

INNOVATION AND ENTREPRENEURSHIP AMIDST CORONAVIRUS: A HYBRID INNOVATION NETWORK RESPONSE

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ABSTRACT

Purpose

This article aims to discuss adaptation of innovation network during crisis, using the context of an Indian state's response during early stages of the COVID-19 pandemic.

Design/methodology/approach

The article is based on a combination of data from public sources, and interviews with entrepreneurs and innovators from an Indian state obtained during the period January – May 2020.

Findings

A hybrid innovation network approach with low barriers between the triple helix agents and a non-linear approach to innovation shaped the response of an Indian state towards the pandemic.

Value

This article serves as a case study for innovation network response during initial periods of a crisis such as COVID-19.

Keywords – Coronavirus, COVID-19, India, Entrepreneurship, Innovation ecosystem, Emerging markets, Crisis

INTRODUCTION

Crisis situations like COVID-19 pose a number of additional challenges in comparison to normal times (Bundy, Pfarrer, Short, & Coombs, 2017; Majchrzak, Jarvenpaa, & Hollingshead, 2007; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017), which mandate different approaches to entrepreneurship and innovation management. For instance, during such crisis there is a great sense of urgency, which offers limited time for individuals to come together and develop solutions to respond to the crisis (Majchrzak et al., 2007). Prior research on innovation networks discusses adapting them to contextual conditions (Carayannis & Campbell, 2009; Rodrigues & Melo, 2012). In this article, I integrate literature on innovation networks and crisis management, to discuss adaptation of innovation network in crisis contexts.

THEORETICAL BACKGROUND

Innovation networks

The innovation network linkage between university-industry-government is commonly known as a triple helix model of innovation. Triple helix model suggests that the interaction between university-industry-government is important to improve the conditions for innovation in a knowledge-based society (Etzkowitz, 2003). In this model, universities are seen as the sources of new knowledge and technology, industry as the locus of production, and government as the source of contractual relations that guarantees stable interactions between stakeholders. Etzkowitz (2003: 302) discusses different origins of the triple helix: “(1) a statist model of government controlling academia and industry, and (2) a laissez-faire model, with industry, academia, and government separate and apart from each other, interacting only modestly across strong boundaries.” In the statist model, government plays a leading role in knowledge and innovation development, while in the laissez-faire model industry is the driving force.

Carayannis and Campbell (2009, p. 202) extend the triple helix model to discuss a Mode 3 innovation ecosystem for the 21st century, which is “a multi-layered, multi-modal, multi-nodal and multi-lateral system, encompassing mutually complementary and reinforcing innovation networks and knowledge clusters consisting of human and intellectual capital, shaped by social capital and underpinned by financial capital”. In such a system, there exists hybrid innovation networks overlapping between the government, industry, universities and non-governmental knowledge entities (Carayannis & Campbell, 2009). Such hybrid innovation networks facilitate creativity and innovation across scientific and technological disciplines in a “top-down, policy-driven as well as bottom-up, entrepreneurship-empowered fashion” (Carayannis & Campbell, 2009, p. 203). Rodrigues & Melo (2012) also discuss an adaptation of triple helix model, using the context of economic crisis. While evaluating the response in the aftermath of the economic crisis in a Portuguese municipality, they found that triple helix model was simplified and adapted to mobilize local innovation actors, to legitimize policy aspects and to improve coherence between the policy aspects of innovation.

Early conceptualization of triple helix model of innovation viewed it more as a linear model of innovation. In such a model, universities undertake basic research, which is converted to applied research through university spin-offs or patents. Industry then takes up the applied research, further experiments with it to transform it into commercial market applications. Non-linear model of innovation discusses a more parallel development of basic research, applied research and experimental development. In this regard, universities, government research

institutions and industry join together to create a network that performs the parallel development (Carayannis & Campbell, 2009).

Crisis management

Crisis management discusses aspects of returning organizations to normal functioning after adversity (Bundy et al., 2017; Williams et al., 2017). Williams et al. (2017) classified the literature in the field into crisis-as-an-event and crisis-as-a-process. This study draws on the crisis-as-an-event perspective, which focuses on exploring the aftermath of a crisis. In this research, crisis is defined as “a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization” (Pearson & Clair, 1998: 66).

Scholars have studied different categories of crisis such as incidents, accidents, conflicts, disasters etc. James et al. (2011) highlights three components as being important for understanding a crisis namely the rarity of the event, significance of it and its impact on the stakeholders. Given the rarity of the crisis, it is acknowledged that one cannot completely plan for it (Topper & Lagadec, 2013). Therefore, the main focus of crisis management research is on understanding how to bring organizations or systems back into functioning in the aftermath of a crisis. Extant research has discussed a number of responses in this regard including the role of emergent organizing, compassionate venturing, local venturing, and inter-organization collaboration (Majchrzak et al., 2007; Shepherd & Williams, 2014; Williams & Shepherd, 2016).

I bring together the literature on innovation networks and crisis management in this executive insights article to present the case study of a hybrid innovation network response to COVID-19 pandemic crisis. The key characteristics of this response was the low barriers amidst the triple helix agents and non-linear approach to innovation development during the early stages of the crisis.

Research context and data sources

The innovation and entrepreneurship ecosystem in India has evolved over multiple stages since independence. It has been influenced by both national (e.g. liberalization policy of 1991) and international (e.g., TRIPS agreement in 1995) factors (Chatterjee & Sahasranamam, 2018; Sahasranamam, Rentala, & Rose, 2019). The last decade has been particularly striking, as it has seen a growing recognition of new business activity (Bhagavatula, Mudambi, & Murmann, 2019; Sahasranamam & Sud, 2016).

The research context for our study is the southern state of Kerala in India. Kerala reported the first COVID-19 positive case in India on 30 January, 2020 (TOI, 2020). Consequently, Kerala was also the state responding to the crisis earlier as compared to other states of the country. This study looks at the first 100 days of response of the state of Kerala, over the time period January 30th – May 10th 2020. During this period, Kerala had reported only three COVID-19 related deaths during this period and managed to bring the case numbers to zero in early May (PTI, 2020). In comparison, overall tally of COVID related deaths was 2,109 across India (The Hindu, 2020a). Despite being a densely populated state, the flattening of COVID-19 curve in Kerala achieved global recognition (Masih, 2020; Spinney, 2020).

I rely on a combination of primary and secondary data sources to develop this article. Primary data includes 10 interviews done with COVID-19 volunteers (2), industry professionals (1), start-up founders (2), government health staff (4), and essential workers (1) closely related with Kerala's response to the pandemic. These interviews were done in-person (adhering to COVID protocols), over telephone or through online conferencing platforms. This was supplemented by secondary data such as government reports and advisories collected from the websites of National Centre for Disease Control (NCDC), Ministry of Health & Family Welfare (MoHFW) Government of India, Kerala State Disaster Management Authority (KSDMA), and Directorate of Health Services (DHS) Government of Kerala. Further, I did a systematic search for newspaper and other press articles on the topic through Gale OneFile database using keywords such as 'Kerala', 'covid', and 'corona' to collect details on all aspects related to the pandemic and the state's response to it. A thematic analysis was employed to identify key themes in the data from multiple sources (Silverman, 2000).

Hybrid innovation network response

In this section, I discuss the hybrid innovation network which brought together government, universities and industry (start-ups predominantly) in Kerala to respond to the pandemic during its initial period. Amongst other reasons like the socio-economic-health infrastructure of the state (Faleiro, 2020), this hybrid innovation network response has had a crucial role in fighting the crisis in Kerala.

During the initial stages of COVID-19 crisis, a proactive approach by the government set the impetus for innovations. The initial positive cases of COVID-19 in India were reported in the state of Kerala in late January 2020, in students who returned from universities in Wuhan. The state government in Kerala immediately setup procedures for health check-up and put in place contact tracing efforts (Shailaja, 2020). On flights coming into India, passengers were given two copies of a self-declaration form¹, which asked for personal address and contact details, alongside specific information like seat number on the flight. These details were then digitized to allow for efficient contact tracing, if any passenger happens to be tested positive for COVID-19 later. As the initial cases were all reported from travellers from abroad, precautionary effort went into training airport staff and airport cab drivers. For instance, airport cab drivers had instruction classes from government health staff, an airport cab driver said:

"We had a class with two government health staff. They showed how to comprehensively wash hands. We were asked to wipe the car seats after every passenger ride with sanitizer liquid. Another point was to recommend passengers to use back seat in the cab to allow social distancing and to keep the windows of the cab open for air circulation".

Further, for all foreign travellers, there was a general advisory of self-isolation at home for 14 days, with health or police staff following-up on it in person or through phone. In addition to precautionary efforts, on every phone call, as a caller tune, an automated health message about COVID-19 was carried to spread public awareness (Business Line, 2020). This

¹ Source -

https://www.cvfr.com.au/media/places/IndiGO/6E_SELF_DECLARATION_FORM_FOR_TRAVELLERS_10Mar20.pdf

caller tune was not just on mobile phones, but also on landlines, and conveyed in English and in respective regional vernacular languages to ensure it reaches everyone.

Kerala state government adopted a proactive and participatory approach that lowered the barriers existing between the triple helix agents. For instance, a university student, who volunteered at a government war room said:

“I work at the collectorate (district administration office). We have a call centre here, manned by us (volunteers) and some volunteers are also working from home. We are directly in contact with the district administration, local self-government, and health staff. I was developing the contract tracing technical features directly based on the inputs I get from them.”

This led to closer integration of efforts between government, university and industry to develop innovation solutions for the pandemic. Universities and academic research institutions began to partner with industry and government. The higher education sector, particularly the trained engineering workforce developed a range of innovations of varying technical complexity that are suited to the local contextual needs. For instance, a team of young innovators from an engineering college in Kerala developed a low-cost (to be affordable) automated hand sanitizer machine that can hold larger volume of sanitizer liquid (to account for the larger population) and can be operated using a battery (to account for power shortages and absence of charging points) (The Hindu, 2020b). This was used at entrances to public spaces and government offices. Another prominent concern of COVID-19 in its early stages was the lack of availability of ventilators and testing kits. To this end, Sri Chitra Tirunal Institute of Medical Science and Technology (SCTIMST), an academic research institution in Kerala, developed multiple products including a ventilator system based on an artificial manual breathing unit (AMBU) and a testing kit that can provide results in 2 hours (Kumar, 2020). The testing kit was developed in partnership with Agappe Diagnostics as industry partner. Given the urgency of the crisis, a non-linear approach to innovation was followed, wherein research and testing were carried out in a concurrent manner to support rapid innovation prototyping. A researcher involved in the project said:

“This is a fast moving project. We are in this field for over 25 years, that was very helpful. Some new entrant would not have managed to quickly respond. In one to one and half months, we co-innovated with Sri Chitra, developing from our earlier product and experience. One of us was working at Sri Chitra itself for 15 days. ... Usually we have multiple beta testing, unit testing, validation etc., but this was rapid innovation. So we are not focussed on aesthetics and user side type aspects now, rather the focus is only on intended use. Regulatory side is same, and we are going through the process with ICMR etc, even that is faster than usual time span. Once the testing and regulatory process is done, we know that we can further improve time efficiency and external aspects for the user.”

Start-ups, more than large firms, led the industry’s efforts in Kerala towards developing innovations for COVID-19. Research suggests that entrepreneurs and small firms are more equipped at operating under the uncertainties of emergencies as they have flexibility, resilience, and faster decision-making (Williams et al., 2017; Williams & Shepherd, 2016). The response from start-ups has been two-fold primarily. First, some start-ups have re-purposed their existing

products to meet with the demands of COVID-19. For example, Asimov Robotics have remodelled the functionality of their robots to deploy them at entrances of office buildings and other public places to dispense hand sanitizers and for delivering public awareness messages on precautionary measures to be taken to control the spread of the virus. These robots were also used in hospital isolation wards to carry food and medicines, to ease the pressure on medical staff (Meghani & Thaker, 2020). In another effort, to ensure transparency and to curb fake news, government collaborated with industry for technology-supported information dissemination. For instance, using a platform developed by the start-up QKopy, Kerala state government launched an app called GoK-Kerala Direct to send official government notifications, COVID-19 case updates and other relevant information (Mathur, 2020). Second, start-ups have used the crisis as an opportunity to do focussed R&D and develop new solutions for COVID-19. For instance, Aqoza technologies developed chemical formulations that disinfect public spaces using a water-based sanitizer (Sahasranamam, 2020).

Conclusion and future research

In conclusion, this article serves as a case study for innovation network response during initial periods of a crisis like COVID-19 in an emerging market context. I highlight the case of a hybrid innovation network response, with low barriers between government, university and industry, coupled with a non-linear approach to innovation. This adds to the research exploring adaptations to triple helix model in different contextual conditions (Carayannis & Campbell, 2009; Rodrigues & Melo, 2012) and to the emerging research stream on managing change during New Normal (Ahlstrom, 2020; Verbeke, 2020).

From my interviews, couple of other aspects also appear to be facilitating the innovation response, which needs detailed future research. First, I notice that the jugaad approach (Radjou, Prabhu, & Ahuja, 2012) – a frugal innovation mind-set to find hacks to problems with limited resources – has particularly helped the trained engineering talent to rapidly respond to demands of the emergency with limited resources. Second, the presence of a strong historical culture that encourages philanthropy and humanitarian work (Agrawal & Sahasranamam, 2016; Sahasranamam, Arya, & Sud, 2019), has personally motivated the innovators to direct their ability towards finding solutions for fighting the pandemic. Third, in the state of Kerala, during prior epidemics and emergencies like Nipah outbreak and Kerala floods, triple helix agents had come together to provide solutions. This experience also facilitated closer collaboration between them during the early stages of COVID-19 pandemic. Future research is needed into understanding how such experiential learning influence the hybrid innovation network response. Fourth, there is also need for future research to look into commercialization of technology prototypes developed during emergencies from university and research labs. Finally, following recent research calls (Ahlstrom et al., 2020; Wang et al., 2020), scholars could explore the different categories of innovation responses during crisis, its processes and implications for the New Normal of our lives.

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