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Entrepreneurial Ecosystem Developments in Malaysia - Existing Actors Moving from a Cluster to a Countrywide Role and the Emergence of New Actors

Avvari V. Mohan☆

Nottingham University Business School, University of Nottingham Malaysia

Abstract

This paper examine the changing ecosystems in Malaysia, starting with the government policy driven greenfield cluster of Cyberjaya, which is part of the Multimedia Super Corridor (MSC) mega project. In this context of an emerging economy, predominantly production oriented, the role of the government was crucial with respect to implementing policies and building infrastructure for the ecosystems. First, the roles played by the cluster development agency, universities, and industry are explained. As the cluster developed, this paper, taking an entrepreneurial ecosystem approach, explores how some actors evolved and changed their roles to become catalyst organisations established for the cluster now serving nationwide. This was followed by the emergence of new actors in the ecosystems, for example, knowledge intermediaries, and new roles for universities. In addition to actors such as universities and industry, this paper recognizes the emergence of media organisations as new actors in the entrepreneurial ecosystems in Malaysia.

1. INTRODUCTION

This paper aims to provide an understanding of the role of the different actors that have emerged in the entrepreneurial ecosystem of Malaysia. Fostering entrepreneurship has become a core component of economic development in cities and countries around the world. The predominant metaphor for fostering entrepreneurship as an economic development strategy is the "entrepreneurship ecosystem" (Isenberg, 2014). Malaysia began the Multimedia Super Corridor (MSC)

project in the mid-1990s to initiate the transformation of the country from a production-oriented economy to a knowledge-oriented one. A crucial element of this project was the development of Cyberjaya, a cluster oriented development for information and communication technology (ICT) industries and the provision of an ecosystem to support entrepreneurial ventures in the sector.

At this point, it is necessary to present a concise overview of the concept of entrepreneurial ecosystems. Cohen (2006) states that individual components of an innovative or entrepreneurial system are needed and there must be linkages amongst them for the overall development of a region. Furthermore, Malecki (1997) states that other actors (e.g. venture capital firms) should be attracted to entrepreneurial ecosystems as this may assist the introduction of more successful startups. Cohen (2006) has identified informal and formal networks, universities, governments, support services, capital, and human talent as components of a general ecosystem. Isenberg's (2011) seminal paper outlines six key domains of the

☆Correspondence to : Prof. Avvari V. Mohan
Associate Professor of Strategic Management and Acting Dean at the Nottingham University Business School (NUBS) in the University of Nottingham - Malaysia Campus (UNMC)
E-mail : Mohan.Avvari@nottingham.edu.my

entrepreneurship ecosystem: conducive culture; enabling policies and leadership; the availability of appropriate finance; human capital; markets for products; and institutional and infrastructural support. Isenberg also cautions that governments tend to pursue some unattainable ideal of an ecosystem by trying to emulate other irrelevant ecosystems (the most popular one being Silicon Valley) in order to establish the best practices.

In sum, it can be seen that the key components of entrepreneurial ecosystems include the availability of finance, human capital/talent, infrastructure and institutional support, markets, enabling policies (government) and leadership, the presence of a university, and networks/linkages. This paper will be based on these components that provide a guiding framework to explain the ecosystem supporting entrepreneurship initially in the Cyberjaya cluster and then emerging to support entrepreneurship across Malaysia.

This paper adopts a narrative approach to examining and providing a descriptive account of the changing ecosystems supporting entrepreneurship in Malaysia's Cyberjaya cluster and beyond[1]. Following this introduction, in section 2, ideas presented in the literature that provide a guiding set of points on entrepreneurial ecosystems are explained. Next, an overview of the Multimedia Super Corridor (MSC) project and Cyberjaya cluster—including the evolution of cluster development agencies and the setting up of new agencies focussing on entrepreneurship and the development of start-ups—is presented. The roles of additional elements/actors in entrepreneurial ecosystems, for instance, universities and industry, are then examined. Finally, the roles of emerging elements/actors such as the media are explored and the paper is concluded.

2. THE BACKGROUND OF THE MULTIMEDIA SUPER CORRIDOR (MSC) PROJECT[2]

Before describing the entrepreneurial ecosystems in Cyberjaya, it is important to explain the background of the Multimedia Super Corridor (MSC) Cluster—the MSC project was developed as a cluster of firms in the information and communication technology (ICT) sector. In August 1995, Dr. Mahathir Mohammed, the then prime minister of Malaysia, announced that the "Multimedia Super Corridor" (MSC) would be the centerpiece of the national ICT strategy under the Seventh Malaysia Plan (1996-2000). The MSC project is a government-led program formulated with the support of various cluster oriented infrastructure and policies.

The following are some of the reasons the MSC project was developed:
- Recognition that Malaysia was losing its comparative advantage in its traditional (commodity and manufacturing) economic sectors;
- A need to drive the economy towards higher productivity through technology and high value-added economic activities;
- The Information Age and converging technologies presented the best opportunities for socio-economic transformation.

The specified areas for development were called 'intelligent cities', namely, Putrajaya, Cyberjaya, and Technology Park Malaysia (TPM). Cyberjaya and TPM were cluster based regions/areas aiming to attract established global companies in the ICT sector as well as local companies. Putrajaya was a purpose-built capital city with several "e-government" projects—these would provide the initial demand/procurement for the services of the companies in the cluster. In addition, "flagship applications", which were government-led projects, were launched to attract leading multinational corporations (MNCs) in the technology field to the cluster and to work with large local firms and small and medium enterprises (SMEs).

Currently, the MSC project can be seen as being in its third/final phase of development with Putrajaya functioning as the capital city and Cyberjaya Technology Park and other designated areas having attracted a threshold of firms to operate in their respective regions. The incentives provided to companies with "MSC" status has now been extended to regions beyond the initial MSC designated areas to areas across the country that are now designated as part of the MSC region. The MSC project and Cyberjaya was the

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[1] The paper builds on material from earlier papers on the Cyberjaya adding new developments in terms of the actors and their roles in the eco-system related to start-ups or entrepreneurship.

[2] This section is drawn from Mohan et al. (2010) "Inter-Organisational Networks Emerging in a Greenfield Cluster – A Study on Malaysia's Multimedia Super Corridor Cluster", Workshop on Regional Knowledge Hubs in Asia: the Social Sciences and Humanities in Science and Technology Human Capital (STHC) - Conference on Inter-Asian Connections II, Singapore, 7-10 December 2010.
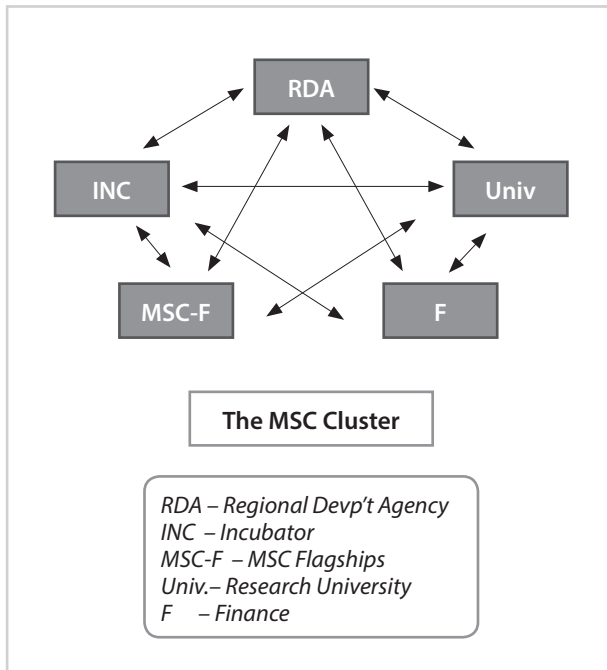
Fig. 1. Key elements in the initial MSC region

Source: Mohan et al. (2004)

focal ICT cluster (and TPM to an extent) in the early stages; however, support and focus is now all across the country. In the next section, an attempt is made to outline the entrepreneurial ecosystem and explain how it has changed from being a part of the MSC project to beyond

3. THE EVOLUTION OF ENTREPRENEURIAL ECOSYSTEMS IN CYBERJAYA

3.1 Cyberjaya – The Beginning

Cyberjaya was started as a greenfield cluster, i.e., it was built literally from scratch by clearing a large palm oil estate. There was no existing infrastructure or organisations to support the information and communications technology (ICT) sector, which the cluster intended to develop; hence the focus on infrastructure, infostructure, policies providing incentives to attract firms to the cluster, and supporting the development of small and medium-sized local firms to participate in the programmes or the cluster. In the beginning, several elements were established to support the develop-

ment of the cluster in order to entice firms to the cluster and also to support startups or entrepreneurial firms. These are depicted in Figure 1 below.

These elements included a regional development agency (RDA) called the Multimedia Development Corporation (MDeC), innovative finance schemes, the MSC Flagships Network, a dedicated university, an incubator, and a set of special benefits to attract firms to set up in MSC corridor areas such as Cyberjaya. These firms received "MSC" status and the special benefits were provided under the Bill of Guarantees (BoGs) approved by the cluster development agency MDeC.

3.2 MDeC – From a Cluster Development to a Countrywide Supporting Agency

The Multimedia Development Corporation (MDeC) was established in 1996 by the Malaysian government as an agency to spearhead the development and implementation of the MSC. As depicted in Figure 2, below, MDeC had multiple roles as a cluster/regional development agency. A crucial role was that of promoting startups and SMEs in the Cyberjaya cluster and in other parts of the MSC through special programmes. A university (The Multimedia University) was set up within the cluster to provide the required manpower for the cluster and to serve as a research support base for SMEs and entrepreneurial firms which could not afford the expensive infrastructure needed to conduct R&D activities necessary to enhance their technological capabilities. The university also had institutions such as a Centre for Commercialization and Technopreneur Development (CCTD) to help with building startups and also to help SMEs in the cluster.

The MDeC organisation also set up the MSC Central Incubator adjacent to the university to help promote ICT startups and enhance the capabilities of SMEs. This incubator was proposed to be the nucleus of the National Incubator Network that would link eight other centers already in operation. In addition to allowing its tenants to have access to the MSC's telecommunication infrastructure, research facilities, networking opportunities, and venture capital funding, the MSC Central Incubator was to support the tenants by holding seminars, providing training, and offering other services such as business plan development, accounting, and marketing assistance. MDeC launched a special programme to catalyse the various actors and elements of the ecosystem to promote startups in Cyberjaya. In the
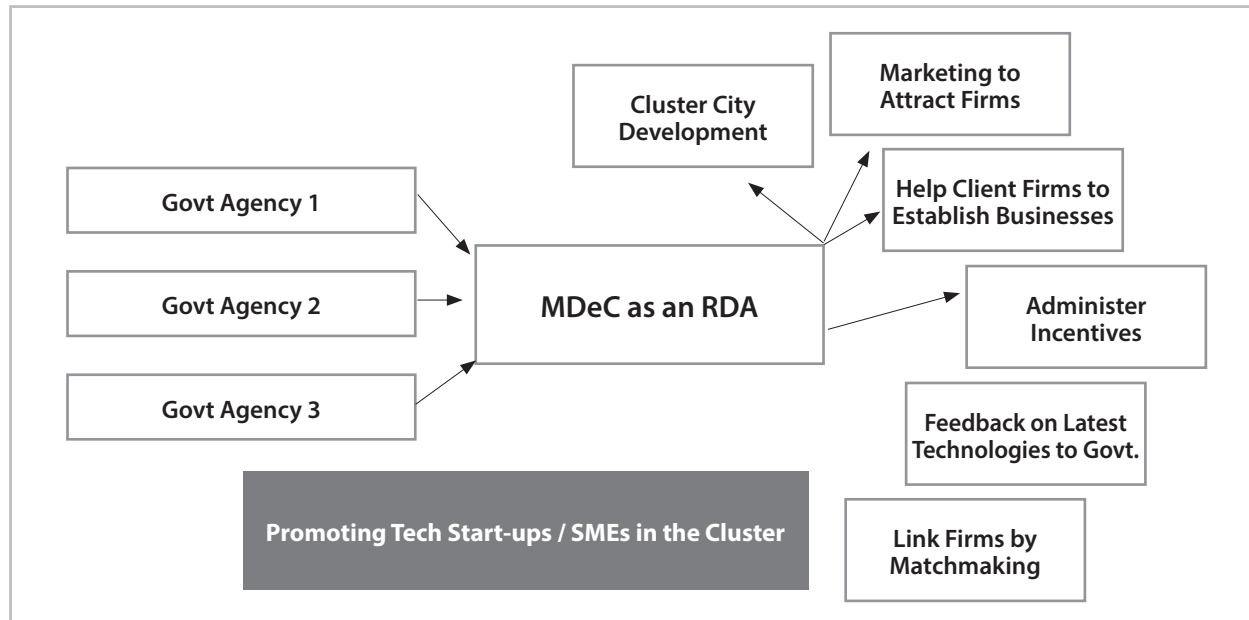
Fig. 2. MDeC as a Cluster / Regional Development Agency
> Source: author

following part of this paper, the Technopreneur Development Programme (TDP) flagship is overviewed.

3.2.1 The MSC Technopreneur Development Programme Flagship (MTDP)

The MSC Technopreneur Development Programme (MTDP) flagship was a specific flagship programme designed for the promotion of small and medium enterprises (SMEs) and startups in the ICT sector. In recognising the need to further enhance the MSC Malaysia's efforts to develop Malaysian SMEs and startups in the ICT sector and other strategic high technology industries, the government launched the Technopreneur Development Division (TeDD) in November 2001. The agency leading the division was the Ministry of Science, Technology & Innovation (MOSTI), with the Multimedia Development Corporation (MDeC) acting as the implementing agency. The mission of the MTD programme was "To catalyse, nurture, develop, and improve technopreneurs and ICT SMEs to become sustainable and competitive ICT SMEs, and enhance them to become MSC globally competitive companies".

The core objectives of the MTD flagship programme were as follows:

- Facilitate the development of technopreneurs (universities and industry)
- Catalyse the establishment of ICT SMEstivities;
- Facilitate the growth of ICT SMEs into MSC status companies
- Facilitate the growth of MSC status companies into MSC global companies
- Catalyse the development of the ICT SME and bio-informatics clusters

The MTDP also had different programmes for the promotion of startups. There was a 'Nationwide Outreach Programme' involving MTD programme personnel organizing roadshows, exhibitions, etc., in order to promote the services and programmes available for potential entrepreneurs interested in establishing technology-based SMEs. Another major activity of the MTDP was 'Startup Development'. The focus of this was on providing support in terms of "getting funding", organising workshops, training, and providing other support sessions to help entrepreneurs with developing business plans. The third activity was incubation/acceleration. For this, government and private sector resources were leveraged to help startups gain a foothold in the market. It also involved the provision of infrastructure for startups, for instance, the setting up of a special building for
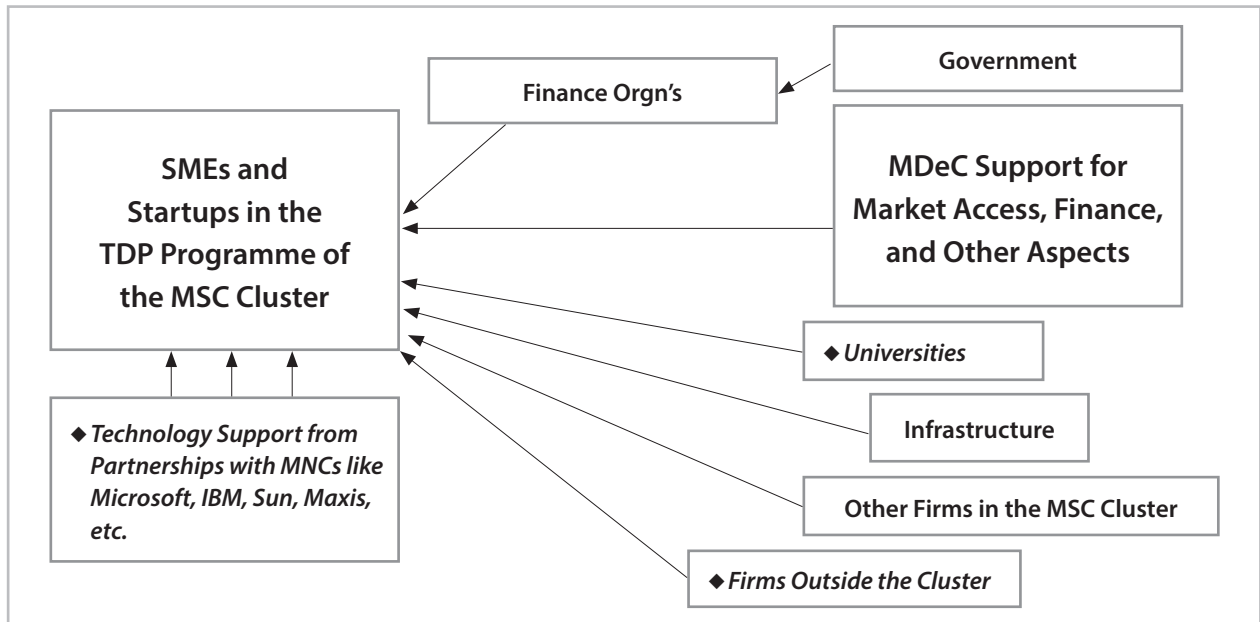
Fig. 3. MTDP flagship catalysing actors in the entrepreneurial ecosystem in the cluster

Source: Developed by Author

small and startup businesses in the regional cluster (at lower costs) and connecting them to the MNCs in the cluster. The final programme was a 'growth development' related programme involving the presentation of awards to recognise successful startup firms and providing them with market access.

Figure 3 illustrates the links in the MTDP programme between the various actors in the entrepreneurial support system for startups and SMEs enhancing their business and technology capabilities. The role of the TDP in the development of startups and SMEs in the ICT sector could be seen as that of a facilitator — the TDP connects the actors in the system in order to improve the business and technological capabilities of the SMEs who are in various parts of the Value Chain (Technopreneur Value Chain).

The MSC project at that time received mixed reviews in the press. One issue was that despite the number of incentives offered, few local startups and SMEs emerged. One of the elements in the ecosystem generally considered helpful was the existence of the Cluster/Regional Development Agency (MDeC) as an institute where multiple services related to the MSC were available. Other incentives (financial and non-financial) considered instrumental in attracting MNCs and larger companies to operate in the MSC were

seen as unhelpful to the SMEs and Startups The overall business climate was considered to favour large companies or MNC businesses. The problems faced by SMEs and startups included high operating costs in the cluster and numerous other hidden costs (including infrastructure costs, distance to market, lack of business services in the region, etc.). There was a review of the cluster, and some changes were made to the role of MDeC and some new organisations were established.

3.3 The Middle Phase (Circa 2002- 2006)

During the early to mid-decade following the millennium, the MSC project entered its second phase with the cluster/regional development authority, the Multimedia Development Corporation, being reformed and rebranded as MDeC. The MSC established new "cyber centres" in various Malaysian states, and the incentives given to MSC status companies were also provided to the firms in these centres. There was a predominantly large focus on the shared services and outsourcing (SSO) sector. The cluster emerged as one of the leading participants in this sector. The MSC Malaysia SSO cluster recorded RM10.4 billion (US$3.22 billion) in revenue in 2012 and 65,800 jobs created since MSC Malaysia's inception ap-
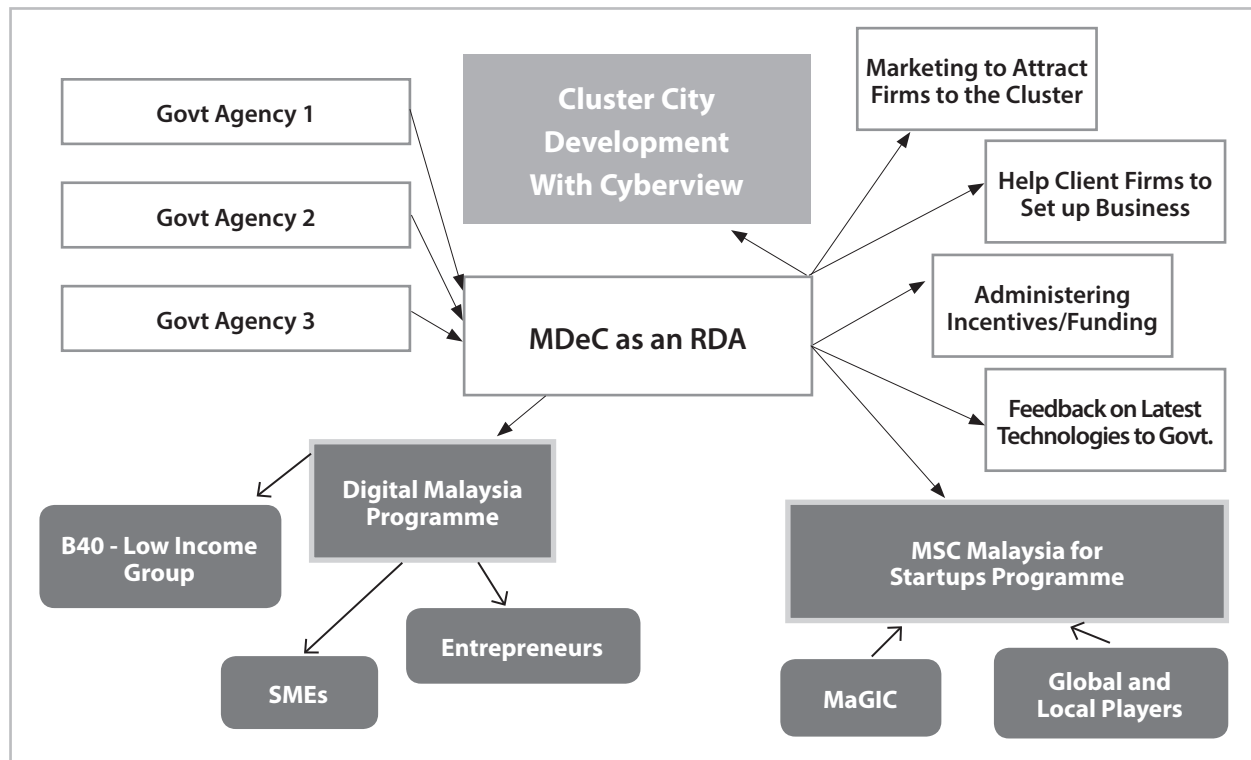
Fig. 4. MDeC – from cluster development agency to national ICT sector development

    Source: Developed by Author

proximately twenty years ago[3] .

The A.T. Kearney Global Services Location Index ranked Malaysia as the world's third most attractive location for shared services and outsourcing activities—now known as Global Business Services (GBS). It was envisioned that 70,000 new jobs would be created by the year 2020 in the GBS sector in MSC Malaysia[4].

The GBS sector continues to be a major sector in the Cyberjaya cluster in terms of job creation; however, it was noted that while providing a crucial component for cluster development in terms of human capital development, this sector was not directly helpful for entrepreneurial or startup development. Given this situation, changes were made, and the new developments and changes in the ecosystem are described in the following section of this paper.

3.4 Developments in the Entrepreneurial EcoSystems – Cyberjaya and Beyond

According to one of the key developers of Cyberjaya, today there are over 600 technology companies, including 35 multinational corporations. Investments from companies in Cyberjaya have totalled over 7 billion Malaysian Ringgit (MYR), contributing over 4 billion MYR to Malaysia's GDP; however, Cyberjaya has received criticism for not creating a 'buzz' as a startup cluster. In the early 2010s, there were major announcements made to enhance and promote the entrepreneurial/startup culture. In this section, the focus is on two key organisations: MDeC, the regional development agency, which changed from a cluster development agency to a national digital economy development agency, and a new organisation called 'MaGIC', set up as an agency to promote startups in Cyberjaya and the country as a whole.

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[3] http://the-outsourcing.com/subpage.php?pn=region&regid=2&aid=513

[4] http://www.mscmalaysia.my/gbscoc

3.4.1 The Expanded Role of MDeC – From a Cluster Development Agency to a Larger Countrywide Role

The Multimedia Development Corporation was changed to the Malaysia Digital Economy Corporation (MDeC). MDeC continues to be the regional development agency for the Cyberjaya cluster and the overall MSC project, which now has a nationwide mandate. In October 2010, MDeC was given an additional task to develop a blueprint for a digital economy programme called "Digital Malaysia". This was unveiled in May 2012. The MSC project was seen to have laid building blocks with its threshold of firms operating in the different MSC recognized 'cyber centres/cyber cities, including Cyberjaya. The Digital Malaysia Programme aims to develop these blocks. Its main goal is to create an ecosystem that promotes the pervasive use of ICT in all aspects of the economy and turn Malaysia into a developed digital economy by 2020. MDeC has a dual mandate to run both the MSC project and Digital Malaysia for ICT industry development in Malaysia. In line with this development, in addition to the existing divisions, there are new divisions/personnel supporting the Digital Malaysia Programme, which also includes entrepreneurship development. Figure 4 shows the additional roles for MDeC — from a custodian of the MSC project to looking at national development with ICT. Figure 4 also presents the dual role of MDeC after changes to its mandate.

It still has a Startup & Entrepreneurship Ecosystem Development (SEED) team that continues to develop and support local high growth startups in new and emerging technology sectors such as big data and analytics, cloud computing/storage, e-commerce, gaming, the Internet of Things, and mobile technology (while the employment generating SSO/GBS sector continues to be an area of separate focus). They also continue to run support programmes in institutes of higher learning (IHLs) to encourage students to become entrepreneurs. Another area of focus for the MSC project is the creative content and gaming sector. MDeC oversees the MSC project's various grants and funding programmes for the gaming sector and ICT product development in general.

The MSC Malaysia for Startups Programme[5] was launched to facilitate and accelerate local startups in obtaining MSC Malaysia status. This programme is supported by the Malaysian Global Innovation and Creativity Centre (MaGIC) and other ecosystem bodies such as StartupMalaysia.org, the New Entre-

preneurship Foundation (MyNEF), Cradle Fund, Cyberview, the National Incubator Network Association, 500 Startups, the Technopreneur Association of Malaysia (TeAM), and the Founder Institute.

The Malaysian entrepreneurial ecosystem by this time had several 'actors' or organisations supporting startups. However, as mentioned before, there was still a lack of emerging startups—there seemed to be a barrier. Around 2013, a major announcement was made regarding a new organisation created to enhance and promote the entrepreneurial/startup culture in Cyberjaya and across the country. One of the reasons for this situation could be that the MDeC had the too many roles from coordinating various ministries and government agencies needed for the development of the cluster, marketing role to attract firms into a cluster, providing support to existing 'client firms and so-on and also doing annual performance reviews of the firm. On the other hand several supporting actors for supporting startups were emerging across Kuala Lumpur. The formation of a new agency focussed on the role of enhancing startup development are explained in the next section.

3.5 The Malaysian Global Innovation and Creativity Centre (MaGIC): An Agency Bringing Together the Actors in the Malaysian Entrepreneurial Ecosystem

The Malaysian Global Innovation and Creativity Centre (MaGIC) was first announced in October 2013. This was to be "a one-stop shop for entrepreneurs – with everything from getting financing from banks or venture capital to incubators for developing start-ups; from intellectual property registration to facilities for training, coaching and mentoring." In April 2014, Cheryl Yeoh was appointed as MaGIC's first CEO. Ms. Yeoh was brought in from the USA due to her experience in technology startups (her company 'Reclip.it' was acquired by Walmart Labs in 2013). MaGIC was launched on 27 April 2014, by US President Barack Obama and the then Malaysian Prime Minister Najib Tun Razak, indicating the importance of the agency and support for entrepreneurship. In the 2014 Malaysian budget, it was announced that MaGIC would receive an allocation of RM50 million for its activities. MaGIC was set up in the Cyberjaya cluster to provide leverage on the infrastructure and to connect MDeC (the MSC Project in charge), the MNCS, and other tech-companies based in Cyberjaya.

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[5] https://www.digitalnewsasia.com/startups/mdec-announces-msc-malaysia-for-startups-support-from-magic
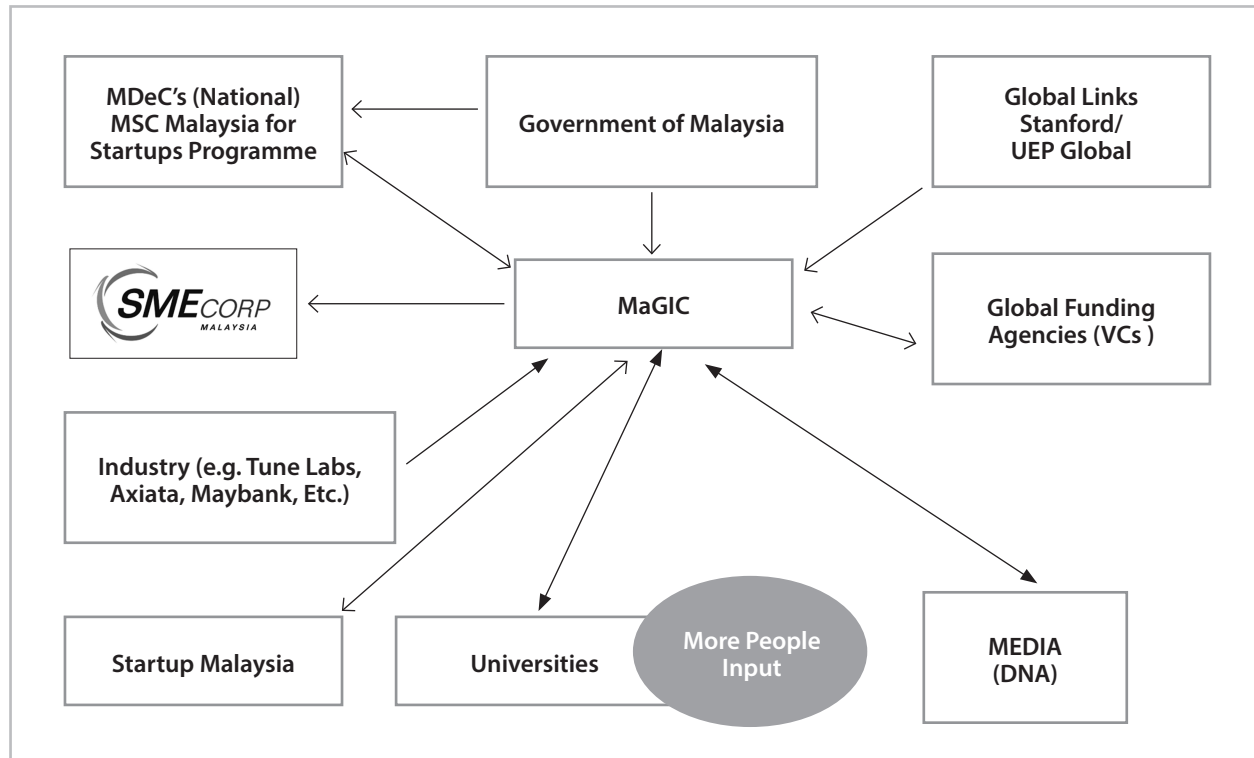
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Fig. 5. MaGIC's linkages helping to develop the entrepreneurial ecosystem

Source: Developed by Author

MaGIC started operations with stakeholder dialogue sessions to identify the needs and requirements of the entrepreneurial community. The dialogue sessions resulted in the identification of various issues, for example, a lack of awareness of the resources available, a lack of finance (local finance was risk-averse), and a lack of technical talent or foreign talent being hired by startups.

The vision of MaGIC is "To make Malaysia the startup capital of Asia", and its mission is "to catalyze the entrepreneurial ecosystem in Malaysia, bringing together the abundant resources from partners and communities alike, and to develop entrepreneurs of enduring, high growth startups that will make a positive impact at a regional or global scale."[6] Among others, its roles include the promotion of entrepreneurial or startup culture across the country (undertaken by the MaGIC Academy which organises workshops, boot camps, etc.), and coordinating the use of various resources, financial and others, of the entrepreneurial ecosystem with the country and from outside the country to support startup development and growth.

The approach taken by MaGIC Malaysia was to have (i) a community outreach to help connect entrepreneurs to the appropriate resources by providing coworking spaces, events, and conferences, (ii) an academy for achieving synergies by enhancing the knowledge and capabilities of entrepreneurs through structured learning programmes (mentoring, workshops, accelerators, boot camps — for example, e@Stanford, the MaGIC Accelerator Program, Social Enterprise Track, Full Stack Web Development), and (iii) ventures to invest in entrepreneurship development through grant funding, intrapreneurship, fellowships, and R&D innovation labs. MaGIC's website provides complete details on the programmes not described in this paper.

Figure 5 shows the linkages that MaGIC has developed with global and regional players to support the various programme —
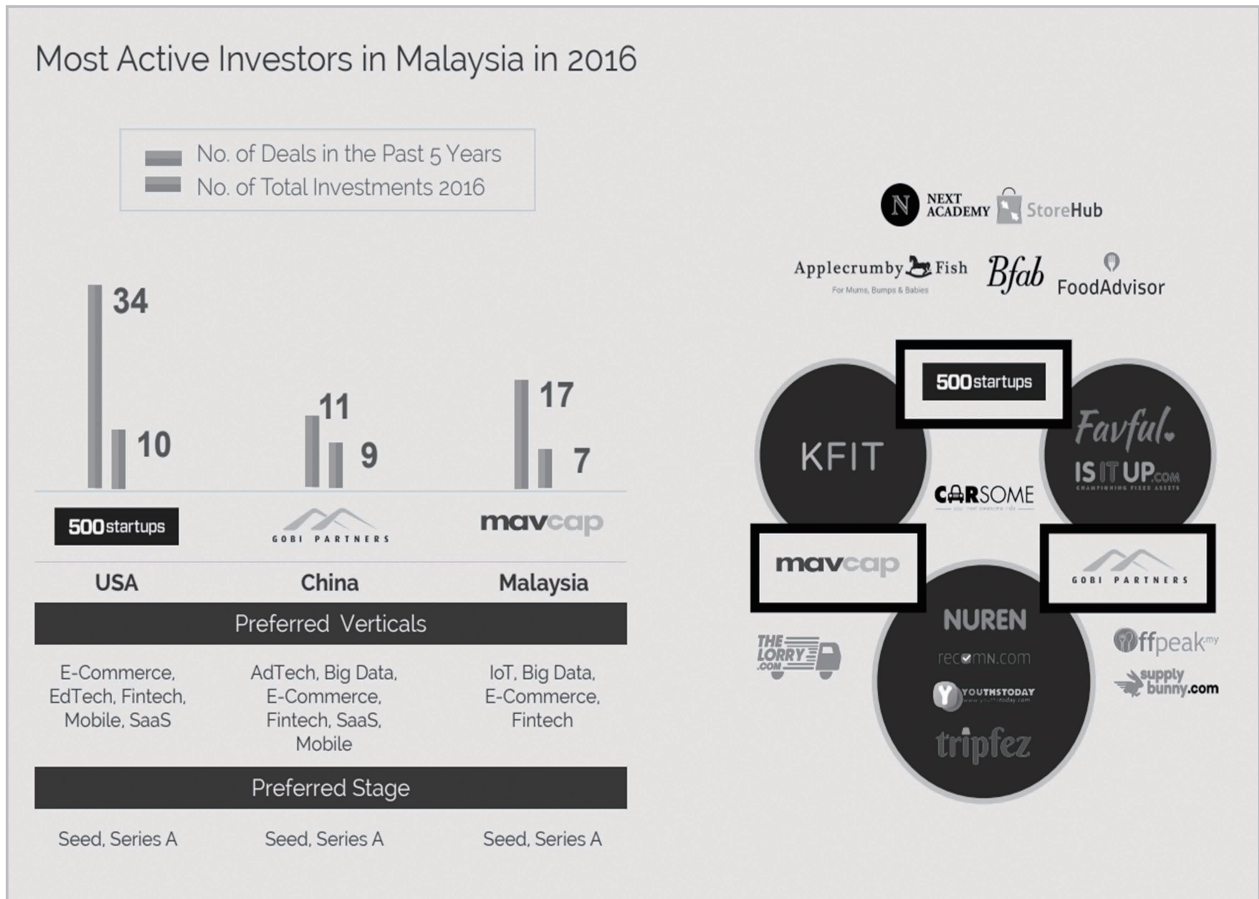
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6 http://mymagic.my/en

Fig. 6. Outcomes in the Malaysian Entrepreneurial Ecosystem
Source: Fong (2016)

with MDeC, it works on the MSC startup programme. The entrepreneurial ecosystem now extends beyond the Cyberjaya cluster and is highly connected with global and regional companies that are involved in other entrepreneurial ecosystems. These linkages are said to provide more information, better access to markets, and better access to funds for local startups. The various organisations that MaGIC has linkages with include venture capital companies; educational institutions from other clusters that are involved in startup development; non-profit companies like UP Global that foster entrepreneurship; grassroots leadership; and strong communities. MaGIC's[7] objectives are premised on three core functions: (i) connecting entrepreneurs to governmental and private agencies (Malaysia has approximately 74 government agen-

cies and over 90 private agencies supporting its entrepreneurs), (ii) ensuring collaboration between all parties to support startups and entrepreneurial development, and (iii) creating a database of successful accounts. What is interesting is the focus on the establishment of a culture of startup development among the technology/engineering workforce of the country.

For the sharing of success stories or the startups / entrepreneurial ventures, the interesting role of Media as an actor has emerged in the Malaysian entrepreneurial ecosystems. There is now a linkage with a local online media organisation called Digital News Asia[8] that shares successful reports of local startups in order to educate the public—this is intended to help build a culture of technology entrepreneurship. This

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[7] https://www.thestar.com.my/business/business-news/2014/09/13/the-magic-of-business/#1KrmsLAb7W2qqtKP.99
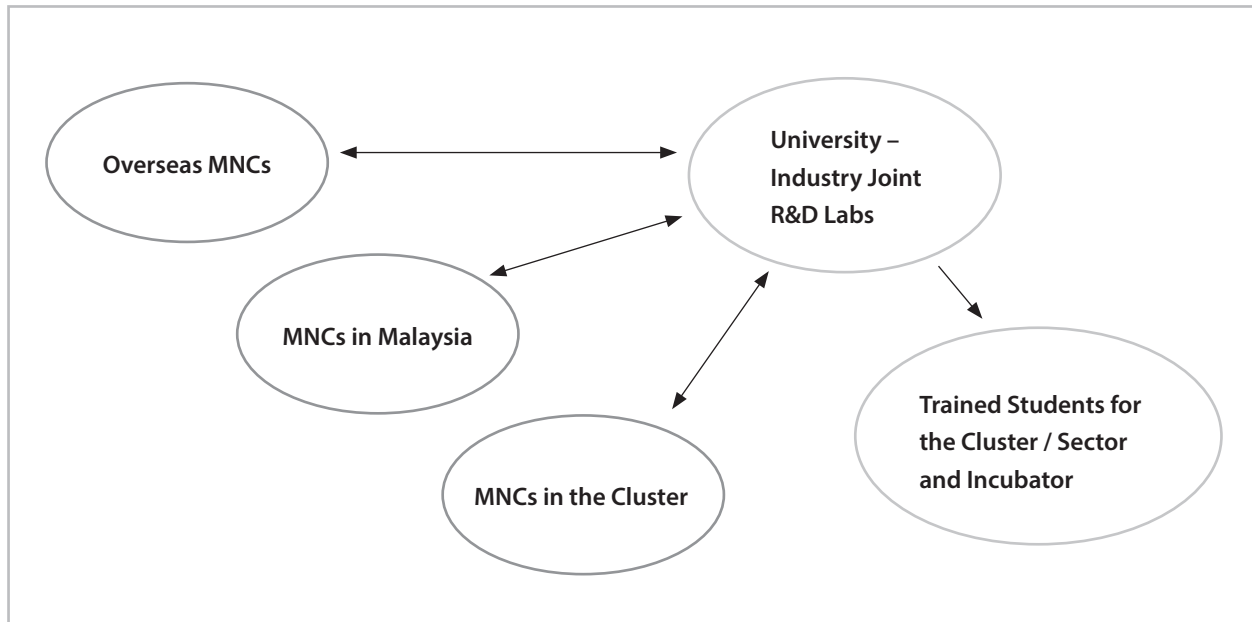[8] https://www.digitalnewsasia.com

Fig. 7. Initial links between the cluster university and MNCs in the greenfield cluster

Source: Developed by Author

new actor, i.e., the media in entrepreneurial ecosystems is discussed later in this paper.

Thus far, the role of the cluster policies and the actors that started the technology cluster and initial efforts to support entrepreneurship/ startups in Malaysia have been overviewed. The evolution of the cluster development agency (MDeC) has been explained, and the new agency's (MaGIC) role in linking together the various actors of the entrepreneurial ecosystem have been examined. In the next section, the role of universities and other actors in the Malaysian entrepreneurial ecosystem will be explored.

3.6 The Role of Universities (Education Policies) and Other Actors

In the nascent stages of the Cyberjaya cluster development, the newly formed Multimedia University (MMU) and two public universities in the vicinity were seen as the educational institutions with major roles to play in the development of the cluster in general. Universities have always been considered a crucial element in the system of innovation (Vang et al., 2007), not just in terms of their teaching and research but also the 'third task' which refers to direct interaction between universities and society. This third task can range from creating new technology firms, consulting local industry, delivering advice to politicians and policymakers, holding general public debates, and shaping the national spatial dis-

tribution of social opportunities and services. Vang et al. (2007) also discuss the importance of context for the role of universities, which is extremely pertinent in the context of Cyberjaya as an entrepreneurial ecosystem.

As mentioned, Cyberjaya started as a greenfield cluster, and the university (MMU) was newly formed and, therefore, had no history of research or achievements to consult. The role of the university was to provide manpower to the cluster and to enhance entrepreneurs and support the cluster incubator established adjacent to the university. Regarding one of the 'third tasks' of creating technology firms or consulting local firms, an interesting linkage with industry was developed.

Figure 7, above, shows the linkages that the cluster university developed with the industry for the development of the R&D function and its role in the entrepreneurship ecosystem. Regarding the flow of knowledge, interestingly, the flows were from the large MNCs into the university laboratories through sponsored programs (Fig. 7). The two-way arrows from the university to firms indicate that the university takes on the role of supplying human resources to firms and indirectly transferring knowledge (Mohan et al., 2012). This is a model or an approach of how new universities or universities transforming from teaching mode to 'third task' can consider supporting entrepreneurship.

As the Cyberjaya cluster has evolved over the last two decades,

Fig. 8. Coworking organisations creating inter-organisational and inter-regional linkages

Source: http://www.icubeinnovation.com.my/event/free-coworking-day-4-january-2018-first-thursday/

there has been a major change in terms of the firms that have emerged within the cluster, and also a change in the role of the university as explained below. While efforts have been made by the Cyberjaya cluster-based university to support startups and entrepreneurship, other universities in Malaysia, both private and public, have been developing their own programmes to support entrepreneurship. More recently, the government of Malaysia introduced the Entrepreneurship Action Plan (EAP) of Higher Education Institutions (2016-2020)[9] . The aim of this plan is to promote entrepreneurship education and entrepreneurship development in institutions and to instil entrepreneurial mindsets and behaviours in the students in the country. The EAP has four initiatives which include: (i) high impact education practices; (ii) a job creator framework; (iii) improving the student entrepreneur development support ecosystem; (iv) strengthening the entrepreneur teaching force competency.

The plan is that the EAP to be linked to the "Shift 1" of the Malaysia Education Blue Print 2015-2020 (Higher Education), which focuses on the "development of students and system aspirations to produce holistic, balanced and entrepreneurial graduates". Several public universities have established centres for students' entrepreneurship development and now organise workshops to educate people about the support available through the EAP, thereby encouraging academics and students to become interested in entrepreneurship. Another practical initiative launched by the ministry is the 'Public-Private Research Network (PPRN)', which aims to help connect businesses and entrepreneurs with the universities and other higher education institutions. There are grants for academics running industry/business proble m-solving projects involving students.

Over the previous two years[10], this plan and related programmes were supposed to have gained traction based on the number of pro-

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[9] https://www.nst.com.my/education/2018/01/323599/entrepreneurial-ecosystems-university

[10] https://www.nst.com.my/education/2018/01/323604/demand-driven-research-proves-cost-effective

Expert Ratings of the Entrepreneurial Eco-system (ranked out of 65)

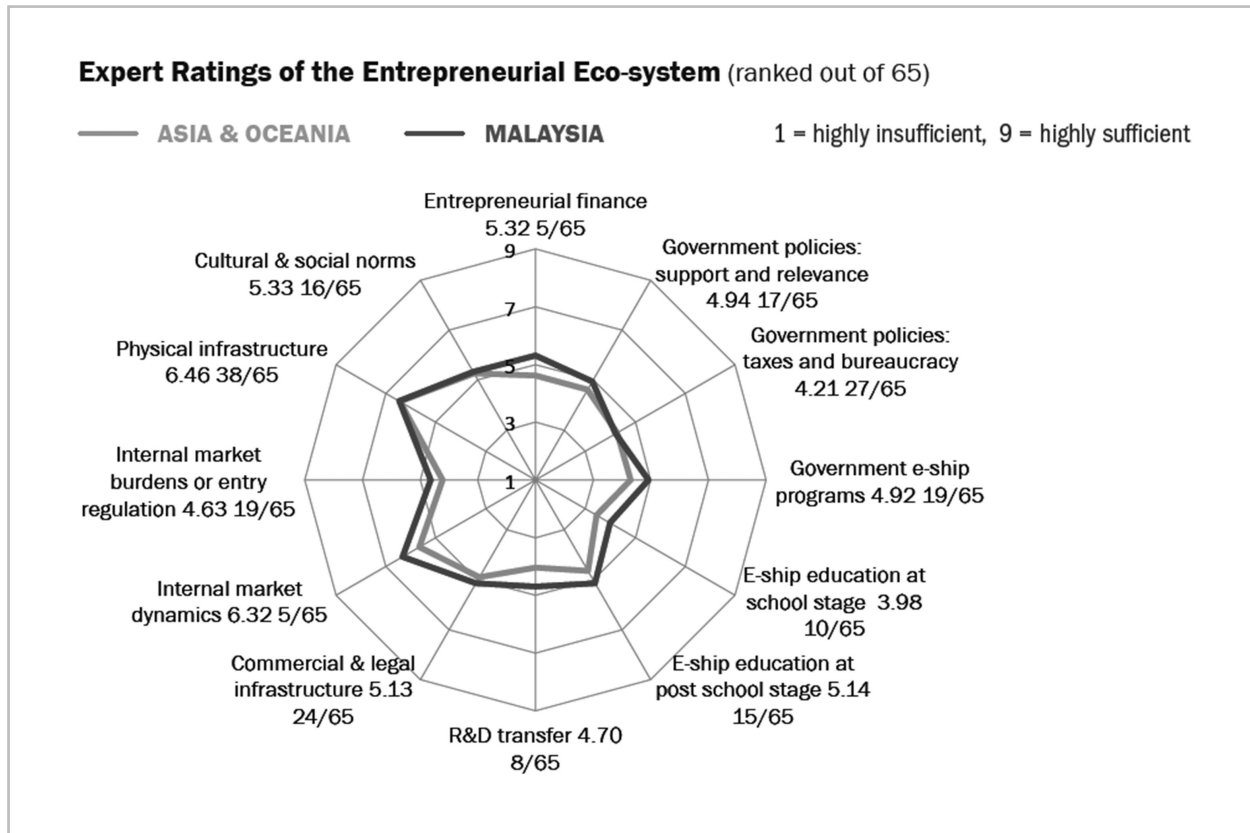—— ASIA & OCEANIA —— MALAYSIA 1 = highly insufficient, 9 = highly sufficient

Fig. 9. The status of the entrepreneurial ecosystem in Malaysia

Source: GERA (2017)

grammes in the universities and the outreach to students. In addition to the government led programmes supporting entrepreneurship development in Malaysian universities, private universities and overseas branches of foreign universities have also been developing their own entrepreneurship development programmes. Some examples of such initiatives are the University of Nottingham's 'Ingenuity programme' and Monash University's Entrepreneurship and Innovation Hub (eiHub).

Thus, there has been an emergence of different types of universities, with a myriad of entrepreneurship development programmes, in Malaysia's entrepreneurial ecosystems. While some anecdotal evidence of entrepreneurs emerging from these programmes has been reported in newspapers, there is a need to study the impact of this role of universities.

3.7 Other Actors – Coworking Spaces, Community Organisations, and Media Organisations as Knowledge Intermediaries in the Entrepreneurial Ecosystem

Malaysia has seen a growth in the number of coworking spaces. Coworking spaces are defined as membership-based workspaces where diverse groups of freelancers, remote workers, and other independent professionals work together in a shared, communal setting (Spreitzer et al., 2015). Interestingly, Spreitzer et al. (2015) have found that individuals seem to thrive in such spaces, and these seem to be an integral part of entrepreneurial ecosystems.

There are different models of coworking spaces. In Malaysia, there are several independent houses (bungalows) and other unused old buildings being converted into coworking spaces alongside trendy cafes and restaurants. Even more interesting is the entry of a company from the hospitality[11] industry called OYO Rooms, which operates cowork-

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[11] https://inc42.com/buzz/oyo-on-a-roll-hospitality-unicorn-launches-coworking-brand-powerstation/

Table 2. Changes in the entrepreneurial ecosystem in Cyberjaya, Malaysia

	Initial Stage of Cluster	Current Stage of Cluster
Characteristics of the Cluster	Embryonic and Greenfield MSC status benefits for within the MSC corridor of Cyberjaya, the Technology Park, and KLCC.	More or less brownfield; MSC status cluster benefits extended to many (MSC) corridors across the country.
The Ecosystem's Key Focus	(Technopreneur) – Setting upbuilding blocks for the foundation of SMEs and entrepreneurs; Focusing more on infrastructure to support (existing) entrepreneurs by running programmes; Setting up resources and tech-funding agencies.	Not only supporting but also fostering an entrepreneurial or startup culture in the country and enhancing the ecosystem; Education programmes involving entrepreneur communities; Ecosystem stakeholder sessions (TeAM and other ecosystem parties); Coordinating supporting firms, funding, and resources; Global connections – more foreign participation.
Organisations, Institutions, and Their Roles	MDeC as the key player; Cluster University (MMU) and neighbouring universities – UPM with MTDC and UNITEN.	MDeC – Nationwide digital Malaysia and startup programmes; MaGIC – Academy, accelerator programme and go Standford programme; MaGIC coordinates and develops linkages among ecosystems' actors, including private incubators, funders, universities across the country as well as regionally.
Other Aspects	Open only to Malaysians.	Open to Malaysians and non-Malaysians
Other Actors	Universities played a relatively minor role in the effort to develop entrepreneurship.	Universities are now key institutions in terms of developing entrepreneurial mindsets and as 'suppliers' of entrepreneurial manpower and academics/researchers as suppliers of knowledge.
	Few additional organisations besides the traditional actors in an innovation/entrepreneurial ecosystem.	New actors emerging, coworking spaces provided (with different models); community organisations and media organisations help to disseminate information and help develop linkages.

ing spaces in India and SE Asia (including Malaysia). There are now 'coworking community' organisations which play a role in connecting or developing links between the various actors in entrepreneurial ecosystems. These community organisations not only operate in Malaysia or in one country but also across borders developing links among the various actors in different countries for the regional development of entrepreneurship. An example of such an event with multiple actors is displayed in the graphic (Figure 8) below.

It is necessary here to discuss the role of media organisations as critical actors in entrepreneurial ecosystems, particularly in emerging economies like Malaysia where the startup or tech-entrepreneurship culture is emerging. Media organisations like Digital News Asia (DNA), an online media organisation covering Malaysia that is dedicated to digital-technology-related business and startup development, have played a very important role. DNA collects and disseminates information on entrepreneurship and supporting

elements, features stories celebrating role models or successful startups at different stages of development, and works with universities in the country to develop an entrepreneurial 'buzz' among young adults. DNA, besides its portal, works with a business focussed radio station in Malaysia, BFM 89.9, which broadcasts DNA's twice-monthly programme. DNA also has a "Tech Talk" segment on LinkedIn and on Bloomberg TV Malaysia. Interestingly, DNA is itself a startup, with one of its founders being a respected journalist who reported for a business newspaper.

4. SUMMARY AND CONCLUSIONS

The description of the ecosystem for startups at the initial stage of the MSC project highlights the need for different elements to support

startup development. In the initial stages, the roles of regional or cluster development agencies (like MDeC) were crucial for attracting businesses into the cluster and in forming an ecosystem. The role of cluster or regional development agencies was also to set up a programme for the support and development of startups. As the cluster evolved from a greenfield cluster to one having a threshold of companies, the development of the entrepreneurial ecosystem failed to make substantial progress in terms of the number of startups emerging. This may have been due to the profoundly broad mandate given to MDeC. As the Cyberjaya cluster and the MSC project have become more established, it would seem that the role of the private sector and more regional and global actors have become important in developing startups with access to a larger pool of resources. While it may seem that MaGIC is similar to MDeC in providing or developing support for startups, there is a marked difference. MaGIC started operations with stakeholder dialogue sessions to identify the needs and requirements of the entrepreneurial community[12] . This dialogue resulted in the identification of various issues to address, for instance, a lack of awareness of resources available, a lack of finance (local finance was risk-averse), a lack of technical talent due to the hiring practices of startups or an aversion to hiring foreign talent, etc., and a lack of 'spaces' for startup entrepreneurs to meet and develop ideas and businesses.

The role of an agency like MaGIC as an information or knowledge broker institutionalising a startup culture through different linkages and connections and trying to develop a culture of startups through education programmes can be seen here. Since MaGIC commenced operations five years ago, it would appear that there has been some 'buzz' in the entrepreneurship or startup areas in the cluster and country. Data is also being acquired by MaGIC, titled the Malaysian Startup and Social Entrepreneurship Ecosystem Reports, and from independent agencies such as the Global Entrepreneurship Monitor (GEM). Some of the outcomes that have seemingly emerged following the efforts of MaGIC are displayed in Figure 9, above.

While there appears to be a "buzz" in terms of entrepreneurship and startup businesses following the changes in the actors and their roles in the ecosystem and most uni-versities have entrepreneurial programmes, the emergence of innovative technology remains weak. 'Tech' (R&D linked) startups are still not prevalent (most are concerned with the development of applications). Knowledge/research flow from universities to the market remains relatively low. The role of universities in innovation systems or entrepreneurial ecosystems from a Western perspective was to provide science and technology knowledge to businesses (through science and technology parks). In Malaysia, there appears to be a critical role that universities are now playing as 'change agent', i.e., to bring about change in society/culture by promoting entrepreneurship as an alternative livelihood to seeking employment by large companies. Some universities provide internal markets and a safe place to experiment. The role of media organisations as important actors in the ecosystem is interesting. The media is playing a role along with industry and universities in creating role models in the startup sector. The media is also involved in the collection and dissemination of information related to entrepreneurship and startups.

Table 2 summarises the development of the entrepreneurial ecosystem in Cyberjaya and the MSC project during the two periods, i.e., in the early stage of the greenfield cluster and the current more brownfield or established phase of cluster development.

Overall, the entrepreneurial ecosystem in Malaysia offers interesting lessons in terms of what is needed at the starting stage of the development of a cluster to the later stage, especially in countries lacking a strong track record in technology development or research and development (R&D). What is of particular interest is the importance of and the changing role of the government in the development of an ecosystem for supporting entrepreneurship in an emerging economy. In the initial stages, there was a focus on the development of infrastructure and support programmes and on attracting businesses/entrepreneurs to the cluster through policies and the provision of incentives. The government also played a role in providing markets (through large government projects) to attract both MNCs and local companies to the cluster and thus develop a technology ecosystem.

In the later phase of the development of the cluster,

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[12] http://mymagic.my/en/magic-hosts-entrepreneurs-dialogue/

with the various building blocks like infrastructure and the threshold of large MNCs and local firms present, there were greater dynamically linked developments in the entrepreneurial ecosystem, including the involvement of various local, regional, and global parties relevant to startup development. These include business associations, venture capital providers, startup education providers, and non-profit organisations that foster startup or entrepreneurial ventures.

More importantly, one of the factors for a successful entrepreneurial ecosystem was identified as culture. While all of the elements needed to support startups were established during the initial phase, it was the lack of startup culture among the engineering and technology education people in the county that was problematic. It is this aspect that is being addressed by the MaGIC organisation. An interesting new actor for the enhancement of the culture of startup development of technology entrepreneurship is the media. In the context of Malaysia in general and also in Cyberjaya, a media organisation called Digital News Asia (DNA) has been playing a valuable role.

This paper is descriptive and based on secondary data; thus, as associated with such work, there are limitations. It would be interesting to see ecosystems being examined in longitudinal case studies with more primary data obtained through interviews besides consideration of historical data. A longitudinal case study investigating how various organisations evolve as well as which elements or actors seem to function well would highlight where support is needed and what is relevant or irrelevant. Nevertheless, it is felt that this paper can offer interesting perspectives and lessons to countries or regions that are attempting to develop technology clusters, particularly those that are building greenfield developments.

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