiso ISI 2001 Congress gets under way; Mohammed presented with comprehensive database

By A Staff Reporter

Dubai Creating an environment conducive to research and development will likely be the next step to take Dubai further along the knowledge economy path, was the consensus of opinion at the International Naiso ISI 2001 Congress, which got underway yesterday.

The event was graced by General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Minister of Defence, and a host of other dignitaries.

Sheikh Mohammed was presented with a comprehensive research database by the organisers, Natural and Artificial Intelligence Systems Organisations (Naiso). The data, considered a leading reference for corporations planning to embark on R&D activities, may also serve as a blueprint for the Ideas Oasis, and for projects that bridge the gap between research and application.

The five-day congress has attracted 800 delegates, includ-

ing 160 from overseas, and has been hosted by the American University of Dubai, in cooperation with Dubai Internet City.

"An R&D environment needs to be created in Dubai to establish a strategic depth for the ongoing growth trajectory into the new economy," stated Dr. Milad Fares Sebaaly, chairman of IT at the university, and general chair of the congress.

He noted that Dubai's rapid progress as an active new economic hub is forcing every economic sector to implement the latest technological tools.

"Knowledge creation through innovation is the key to success and, while a country might initially need knowledge transmission and diffusion through importing tools, products and expertise, it must eventually produce tools and products itself, through R&D innovations," he declared.

Dr. Abdulla Mohammed Al Karam, DIC research unit manager, noted that the IT complex provides a focal point for innovation and creativity, and that research coupled with education

would go hand in hand, going forward.

"Any industrial-based economy requires a strong R&D focus," he noted. In the context of Dubai's drive towards a knowledge economy, he stressed that DIC's thrust would now be

The five-day Naiso congress has attracted 800 delegates, including 160 from overseas

on promoting research for Internet computing as regards software, hardware and communication engineering.

"Another of our goals is the creation of a Net-based learning system, or university, at DIC, to create a regional centre of excellence and give our youth the tools they need to face the chal-

lenges of the new economy," he stated.

The DIC will host two events during the congress, the first to examine the future of e-learning and e-education, and the second to create a consensus on the best approach to meeting the future R&D needs for local and international companies operating in the region, he added.

Earlier, Dr. Lance de Masi, president and chief academic officer at the university, observed that Dubai is committed to transforming the region from one of technological consumption to that of technological production.

"The government's economic agenda rests on making the new economy Dubai's economy, recognising that as the future draws upon us there simply won't be any other," he added.

Dr. Peter Anderson of Naiso (Natural and Artificial Intelligence Systems Organisation) stated that the congress on information science innovations, ISI 2001, would

focus on integrating the engineering, scientific and computing principles with the needs of business, industry and government, particularly in their IT needs and applications.

"We see a growing interconnectedness: the Internet and enlightened policies of openness are working together to allow this technology transfer to proceed globally," he added.

The keynote address was presented by Prof. H.J. Zimmerman, who has been one of the leading lights in the area of fuzzy logic. His focus yesterday was on intelligent methods in engineering and management, now and in future.

He also outlined the basic paradigm development and generalised set theory, with the goals, including complexity reduction, efficient determination of approximates, and eventual solutions.

The five-day congress will witness numerous seminars proceeding simultaneously, and culminates on Wednesday with a robot soccer championship tourney.

Three top firms may participate in Internet City

'I want Dubai to be the best physical location in the world for any and every virtual company,' says Sheikh Mohammed

By Eudore R Chand
Our Business Editor

Dubai At least three global computer companies are expected to announce their participation in the Dubai Internet City project over the next couple of days.

While laying down the future development path for Dubai, General Sheikh Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and UAE Minister of Defence, yesterday declared: "I want Dubai to be the best physical location in the world for any and every virtual company."

"My vision is simple. In the future, all commercial action will be in cyberspace. But the cyber world will need a ground base, on this physical world. Internet companies will need physical offices, a community, and on-the-ground technology," Sheikh Mohammed said.

Sources close to the project said representatives of several major companies like IBM, Compaq, LG and Cordiant Communications Group, will meet Sheikh Mohammed in the next couple of days, and an announcement of participation by a couple of them could be expected in the next few days.

Global marketing of the project is expected to begin today at Gitex '99, which with more than 465 local, regional and international

exhibitors representing some 1,500 companies, would form a natural platform to globally launch the latest Dubai initiative.

Other marketing plans include showcasing the project at Comdex and, later setting up venture capital firms. "The marketing policy is to be more proactive than the Jebel Ali Free Zone model. We have a list of companies that we want in, and we'll go after them," the source said.



DUBAI INTERNET CITY
The world's first free trade zone for e-business and e-commerce.

Sheikh Mohammed issued an open invitation to IT majors. "I would like to invite global internet-focused companies like IBM, Microsoft, Oracle, Sun, Cisco, Yahoo, Infosys and more to consider setting up not just regional offices, but global software development centres at Dubai Internet City."

"Dubai can offer them the ideal environment for work and provide a competitive advantage at a fraction of the cost in places like Silicon Valley," he said.

"I would also like to invite global e-commerce players like Amazon.com, eBay, eToys, eTrade, Dell etc to consider having warehousing and distribution hubs to service their customers

from the Middle East to the Subcontinent and from Africa to the CIS. Dubai is the business hub for over two billion consumers in this region," he added.

Addressing journalists and prominent businessmen and officials, Sheikh Mohammed said: "Success can only be a stepping stone for even greater achievements. As I have often said, in the race for excellence there is no finish line."

"Several decades ago, our late father Sheikh Rashid ordered the dredging of the Creek to facilitate Dubai merchants to trade by sea across the Region. I believe that Dubai Internet City will help Dubai trade globally in tomorrow's e-economy. To me, this initiative is as strategic as the Creek."

Defining the project's rationale, Sheikh Mohammed said: "The industrial economy is giving way to the information economy. In yesterday's economic world, the critical factors for success included labour, raw material and capital. But in tomorrow's world—in the world of the Internet and e-business—the critical factors will be ideas, creativity and knowledge."

"We can emerge as an economic leader in this world. We can—with the right vision and the right ideas—create a country that can compete with the most prominent economic centres of the world," Sheikh Mohammed said.



GITEX DUBAI '99 TO OPEN TODAY... Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and UAE Minister of Finance and Industry, is expected to open Gitex Dubai '99, the third largest IT exhibition in the world, today. More than 465 exhibitors representing 1,500 companies worldwide are participating in the mega event. — GN picture by Asghar Khan

Mohammed unveils new e-business entity

Says Dubai Ideas Oasis will be a community of entrepreneurs, venture capitalists and other consultants and service providers

By Manoj Nair

Dubai
A new entity, Dubai Ideas Oasis (DIO), has been launched by General Sheikh Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and UAE Defence Minister.

DIO "will be a community of entrepreneurs, venture capitalists and all the other consultants and service providers who are required to convert an idea into a successful business," said Sheikh Mohammed at the opening of Dubai Internet City (DIC).

"One year from now, I want to see at least 10 e-businesses being successfully executed out of DIO and aggregate venture capital funding of at least \$100 million.

"Dubai will become an oasis of innovation. That is my commitment to you. Our dreams are high. Let's be persistent and determined to reach our goals," added Sheikh Mohammed.

He observed that a very important part of the New Economy is innovation.

"Wealth creation happens when powerful new ideas meet smart capital. Entrepreneurs, venture capitalists and experts who can help new companies execute their ideas are the three important pillars of the New Economy. And we must have all three in Dubai," he affirmed.

The first phase of DIC was commissioned yesterday a day ahead of schedule, with 194 companies having been registered.

"The construction of the new city and its infrastructure have been completed in record time.

We expect the companies that are licensed will be able to move in shortly and begin operations," said Mohammed Al Gergawi, chairman of DIC.

Set on 420,000 square feet of land, the first phase entailed investments of over Dh700 million.

Among those to have received licences to operate are Microsoft and Oracle (both will have their dedicated buildings), Gemplus, Sakhr, MasterCard, Hewlett-Packard, Dell and IBM.

Another 350 companies have applications pending with DIC, which expects to host over 500 firms by 2002 when all project phases are completed. By that time, investments would have totalled Dh2.5 billion.

DIC offers 100 per cent ownership, 50-year renewable land lease and blanket exemption on taxes, capital consultancy support for dotcom entrepreneurs and protection of intellectual property rights.

The facility will feature an Internet university, a world first, a research and development centre, and a science and technology park.

"DIC has capitalised on the explosive growth of the Internet which is fuelling the rapid diffusion of e-commerce all over the world and in all sections of business, trade and industry," said Ahmed Abdullah Binbayat, chief executive of DIC.

Announcements regarding the Dubai Media City are expected to be made shortly.

The opening of DIC coincides with the first day of Gitex, now into its 20th year.



General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Defence Minister, watching the presentation of Dubai Internet City. He is accompanied by Sheikh Ahmed bin Saeed Al Maktoum, President of Dubai Department of Civil Aviation and Chairman of Emirates airline; Sheikh Hasher Maktoum, Dubai Director of Information, and invited guests.

"If you do not have a strategy for the Web, your business is done for," was the pervading sentiment at the exhibition, which opened in the morning.

There was also genuine concern that small and medium businesses, and even some bigger entities may not be clued in to the potential, and threats, that e-commerce provides.

"Nobody has any choice — you just cannot be outside the New Economy. The governments have understood the importance, with Dubai, Jordan, Egypt, Bahrain and Saudi Arabia having major initiatives," said Gilbert Lacroix, regional general manager at Intel.

Another area which will see some major developments in com-

ing years is Arabic language capabilities over the Internet. This process has received a timely boost with Sakhr Software launching its Internet portal, Ajeeb.com, headquartered in Dubai, on Friday.

"There's huge potential in offering Web-based services to about 300 million Arabs," observed Fahad Al Sharekh, chief executive of Ajeeb.com Inc.

As for the exhibition itself, another record turnout is expected this year. Over 72,000 attended Gitex 1999, which featured 465 exhibitors and 1,500 companies.

Gitex 2000 features 10 national pavilions, with France making a first time appearance. Arab states represent 20 per cent of the 32 participating countries.

See also page 31

Dubai aims to become a hub for commodities

A TEA TRADING CENTRE AND AN INTERNATIONAL BULLION EXCHANGE WILL FOLLOW THE MARKETPLACE FOR DIAMONDS

By C.L. Jose
Staff Reporter

Dubai The Dubai Metals and Commodities Centre (DMCC) has already issued 130 licences. Demand for membership remains strong, as more applicants knock on its doors for admission. Its first product, the Dubai Commodities Receipt (DCR), is already in the market.

Another achievement is the establishment of the Dubai Diamond Exchange, with efforts at an advanced stage to establish a commodities exchange, a tea trading centre and, now, an international bullion exchange.

As Tawfiq Abdullah might well say: "Not bad, for what was essentially just a concept as recently as two years ago."

The DMCC chief executive officer can justifiably be proud of what the centre has achieved since it was created in 2002 as a strategic goal of the Dubai Government to establish a commodity marketplace.

But what he actually continues to say is: "We want to see Dubai evolving as an important trading hub for diamond, gold, metals, agricultural crops, etc. And we are putting in all efforts to create world-class infrastructure by offering a marketing support to the whole range of commodities."

Launched by General Shaikh Mohammad Bin



Golden landmark
The AU Tower will be offered to gold and precious metals market participants on an optional freehold or lease basis. The tower, to be completed by early 2006, will be 35 floors high.

Rashid Al Maktoum, Crown Prince of Dubai and UAE Defence Minister, the DMCC cluster is ready to take off.

About two months ago, it

launched its first product, the DCR, a strong trading instrument aimed at extending liquidity and security to traders. And within a month of its launch, the

first two deals were executed in sugar with the participation of two member banks - Dubai Islamic Bank and Standard Chartered Bank.

ROLE

An innovator and regulator

• The DMCC is committed in its role as innovator and regulator to serve the needs of participants in the gold, diamonds and commodities markets.

• It provides the market infrastructure that brings together a wide range of commodities activities, and resident companies of DMCC are offered attractive benefits under a free-zone status.

• Alongside a 50-year guaranteed tax holiday, 100 per cent business ownership and a secure regulated environment, DMCC is the only UAE centre to offer full ownership of business premises.

• The centre aims to attract important players throughout the entire value chain of each of these industry sectors, together with relevant support industries.

• The 300-hectare DMCC development is located at a prime site in the heart of the new developments in Dubai including the Jumeirah Lakes, Palm Island and the Dubai Marina. The development will include purpose-built facilities from commercial towers housing trading operations and trading platforms to a manufacturing complex.



The other important initiative, Dubai Diamond Exchange, has already been admitted to the World Federations of Diamond Bourses, as its 25th member - the first from the region to do so.

Moving forward, Abdullah has more dreams to be fulfilled at the DMCC. The diamond exchange has gone a long way and has 52 members registered on it. "More than 65 applications are being processed," he said.

Moves are also on to replicate exchange platforms for other commodities. David Rutledge, executive director of DMCC's commodities division, said

DMCC has already signed a memorandum of understanding with Dubai International Financial Centre (DIFC) on areas of cooperation in the future.

"Since DIFC has plans to create market platform for trading in commodities

and derivatives of commodities apart from securities and derivatives of securities, we feel there exist areas of cooperation on this front," Rutledge said. He said, however, a broader understanding is yet to be reached on this.

Ambitious move

In its ambitious move to promote commodities trade in the region and transform Dubai into a trading hub, DMCC has also announced plans to create Dubai Tea Trading Centre to boost regional trade in tea.

Rutledge said all soft and agricultural commodities will be allowed to be stored in the warehousing facilities within the DMCC so that DCRs can be issued against these commodities.

Tawfiq's future plans for DMCC include development of a diamond cutting industry, alongside the gold jewellery manufacturing industry.

Dubai imports approximately \$1.2 billion (Dh4.4 billion) worth of rough dia-

monds every year. "With the duty on rough diamonds being lifted, the industry will get a much-needed push in the future," Abdullah added.

He said out of four gold manufacturing refineries which form the part of DMCC, two have gone operational, and the other two will go on stream soon.

The gold jewellery manufacturing facility has also made good progress, with 360 units having been sold. Manufacturing licences also entitle the holders to carry out refining and minting. These units, measuring 50 square metres, are sold at approximately Dh220,000 per unit.

Interestingly, Abdullah has one message to convey to all the licence aspirants: "Don't mistake DMCC to a real-estate project. You need to have a good project which you have to convince the authorities and afterwards the prospective licensee will have to open an office within DMCC, before he can take the project forward."

PUBLIC NOTICE

Nakheel Co. LLC

In reference to your public notice in The Gulf News dated Thursday 21st, October 2004, Rockford Real Estate apologises for any inconvenience caused.

This misunderstanding was due to a communication error of a newly appointed employee in the administrative department, who

Dubai Gold and Commodities Exchange finalises structure

New bourse invites expressions of interest for membership

Staff Report

Dubai Dubai's new electronic exchange, Dubai Gold and Commodities Exchange, has finalised its membership structure.

DGCX is now calling for expressions of interest (EoI) from interested commodities traders and brokers.

The exchange, which is scheduled to be fully operational by the second half of this year, has already received strong interest from the market, particularly the local gold trade, since the initial joint venture announcement just two months ago.

DGCX is a joint venture between the Dubai Metals and Commodities Centre (DMCC), Multi Commodity Exchange of India

(MCX) and Financial Technologies India Ltd (FTIL).

"The market's enthusiastic reception, which exceeded our projections, proves that Dubai is poised to become a major market player, both regionally and on the international commodities trading map," said Ahmad Bin Sulayem, chief operating officer of DMCC.

Categories

"DGCX will provide an advanced electronic infrastructure and an organised and monitored environment, where contracts in precious metals, energy, steel, freight and cotton can be initiated and executed."

The DMCC official said the membership structure

for DGCX is divided into two categories: general and market membership. Membership in both categories will be limited, and members will face stringent application requirements.

Jignesh Shah, MCX managing director, and chairman and managing director of FTIL, said general members can trade on any of the DGCX's markets as a principal or on behalf of clients, whereas market members can only trade on those DGCX markets as defined in their membership class, for example, in precious metals, energy and so on.

Market members can only trade on their own behalf, and not for their clients. Further modalities are being fine-tuned, and regulatory discussions are continuing.



From left: Tawfique Abdullah, CEO of the Dubai Metals and Commodities Centre, Anis Al Jallaf, chairman of the Dubai International Financial Centre, Andre Bisang, chairman of the Organising Committee, 'City of Gold – A Vision for the Future,' Mohammed Al Gergawi, chairman of the Dubai Development and Investment Authority, Tawhid Abdullah, chairman of the Dubai Gold and Jewellery Group, and others listen to a speaker during the conference in Dubai. — GN picture by Joseph J. Capellan

Gergawi sees new breed of entrepreneurs

Plans to make gold, jewellery trade in Dubai professional

By A Staff Reporter

Dubai The Gold and Jewellery Group — the umbrella body for over 450 jewellery outlets in Dubai — is chalking out plans to make the gold and jewellery business more professional and customer focused.

Addressing the 300 delegates at the 'City of Gold — A Vision For the Future' conference yesterday, the group's chairman, Tawhid Abdullah, outlined his vision of creating world-class standards for the industry in Dubai.

"The gold and jewellery business in Dubai will ensure it matches the same quality standards being implemented by the Government of Dubai and the vision of General Sheikh

Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and UAE Minister of Defence," said Tawhid.

Addressing delegates, Anis Al Jallaf, who heads the Dubai International Financial Centre (DIFC) and Emirates Bank Group (EBG), said Dubai will play a leading role in bridging East and West.

"Gold has been traded here traditionally and with the overall progress, Dubai has been making in the information age, the emirate is set to become a trading hub for gold, especially catering to the needs of the neighbouring countries like India, Pakistan, etc," said Al Jallaf.

Mohammed Al Gergawi, chairman, Dubai Development and Investment Authority (DDIA), said Dubai is now

thinking not only in terms of trading, but also manufacturing and refining of gold.

"By 2010, Dubai will see a new and young entrepreneurship emerging and establishing itself on Dubai's growth chart," added Gergawi.

The conference was attended by senior representatives from the Government of Dubai, international and regional industry experts, senior banking officials and major institutions.

Tawhid, who emphasised the need for the gold and jewellery group to adopt the best international standards of quality and the importance that a unified trade in a small country like the UAE can play in the delivery of world-class standards, said that manufacturing is one area where Dubai has massive untapped

potential.

"As industry, we must recognise where our strengths lie. And these strengths lie in the creation of specialised jewellery tailored at the Arab and Asian markets. We will aim to complement and not compete with the world's manufacturing giants," he added.

He said that the gold and jewellery industry has set an annual growth target of 10 per cent over the next five years.

Tawhid also outlined his commitment to enhancing the skills base of people working in the industry from manufacturing, wholesale and retail, utilising the skills of established international bodies such as the International Gemological Institute and the Antwerp High Diamond Council.

Appendix C | Survey Form

DMCC Community Innovation Survey

The purpose of this survey is to collect information about company innovation in the DMCC Free Zone for the three years 2019 - 2021. We are equally interested in firms engaged in innovation activities as well as ones that are not, so please take a moment to include your business in this important report. All individually identifying information will be kept confidential.

This survey is based on the internationally recognized Community Innovation Survey, used in over 50 countries around the world over the last three decades providing important data on business innovation across countries.

Your responses will be used in the following ways:

- Improving the DMCC's offerings to support your innovation activities
- Publicly reporting on the state of innovation in the DMCC, comparing our community's results to other countries in the world
- Sharing highlighted case studies of local innovations (you will have the opportunity to opt in to be contacted about participation)
- Contribute to the research of innovation in the region, as participants in the first innovation survey of this type in the Arab world

Thank you in advance for your participation!

Definition of Innovation

- Innovation, for the purpose of this survey, is defined as new or significantly improved **goods or services as well as processes** used to produce or supply all goods or services that the business has introduced, regardless of their origin. These innovations may be **new to the business** or **new to the market**.
- Investments for future innovation and changes that the business has introduced at a strategic level (in organization and practices) are also covered.

Basis for Completion

- Please complete this questionnaire for the business named above for the period **1 January 2019 to 31 December 2021**. If information is not available for calendar years, your responses may cover the nearest financial years.
- If this business is part of an enterprise group, **please answer all questions for this business in the DMCC only**. Do not include results for subsidiaries or parent enterprises.
- You can provide informed estimates if actual figures aren't available.
- We will treat your data securely and confidentially.

1 Company identification

Company Name	
Address	
DMCC License Number	

If your business is part of an enterprise group (e.g., subsidiary or branch):

- Please answer all further questions about your business only for its own activities in the United Arab Emirates
- Exclude the activities of all subsidiaries or parent entities

2 Product Innovation (Goods & Services)

2.1 During the three years 2019 to 2021, did your business introduce any:

Select all that apply

New or significantly improved goods?

Include: all new significantly improved goods (for example, improvement in quality or distinct user benefits). Goods innovations are new to the business, even if they are not new to the market, all product innovations, regardless of their origin

Exclude: the simple resale of goods purchased from other businesses and changes of a solely aesthetic nature

New or significantly improved services?

Include: all significantly improved services (for example, improvement in quality or distinct user benefits) and all services innovations, regardless of their origin

If neither is selected, go to question 2.6

Otherwise go to question 2.2

2.2 Who was primarily responsible for developing these new or significantly improved goods or services?

Note: "Other businesses" include independent companies plus other parts of your enterprise group (subsidiaries, sister businesses, head office, etc.). "Organizations" include universities, research institutes, non-profits, etc.

Select all that apply

Your business by itself

Your business together with other businesses or organizations

Your business by adapting or modifying products originally developed by other businesses or organizations

Other businesses or organizations

2.3 During the 3-year period 2019 to 2021 were any of your goods and services innovations:

Select all that apply

New to your market?

Your company introduced a new or significantly improved good or service onto your market before your competitors (it may have already been available in other markets)

Only new to your business?

Your business introduced new or significantly improved goods or services that were essentially the same as a good or service already available from competitors.

2.4 What was the estimated percentage of your business's total revenues in 2021 from goods and services for each of the following definitions?

Enter 100% in the 'Unchanged or only marginally modified' answer field if your business did not introduce any new or significantly improved goods or services. Estimates are acceptable and percentages (a+b+c) must total 100%.

a. Goods and services new to the market in 2019-2021

_____ %

b. Goods and services only new to this business in 2019-2021

_____ %

c. Goods and services that remain unchanged or only marginally modified

_____ %

3 Process Innovation

3.1 During the three years 2019 to 2021, did your business introduce any of the following types of new or improved processes that differ significantly from your previous processes?

- | | Select all that apply |
|--|--------------------------|
| Methods for producing goods or providing services (including methods for developing goods or services) | <input type="checkbox"/> |
| Logistics, delivery or distribution methods | <input type="checkbox"/> |
| Methods for information processing or communication | <input type="checkbox"/> |
| Methods for accounting or other administrative operations | <input type="checkbox"/> |
| Business practices for organising procedures or external relations | <input type="checkbox"/> |
| Methods of organising work responsibility, decision making or human resource management | <input type="checkbox"/> |
| Marketing methods for promotion, packaging, pricing, product placement or after sales services | <input type="checkbox"/> |
| None of the above | <input type="checkbox"/> |

If "None of the above" is selected, go to 4.1
Otherwise go to next question

3.2 Who was primarily responsible for developing these processes?

Include independent enterprises plus other parts of your enterprise group (subsidiaries, sister enterprises, head office, etc.). Organizations include universities, research institutes, non-profits, etc.

- | | Select all that apply |
|--|--------------------------|
| Your business by itself | <input type="checkbox"/> |
| Your business together with other businesses or organizations | <input type="checkbox"/> |
| Your business by adapting or modifying products originally developed by other businesses or organizations | <input type="checkbox"/> |
| Other businesses or organizations | <input type="checkbox"/> |

4 Constraints

4.1 During the 3-year period 2019 to 2021 did this business have any innovation activities that were abandoned, scaled back or ongoing?

Select all that apply

- Innovation activities were abandoned
- Innovation activities were scaled back
- innovation activities were still ongoing at the end of 2021

4.2 During the 3-year period 2019 to 2021 how important were following factors in constraining innovation activities?

Select one box per row

	Degree of importance			
	High	Medium	Low	Not a constraint
Lack of internal finance for innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of credit or private equity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulties in obtaining public grants or subsidies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Costs too high	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of skilled employees within your business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of collaboration partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of access to external knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Uncertain market demand for your ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too much competition in your market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Different priorities within your business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Issues related to the coronavirus (COVID-19) pandemic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5 Expenditures

5.1 During the three years 2019 to 2021, did your business engage in the following activities for the purposes of current or future innovation?

Select all that apply

a) Internal Research and Development

This refers to creative and systematic work undertaken within your business that increase stock of knowledge, and in order to devise new applications of available knowledge for developing new and improved goods or services and processes. R&D activity must have elements of all these five criteria: novel, creative, uncertain, systematic, transferable or reproducible.

b) Acquisition of Research and Development

Include: creative work undertaken by companies, including other businesses within your group, or by public or private research organisations and purchased by your business

c) Acquisition of machinery and equipment, computer hardware and software for innovation

Machinery and equipment

Major (i.e., capitalized) machinery and equipment acquired for use in the performance of innovation by the business

Computer hardware

For example, computer monitors and terminals, printers, keyboards and computer projectors, servers

Computer software

For example, program descriptions, extensions or supporting materials for systems and applications

d) Acquisition of existing knowledge

Include: purchase or licensing of patents and non-patented inventions, know-how and other types of knowledge from other businesses or organisations

e) Training for innovative activities

Include: internal or external training for your personnel, specifically for the development or implementation of new or improved goods, services and processes

f) Any form of design activity

This refers to the design of goods or services (including artistic design) to develop a new or modified form, appearance or function for goods or services. Include engagement in design activities including strategic, for the development or implementation of new or improved goods, services and processes

g) Market introduction of innovations

This refers to internal or external work intended to enhance reputation or brand values, either of the business as a whole or individual goods or service lines, as well as to support the market placement of new goods and services. Include changes to product or service design, market research, changes to marketing methods, advertising for a product or service launch

Changes to product or service design

Market research

Changes to marketing methods

Launch advertising

If (a) is selected, go to question 5.2
Otherwise go to question 5.3

5.2 In which of the following years did your business invest in "Internal Research and Development"?

Select all that apply

2019

2020

2021

5.3 How much did your business spend on each of the main innovation related investments above in the calendar year 2021?

Expenditures on innovation and R&D in 2021

Please estimate if you lack precise accounting data

a) Internal Research and Development	AED _____	<input type="checkbox"/> none
b) Acquisition of Research and Development	AED _____	<input type="checkbox"/> none
c) Acquisition of machinery, equipment and software	AED _____	<input type="checkbox"/> none
d) Acquisition of existing knowledge	AED _____	<input type="checkbox"/> none
e) Training for innovative activities	AED _____	<input type="checkbox"/> none
f) All forms of design activity	AED _____	<input type="checkbox"/> none
g) Market introduction of innovations	AED _____	<input type="checkbox"/> none

5.4 During the three years from 2019 to 2021, did your enterprise try to obtain the following types of funding to use, partially or in full, towards R&D or other innovation activities?

	<i>Yes, successfully obtained some funding of this type</i>	<i>Tried, but not successfully</i>	<i>No</i>
Equity finance Finance provided in exchange for a share in the ownership of the business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debt finance Finance that the business must repay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6 Cooperation

6.1 During the three years 2019 to 2021, did your business cooperate with other businesses or organizations:

	Yes	No
on R&D?	<input type="checkbox"/>	<input type="checkbox"/>
on other innovation activities (excluding R&D)?	<input type="checkbox"/>	<input type="checkbox"/>
on any other business activities?	<input type="checkbox"/>	<input type="checkbox"/>

If 'yes' to either option a) or b), go to question 6.2
Otherwise go to question 7.1

6.2 Please indicate the type of innovation cooperation partner(s) your business has worked with in the years 2019-2021, by location:

Select all that apply

Type of co-operation partner	Within DMCC Community	UAE	MENA Region	All other countries
Private businesses outside your enterprise group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consultants, commercial labs, or private research institutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suppliers of equipment, materials, components or software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses that are your clients or customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses that are your competitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses within your enterprise group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Universities or other higher education institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government or public research institutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clients or customers from the public sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-profit organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.3 How many partners did you interact with for innovation activities (e.g., research, training, co-development, etc.) in the years 2019-2021 across the geographies below?

Geography	0	1	2-3	4-5	6+
Within DMCC Community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UAE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MENA Region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All other countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.4 On a scale 1-10, to what extent has being part of the DMCC community supported your innovation activities?

SCALE 1-10

7 COVID-19 Impact

7.1 Did your business introduce any innovations specifically in response to the Covid-19 pandemic?

Yes

No

If yes, proceed to 7.2. Otherwise skip to 7.4

7.2 Were these innovations:

Select all that apply

Product (goods or services) innovations

Business Process innovations

New to your market

New to your business

7.3 Do you expect to continue any of these innovations post pandemic?

Yes

No

7.4 Did your business abandon or suspend any planned/ongoing innovation activities due to the Covid-19 pandemic?

Yes

No

8 Non-Innovators

8.1 If your business had no innovation activity during 2019 to 2021, please indicate why it has not been necessary or possible to innovate:

Select all that apply

No need due to previous innovations

No need due to market conditions

Factors constraining innovation

Other

9 General Information

9.1 What your business's estimated number of employees for the calendar years 2019 and 2021?

2019

2021

9.2 What was the approximate proportion of employees who held a degree or higher qualification for the calendar year 2021?

_____ % Bachelor's (BA/BSc) _____ % Master's (MA) _____ % Doctorate (PhD)

9.3 What was your business' total revenue in 2019 and 2021?

2019

2021

9.4 In which year was your business established?

9.5 Please provide any additional information that will help us understand the answers you have provided.

9.6 Would you be willing to be contacted by the DMCC or its partners to further discuss your business' innovation activities? Selected companies will be offered the opportunity to be featured in public case studies highlighting their local innovations.

Please provide details of the person we should contact if we have any queries regarding the information returned on this survey.

Name _____

Position _____

Phone Number _____

Email _____

Appendix D | Survey Results

Combined view for all innovation activity: Goods, Services and Process

86 companies have had at least one innovation activity between 2019-2021 (82% of all companies)

Out of which:

- 9 companies have introduced an innovation in ALL three categories of processes, services and goods (10% of the 86)
- 13 companies have introduced an innovation in processes and goods but not services (15% of the 86)
- 31 companies have introduced an innovation in processes and services but not goods (36% of the 86)

Companies with new goods or services innovations between 2019-2021

55% total (57)

Category of innovation

77% of them introduced new services (44)

39% of them introduced new goods (22)

Primarily responsible for new services or goods (out of the 55%)

56% business itself (32)

44% business + other biz or org (25)

19% business by adapting products from other biz (11)

5% other biz (3)

95% business was involved in a way or another (54)

63% New to market (36)

47% New to business (27)

11% Both (6)

Average revenue in 2021

26% Goods and services new to the market in 2019-2021

23% Goods and services only new to this business in 2019-2021

55% Goods and services that remain unchanged or only marginally modified

Companies with new process innovations between 2019-2021

77% of the total respondents had process innovation (81)

Type of new processes

35% Methods for producing goods or providing services (including methods for developing goods or services) (37)

25% Logistics, delivery or distribution methods (26)

44% Methods for information processing or communication (46)

29% Methods for accounting or other administrative operations (30)

37% Business practices for organising procedures or external relations (39)

38% Methods of organising work responsibility, decision making or human resource management (40)

23% Marketing methods for promotion, packaging, pricing, product placement or after sales services (24)

Primarily responsible for new services or goods (out of the 77%)

45% business itself (47)

33% business + other biz or org (35)

13% business by adapting products from other biz (14)

6% other biz (6)

94% business was involved in a way or another (75)

Innovation activity between 2019-2021

10% Innovation activities were abandoned (11)

15% Innovation activities were scaled back (16)

74% Innovation activities were still ongoing at the end of 2021 (78)

Activities engaged for innovation

82% total (86)

Out of the 82%:

53% Internal R&D (46)

18% Acquisition of R&D (16)

15% Acquisition of machinery and equipment (13)
42% Acquisition of computer hardware (36)
45% Acquisition of computer software (39)
41% Training activity (35)
24% Design activity (21)
42% Market Intro (36)
28% Change to product (24)
45% Market research (39)
36% Marketing change (31)
16% Launch Ads (14)

Investment in R&D

26% invested in 2019 (27)
27% invested in 2020 (28)
44% invested in 2021 (46)

11% invested in the three years 2019, 2020 and 2021 (12)

22% invested in two years only (23)

19% invested in both 2020 and 2021(20)

3% invested in both 2019 and 2021 (3)

*every company that invested in 2019 and 2020 ended up investing in 2021 as well

Investment spend in 2021

Total: AED 25.6m

43% Internal R&D (11M – avg. 333K)

2% Acquisition of R&D (623K – avg. 48K)

31% Acquisition of machinery (7.9M – avg. 203K)

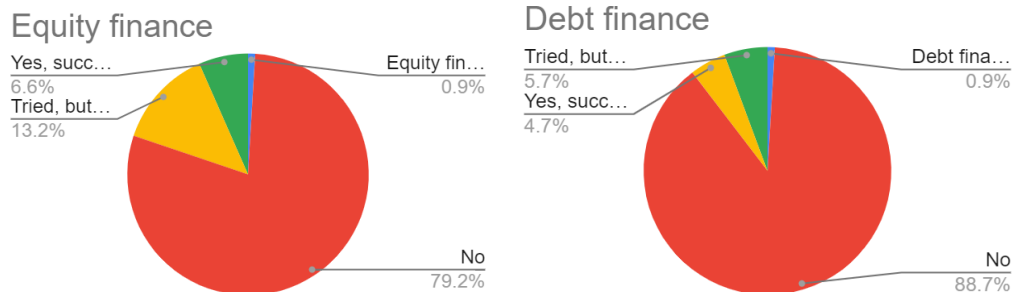
3% Acquisition of existing knowledge (791K – avg. 61K)

5% Training activities (1.2M – avg. 48K)

9% Design activity (2.4M – avg. 118K)

7% Market intro (1.7M – avg. 72K)

During the three years from 2019 to 2021, did your enterprise try to obtain the following types of funding to use, partially or in full, towards R&D or other innovation activities?



Co-operation with other businesses or organizations for innovation

39% Yes (41)

61% No (64)

Type of innovation cooperation partner (location)

85% Private businesses outside your enterprise group (89)

67% Consultants, commercial labs, or private research institutes (70)

74% Suppliers of equipment, materials, components or software (78)

83% Businesses that are your clients or customers (87)

59% Businesses that are your competitors (62)

60% Other businesses (63)

66% Businesses within your enterprise group (69)

53% Universities or other higher education institutions (56)

52% Government or public research institutes (55)

54% Clients or customers from the public sector (57)

51% Non-profit organizations (54)

On a scale 1-100, to what extent has being part of the DMCC community supported your innovation activities?

Average: 35

Median: 25

Innovation during pandemic

44% Total of yes (46)

Type of innovation

46% Product (21)

63% Process (29)

11% New to market (5)

33% New to business (15)

Continued post-pandemic?

91% Yes (42)

9% No (4)

Did your business abandon or suspend any planned/ongoing innovation activities due to the pandemic?

27% Yes (28)

75% No (79)

If your business had no innovation activity during 2019 to 2021, please indicate why it has not been necessary or possible to innovate.

5% No need due to previous innovation (6)

8% No need due to market conditions (10)

9% Factors constraining (11)

13% Other (16)

70% Doesn't apply (84)

Number of employees

2019:

Average 19

Median 10

Total 1611

2021:

Average 23 (13% increase)

Median 11 (10% increase)

Total 2056 (28% increase)

Qualification:

Bachelor's - Average per company 53%

Master's - Average per company 19%

Doctorate - Average per company 5%

Business revenue

2019:

Total: AED 3.1bn

Average: AED 54m

2021:

Total: AED 4.5bn (47% increase)

Average: AED 73m (34% increase)

Appendix E | Sample Interview Questions

Although each interview conducted was unique owing to the informal, semi-structured nature of the discussions, I used the following list of questions across the 25 interviewees as a baseline for consistency of data collection:

- 1) Please tell me about your background leading you to this role at the organization being studied. What roles and responsibilities did you have during your tenure here?
- 2) How were you personally involved in the innovation activities of the organization?
- 3) What role did the organization itself play in fostering an innovation ecosystem in Dubai?
- 4) What were the limiting factors that impacted the organization's ability to innovate?
- 5) What role did the relationship with the government play in enabling innovation? What gaps did you notice? What could the government have done to improve?
- 6) What role did the relationship with industry play in enabling innovation? What gaps did you notice? What could the broader industry have done to improve innovation outcomes?
- 7) What role did research and development as well as specialized talent play in facilitating innovation? What gaps did you notice? What could have universities done to improve this dimension?
- 8) What are some examples of innovations that the entity brought to market?
- 9) What makes Dubai a unique innovation ecosystem?
- 10) Are there any other topics that I did not ask about relating to innovation and the research at hand which you would like to share?








Appendix F | Global Innovation Index Ranking

GII 2022 rank

United Arab Emirates

31

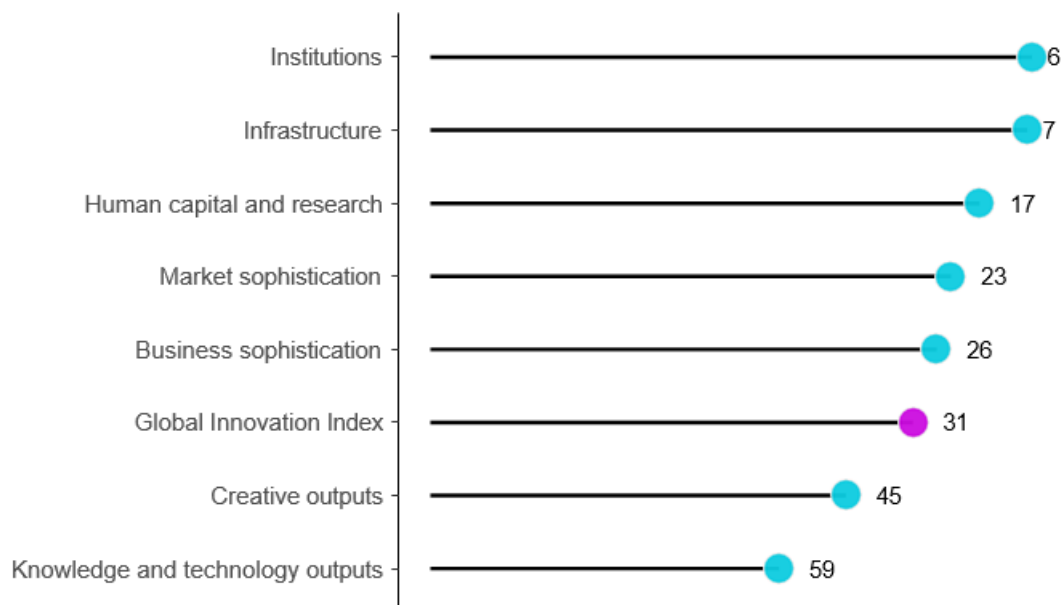
Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
52	18	High	NAWA	10.0	699.4	74,245

		Score/Value	Rank			Score/Value	Rank
	Institutions	83.5	6 ●◆		Business sophistication	48.2	26
1.1	Political environment	75.5	33	5.1	Knowledge workers	50.2	29
1.1.1	Political and operational stability*	72.7	46	5.1.1	Knowledge-intensive employment, %	⊙ 41.7	27
1.1.2	Government effectiveness*	78.3	22	5.1.2	Firms offering formal training, %	n/a	n/a
1.2	Regulatory environment	85.5	18	5.1.3	GERD performed by business, % GDP	⊙ 0.8	31
1.2.1	Regulatory quality*	72.0	30	5.1.4	GERD financed by business, %	⊙ 74.3	5 ●◆◆
1.2.2	Rule of law*	69.9	34	5.1.5	Females employed w/advanced degrees, %	⊙ 8.6	80 ○◆
1.2.3	Cost of redundancy dismissal	8.0	1 ●◆◆	5.2	Innovation linkages	47.8	19
1.3	Business environment	89.4	1 ●◆◆	5.2.1	University-industry R&D collaboration ¹	63.1	17
1.3.1	Policies for doing business ¹	78.8	6 ●◆◆	5.2.2	State of cluster development and depth ¹	69.9	5 ●◆◆
1.3.2	Entrepreneurship policies and culture*	100.0	1 ●◆◆	5.2.3	GERD financed by abroad, % GDP	n/a	n/a
				5.2.4	Joint venture/strategic alliance deals/bn PPP\$ GDP	0.2	14
				5.2.5	Patent families/bn PPP\$ GDP	0.1	57
	Human capital and research	55.8	17	5.3	Knowledge absorption	46.6	22
2.1	Education	54.8	57	5.3.1	Intellectual property payments, % total trade	0.7	56
2.1.1	Expenditure on education, % GDP	3.9	84 ○	5.3.2	High-tech imports, % total trade	13.9	17
2.1.2	Government funding/pupil, secondary, % GDP/cap	26.6	17	5.3.3	ICT services imports, % total trade	1.4	66
2.1.3	School life expectancy, years	15.7	42	5.3.4	FDI net inflows, % GDP	4.1	24
2.1.4	PISA scales in reading, maths and science	433.5	47 ○	5.3.5	Research talent, % in businesses	⊙ 77.9	2 ●◆◆
2.1.5	Pupil-teacher ratio, secondary	9.6	25				
2.2	Tertiary education	71.5	1 ●◆◆		Knowledge and technology outputs	23.3	59 ○
2.2.1	Tertiary enrolment, % gross	53.7	60	6.1	Knowledge creation	6.2	97 ○◆
2.2.2	Graduates in science and engineering, %	33.1	13 ●◆◆	6.1.1	Patents by origin/bn PPP\$ GDP	0.1	113 ○
2.2.3	Tertiary inbound mobility, %	73.0	1 ●◆◆	6.1.2	PCT patents by origin/bn PPP\$ GDP	0.2	55
2.3	Research and development (R&D)	41.2	25	6.1.3	Utility models by origin/bn PPP\$ GDP	0.0	76 ○◆
2.3.1	Researchers, FTE/mn pop.	2,442.5	34	6.1.4	Scientific and technical articles/bn PPP\$ GDP	10.0	88 ○◆
2.3.2	Gross expenditure on R&D, % GDP	1.4	28	6.1.5	Citable documents H-index	13.2	59
2.3.3	Global corporate R&D investors, top 3, mn USD	59.6	23	6.2	Knowledge impact	27.1	67
2.3.4	QS university ranking, top 3*	36.8	33	6.2.1	Labor productivity growth, %	0.7	71 ○
				6.2.2	New businesses/th pop. 15-64	2.3	53
	Infrastructure	63.2	7 ●◆	6.2.3	Software spending, % GDP	0.3	44
3.1	Information and communication technologies (ICTs)	90.2	13	6.2.4	ISO 9001 quality certificates/bn PPP\$ GDP	5.8	49
3.1.1	ICT access*	98.2	3 ●◆◆	6.2.5	High-tech manufacturing, %	26.4	47
3.1.2	ICT use*	78.7	25	6.3	Knowledge diffusion	36.4	40
3.1.3	Government's online service*	90.0	15	6.3.1	Intellectual property receipts, % total trade	1.0	21
3.1.4	E-participation*	94.0	16	6.3.2	Production and export complexity	31.4	80 ○◆
3.2	General infrastructure	64.6	4 ●◆◆	6.3.3	High-tech exports, % total trade	10.9	16
3.2.1	Electricity output, GWh/mn pop.	⊙ 14,170.9	8 ●◆◆	6.3.4	ICT services exports, % total trade	2.6	51
3.2.2	Logistics performance*	88.8	11 ●◆◆				
3.2.3	Gross capital formation, % GDP	25.4	52		Creative outputs	26.4	45
3.3	Ecological sustainability	34.8	42	7.1	Intangible assets	33.5	54
3.3.1	GDP/unit of energy use	12.4	43	7.1.1	Intangible asset intensity, top 15, %	63.9	34
3.3.2	Environmental performance*	52.4	34	7.1.2	Trademarks by origin/bn PPP\$ GDP	9.7	110 ○◆
3.3.3	ISO 14001 environmental certificates/bn PPP\$ GDP	3.0	29	7.1.3	Global brand value, top 5,000, % GDP	131.5	12
				7.1.4	Industrial designs by origin/bn PPP\$ GDP	0.1	115 ○◆
	Market sophistication	46.4	23	7.2	Creative goods and services	30.3	30
4.1	Credit	40.8	27	7.2.1	Cultural and creative services exports, % total trade	n/a	n/a
4.1.1	Finance for startups and scaleups*	48.9	16	7.2.2	National feature films/mn pop. 15-69	0.8	63 ○◆
4.1.2	Domestic credit to private sector, % GDP	88.4	34	7.2.3	Entertainment and media market/th pop. 15-69	23.3	26
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	7.2.4	Printing and other media, % manufacturing	1.3	31
4.2	Investment	35.8	20	7.2.5	Creative goods exports, % total trade	5.2	11 ●◆◆
4.2.1	Market capitalization, % GDP	65.4	28	7.3	Online creativity	8.4	50 ○
4.2.2	Venture capital investors, deals/bn PPP\$ GDP	0.2	19	7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	11.2	38
4.2.3	Venture capital recipients, deals/bn PPP\$ GDP	0.1	18	7.3.2	Country-code TLDs/th pop. 15-69	7.5	44
4.2.4	Venture capital received, value, % GDP	0.0	11	7.3.3	GitHub commit pushes received/mn pop. 15-69	5.1	57 ○
4.3	Trade, diversification, and market scale	62.5	41	7.3.4	Mobile app creation/bn PPP\$ GDP	9.8	41
4.3.1	Applied tariff rate, weighted avg., %	3.3	75				
4.3.2	Domestic industry diversification	93.2	32				
4.3.3	Domestic market scale, bn PPP\$	699.4	33				

NOTES: ● Indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; ¹ a survey question. ⊙ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at https://www.wipo.int/global_innovation_index/en/2022. Square brackets [] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Strengths		Weaknesses	
Code Indicator name	Rank	Code Indicator name	Rank
1.2.3 Cost of redundancy dismissal	1	2.1.1 Expenditure on education, % GDP	84
1.3.1 Policies for doing business	6	5.1.5 Females employed w/advanced degrees, %	80
1.3.2 Entrepreneurship policies and culture	1	6.1.1 Patents by origin/bn PPP\$ GDP	113
2.2.3 Tertiary inbound mobility, %	1	6.1.3 Utility models by origin/bn PPP\$ GDP	76
3.1.1 ICT access	3	6.1.4 Scientific and technical articles/bn PPP\$ GDP	88
3.2.1 Electricity output, GWh/mn pop.	8	6.2.1 Labor productivity growth, %	71
3.2.2 Logistics performance	11	6.3.2 Production and export complexity	80
5.1.4 GERD financed by business, %	5	7.1.2 Trademarks by origin/bn PPP\$ GDP	110
5.2.2 State of cluster development and depth	5	7.1.4 Industrial designs by origin/bn PPP\$ GDP	115
5.3.5 Research talent, % in businesses	2	7.2.2 National feature films/mn pop. 15–69	63
7.2.5 Creative goods exports, % total trade	11		

The seven GII pillar ranks for the United Arab Emirates



Note: The highest possible ranking in each pillar is 1.