



Mohammed Bin Rashid School Of Government

POLICY BRIEF

Policy Brief No. 60

January 2022

Summary

Innovation is playing an ever-greater role in the economic trajectories of nations. The post COVID-19 era suggests that the pace of recovery of an economy and its resilience to external shocks are contingent on the strength of its innovation ecosystem, of which 'clusters' are an essential element. This policy brief provides an overview of the specificities of successful clusters and the many roles they play in fostering innovation on a national level. It highlights the ways in which robust cluster systems have helped minimize the impact of the pandemic on innovation stakeholders. Finally, based on extensive primary research, this brief concludes with policy recommendations towards a clusters approach to innovation that could advance economic value generation in the UAE.

Clusters as Drivers of the Innovation Ecosystem: Policy directions for re-designing clusters in the UAE

Salma Refass with Fadi Salem

Introduction

Investing in innovation leads to economic growth and prosperity¹. It is through innovation that businesses find ways to generate more value from existing resources. Research shows that increased innovation correlates closely to higher productivity levels, across sectors of the economy². As a result, innovation is, directly or indirectly, the main driver of productivity growth and is the principal source of national prosperity^{3,4}.

In the last decade, in line with its efforts to become a knowledge and innovation-based economy while fostering economic prosperity, the UAE has cemented its place as a regional and global innovation hub. It has done so by investing in entrepreneurship, encouraging STEM education, and building facilities and universities that act as levers of innovation. Given the ambitious goals of the country's industrial, technological and scientific fields, the UAE's focus must be to continue heavily investing in innovation by developing high-added value, internationally competitive goods and services, and ascertain its place in global value chains.

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¹ OECD (2004), Innovation and Economic Growth.

² Agenor and Neanidis (2015).

³ Aghion et al. (2010)

⁴ Fan (2011)

For the UAE to be successful in the global innovation race and to reap the most benefits from it, a new holistic approach to innovation should be at the heart of all strategies and policies aimed at emerging and exiting industries. This approach should be grounded in the collaboration and integration of different innovation actors – including large enterprises, SMEs (across different sectors), government entities, academic actors – as well as the promotion and enablement of cross-country and cross-sectoral collaboration leading to new value chains, innovation and entrepreneurship.

There is a global consensus on the role of “clusters” in driving collaboration of innovation stakeholders and therefore improving the innovation ecosystem in a country or a region⁵. Previous extensive policy research by MBRSG⁶ focusing on clusters in the UAE highlighted inefficiencies in the current approach towards clusters and suggested areas of improvement in order to fully exploit the potential of existing and new clusters. As it stands, the way clusters are conceptualized and engineered in the country does not lead to innovation creation and dissemination.

The research suggests that a whole-of-government approach is necessary to improve the innovation ecosystem to directly benefit innovation stakeholders. Inter-governmental collaboration—both horizontally and vertically—can be strengthened. Meanwhile, designing policy tools to help overcome challenges faced by innovation stakeholders across the ecosystem is required. Collectively, this would improve the policy landscape to sustain and grow the innovation ecosystem across the nation.

This policy brief provides an overview of the role of such cluster strategies and policies that guide nations and regions towards embracing innovation and growing their economies. It gives policy directions and suggests a way forward on how these can be leveraged in the UAE, specifically through re-thinking and re-engineering clusters across the nation as hubs and drivers of innovation. Primarily, it suggests a shift

away from the dominant free-zone and jurisdiction-based model in the UAE, towards a more holistic conceptualization and operationalization of clusters, aligned with successful international best practices. The policy directions presented draft a pathway from which clusters can be key centers of growth for the economy in times of global and regional economic transformation.

I. Clusters Strategy for Economic Growth and Industrialization

While there is no single definition of ‘clusters’ within an economy, there is a universal agreement on what the foundational elements of a cluster are, and the objectives it aims to achieve. A cluster is always made of a concentration or network of complementary local assets and firms that function within a shared domain. One of its key objectives is the facilitation of new business formation and commercialization, as well as the development of infrastructure that meets the specific needs of cluster-members.

Generally, and across industries, clusters have proven to be powerful tools and mechanisms that can support structural transformations in a national economy, or across multiple connected economies. They can help revitalize certain sectors and drive specialization of nations in areas of competitive advantage^{7,8}. Innovation policies can be significantly supported by clusters development, and so can policies aimed at job creation and employment (e.g. cluster-leveraging and cluster-facilitating policies).

Industrial clusters have long been defined through three key interactions, leading to production advantages of local specialization: Customer-supplier interactions, labor market pooling and knowledge spillovers⁹. When analyzing the driving forces behind Tech clusters in particular, or more broadly behind “innovation clusters”, research suggests that these three factors are even more relevant. Recent research has outlined four different gains associated specifically with Innovation and Tech-centric clusters:

⁵ Ferras-Hernandez, Xavier & Nylund, Petra. (2018). Clusters as Innovation Engines: The Accelerating Strengths of Proximity. *European Management Review*. 16. 10.1111/emre.12330

⁶ Research and analysis conducted by the MBRSG Policy Research team over a two-year period on policies and pain points in the UAE ecosystem of science, technology and innovation. It consisted of over 65 in-depth interviews with innovation stakeholders, several focus groups with innovation-gear SMEs and engagements with large multinationals that are acting as “anchor” institutions in the UAE innovation ecosystem.

⁷ Tallman, S., Jenkins, M., Henry, N., & Pinch, S. (2004). Knowledge, Clusters, and Competitive Advantage. *The Academy of Management Review*, 29(2), 258-271. doi:10.2307/20159032.

⁸ Uyarra, E., Ramlogan, R. (2012). The effects of cluster policy on innovation. Nesta working papers No. 12/05.

⁹ Marshall 1890, Faggio et al. (2017)

1) Knowledge spillovers, 2) Access to specialized labor, 3) Industrial organization and scaling; and 4) Pools of immigrants leading to diverse talent pools¹⁰. As clusters stand in the UAE today, the vast majority are not vectors of innovation nor facilitators of interactions between cluster members.

II. The Function of Clusters in the Economy

Empirical research around clusters has unveiled the importance of cluster-based agglomeration in national and regional economic performance¹¹. In fact, industries participating in a mature cluster exhibit higher employment and wages growth alongside higher numbers of new businesses and patents which are key innovation outputs¹². Clusters also act as talent magnets. Successful clusters are a powerful approach for nations not only to attract sought-after global talent competitively, but also to act as hives for developing local talent. Canada, China, the European Union, Israel, Malaysia, Norway, Singapore and South Korea are countries and regions that are at the forefront of betting heavily on clusters to drive innovation. Evidence from these economies has shown a significant increase in knowledge transfer, number of patents filed, higher productivity levels for companies that are part of a cluster, increased number of local assets and similar firms relocating, facilitated new business formation and commercialization as well as adequate infrastructure that meets the specific needs of cluster-members¹³. Furthermore, clusters increase the likelihood of internalization of areas of competitive advantage, when leveraged as a specialization tool by governments¹⁴.

From a **stakeholder perspective**, clusters, over the past two decades, have played a role in:

- Supporting collaborations between companies, in particular SMEs, and building bridges between ecosystems
- Allowing for the internationalization and the growth of SMEs

- Set up international partnerships to help SMEs access global value chains
- Support industrial innovation on the ground and smart specialization
- Play an important role in the dissemination of the culture of intellectual property and protection.
- Strengthening the competitiveness of its members
- Developing growth and supporting employment in markets relating to its strategic areas, sources of value creation.

From an **economic perspective**, a strong cluster environment or the existence of a strong cluster in a given region, also leads to the following:

1. Increased industry and cluster level growth;
2. Emergence of new related industries;
3. Additional opportunities in other industries and clusters

Primarily, key tenets for successful city-level or national clusters or “superclusters” include:¹⁵

- **A focus on building a conducive ecosystem with a long-term plan.** Cluster initiatives must be focused on establishing a robust and dynamic ecosystem aimed at driving innovation, attracting talent, and creating economic opportunities. Such an ecosystem should be built with increased competitiveness of cluster members at the core. Therefore, cluster development strategies should avoid targeting short-term gains such as rapid job growth or financial revenue.
- **An approach grounded in the ‘Industry-Universities-Government’ triple-helix**, which has proven successful across the globe. The strongest cluster initiatives are private sector-driven, government-funded and fueled by talent and research from local universities, which are often part of international collaboration networks.

¹⁰ Kerr and Nicoud (2019)

¹¹ Kearney (2018) <https://www.kenarney.com/public-sector/article/?/a/next-generation-economic-clusters>

¹² <https://www.unido.org/our-focus-advancing-economic-competitiveness-supporting-small-and-medium-industry-clusters/clusters-and-networks-development>

¹³ Bresnahan and Gambardella (2004)

¹⁴ Ketels (2017), Cluster-Based Economic Development; INTER-COMP-INNO Conference Riga, Latvia 18 November 2017

¹⁵ Brookings Institute (2018), Rethinking Clusters Initiatives, https://www.brookings.edu/wp-content/uploads/2018/07/201807_Brookings-Metro_Rethinking-Clusters-Initiatives_Full-report-final.pdf

- **A collective effort to drive the competitive edge.** Members of successful cluster initiatives understand the role of joint efforts and a common goal. They are willing to invest financial resources and human capital into specific areas of specialization in order to fit into the larger puzzle that is the cluster, therefore creating a win-win situation for their organization and other cluster members. This mindset is also what tends to drive corporation to adopt an “open innovation” strategy.
- **A dedicated and visionary cluster organization.** Clusters are not just a collection of firms and satellite organizations. At the core of all cluster initiatives, there is a cluster management organization that champions the goals of all members of said cluster. These organizations must be led by strong visionary leaders, who often come from the business community. Increasingly, cluster organizations follow a firm-like structure, with a CEO at the helm and a management team. Team members of these cluster organizations meet often, publish annual reports and frequent communications for cluster members and the general public.
- **A physical center of the cluster.** In an effort to ‘signal’ that a cluster is developing into a hub for a specific sector, research shows that a physical representation of the cluster is important. While companies and assets involved in the cluster are often scattered across a country or region, and the role of strong international collaboration networks play an increasing role in the clusters’ success, these physical centers continue to bring them together. How large the physical center is, however, is not as critical a factor as having a center is. Yet, it is important to stress that such physical centers can be detached from a specific ‘real-estate’ zone, and function as a whole, even if existing across different political or commercial boundaries and jurisdictions.

Clusters which were able to scale-up and become part of industry-specific global networks, have, at the core of their cluster formation and management strategies, the five foundational tenets outlined earlier. In recent years, particular attention was given to the management of clusters (“cluster leadership team” in the list) and their role, which has proven to be a key determinant, in the successful maturation and performance of clusters. The emergence of initiatives such as the “European Cluster Excellence Initiative” launched in 2009 by the European Commission, aim to enhance cluster organisations’ management, by supporting them in improving their internal procedures and the quality of support they provide to cluster members¹⁶.

In the UAE, the vast majority of “clusters” still refer to free zone (FZ) jurisdictions or business parks. They do not provide the synergies, support – whether financial or operational – nor have they embedded the triple helix into their foundational structures. Additionally, the management organizations of these free zones are mainly tasked with ensuring day-to-day operations within the free zone and issuing licenses. Finally, driving a competitive edge, for most free zones across the country, is synonym with having lower company set-up costs, in order to attract more companies to set-up in their real-estate jurisdictions and therefore generate income from the issuance of licenses and rental leases¹⁷.

While the majority of free zones remain real-estate clusters, and are not on a path to becoming successful national or global clusters, in the sense established in the introductory section of this paper, a few notable initiatives have emerged, promoting a paradigm shift in the way cluster development is approached in the country. The Abu Dhabi based Masdar City R&D cluster is one example of a successful UAE cluster, that is increasingly competitive on the global stage in clean-tech innovation. It has developed a thriving R&D center which allowed it to attract global players¹⁸, SMEs and start-ups to relocate in its physical center. Beyond the infrastructure, it has a clean technology start-up accelerator, offers investment

¹⁶ https://ec.europa.eu/growth/industry/policy/cluster/excellence_en

¹⁷ Based on findings from interviews conducted by the MBRSG Policy Research Team in 2019/2020, with SMEs and FZAs employees of Dubai, Abu-Dhabi and Sharjah FZs

¹⁸ The International Renewable Energy Agency, Siemens Middle East HQ, the Emirates Nuclear Energy Corporation and the Saint-Gobin Group are among the global organizations and companies that are located in Masdar City, acting as anchor institutions for the cluster

opportunities for SMEs and partnerships with energy and sustainability industry leaders. Additionally, it is home to the *Mohamed bin Zayed University of Artificial Intelligence* and engages with universities, both local and international. The synergies created amongst cluster members – over 900 industry players of all sizes, universities, governmental and international organizations¹⁹ – are supporting the successes of this cluster.

Dubai International Financial Center (DIFC) is another potential high-impact, global cluster. With the recent launch of the DIFC-based Innovation Hub, this free-zone jurisdiction attracts innovators, investors, firms and entrepreneurs from across industries for reasons other than simple real-estate. This cluster helps create partnerships amongst players across the financial services value chain, in order to drive financial innovation and ascertain DIFC's position as a global hub for FinTech²⁰. In addition to having an ecosystem of financial services firms, DIFC has an independent court system and offers a liquid environment with private capital and funding opportunities through the FinTech Fund, among others. Adaptable and innovative business licensing options were created in order to ensure that innovation is not hindered. As such, these examples show that the

state can play a role of subsidizer and investor in innovation while simultaneously improving public policies and regulations around innovation in order to drive the development of a national industrial and technological complex.

III. Future Directions for Clusters

Over the past decade, leading countries in industrial and tech cluster development have seen their economic gains plateau²¹. These countries started to explore the idea of 'Innovation Superclusters', in order to push for transformation at scale and to leverage on technological advances. Importantly, they gradually abandoned the idea of equating clusters with geographical agglomeration²². For example, Canada, Israel and Malaysia, among others, have adopted new Supercluster strategies. Built around the industries of the future, such Superclusters have the potential to accelerate transformation and drive system-level innovation at scale, with cross-country partnerships. The latter conceptualization is proving to be more agile in the post-COVID19 era, where numerous traditional business models have rapidly transformed into virtual and hybrid ones, deprioritizing geographic considerations.

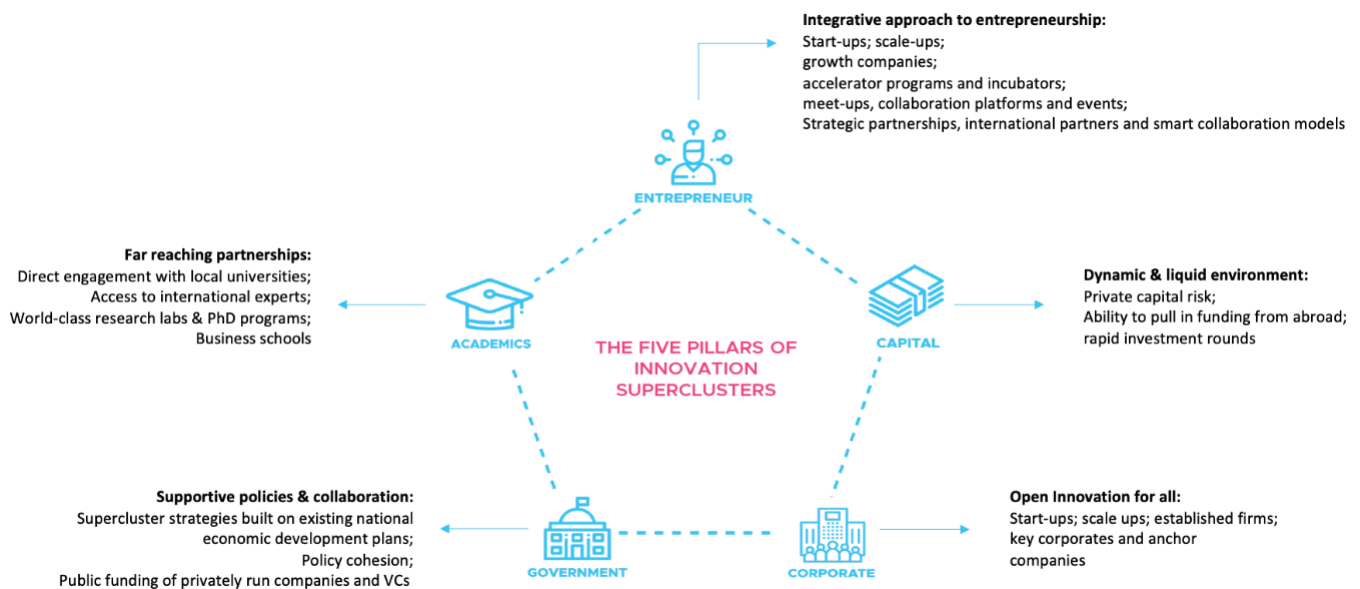


FIGURE 1: *The Five pillars of innovation Superclusters (Source: adapted from Rangen, C. & Foo-Hodne, J. (2020))*

¹⁹ https://www.zawya.com/mena/en/press-releases/story/Innovation_Month_2021_How_Masdar_City_is_supporting_the_UAE_as_a_power_hub_of_innovation-ZAWYA20210224105715/

²⁰ <https://www.difc.ae/newsroom/news/maktoum-bin-mohammed-officially-inagurates-difc-innovation-hub/>

²¹ Fundeanu, Daniela & Badele, Cosmin. (2014). The Impact of Regional Innovative Clusters on Competitiveness. *Procedia - Social and Behavioral Sciences*. 124. 405-414. 10.1016/j.sbspro.2014.02.502

²² <https://www.investcanada.ca/programs-incentives/innovation-superclusters-initiative>

As such, the five key tenets of successful clusters & superclusters remain valid for ‘Innovation Superclusters’. In addition to those, other conditions must be met in order to address the specific needs of innovation stakeholders (such as a greater reliance on funding rounds & VCs as well as increased likelihood of requiring R&D infrastructure)²³. While the core ideas behind the necessary conditions for building a successful cluster still hold true, a supercluster model specifically tailored to innovative players adopts more fluid definitions to help build a more agile and resilient ecosystem while concurrently catering to the requirements of innovation. For instance, in lieu of “the triple helix”, countries that have adopted Innovation Supercluster strategies insist on “partnerships with international partners”, “collaboration amongst stakeholders” etc. The below figure outlines the “Five Pillars of Innovation Superclusters”:

Prior to the pandemic, cross-continental and international cluster partnerships increasingly emerged. A recent example is the European Cluster Partnerships initiative, launched by the European Commission, to build a more integrated, European approach to clusters and drive the level of collaboration amongst clusters from across Europe²⁴. These same European Cluster partnership have led to the emergence of international collaboration opportunities, resulting from coordinated and planned policies and funding schemes. It is important to note that having a robust and advanced national cluster ecosystem and conducive policies in place are sine qua non conditions for building such cross-regional and/or global partnerships.

IV. The Role of Clusters in the Covid-19 Crisis

In light of the Covid-19 crisis, in addition to the tried and tested gains brought about by clusters over the past 20 years, nations with some of the most advanced cluster strategies, policies and management tools, have utilized this crisis as a proof of concept of how clusters play a pivotal role in **1)** minimizing negative economic impact at the height of a crisis, and **2)** driving the post-crisis recovery. These efforts took place in the following approaches:

- Improved supply chain resilience**
Supply chains usually involve a variety of actors and a range of input providers. In case of inability of one link in the chain to deliver, a company can seldom quickly replace or bypass it. SMEs tend to be more vulnerable to the disruption of business networks and supply chains as they outsource several essential business services. To replace an input provider, due to his inability to complete his role in a time of crisis, may in effect require a complete overhaul of the supply chain due to strict dependencies. This is especially true for industrial producers. During the initial months of the Covid-19 crisis, cluster associations have allowed firms to swiftly adapt to changing conditions and to change their sourcing at a time when supply chains were paralyzed across the globe. Cluster organizations are essentially networking platforms for cluster members and act increasingly as facilitators with other cluster organizations. They were therefore able to support their members with contacts of alternative suppliers, knowledge transfers, sourcing opportunities at a regional, national or international.
- Targeted government support**
The existence of cluster organizations allows government entities to have a unique interlocutor, which will then be responsible for enacting change or providing support at the cluster-level, to cluster members. Such organizations are all the more useful to provide insight into the needs of cluster-members, specific to their unique characteristics or industry they operate in.²⁵ Governments across Europe for instance, have been able to implement a host of measures addressing the needs of the most vulnerable firms and individuals in close collaboration with cluster organizations. From measures specifically focused on the self-employed to measures aimed at easing liquidity issues and the establishment of direct lending mechanisms, grants and subsidies to firms. Clusters have allowed governments to implement swift

²³ <https://www.strategytools.io/rise-of-innovation-superclusters/>

²⁴ <https://clustercollaboration.eu/eu-cluster-partnerships>

²⁵ OECD Covid-19 Policy Responses (2021) <https://www.oecd.org/coronavirus/policy-responses/coronavirus-covid-19-sme-policy-responses-04440101/>

structural policies to help vulnerable firms adopt new technology quickly in order to work remotely and develop new sales channels in order to continue to operate despite stringent lockdown measures.²⁶ These discussions were often piloted by the country's national cluster agency or alliance.

- **Re-skilling and upskilling**

Clusters can help ensure skills and human resources are used in an effective way. They help manage issues of skills shortages and/or skills mismatches.²⁷ They do so on the one hand by creating a 'critical mass' (cluster members) that is able to address the skills challenges that are usually only addressed by larger firms, through capacity building and training. On the other hand, clusters function has a platform keeping track of the skills needs of the different cluster members, allowing for an efficient allocation of resources. Whenever layoffs would occur during the pandemic, cluster organizations, with a helicopter view of the cluster, proved essential in helping individuals sign short or long-term contracts with other firms within the same cluster, thus helping maintain talent within the cluster structure.

In the post-Covid19 recovery, sectoral cooperation and cluster cooperation is highly encouraged in order to tackle systemic issues of skills shortages that have been persistent²⁸.

- **Enabling a shift towards the digital and green transition at a lower cost:**
Across South Korea, the United States and the European Union, clusters are proving to be a means to a successful green transition²⁹. One such example is The European Automotive Cluster Network for Joint Industrial Modernisation (EACN), which operates across five EU countries and brings together 560 companies. By developing joint R&D projects for the role of AI and robotics in the manufacturing process, their efforts have results in more efficient and sustainable processes at a reduced cost for all manufacturers involved.

Moving forward, clusters, whether they are tech or industrial-focused, can be the bedrock of a strengthened STI ecosystem, through which innovative activity is substantially more concentrated inducing significant knowledge spillovers, easier access to specialized talent, new avenues for capacity-building and increased opportunities for industry members to scale and become competitive.

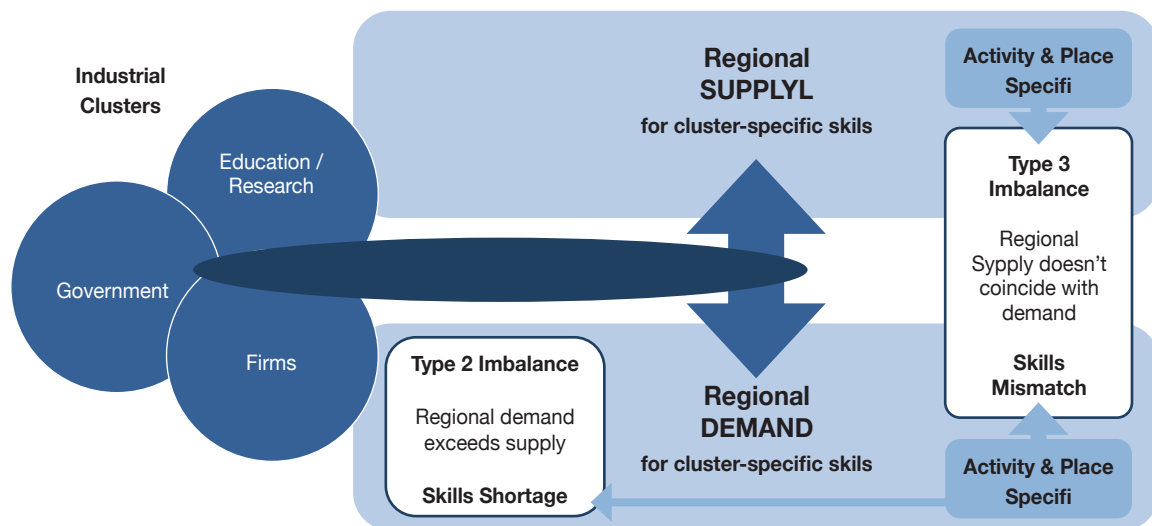


FIGURE 2: Supporting skills for industry through clusters (Source: ECCP Discussion Paper, James Wilson, Orkestra)

²⁶ https://ec.europa.eu/growth/industry/policy/cluster/observatory_en

²⁷ Orkestra, J.W. (2020), Supporting skills for industry through clusters: European Cluster Collaboration Platform discussion paper 1, European Commission

²⁸ <https://ec.europa.eu/social/main.jsp?catId=1415&langId=en>

²⁹ Zaburanna, L.; Yarmolenko, Y.; Kozak, M.; Artyukh, T. (2019) Modelling of regional clusters considering sustainable development. Adv. Econ. Bus. Manag. Res. 99, 222–226

The Covid-19 pandemic has shown the extent to which existing mechanisms for coordination and facilitation of interaction amongst innovation actors, especially SMEs, helped navigate the economic crisis that ensued. Clusters help put in place different resources, tools and instruments that foster agility and adaptability to external shocks and internal difficulties.

V. The Future of Clusters in the UAE - Policy Directions

Based on extensive field research, this section highlights future policy directions extracted from the findings generated from clusters stakeholders across the country.

While the UAE has signaled a shift towards increased cross-industry collaboration and implemented ambitious programs such as Abu Dhabi's "Ghadan 21", research highlighted that clusters across the country remain synonym of real-estate jurisdictions and free-zones.

Shifting towards a national approach to clusters in the UAE is critical. Such shift should lead to policies targeting cluster formation and development alongside building tools and programs that will help form world-class, competitive clusters across the UAE.

For instance the newly established Dubai Integrated Economic Zones Authority, which brings under one legal and financial authority three previously independent free-zones – namely DAFZA, Dubai Silicone Oasis and CommCity – is a promising step in the right direction³⁰. By consolidating three key free-zones of the emirate, it creates an opportunity for greater coordination of policy efforts and increases the attractiveness potential of the free zones. This can in turn lead to the physical concentration of capital, firms of all sizes – including anchor entities, specialized skills etc. Initiatives such as the Integrated Economic Authority have the potential, if they adopt strategies and goals that shift from the 'real-estate' model to the ecosystem driver model, to facilitate the creation of superclusters (cf. figure 1).

Additionally, designing clusters around existing national strategies or policies, focusing on the

country's sectors of choice and future priorities, can be an ideal industrial specialization strategy. For example, in March 2021, the UAE Industrial Strategy was launched, reaffirming the priorities set out for the country prior to the pandemic while ensuring strategic planning for the recovery of the UAE's industry and economy. Clusters design and engineering represent a unique opportunity to fuel and strengthen an ambitious strategy such as the one put forth by the UAE in 2021. The Industrial Strategy lays out several strategic objectives³¹, five of which can be achieved and amplified through a cluster-approach, namely: 1) develop the UAE's industrial sector; 2) increase its in-country value (ICV); 3) establish the UAE as a global hub for future industries; 4) build the reputation of the UAE's industrial products through the promotion of exports to global markets; 5) create quality job opportunities in the industrial sector.

Similarly, the post-COVID 19 recovery represents a window of opportunity to focus regulatory policy towards cluster development in an array of sectors in which the UAE can have a significant competitive advantage. As the country is increasing the level of investments in non-oil sectors, shifting towards the green and knowledge economy while ensuring homegrown and foreign talents are retained, the prospect of strong and resilient collaboration networks should be a means to achieve the critical strategic goals it has set for itself. Based on the research findings, such policy directions would require the following foundational steps:

- **Adopting a new understanding and definition of clusters:** Across the UAE, moving away from the *free-zone and jurisdiction-based model* is critical, towards an understanding aligned with international standards, which can boost cluster members most in a changing economic atmosphere. The existing model of clusters has reached its limits globally, and is proving to be inefficient for the global age and race towards innovation. Clusters provide a framework for organizing the implementation of public policy and public investments towards economic development and greater innovation, therefore encouraging

³⁰ <https://mediaoffice.ae/en/news/2021/September/20-09/Mohammed-bin-Rashid-issues-Law-creating-Dubai-Integrated-Economic-Zones-Authority>

³¹ <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/the-uae-industrial-strategy>

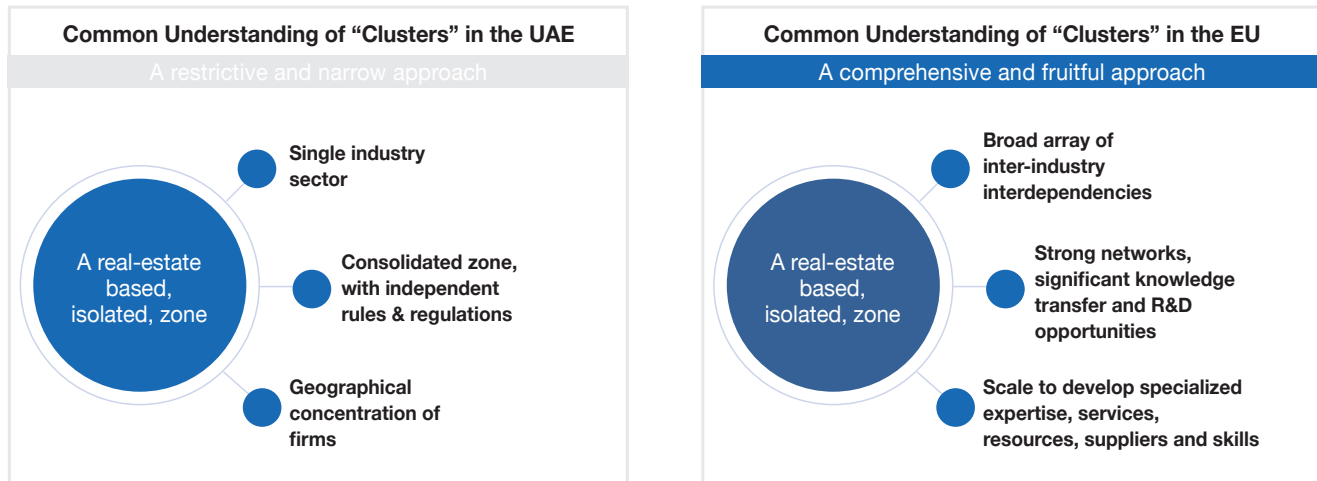


FIGURE 3: Redefining clusters in the UAE (source: authors)

greater interaction between government, academia and the private sector. Research shows that while real-estate development can help support a robust cluster develop its facilities if needed, in reality it cannot 'create' and sustain a cluster. Figure 3 outlines the necessary shift in the way clusters are understood and perceived in the UAE. This is a sine qua non condition for clusters to grow into drivers of innovation in the country.

- Developing a National Cluster Policy:** Support and collaborate on a national cluster strategy and continue to identify and promote UAE-specific opportunities. Designing robust cluster-leveraging and cluster-facilitating regulations in an effort to foster the development of clusters as levers of innovation across the country. Such a policy would support STI, 4IR, Circular Economy and Industrial strategies' goals and encourage cross-industry strategies in lieu of sectoral ones. For example, in Singapore and South Korea³², two of the world's most innovative countries, cluster policy is part of innovation policy, aimed at facilitating the networking and cooperation between the science and business communities, ensure flow of knowledge and transfer of technology. Across countries, we are seeing clusters emerge as a result of government decisions and policies, rather than an organic phenomenon.
- Creating a National Cluster Agency:** Create a Cluster Agency in charge of policy coordination on a federal level. The implementation of a comprehensive cluster policy is a complex task requiring constant coordination amongst various ministries (for example, Ministry of Economy, Ministry of Higher Education and Research, MOHRE, etc.) and government agencies from different sectors and policy areas. It will also require policy coordination and homogenization across levels of government (federal, local land where necessary on a GCC level). Such an agency would allow for a successful and integrated implementation of the federal cluster policy and of sector-specific cluster strategies. As clusters develop and mature, the Cluster Agency will be in charge of ensuring continuing alignment between all cluster-specific funding/support programs and general policy such as macroeconomic policy, infrastructure development policies, telecommunication regulations etc. Additionally, the agency will conduct reviews of clusters in an effort to ensure their classification (mature, in transition, world-class etc.) remains valid, which has an impact on the programs and initiatives rolled-out in each cluster. Finally, beyond the role of stakeholder and policy coordinator the agency will act as the centralized data bank for all matters related to clusters across the nation, by gathering data/information from cluster organizations.

³² Kowalski, A.M.; Mackiewicz, M. Commonalities and Differences of Cluster Policy of Asian Countries; Discussion on Cluster Open Innovation. J. Open Innov. Technol. Mark. Complex. 2021, 7, 21. <https://doi.org/10.3390/joitmc7010021>

- **Developing cluster-specific strategies and support-packages for clusters across the UAE:** Develop cluster strategies outlining the directions to create, enable and grow specific, national-priority sectors/ clusters, and ensure they are reviewed every five years. These strategies should be supported by the creation of cluster management organizations (to replace or merge with existing Free Zone Authorities) ensuring the optimal performance and functioning of the cluster, and the tailoring of cluster-specific packages. These support packages have to be tailored to the specific needs of members of any given cluster (SMEs, large companies etc.) and address a wide array of areas: IP, access to government tenders, support for SMEs, etc.
- **Creating the conditions for virtual proximity of cluster stakeholders:** Technological advancements have allowed leading global clusters and Superclusters to move away from the imperative of physical proximity. Today, clusters can have a physical center (limited in size) and a virtual network of stakeholders. Their interaction can be maintained through self-organized spaces in which cluster stakeholders can meet and discuss the latest developments in their respective organizations. Their interaction, increasing the likelihood of “knowledge spillover” occurring albeit the lack of

physical proximity, can also be cemented by the cluster management organization. The existence of such strong virtual networks can also be essential for policymakers and policymaking in the post-Covid19 future. They have proven to enable the co-creation of novel, fitting and ecosystem-centric policies, while customizing existing policies to specific sectors or stakeholders

- **Cyclical analysis of strategies, tools and other interventions to support clusters and continuously engage with cluster organizations:** Implementing such a feedback-loop is essential to avoid policy decay and devise cluster-specific and industry-specific support tools.

At a time where the UAE is devising new medium and long-term industrial and innovation strategies and goals, a shift to a new approach to clusters present an ideal tool to support the ongoing recovery and the attainment of the goals the country laid out for itself. Given the mounting evidence tying successful clusters to higher productivity levels and significant technological spillovers—leading to economic gains—the UAE needs to devise a national approach to clusters to that policies targeting cluster formation or their economic growth can be highly effective, policy makers need to develop the adequate policy tools to ensure the formation and development of world-class, competitive clusters across the UAE.

UAE Free Zones with potential to develop into Clusters or Super-Clusters ³³	
Khalifa and Industrial Zone Abu Dhabi (KIZAD)	Higher Corporation for Specialized Economy
Twofour54	Dubai Health Care City Free Zone
Dubai Biotechnology & Research Park Free Zone (DuBiotech)	Sharjah Media City (SHAMS)
Dubai Auto Parts City (DAPC) Free Zone	Ras Al Khaimah Media Free Zone
International Media Production Free Zone	Creative City Fujairah

FIGURE 4: *Non-exhaustive list of free-zones or business parks with potential to develop into specialization clusters.*

³³ This assessment is based on a systematic review of a select number of free-zones. It takes into consideration existing hard and soft infrastructure, presence of anchor institutions, role of coordinating bodies within the free-zone (often free-zone authorities), partnerships with universities local and/or international, presence of funding facilities, potential for a competitive advantage given the UAE’s economy and geo-location

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Acknowledgements

The author(s) wish to express personal appreciation to the following individuals for their input to the different stages of producing this working paper and for providing essential input and assistance into the report and its related materials:

Wissam Adib | Nourhan Ahmed | Engy Shibl | Shuaib Kunnoth | TABEER.NET

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The Mohammed Bin Rashid School of Government

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The Mohammed Bin Rashid School of Government (formerly Dubai School of Government) is a research and teaching institution focusing on public policy in the Arab world. Established in 2005 under the patronage of HH Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai, in cooperation with the Harvard Kennedy School, MBRSG aims to promote good governance through enhancing the region's capacity for effective public policy.

Toward this goal, the Mohammed Bin Rashid School of Government also collaborates with regional and global institutions in delivering its research and training programs. In addition, the School organizes policy forums and international conferences to facilitate the exchange of ideas and promote critical debate on public policy in the Arab world. The School is committed to the creation of knowledge, the dissemination of best practice and the training of policy makers in the Arab world. To achieve this mission, the School is developing strong capabilities to support research and teaching programs, including:

- applied research in public policy and management;
- master's degrees in public policy and public administration;
- executive education for senior officials and executives; and,
- knowledge forums for scholars and policy makers.

The MBRSG Research Department focuses on the following seven priority policy areas:

1. Future Government and Innovation
2. Education Policy
3. Health Policy
4. Public Leadership
5. Social Policy, Wellbeing and Happiness
6. Sustainable Development Policy
7. Economic Policy

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Economic Policy:

This research area focuses on the future of the economy in the region and the UAE, with a strong emphasis on policy analysis and economic foresight aimed at sustained long-term prosperity, growth and sustainable development. It explores the main economic challenges and structural shifts underway in the UAE and the region, including the economic consequences of innovation and emerging technology, the knowledge economy, the economic impact of the Fourth Industrial Revolution, the adequacy of existing employment and social policies and inclusive policymaking for greater economic inclusivity. Furthermore, research in this area aims to create thought-leadership and advance the quality of government practice in the field of public economics in the region, analysing the economic aspects of the expansion and regulation of the public sector and its role in driving economic growth and equity.

Economic policy research at the MBRSG seeks to be intrinsically cross-sectoral, supporting and overlapping with most other research tracks led by the School. It strives to provide a holistic approach to economic policy research and policymaking in the region by addressing a wide variety of topics. Examples of such research topics include economic diversification, sharing and circular economy, the economics of the “new oil normal” and the economics of innovation. Finally, policies directly and indirectly aimed at economic diversification are explored at length in this research area, with a focus on commodity-dependant economies in the GCC and beyond.

The Mohammed Bin Rashid Centre for Government Innovation

The Mohammed Bin Rashid Centre for Government Innovation was established to cultivate a culture of innovation within the government sector through the development of an integrated framework.

MBRCGI aims to make innovation one of the key pillars of the UAE Government, in line with the vision of H.H. Sheikh Mohammed Bin Rashid AlMaktoum, UAE Vice President, Prime Minister and Ruler of Dubai, to enhance governmental operations and the country’s competitiveness by making the UAE Government one of the most innovative in the world and promoting a digital, knowledge-based economy.

MBRCGI aims to strengthen the UAE’s innovation ecosystem by experimenting with new approaches and building capabilities and networks, thereby enriching the culture of innovation and spurring innovation locally, regionally, and internationally.

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