Entrepreneurial Research Culture Preconditions Innovation Ecosystem; A Case Study of Innovation Summit in Pakistan

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Abstract

Innovation system is based on degree of triple helix model being exercised in a country. The high level of interaction between industry, academia and public sector determines effectiveness of innovation system. The relationship of innovation system and triple helix exercise is moderated by entrepreneurial research culture existing in the society. The current study is conducted using qualitative inquiry approach and single case study method as strategy for investigation. The paper is based on the case study of innovation summit being organized in Pakistan for last five years. The innovation summit is planned to promote entrepreneurial research in academia and industry of Pakistan. The strong connection between academia, industry and public sector is resulted as outcome of this innovation summit. The entrepreneurial research drives the interest, connects science with economics, reduces trust gap and builds confidence of triple helix partners on each other's. The phenomenon presented in the case study leads to theorization of relationship between entrepreneurial research and implementation of triple helix concept. The paper helps policy makers to use entrepreneurial research as tool to practice triple helix and strengthen innovation ecosystem in the society.

Key words: Entrepreneurial Research Culture, Innovation Ecosystem, Innovation Summit, Pakistan

1. Introduction

The triple helix of university-industry-government (UIG) relationship has been regarded important for development of innovation ecosystem (Leydesdorff, 2018; Ranga and Etzkowitz, 2015; Kim et al., 2012; Leydesdorff et al., 2006; Etzkowitz et al., 2000). Innovation ecosystem is not only about any innovation structure or innovation events rather it consist of economic relations, economic actors and non-economic components like culture, sociological interactions, institutions and the technology; these non-economic parts facilitate idea generation, knowledge and technology diffusion (Mercan & Goktas, 2011). However, the crucial step to keep the innovation ecosystem vibrant, vigorous participation of practical and scientific actors is essential, they need to work beyond the boundaries of firms (Pulkkinen, 2014). The role of academia, public sector and private sector becomes extremely important to transform basic research into applied research. Whereas, high level of trust make this collaboration more effective. Furthermore, innovation ecosystem is emerged as an imperative context in field of entrepreneurship (Carlsson et al., 2013; Obschonka, 2017). For instance, ecosystem of Intel's microprocessor, Apple's iPhone ecosystem, IBM's Power Architecture and others. Eventually, these digital innovations infused in many products and services

through many sectors that led to develop innovation ecosystem in country (Nambisan & Baron 2013; Yoo, Henfridsson, & Lyytinen, 2010).

However, numerous scholars stated that some of the important determinant of entrepreneurship are firms' R&D and university' research and development (Spilling, 1996; Armington and Acs, 2002; Lay, 2003; Audretsch and Lehmann, 2005; Wang, 2006; Brixy and Grotz, 2007). Furthermore, explaining the domain of entrepreneurship research, Carlsson et al. (2013) claimed that entrepreneurship research as one of the main contributor of developing innovation system. Moreover, researchers confirmed the positive impact of triple helix actors on entrepreneurship research (Etzkowitz & Zhou, 2007; Etzkowitz, 2011; Sá et al., 2018). Here the role of entrepreneurship research is important between UIG interactions and developing innovation ecosystem. Considering this concept we theorized relationship between implementation of triple helix concept and innovation ecosystem with moderating role of entrepreneurial research using the leans of triple helix model. Results of study are based on the case study of innovation summit that is being organized in Pakistan annually from last five years. It's a two days event organized four times in a year. The main objective of summit is to bring three innovation stakeholders at one platform; public sector, private sector and academia.

Innovation summit is playing very important role in promoting, distributing, expanding and advancing the viable research technologies. Whereas academia sell technologies, industry buy technologies and the role of government is to facilitate this process. Inclusively, Innovation summit open the doors of networking for innovation experts for finding partners, linking ideas with stakeholders and promoting technology. So this study is attempted to theorize and understand the relationship between stakeholders and overall impact of summit on national level.

This study will help scholars to understand the importance of entrepreneurship research culture in country for effective innovation ecosystem. This study will contribute the understanding of policy makers to use entrepreneurial research an important tool for triple helix exercise at national level.

2. Literature Review

This paper aims to provide insights that how Innovation summit is one of the main contributors in developing innovation ecosystem in Pakistan. While the effectiveness of innovation ecosystem is based on degree of triple helix being exercised in the country. This study highlights relationship between triple helix and innovation ecosystem with moderating role of entrepreneurial research culture existing in the country.

Innovation Ecosystem

The innovation ecosystem is getting popular progressively however this concept is used equivocally by the academia, business and the policy (Ritala & Almpanopoulou, 2017). Nevertheless, Oh et al. (2016) criticized conceptual ambiguity of Innovation ecosystem and called this as "flawed analogy" that is borrowed by innovation and management studies from the biology. According to Jackson (2011) biological ecosystem is defined as the complex set of connections among area's residents,

habitats and the living resources, where they need to maintain the equilibrium state as their functional goal. Conversely, innovation system is considered as economic where innovation and technology development are the basic goals of entities and actors. Whereas actors include the human resources such as faculty, students, staff, industry representatives and researchers, etc. and the material resources such as equipment, funds, facilities, etc. that put together the institutional entities to participate in the ecosystem such as engineering colleges, business schools, universities, business firms, venture capitalist, university-industry research institutes, industrial or federal supported centers, business assistance organizations, state or local economic development, industries, state, policy makers, funding agencies etc.

He further added that innovation ecosystem consists of two distinct; the knowledge economy and the commercial economy but they are largely separated economies. Knowledge economy is driven by the fundamental research and commercial economy is driven by marketplace. In 1993, Moore introduced the concept of Innovation ecosystem in terms of management literature and defined it as loosely interconnected network of the entities and companies that collaborate around a share set of knowledge, skills, technologies, and work together and competitively in order to develop the new products and the services (Moore, 1993). Furthermore, competition is considered an essential driver that motivates entrepreneurs to innovate and encourage stakeholders to develop (Moore 1998; Porter 1998). While from the innovation view point Oksanen (2014) defined innovation ecosystem as the system that develops innovation through networking of the local actors and the processes in order to find solution for the different problems.

In summary, Innovation ecosystem is a system that develops innovation, technology and solution for challenges by interlinking different actors and the processes whereas competition is considered motivating factor. While in order to keep the innovation ecosystem vibrant and active many actions and characteristics are required (Isenberg, 2010) where the core is “continuous movement of ideas and people” (Oksanen, 2014).Furthermore, scholars claimed that innovation ecosystem is different from the natural ecosystems (Papaioannou, Wield & Chataway, 2009) as innovation ecosystem is engineered system that is designed for a purpose; it’s not evolved naturally (Oh et al., 2016). Moreover, scholars and policy makers recognized that innovations are developed through dynamic and complex national ecosystems which include schools, university, industry and the government (Frenkel&Maital, 2014).

Meanwhile Pulkkinen (2014) claimed that ecosystem is not only about internal E & I activities in fact in order to make ecosystem more effective the collaboration among academia, public and private sector is necessary. He elaborated that innovations are developed by engaging practical and scientific actors where product development is done by a linear process; basic research is followed by the applied research. He also added that openness, active co creation, informality and high trust communication help to keep the regional ecosystem active and vibrant.

From the literature review, many types of Innovation ecosystem are observed where many researchers didn’t used the term “eco” (Oh et al., 2016), for instance, Regional innovation ecosystem and national innovation ecosystems (Morrison, 2013), Corporate (open innovation) innovation

ecosystem (Zhang et al., 2014), Digital innovation ecosystems, city-based innovation ecosystems and innovation districts (Lin, 2014; Cohen et al., 2014; Morrison, 2013), High-tech SMEs centered ecosystems (Frenkel and Maital, 2014; Lorré et al., 2006), hyper-local innovation ecosystems, the university-based ecosystems (Graham, 2013; León, 2013) and the entrepreneurial ecosystem (Fetters et al., 2010).

The innovation and entrepreneurial ecosystem of Pakistan are evidently flourishing (Zaman, 2018). Despite the sluggish growth in entrepreneurial activities, Pakistan is ranked 109 of 126 according to the Global Innovation Index (GII) report 2018 and remains in the list of one of the least innovative countries in world but comparing with the last year remarkable improvement have been observed such as in 2017 ranked 113 of 127 and in 2016 ranked 119 of 128. Hence this progress mean that Pakistan is no longer the least innovative country in region as Pakistan maintain superiority over Bangladesh.

Innovation in different sectors of Pakistan has been observed during the different time period yet it has been in isolated and fragmented way (Idrees, 2016). Many innovations happened in the defense and the security programs such as manufacturing of defense equipment, fighter aircrafts, long-range missiles and nuclear program, however more dedication and focus of leadership is required (Speakman et al., 2012). Moreover, for economic development, Pakistan needs a National Innovation System (NIS) that must be well resourced, interactive, coordinated and robust (Kazmi, 2008). Many components are contributing in developing innovation ecosystem in Pakistan for instance, private sector firms, government, R&D sector and the state of Human Resources Development. Many universities and research centers in public sectors are established and Higher Education Commission is playing very important and leading role in developing innovation culture is Pakistan through different programs which connects universities with the industry and the government like Triple helix (Idrees, 2016), He further added that there are opportunities for a dynamic National innovation ecosystem in Pakistan but serious efforts are required for strengthening and developing collaboration among stakeholders by regime settings, resource allocation, support and coordination where stakeholders include academia, firms and the government . Furthermore, ulHaq et al. (2014) highlighted the technology diffusion issue in Pakistan, he stated that mostly firms in Pakistan are non-research based and their attitude towards technology adoption is very negative. He mentioned that for the enhanced technology diffusion, new Science Technology and information policy have adopted such as capacity building, industry collaboration, institutionalizing of university R&D and the increase in absorptive capacity among the entrepreneurs. While In order to develop effective National innovation ecosystem in Pakistan Speakman et al., (2012) suggested some policies such as, considering competition the main innovation driver, sound regulatory environment, infrastructure development, promoting ICT, investment in the HR development, promoting young entrepreneurs, effective institutional structure for coordination, evaluation and monitoring policy.

Entrepreneurial Research Culture

Researchers defined entrepreneurship as the main driver for the social change (Obschonka, 2017), industrial dynamism (Carlsson et al., 2013), economic growth and economic development (Cantillon, 1755; Casson & Richardson, 1997; Cornelius et al., 2006; Farhat et al., 2018). Low &

MacMillan (1988) defined entrepreneurship as 'creation of new enterprise'. While, according to classical approach, entrepreneurs not only start business but also provide capital for the business (Küçük, 2005). However Schumpeter (1934) introduced contemporary entrepreneurship and defined entrepreneurs as the innovators, who crush the existing status quo of products and services in order to set up the new products and the services (Sharma et al., 2013). While Shane (2010) defined entrepreneurship as discovering, evaluating, and exploiting the opportunities to create the goods and the services for the future and classical entrepreneurial behavior is not only starting and growing own independent business but also making innovations for profit or for the social reasons. Example includes Microsoft, Apple Inc., Facebook, eBay and many others. These are profit-oriented businesses that are making technological and social change in society. Although, these are only few successful startups but around the world there are millions of entrepreneurial startups every year in different fields (including failure) that accentuates researchers studying factors of entrepreneurship culture (Chesbrough, 2003; Nambisan & Sawhney, 2007; Bosma & Levie; 2010).

Time to time many scholars has contributed to understand the concept of entrepreneurship reserach (Acs & Audretsch, 2006) on different levels (Carlsson et al., 2013) such as on individual (Schumpeter, 1934; Low & MacMillan, 1988) to organizational level (Moran & Ghoshal, 1999, Van et al., 1989), new firms formation level (Covin & Slevin, 1991; Lumpkin & Dess, 1996; Wiklund, 1998; Zahra, 1991), social and macroeconomic level (Baumol, 1993; Birch, 1979; McGrath, 1999). However, Low & MacMillan (1988) suggested that the focus of entrepreneurial research should be to explaining and facilitating the role of the new enterprises in advancing economic progress. They further suggested that researchers should consider micro and macro perspectives. They stated that entrepreneurial research should be done at the multiple levels of analysis and these analyses should be complementing each other because of entrepreneurial phenomena itself as entrepreneurship differently effect on social levels simultaneously.

From the previous couple of decades, entrepreneurship research is rapidly evolving in many subfields. Researchers represented many research perspectives, methods and traditions. Initially Cantillon (1755) given concept of entrepreneurship an economic development and first time Schumpeter (1934) focused on role of entrepreneurship the on economic development. He continuously worked on it and introduced economic theory that was based on the change, he called entrepreneurs as innovators eventually he derived the concept of entrepreneurship individual to organizational level innovation in 1942.

Unfortunately, entrepreneurship research was somehow less progressive during 1950-1980 due to World War II (Carlsson et al. 2009). However, researchers gradually worked on it and entrepreneurship research emerged in many other fields like business management, business administration, business history (Chandler, 1962, 1977, 1990), psychology and behavioral sciences (McClelland, 1961), cultural and social anthropology (Geertz, 1963; Barth, 1963). After 1980s there was revival of entrepreneurial research and it was emerged in many others fields, for instance, finance, marketing, and geography sociology, innovation, gender, banking and engineering (Casson, 1990; Acs & Audretsch 2003a, b; Carlsson et al., 2013; Autio et al., 2014). Moreover, the first

conference on entrepreneurship research was held in 1970 at Purdue University (Carlsson et al., 2013).

According to Cooper (2003), entrepreneurship research work was relatively at small level in 1900s, initially research focus was on individual firms and entrepreneurs where researchers focused on personal traits, attitude, and attributes of entrepreneurs and at organization level researchers studied the birth and death of organizations. Mostly researches were based on sociology and psychology with the leans of behavioral science and social cognition (Cooper, 2003). However, after period of 2000s entrepreneurship research was evolved in many other disciples and researchers dedicated time to summarized the foundation of entrepreneurship research and also working to establish theoretical basis, for instance, theory, methods, types, environment, culture, venture creation, venture development and growth, finance, opportunity recognition, career, corporate venture, franchising, internationalization and technology based firms (Shane & Venkataraman, 2000; Westhead and Wright 2000; Ahuja & Morris Lampert, 2001; Aldrich & Martinez, 2001; Shane 2002; Acs and Audretsch 2003a, b; Welsch 2004; Mair & Marti, 2006; Stevenson & Jarillo, 2007; Hall et al., 2010; Audretsch et al. 2011; Landström et al., 2012, Meyer et al., 2014; Henry et al., 2016; Su et al., 2017).

Whereas Carlsson et al. (2013) stated that entrepreneurship research might be viewed as a whole system where each component contribute to a broader level of understanding with separate level of analysis. In the recent few years, entrepreneurship research is emerging in relational perspective (Tatli, 2014). Scholars worked on networking entrepreneurship with numerous other fields based on theoretical models and more conceptual work is done by scholars; they explored various dimensions for instance, strategic management (Hitt & Duane Ireland, 2017), human capital (Marvel et al., 2016), network based research (Hoang & Yi, 2015) reworking on scope of gender (Marlow & Martinez, 2018), social aspects of entrepreneurship like environment (Littlewood & Holt, 2018). In last few years major contribution in terms of methods and frameworks are done in entrepreneurship research like qualitative research methods (Hlady-Rispal & Jouison-Laffitte, 2014; Suddaby, 2015; Kraus et al., 2018; Kuckertz & Prochotta, 2018) including case studies, ethnographic method (Johnstone, 2016) and experimental methods (Kraus et al., 2016).

Moreover, it is also important to know that how entrepreneurship culture is developed and how it works, researchers mentioned that entrepreneurship is influenced by the local culture of the organization for example culture in universities, firms and the government institutions while the region or the country could be the main driver of entrepreneurship (Shane 1992, 1993; Davidsson 1995; Davidsson and Wiklund 1997; Sun 2009; Stephan and Uhlaner 2010; Williams and McGuire 2010; Rinne, Steel, and Fairweather 2012). Furthermore, entrepreneurship activities are considered as expression of and motivation by the local culture (Hayton & Cacciotti, 2013; Fritsch, & Wyrwich, 2014). While Walter & Block (2016) considered entrepreneurship activities as outcome of entrepreneurship education. The most important point here is that the entrepreneurship research culture is developed by the local culture of educational institutions.

Entrepreneurship is an emerging field in Pakistan. The entrepreneurship literature in terms of methodology is not very rich in context of Pakistan as limited entrepreneurship activities are observed in the country. The main reason behind that is political instability and economic challenges (Pervaiz & Khan, 2015). Many economic reforms are suggested by the scholars to develop entrepreneurship culture in Pakistan (Haque, 2007). Moreover, Muhammad et al. (2017) highlighted major barrier in development of entrepreneurship in rural areas of Pakistan and suggested government intervention in societal structures is necessary. It is worth considering that the Global Entrepreneurship Index ranked Pakistan 120 of 137 countries in 2018 while it was 122 of 137 countries. We believe that Pakistan need to improve education and work on skill development as World Economic Forum's Global Human Capital Report ranked Pakistan 125 out of 130 countries. There is intense need to strengthen entrepreneurship education system and nourish local culture to develop entrepreneurship research culture in Pakistan.

However, in 1900s, researchers started worked on productivity and efficiency of small level firms (Burki & Terrell, 1998), business startup by women (Shabbir & Di Gregorio, 1996). Furthermore, in recent two decades, scholars' attention is diverted towards institutional theory (Williams, & Shahid, 2016), social entrepreneurship, government policies (Chemin, 2010), culture and environment (Pervaiz & Khan, 2015), entrepreneurship reforms (Haque, 2007), women entrepreneurship (Roomi & Parrott, 2008; Afza et al., 2010; Azam Roomi & Harrison, 2010; Rehman & Azam Roomi, 2012), microfinance (Mustafa & Ismailov, 2008) innovativeness and emotional intelligence skills (Aslam et al., 2018) and traits of entrepreneurs (Hadi & Abdullah, 2018). Despite of these scholarly efforts Pakistan is on long way to develop entrepreneurship research culture in Pakistan.

From the literature review, we noticed that the entrepreneurship research literature is rapidly growing. The focus of entrepreneurship research started with individual approach to organization level, regional and economic level. However, the focus is shifted towards networking through interaction processes and stakeholder support. We observed that entrepreneurship is not an isolated field, it is intensely rooted and related with natural sciences, behavioral sciences, social sciences, management sciences, environmental sciences, anthropography, applied economics, engineering, banking & Finance. The main argument was that entrepreneurship research culture is outcome of local culture of educational institutes. In Pakistan, despite of government policies and opportunities, entrepreneurship activities are very limited. Pakistan needs economic reforms and government intervention to improve entrepreneurship. Current study focuses on explorative side of entrepreneurship research domain where attention is paid to economic level. For this purpose qualitative and open ended research is taken place and survey is conducted on high level.

Innovation ecosystem, entrepreneurial Research Culture and Triple Helix Model

Over the last three decades, the entrepreneurship has been emerged as an important field in the innovation ecosystem (Obschonka, 2017). The concept of innovation and entrepreneurship have been closely linked since the Schumpeter's early work in nineteens, he discussed about the "gales of creative destruction" that was untie by the entrepreneurs through introducing radically different and

new process, products and services to marketplace, by that mean also challenging the status quo-preserving by the industry incumbents. Because of this idea the link between innovation and the entrepreneurship is established very closely (Autio et al., 2014).

In 1997, Scherer identified many innovations that were introduced by the entrepreneurial firms such as sound motion pictures, alternating electric current, turbojet engine and the electronic calculator. While Autio et al. (2014) stated some contemporary examples of entrepreneurial innovations such as personal computer, internet search engines and the biotechnology.

Moreover, In order to develop national innovation ecosystem and facilitate economic growth, many countries, states, universities and regions have implemented policies by the entrepreneurial firms that include university-based start-ups on national, regional and local level (Grimaldi et al., 2011). While many scholars mentioned that some of the important determinant of entrepreneurship is R&D and university Research and Development (Spilling, 1996; Armington and Acs, 2002; Lay, 2003;; Audretsch and Lehmann, 2005; Wang, 2006; Brixy and Grotz, 2007). While explaining domain of entrepreneurship research Carlsson et al. (2013) mentioned this as one of the main contributor of developing innovation system. While Nambisan & Baron (2013) stated that digital innovations provide opportunities to the entrepreneurs to contribute to develop innovation ecosystem. We have observed that entrepreneurship research drivers innovation ecosystem in the country.

However, from the literature review it has been noticed that Triple helix of academia, industry and the government linkages are considered as the one of main determinant of entrepreneurship and innovations (Kim et al., 2012). In mid 1900s, triple helix model of university-industry-government linkages was developed by Etzkowitz and Leydesdorff (1995). After introduction of triple helix model, researchers continued work on this model and develop analytical frameworks, theories and introduced triple helix system of innovation (Ranga and Etzkowitz, 2015). Researchers argued that the Innovation system develop by networking among institutions; the university, industry and the government (Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2002; Leydesdorff et al., 2006). Furthermore, scholars merged the features of innovation system and triple helix and presented systems theory as set of components, functions and relationships. One of the main component is the knowledge transfer as transferring university research and the technology is called as third mission of universities (Etzkowitz et al., 2000; Ranga and Etzkowitz, 2015). In 2005, Etzkowitz et al. considered universities as the prominent actors for innovation system. It shows that triple helix positively impact entrepreneurship and researcher validated this argument by using triple helix as framework (Etzkowitz & Zhou, 2007; Etzkowitz, 2011; Sá et al., 2018).

Furthermore, it is acceptable by the researchers that with the combination of triple helix with National innovation ecosystem, progress can be enhanced (Afzal et al., 2018; Ranga and Etzkowitz, 2015; Carayannis & Campbell, 2009). Despite the importance of triple helix for innovation ecosystem very rare work in done in Pakistan to understand and implement this phenomena where entrepreneurship moderator relationship between. However, considering the need of triple helix culture in Pakistan, innovation summit was started five years ago to bring universities, industry and government on one platform and develop entrepreneurship research culture in Paksiatn. The focus of

current study is to investigate the application of triple helix model exercise inside national innovation ecosystem with moderating effective of entrepreneurship research culture in Pakistan.

Research Framework:

On this basis of literature review following framework (see figure 1) is develop for the current study:

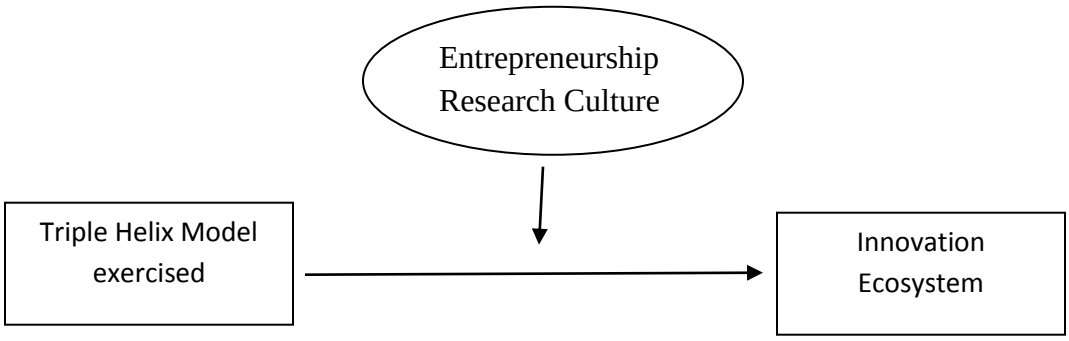


Figure 1

3. Methodology

The current study is conducted using qualitative inquiry approach and single case study method as strategy for investigation. Case study method is one of the most popular method rapidly progressing in research for qualitative research (Hyett, Kenny & Dickson-Swift, 2014; Thomas, 2011). As the main focus of study is theorization of relationship among entrepreneurial research and implementation of triple helix concept. In order to achieve objective of the study we collected data from Innovation summit that is organized annually four times. We use singly case study approach, such as Siggelkow (2007) stated that the single case studies richly explain the existence of phenomenon. While Dyer & Wilkins (1991) mentioned that for developing high-quality theory, it's better to choose single case study as it help in producing better and extra theory.

He further added that this type of studies facilitate researcher to explore and understand the phenomena deeply. Moreover, Yin (2003) argued that it's appropriate to conduct single case study where researchers are studying single thing, or single people or a group. He mentioned that while using single case study researchers can question the existing theoretical relationship and they can also explore the new relationship that provide detailed insight about a phenomena (Gustafsson, 2017).

Data was collected from Summit participants such as organizers, industrial experts, government representatives, academicians, media and researchers from four provinces of Pakistan in order to generalize the overall picture. We conducted forty videos interviews as in qualitative studies, one to thirty informants are considered suitable depends on the nature of study (Fridlund & Hildingh, 2000). Moreover, it's necessary to consider the size of sample on the base of information required to answer the research question (Krippendorff, 2004; Patton, 2002). However, data was collected until we reached at saturation point. In qualitative research, saturation is explained as a point where

themes are repeating and no emergence of new themes (Mason, 2010). After collecting data from forty participants we realized that no new themes are emerging, so we paused the process. Moreover, data collection method highly impact the depth of data analysis and results for instance open ended written questions can't provide the insights that we can attain from interviews (Bengtsson, 2016). So we conducted deep interviews, using semi structure questions. This provide opportunity to have a detailed discussion with participants (Wann-Hansson, Hallberg, Klevsgård & Andersson, 2005), this process help us to have in depth understanding of data.

In order to draw the realistic conclusions from the collected data, we organized data before performing content analysis (complete process shown in figure 2). We transcribe the videos into text form. For analysis purpose, we only choose manifest analysis where emphasis place on the text; words used by participants (Berg, 2004; Downe-Wambolt, 1992). Results are interpreted on base of actual quotes of participants. Moreover, Content analysis is performed to get meaning from the data; content analysis is a unique technique used in qualitative method to analysis the data and draw inferences from the data (Berg, 2001; Catanzaro, 1988). While doing analysis, data is presented in the words and themes, where researcher draw interpretations of results (Polit & Beck, 2006; Burnard, 1991). We classified data into descriptive topics. As, while performing content analysis, classification of data into categories according to topics help researchers to organize and interpret the data (Côté et al., 1993). We develop descriptive themes from the topics. This help to reduce data and describe phenomena in best way (Cohn, 1990, 1991; Partington & Orlick, 1991). Once descriptive themes were developed, in order to attain a unified picture of data, we develop primary things eventually results were presented in form of framework to obtain conceptual understanding of relationships.

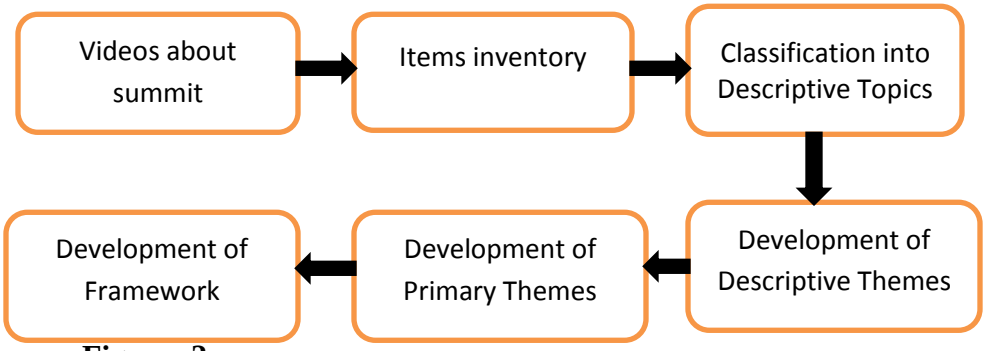


Figure: 2

4. Analysis and Results

The innovation summit is an event of two days organized four times in a year in Pakistan. We have analyzed this innovation summit as potential contribution of innovation eco system. The summit is a multidimensional event where numerous activities are performed to provide an innovation ecosystem. The preparation of the summit also has in built design of affective innovation ecosystem. 100 of eco system stakeholders work in a geographically separated but networked and integrated way to pan and execute various tasks. The innovation summit is a continuous drive to involve all stakeholders to contribute their part in developing innovation eco system in Pakistan.

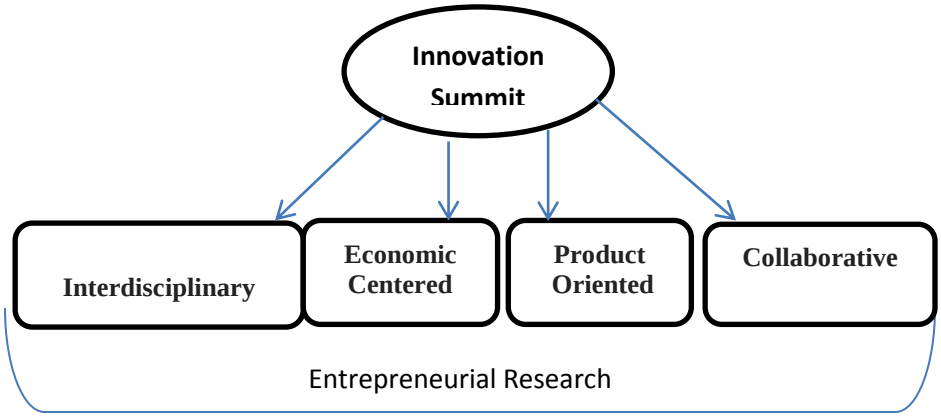


Figure: 3

4.1. Role of Innovation Summit in Entrepreneurial Research

The entrepreneurial concept has been applied on various aspects of this pheromone. The academics have described entrepreneurial scientists, entrepreneurial universities, entrepreneurial culture, entrepreneurial behavior, entrepreneurial leadership and other forms. These terms are given birth recently in last 2-3 decades after the emergence of third generation of universities. These universities are expected to contribute in social and economic development through their research pursuits along with teaching. The research is now characterized as basic research following the Bohar, applied research following the Edison and applied research following the Posture. We term third type of research as entrepreneurial research and aim to define it in this research paper. The innovation summit promotes entrepreneurial research in the society. The entrepreneurial research can be basic or applied using any of qualitative or quantitative research strategy and tool.

Innovation summit awards and appreciates entrepreneurial research exhibited in the tech expo and presented in the technology sessions. Innovation summit connects entrepreneurial research with potential donors for funding and investors for commercialization. We define entrepreneurial research with four major characteristics (see figure 3).

4.1.1. The Interdisciplinary

The interdisciplinary nature is always required for entrepreneurial research. This research when turns into technology have to fit along with 7-10 other disciplines and sciences. The production of this research as final product requires mechanical, material, civil, electronics, electrical, design and much other expertise. The post-production of the research based product requires sales, marketing, management, finance, and supply chain expertise. This creates need of interdisciplinary perspective of entrepreneurial research to best fit with other sciences and make a good business. The

entrepreneurial research needs alignment and co-creation to convert from research to wealth-creation business.

4.1.2. The Economic Centered

The entrepreneurial research needs to be economic focused. The ultimate purpose of entrepreneurial research is to generate numerous economic activities and produce welfare for all associates. The economic viability of entrepreneurial research inspires stakeholders to invest and take risk. The entrepreneurial research generates economic and social profit for every one contributes in its commercialization and capitalization. The entrepreneurial research aims at wealth creation and needs to be driven by some strong economic motive. The research purely focused on social entrepreneurship also has economic advantages as financial rewards are paid by the donors instead of consumers.

4.1.3. The Product Oriented

The entrepreneurial research does not support to end at some report, survey findings or results of some lab experiments. Although, it creates new knowledge but does not aims to contribute in the body of knowledge only. The aim of entrepreneurial research is to solve some problem and add value more than offered by existing solutions. This demands entrepreneurial research to be converted into some offer-able product or services. The society ultimately needs some form of product or services to consume the impact of research. Therefore, product development science needs to be incorporated into entrepreneurial research and offered as a solution. The innovation summit inspires academic scientists to present product development of their research in technology session in front of investor panel.

4.1.4. The Collaborative

The entrepreneurial research is hardly managed by the scientist and students alone as mostly done in the case of basic research. There are number of allied expertise are needed to succeed in entrepreneurial research. The most importantly, the expertise of intellectual property (IP) is needed during execution, disclosure, licensing and collaboration documents of the research projects. The scientist finds impossible to develop each and every expertise. This leads to the need of collaboration with IP managers to guide about patenting issues. Similarly, the research project in life sciences needs collaboration with engineers to produce plant for product manufacturing. The innovation summit drives lot of collaborations in research and promotes entrepreneurial research.

4.2. Role of Innovation Summit in National Innovation System

Pipatthitikorn, T., & Mikami, Y. (2018) citing OECD studies reported four primary knowledge flow contributors to build up national innovation system. The happenings of these flows actually make up the innovation system of any country. These contributing variables are “1) interactions among enterprises; 2) public/private interaction; 3) knowledge and technology diffusion; 4) and

public/private personnel mobility'. The program which can facilitate happening of these factors actually can contribute in national innovation system. The innovation summit is designed to drive institutional interaction, to exercise triple helix concept, to promote technology diffusion and adoption and mobilize stakeholders across the region to network and exchange innovative ideas, needs and potentials. Therefore, innovation summit is significantly contributing in the development on national innovation system (see figure 4).

4.2.1. Interactions among Enterprises

Pipatthitikorn, T., & Mikami, Y. (2018), advocate for interaction among enterprises to develop national innovation system. The innovation summit has in built features of organization by multi-partners. The summit is hosted and contributed by many organization including universities, industries and public sector organizations. This collaboration of various partners is exercised at three levels as planning, execution and participation. The sessions are organized by these three partners and the display stalls are also setup by 100 plus organizations from academia, industry, social and public sector. They evaluate, reward, support and serve each other's in various capacities. Innovation summit has a design to drive interaction among various enterprises to contribute in the growth of national innovation system in Pakistan.

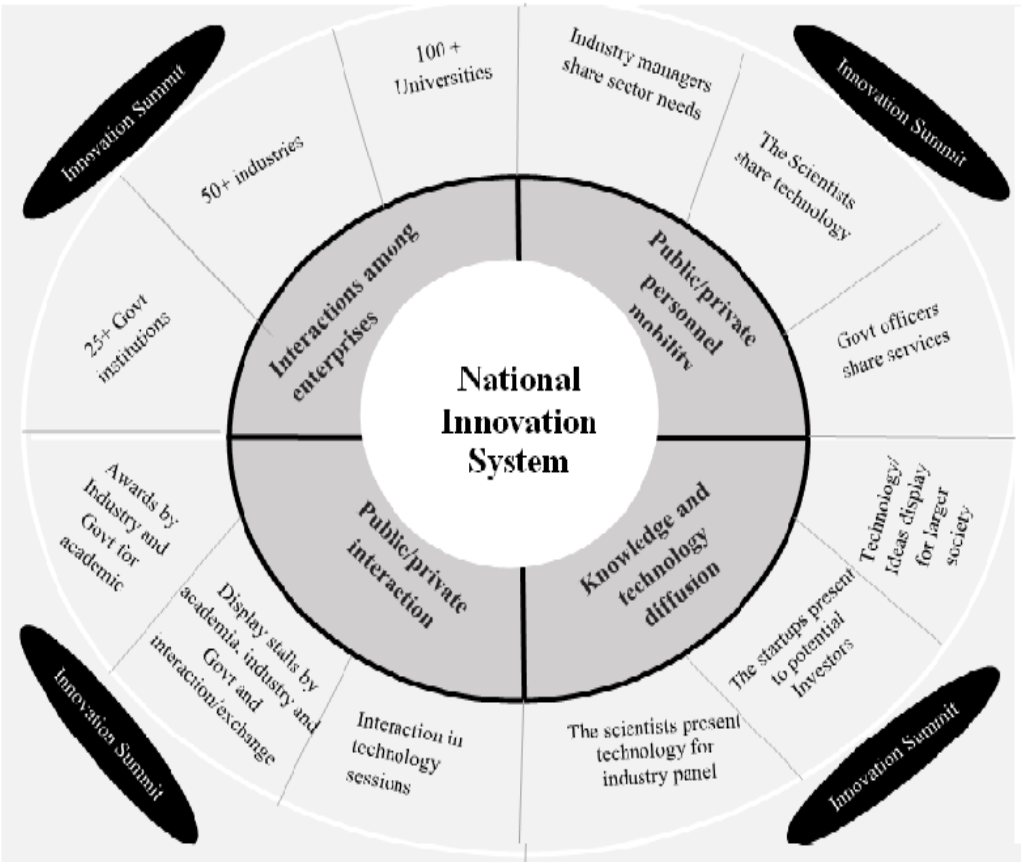
4.2.2. Public and Private Interaction

Pipatthitikorn, T., & Mikami, Y. (2018) refers to public and private interaction as contributing factor in national innovation system. The innovation summit primarily organized by both public and private partnership. The innovation summit is financially supported by Pakistan Science Foundation which premier funding agency along with many private industries. The summit is hosted in a university to reflect hospitality of public sector. The awards are given to academia by private and public sector. The services and technologies are exhibited by both public and private sector. The sessions are jointly organized by both public and private sector organizations. The innovation summit presents mechanism for public and private sector to joint work for the development of innovation and technology culture in Pakistan.

4.2.3. Knowledge and Technology Diffusion

The national innovation system is also measured by level of technology diffusion in the country as indicated by Pipatthitikorn, T., & Mikami, Y. (2018). Pakistan is very low in net technology diffusion. However the process of technology diffusion is started. Innovation summit is catalytically enhancing the progression in technology diffusion. There are lot of exchanges between technology partners on planning and execution of mutually benefiting technologies. Here are few examples:

The representative of an energy company met a scientist working on insulation sheets for buildings in KP innovation summit.. They both agreed to work on insulation sheet for buildings from plastic waste. The technology is developed and reached upto pilot level trails. It is expected to be commercialized as insulation has potential to save 20%-30% energy of buildings. **Figure: 4**



The FAO representatives came to know about very good potential of system development by computer scientist of university of Baluchistan during innovation summit 2017. The summit enhanced interaction and collaboration between both. The scientist got number of projects from FAO to develop agriculture related innovative solutions. See www.satha.org for detailed case study of the scientist.

Hamdard University Pakistan displayed electrical vehicle run by solar energy in Sindh Innovation Summit 2017. The industry people were visiting innovation summit and giving keynote lectures. They got interested in this vehicle and gave order of production of few vehicles. The innovation summit has derived technology diffusion and commercialization.

4.2.4. Public and Private Personnel Mobility

The mobility of people across regions and sectors is considered critical for national innovation system of a country as cited by Pipatthitikorn, T., & Mikami, Y. (2018). The innovation summit is organized in four provinces of Pakistan that are geographically scattered and located. The scientific community moves from one province to others to attend the summit and find technology partners. The government officers mostly located in capital city of Islamabad also moves to four provinces to attend summit and demonstrate their public services for science and technology. The industry is also

invited to give lecture from other provinces. The innovation summit is a great source of mobility across the sectors and regions. The innovation community interacts and exchange with people of other cities and provinces to experience diversity and cultural harmony.

4.3. Role of Innovation Summit for Entrepreneurial Actors

Innovation summit largely impacts the entire society towards innovation and contributes in the development of technology culture. All the segments of society including academia, government, industry and social sector interact four times a year in four geographically scattered places to exhibit an innovation eco system. The summit affects all actors like individuals, institutions and overall environment for entrepreneurial pursuits (see figure 5).

4.3.1. The Entrepreneurial Individuals

The individuals from academia, industry, Government and social sector participate in the innovation summit and interact with each other's. The academic scientists get orientation of society and industry problems from the people of society and industry. The scientists learn from Government officials about state services, facilitations, funding opportunities and other options available for applied research. The people of industry and society interact with academic scientists and find potential solutions and expertise related to their business problems and growth. The mutual awareness and interaction of individuals from different segments of society develop entrepreneurial behavior in the individual and lead to impact making research endeavors.

4.3.2. The Entrepreneurial Institution

There is institutional capacity to support entrepreneurial adventures of individuals. There are universities with high entrepreneurial zeal and spirit and others lack it. The innovation summit also builds capacity of institutions to behave and act as entrepreneurial one. The summit is organized jointly by many partner institutions which reflect an entrepreneurial approach. The summit also presents opportunities to many institutions to organize various entrepreneurial activities like ideas sessions, technology demonstrations, innovation competitions, and mobilization. The institutions do outreach, interact with stakeholders,

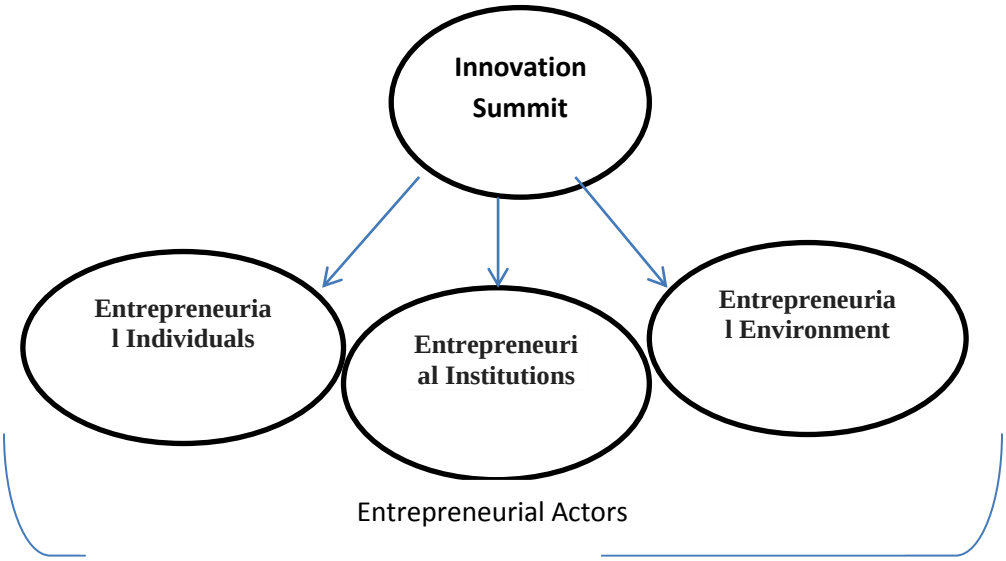


Figure 5

exhibit their services and make new collaborations through innovation summit. Institutions travel across the provinces to participate in the summits and find partners of other provinces. The institutions increase their learning in the summits and take new initiatives by observing experiences of others. Many joint initiatives are taken by partner institutions to contribute in the overall innovation ecosystem.

4.3.3. The Entrepreneurial Environment

The environment acts as pro-entrepreneurship or anti-entrepreneurship making significant impact. The individuals and institutions play in the environment are greatly affected. The dynamic pro—entrepreneurship environment inspires individuals and institutions to take entrepreneurial initiatives and respond to the needs of society. The summit builds entrepreneurial environment which contributes to the overall active innovation ecosystem. The environment consists of synergetic effects of interaction by various stakeholders and actors. The inter-play of various ventures and adventures makes up overall entrepreneurial environment. The summit presents 1000s of entrepreneurial activities by 100s of partners and collaborators which constitute an overall environment. These entrepreneurial activities include interaction of technology stakeholders, awareness of expertise and strengths, orientation of needs and opportunities, trust building measures, and resource sharing. The summit also increases collaborative initiatives and joint activities. The sum of all such activities creates an entrepreneurial environment.

4.4.The Study Framework

The study is based on features of innovation summit which acts as innovation drives in Pakistan. The summit has connected R&D stakeholders based on triple helix philosophy and promoted entrepreneurial culture of research in the society. The study collected the views of summit participants described in the videos.

The inventory of items is developed based on narrated views about the summit. The themes are further extracted from the developed items inventory in three iterations till the saturation of the concepts.

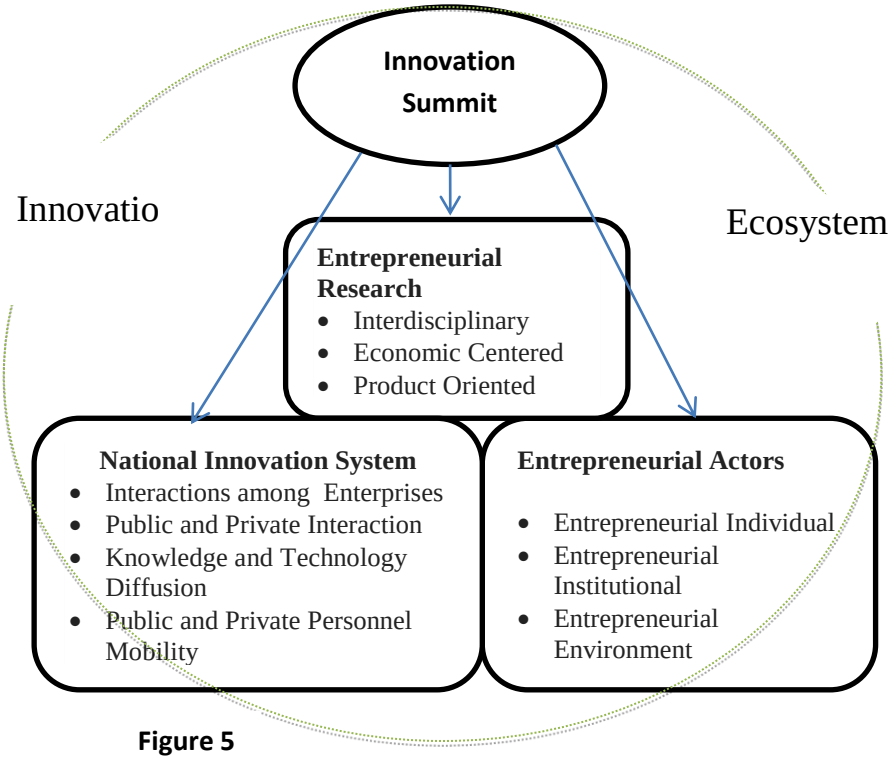


Figure 5

These themes are profiled and theoretical constructs are developed and presented in the form of theoretical frameworks (see figure 6).

The study framework presents role of innovation summit in developing innovation ecosystem in Pakistan. The model theorizes that entrepreneurial research affects entrepreneurial actors and national innovation system. The entrepreneurial research, entrepreneurial actors and national innovation system jointly affect and constitute innovation ecosystem. The entrepreneurial research culture, entrepreneurial actors and national innovation system become a strong innovation ecosystem. The innovation summit in Pakistan is positively contributing in the development of entrepreneurial research, entrepreneurial actors and innovation systems.

We advocate that entrepreneurial research culture preconditions innovation ecosystem. The absence of entrepreneurial research culture restricts the birth innovation ecosystem. The entrepreneurial research culture in a society serves as foundation and seeds the roots of innovation ecosystem. The entrepreneurial research by nature connects many disciplines and subjects and hence a clear manifestation of triple helix concept. It also has a characteristic of economic returns which inspires investors, policy makers and entrepreneurs to join the pursuits of entrepreneurial research. The society accepts it and adopts it due to solution orientation and consumable product or services. The collaboration and joint working is prerequisite of entrepreneurial research and connects academia, industry and government to work together. The development and promotion of entrepreneurial research which serves both science and society leads to the development of innovation ecosystem. It creates the environment and adds many enabling factors in the overall innovation ecosystem. This discussion helps us theorize the relationship that entrepreneurial research preconditions innovation ecosystem.

5. Conclusion and future research recommendations:

The purpose of this study is to advance the theorization of relationship among triple helix actors and innovation ecosystem, where the role of entrepreneurial research is prerequisite. The results of the study indicate that the innovation summit is a continuous driving force that facilitate and motivate stakeholders to develop innovation ecosystem in Pakistan by participating in entrepreneurial activities. We theorized the concept of entrepreneurial research and explained its four major characteristics: the interdisciplinary, the economic centered, the product oriented and the collaborative. We articulated that innovation summit is developing entrepreneurial research culture in Pakistan through contacting triple helix actors. In fact, innovation summit is positively impacting entire society towards innovation and promoting technology development. Summit engage all actors like individuals, institutions and overall environment for entrepreneurial pursuits.

This study theoretically contribute in existing triple helix literature that how triple helix actors contribute in development of innovation eco system by moderating role of entrepreneurial research. We endorsed that innovation summit is significantly contributing in the development of national innovation system through driving institutional interaction, exercising triple helix concept,

promoting technology diffusion and adopting and mobilizing stakeholders across the region to network and exchange innovative ideas, needs and potentials. This study could be enlightening for developing countries' entities for creating and disseminating national innovation ecosystem. In future, more qualitative studies should be conducted to explore more moderating construct between Triple helix and innovation ecosystem. Moreover, quantitative research should be conducted to rationalize the findings. Furthermore, cross-sectional study could help to present detailed understanding that how relationship among stakeholders were evolved and developed with the passage of time.

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