

Innovation, Entrepreneurship and Technology Commercialization in Developing Countries: A GCC Perspective in an International Context

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Abstract:

Purpose - Innovation, entrepreneurship, and technology commercialization (IET) are critical elements in diversification of economy worldwide. Researchers and practitioners alike are claiming positive effects of IET on the economic development. However, the successful implementation in developing countries such as a Gulf Cooperation Council (GCC) needs further investigation for successful implementation for growth and development. The purpose of the study is, therefore, to identify the similarities and differences based on the three categories of IET such as economy, policy and industry with a focus on the GCC states, as well as developing countries.

Methodology/approach - This paper based on a wide literature review, and a multi-case study. The authors' professional experience on the topic provides the foundation for this paper.

Findings - The findings of this research can help practitioners such as governments and policy maker to implements successfully and extend the climate of smart growth.

Practical implications - The results highlight implications successfully from different levels such as economic, social, political, organizational and institutional.

Originality/value - This study makes a contribution to knowledge about the effect of (IET) in developing countries, as well as GCC states.

Keywords:

Innovation, Entrepreneurship, Technology Commercialization, Gulf Cooperation Council States (GCC).

1. Introduction

To catch-up the 21st century, the authors will activate the new modern tool, such as innovation and technology transfer with fostering the entrepreneurship climate. The innovation and technologies will be the driver of 21st century. In addition, the accelerator of Innovation will create new job, new product, digital growth and catalyze broadly shared economic growth (Al-Mubarak, and Busler, 2010).

The strategy for American innovation consists of three parts: (1) to invest in the building blocks of American innovation and to ensure that the economic tools for successful innovation from research and development to transfer of those innovations, (2) to promote competitive markets that spur productive entrepreneurship to allow companies to be internationally competitive in innovation, and (3) to catalyze breakthroughs for national priorities (White House, 2010).

The objective of this paper is to identify the similarities and differences based on the categories of IET with a focus on the GCC states, as well as developing countries. It will focus on four categories such as economy, culture, policy and industry; and each categories classified to measured indicators. The paper is structured as follows: Section 2 provides a thorough review of the literature on the IET, and section 3 includes research methodology. In section 4, the authors provide the survey results and in section 5, briefly discuss the 10 successful case studies to illustrate different key variables. Section 6 reflections and the international context and section 7 concludes with implications of the IET outcomes from successful countries.

This paper aims to address this gap in knowledge by addressing three main research questions:

Q1: Which are the commonly agreed categories in measuring the successful implementation of the IET?

Q2: What are the similarities and differences of IET that can be identified from a GCC perspective?

2. Literature Review Related to Innovation, Entrepreneurship and Technology Commercialization (IET)

Business research method is a practical and comprehensive guide for business and management students embarking on research projects, which offer helpful advice on successful research strategies and potential pitfalls. The content is on planning a research project, forming research questions, reviewing literature, and writing up research (Bryman and Bell, 2007). Hart (1998) provides an excellent framework for bolstering what is often an experiential process - doing a literature review. Learning how to carry out a literature review has always entailed the experiential. While this is the best way of learning, it is only so providing that learning actually takes place during the experience (or by reflection afterwards). The case study method is recognized as the most effective research strategy to capture the rich experience of complex projects (Yin, 1994, 2004, 2009).

Business incubation has long been a successful economic development tool in developed as well as lesser developed countries. In the United States, incubation has been a growing phenomenon for almost thirty years, with the first incubators emerging in areas where manufacturing was on the decline, and redundant factory buildings held the promise of renewed economic activity. The business incubators offer considerable potential for promoting economic development worldwide, where small companies may be struggling to compete in local, national or international markets with relatively few resources and limited technical or business expertise (Al-Mubarak and Bustler, 2009).

Business incubation program is an economic and social program which provides the intensive support to start-up companies, coach them to start and accelerate their development and success through business assistance program. Al-Mubarak and Bustler (2010) indicated that the Business incubators can help young firms to survive and grow during their start-up years, and can play a key role in the economic development of a community or region. In developing countries including Kuwait and the other GCC member states, business incubators can be particularly valuable in helping to develop local economies, promote technology transfer, create new enterprises and generate jobs. In addition, recommendations to maximize the success of incubators, including matching services offered to the needs of clients and involving a range of community stakeholders in the development of their programs. A number of options was proposed in their work for developing and expanding the business incubator concepts in Kuwait and the GCC member states.

Today, Europe has funding in incubators with the goal of job creation and economic recovery. Business incubators contribute to the international economy and play a vital role not only in the economic recovery but also in economic development. International adaptation leads to the support of diverse economies, the commercialization of new technologies, jobs creation and wealth building. In addition, more than 7000 incubation programs worldwide are engaged in supporting the development of new high-growth businesses. Al-Mubarak and Bustler (2011a) discussed three practical Business incubation European models based on their adoption as case study examples: the United Kingdom, France, and Germany. These three countries contain approximately 83% of all the incubators located throughout Europe today and focused on the nature of incubator financing, the incubator's mission and strategy and graduation it in turn offer its incubatee clients. The S.W.O.T analysis of each case study reflects the strengths of each program and complies with its mission and objectives showing great opportunity with the future plans and performance of each program.

Al-Mubarak and Busler (2011b) studied a mixed-method approach which clearly stated that business incubation is a tool for economic development with incubation outcomes, such as entrepreneurs, companies created, jobs created, and incubator companies. This was evident in both the United States and developed countries, but still taking shape in the developing countries such as the GCC member states. A recent study showed results of quantitative and qualitative responses used to determine success rates and key indicators of incubators in various countries (Al-Mubarak and Busler, 2012). This best practice model based on the lessons learned from case studies indicated that the success of incubatees to sustainable graduation is reliant upon: 1) clear objectives, 2) incubators location, 3) access to services, 4) employment creation, and 5) economic development strategy. Moreover, when accomplished, the best practice model can lead to a 90% survival rate of companies and reflects sustainability in the market.

Al-Mubarak and Schrödl (2011; 2012) proposed a measurement models relevant to the international context. Four measured indicators were looked at: 1) graduation of incubated businesses, 2) success of businesses incubated, 3) jobs created by incubation, and 4) salaries paid by incubator clients. The recommendations from the study could be helpful to develop business incubation guidelines for best practices in the GCC, which will lead to the economic development worldwide and to the GCC. Al-Mubarak and Wong (2011) presented some cases related to incubators performance from Europe and other developed countries. Some incubators perform better than others. Several reasons may contribute to this difference in performance, and they concluded that the incubators may differ in size, services provided by each incubator and difference in their focus of services.

Al-Mubarak and Busler (2012, b) identified the roadmap for incubators as four strategic outcomes: (1) entrepreneurial climate, which 62% indicated was the primary purpose of their incubator; (2) commercialization technologies, indicated by 55.5%; (3) employment, 51.6%; and (4) innovation and diversifying local economies, 46.1%. The research adds value to current literature on sustainability of incubators and outcomes. Moreover, Al-Mubarak and Busler (2011c) examined case studies of 10 incubator organizations in developing countries. The findings of this study indicated business incubators were an effective and innovative tool in supporting start-up businesses. The empirical results highlighted some implications for successfully developing and implementing best practices of business incubation programs. This study further contributes to knowledge regarding the process of business incubation.

It has been observed in China, (Chandra and Fealey, 2009) that the extensive business incubator program developed in the early 1990s has played a key role in facilitating the country's transition from a socialist to a market economy by enabling the commercialization of technological developments and promoting a culture of innovation across China. Similarly, in India, business incubators have formed an important part of the Government's science and technology policy. The technology transfer function in university with sensitivity to regional economic development will also commercialize faculty inventions via licenses with state based companies' involvement in entrepreneurial and economic development. Innovation strategy is a critical activity in the US State Government. Funding for support to innovation strategy is over \$100 billion.

The 21st century will be shaped and built by technologies and innovation. Innovation will create new jobs and catalyze broadly shared economic growth. The strategy for American innovation consists of three parts: (1) to invest in the building blocks of American innovation and to ensure that the economic tools for successful innovation from research and development to transfer of those innovations, (2) to promote competitive markets that spur productive entrepreneurship to allow companies to be internationally competitive in innovation, and (3) to catalyze breakthroughs for national priorities (White House, 2010).

Joseph and Eshun (2009) recently demonstrated the commercialization of new products, new processes, and new business models, among others whose main strategic goals require firms to pursue leverage creativity, innovation, and entrepreneurship as well as embrace and adopt business incubation as strategy. The authors attempt to make business incubation a strategy not only for new and emerging technology-driven firms but also for large industrialized corporations. Further argued is that creativity, innovation and entrepreneurship should not only be the exclusive routine or practice of small firms but should also be a part of large corporations if they are to survive and prosper in the new economy.

There are 7000 incubators world wide and 21 incubators across Middle East (Monkman, 2010). Interviews were conducted with senior executives of 5 incubators organizations across the developing countries. Furthermore, the benefits of incubators in developing countries including Kuwait and other GCC member states, could be development of the local economy, promote technology transfer, and create new enterprises and positive impacts on jobs creation. The business incubators offer considerable potential for promoting economic development worldwide, where small companies may be struggling to compete in local, national or international markets with relatively few resources and limited technical or business expertise.

3. Research Methodologies

This study concentrates on a specific context, i.e., the innovation, entrepreneurship and technology commercialization (IET), making the case study method most appropriate. The investigation and analysis of literature is an accepted

form of desk based research that compares the works of different authors (Hart, 1998). This type of approach is closely linked to mixed methods approach quantitative (survey questionnaire) and qualitative (multi-case studies, literature review) with qualitative research (Bryman and Bell, 2007). This approach allows a broader assessment of a particular and real situation (Yin, 2004). The case study allows researchers to gain an in-depth understanding of the phenomenon under investigation (Yin, 2009). Furthermore, it provides both an understanding of the research context and a rich insight into the issue being examined (Eisenhardt, 1989; Yin, 1994). Please see figure 1.

4. Survey Results

The survey questionnaire was intended to provide quantifiable information on the characteristics of innovation and incubators program around the world, including age of incubators, client catchment areas, and location of incubators, primary functions and priority goals, sponsoring entities and stakeholders and client performance. The case studies were intended to collect more in-depth information about the operation and innovation program outcomes such as innovation, entrepreneurship, job creation by drawing on the views and experiences of best practice. Of the 100 survey invitations, that were emailed to NBIA members via survey monkey web site with a total number of survey responses was 41, representing a response rate (RR) of about 41 percent.

Figure 2 shows the distribution of respondents by their incubators program goals. The highest percentage of respondents 62 % were an entrepreneurial climate, followed by commercializing technology 55.5 % and employment 51.6%. See Table 1.

Figure 3 shows the distribution of respondents by their innovation program services. The highest percentage of respondents 63.2% were a strong tangible and specialize services, followed by partially tangible services 39.5%. See Table 2.

Figure 4 shows the distribution of respondents by their financial model via income. The highest percentage of respondents 51.3% were a medium income, followed by low income 43.6%. See Table 3.

Figure 5 shows the distribution of respondents by their jobs creation from innovation programs. The highest percentage of respondents 57.5% were more than fifty jobs created by the programs, followed by the second group between 25 jobs to 50 jobs 39.5%. See Table 4.

Figure 6 shows the distribution of respondents by their survival rate of tenants. The highest percentage of respondents 55.53% were the survival rate ranged between 81 to 90, followed by the second range less than 80%. See Table 5.

Figure 7 shows the distribution of respondents by their Innovation program focus. The highest percentage of respondents 74.4% were entrepreneurship, followed by the Jobs creation 59% and Economic development 56.4%. See Table 6.

Figure 8 shows the distribution of respondents by their rate of fostering entrepreneurship. The highest percentage of respondents 61.8% were at market rate, followed by the below the market rate 20.6%. See Table 7.

Figure 9 shows the distribution of respondents by their role of innovation. The highest percentage of respondents 38.5% were very active role, followed by the active role 35.9%. See Table 8.

Figure 10 shows the distribution of respondents by their technology transfer from innovation program. The highest percentage of respondents 45.9 % were modest technology transfer from innovation program, followed by the same percentage of strong and poor technology transfer 27%. See Table 9.

Figure 11 shows the distribution of respondents by their innovation program create the entrepreneurial climate. The highest percentage of respondents 57.5 % were strongly agreed the innovation program create the entrepreneurial climate, followed by the agree 42.5%. See Table 10.

Table 11 provides an overview of 100 innovation programs in the survey sample that are based on developing countries, as well as GCC states. More than half (62%) of countries' programs goals were the assistant of entrepreneurial climate. Furthermore, most innovation programs offered strong tangible, and specialized services (63.2%). The majority (51.3%) of the developing countries' innovation programs were medium income. More than 50 jobs created per program with percentage of 57.5%, more than half (55.5%) of developing countries' innovation programs were the survival rate range between 81 to 90. Moreover, more than half (74.4%) developing countries' innovation program

focus on entrepreneurship. The rate of fostering entrepreneurship at the market rate with (61.8%). Less than half (38.5%) very active role of innovation per programs in developing countries. The medium level of technology transfer from innovation program in developing countries 45.9%. More than half 57.5% developing countries strongly agree the innovation program create the entrepreneurial climate.

5. Case Study Results

Table 12 shows the analysis of the case studies included country case classified to the three categories such as economy, policy and industry, and each categories included many variables such as goals of innovation programs, programs types, funded year, the services provided by the innovation programs and the number of startup companies.

6. Reflections and Discussions

Table 13 presents the summary of three categories similarities. First the majority of policies are high in all the variables which lead the high impact of innovation program on the entrepreneurial climate, commercializing technology and employment. Second, most of the industry variables indicate high demand in the developing countries' governments and practitioners, as well as GCC states. Finally, all the economy variables present medium potential because most of the programs implemented within less than 10 years.

Although the differences between the developing countries can be concluded: 1) By economy variables such as the number of startup companies and jobs creation can be change from country to other depend on the funded year, for example, in Bahrain program the funded year 2003 and the number of startup companies 35. However, in Saudi Arabia the funded year 2009 and number of startup companies 6. 2) from the perspective Industries variables some innovation programs operated by governments and others operated by the private sectors or technology park, for example, the in Dubai innovation program operated by the government but the Qatar program operated by technology park, and Morocco programs operated by private sectors.

7. Conclusions

Business and innovation programs are an economic and social development entity designed to advise potential start-up companies, and accelerate their growth and success through a comprehensive business assistance program. The main goals are 1) innovation accelerator, 2) commercializing technologies, 3) entrepreneurial climate, 4) diversifying local economies, and 5) employment.

This paper is based on a mixed-method approach using both qualitative and quantitative methods, would provide a deeper insight and understanding into the phenomenon under investigation. Each case study has investigated, addressed and explained the incubator goals, incubator types, incubator age, services, client companies created, and Incubator companies graduated. The survey result of 100 innovation programs lead to the adaptation of innovation programs in developing countries, as well as GCC states as modern tool for fostering the innovation and entrepreneurship climate with technology transfer.

In conclusion, this study has clearly stated that the innovation programs provides a support structure and an adequate framework for innovation, entrepreneurship and technology commercialization (IET) towards 21st century growth. This is evident in the developed countries such as the GCC member states. Hence, the authors are planning to develop blueprint model for the GCC countries implication taking in the account of the economic, social and industrial strategies.

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He has been published in eight different academic journals and has presented his research in ten countries. In addition he has worked as a Financial Analyst for Ford Motor Company and FMC Corporation and has been an entrepreneur having owned several businesses mostly in the Real Estate development field. He earned his Doctorate at Drexel University.

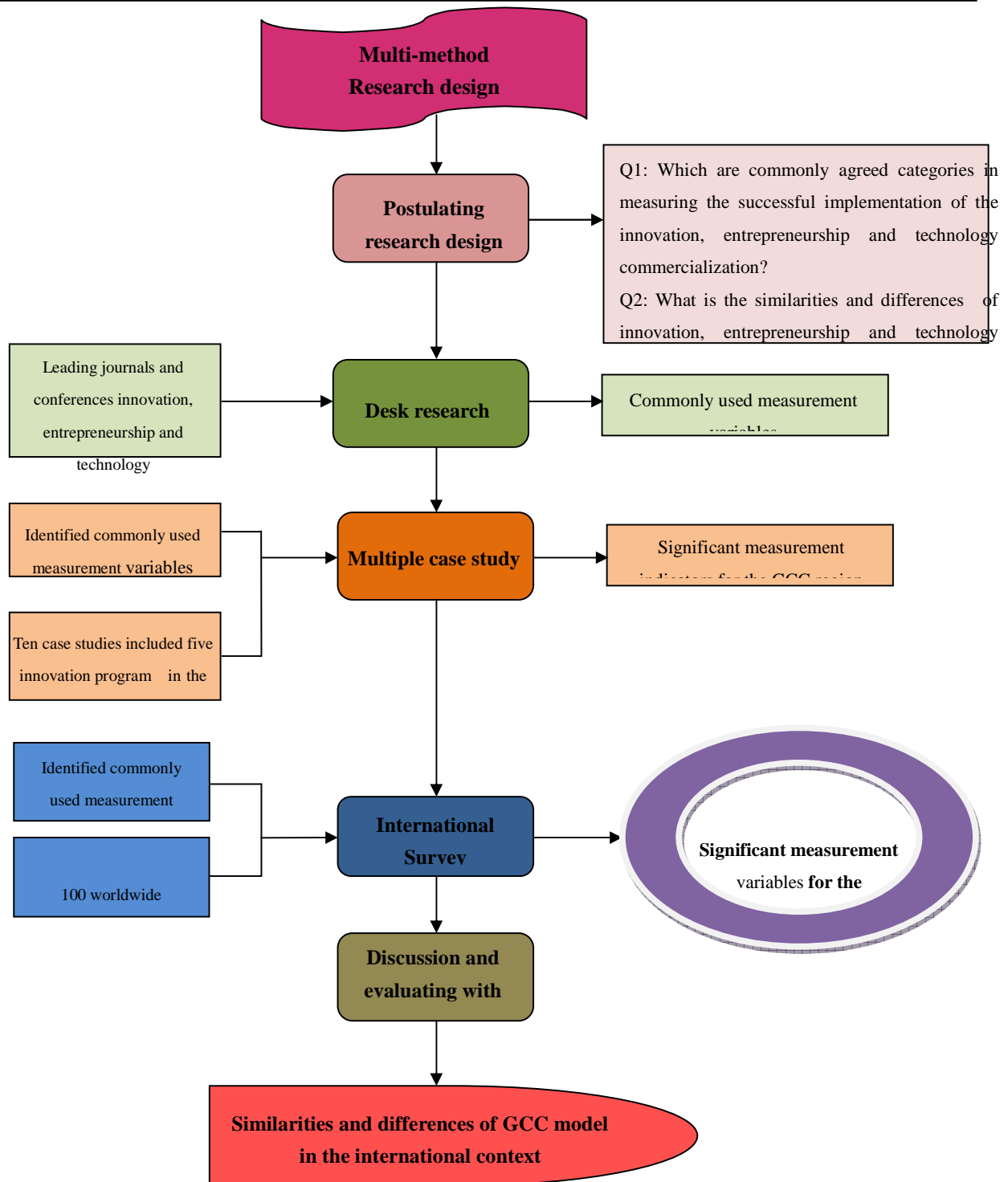


Figure 1. Research Design

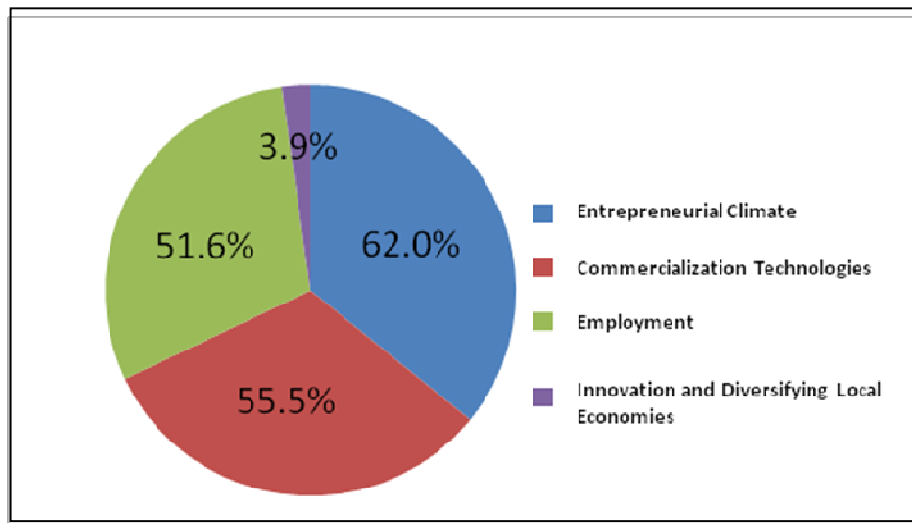


Figure 2: Innovation program goals

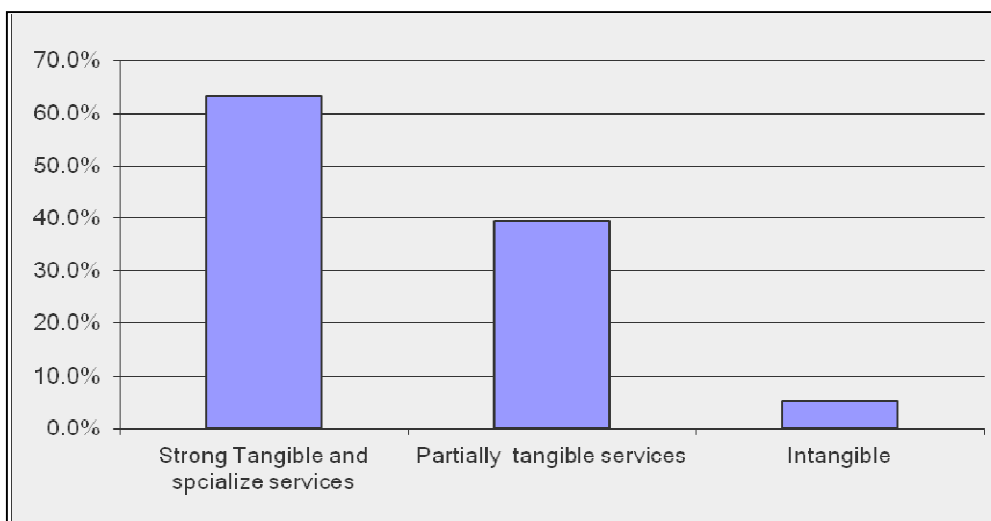


Figure 3: Service offered by innovation programs

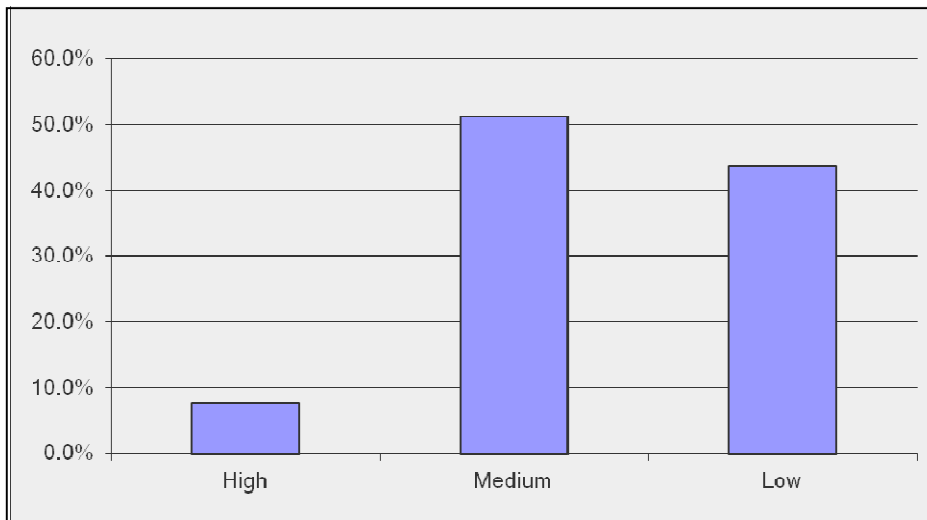


Figure 4 : Financial model via income

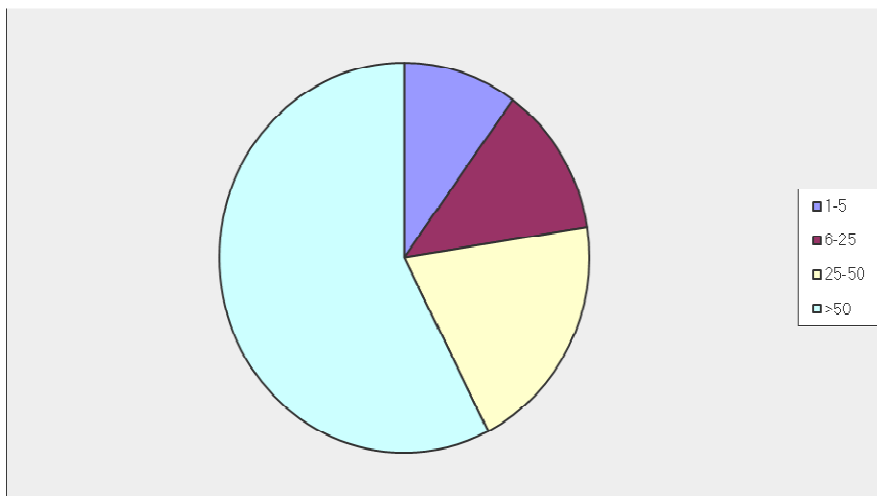


Figure 5: No. of jobs creation from innovation programs

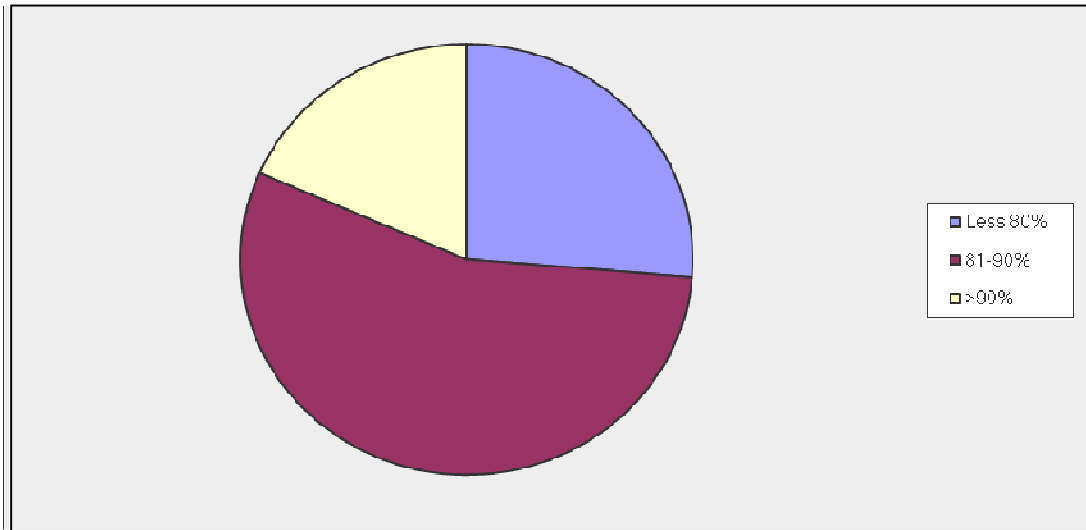


Figure 6: Survival rate of tenants

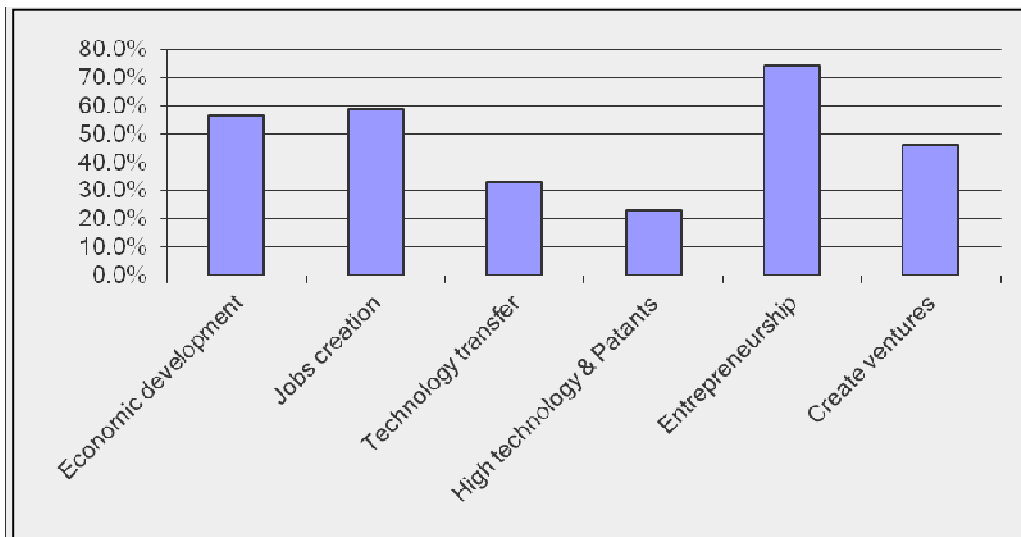


Figure 7 : Innovation program focus

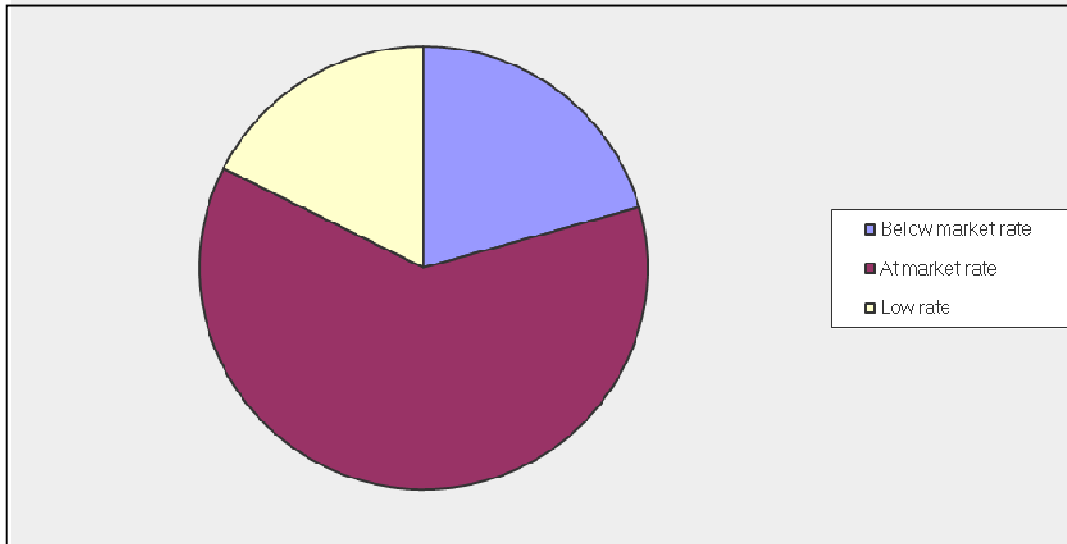


Figure 8: The rate of fostering entrepreneurship

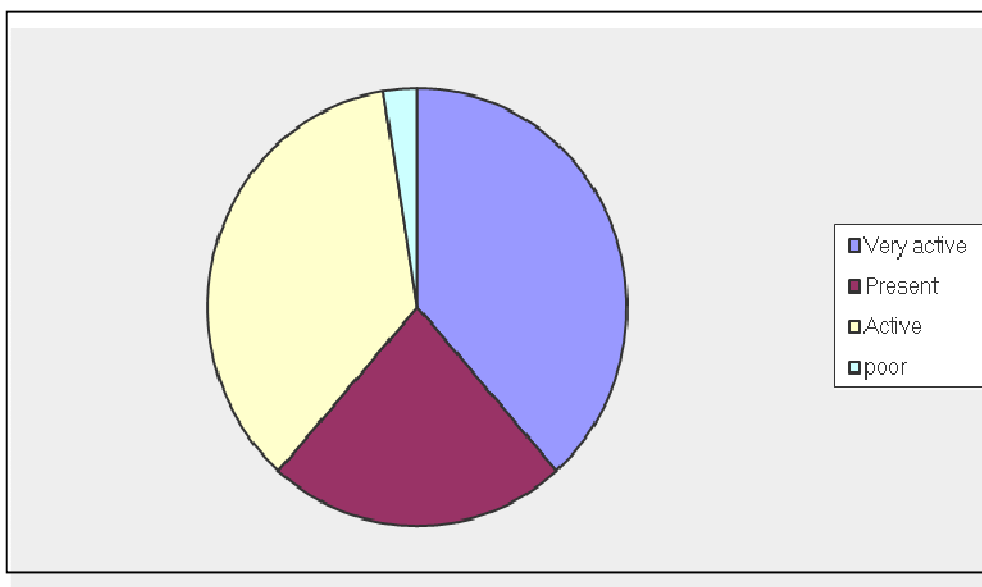


Figure 9: The role of innovation

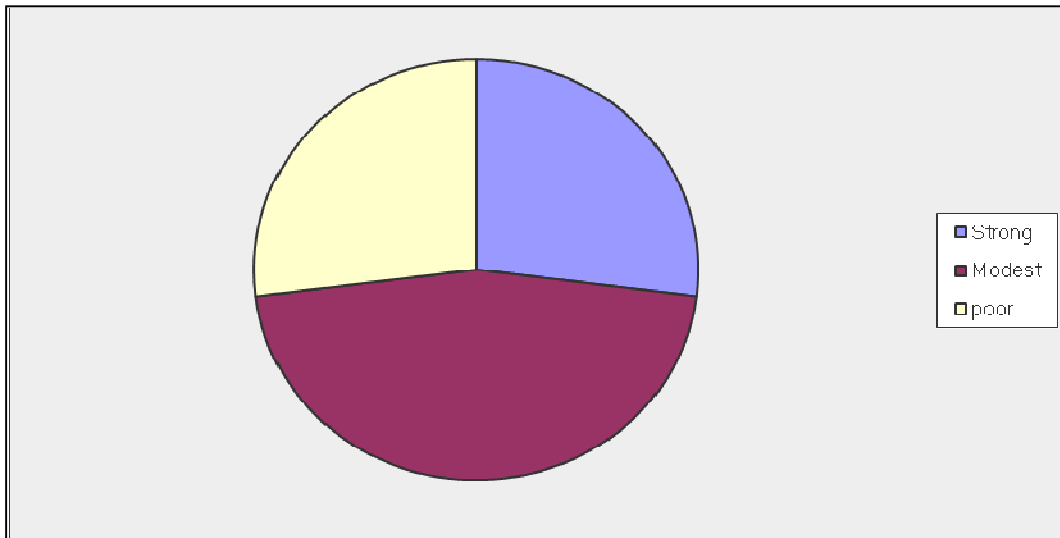


Figure 10: The technology transfer from innovation program

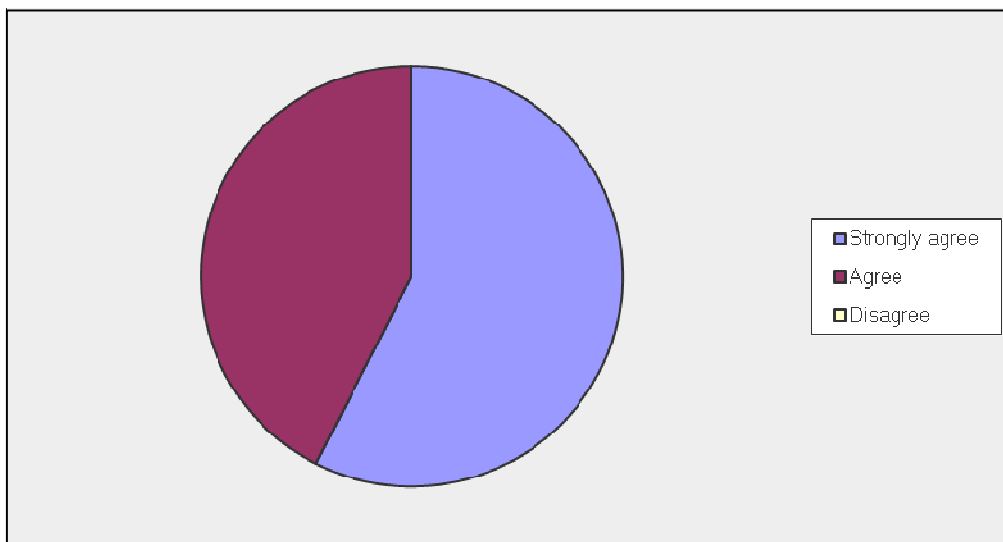


Figure 11: The innovation program create the entrepreneurial climate

Table 1: Innovation program Goals

Answer Options	Response Percent
Employment	56.4%
Entrepreneurial climate	71.8%
Diversifying local economies	41.0%
Commercializing technologies	53.8%
innovation	61.5%

Table 2: Service offered by innovation program

Answer Options	Response Percent
Strong Tangible and specialize services	63.2%
Partially tangible services	39.5%
Intangible	5.3%

Table 3: Financial model via income

Answer Options	Response Percent
High	7.7%
Medium	51.3%
Low	43.6%

Table 4: No. of jobs creation from innovation programs

Answer Options	Response Percent
1-5	10.0%
6-25	12.5%
25-50	20.0%
>50	57.5%

Table 5: Survival rate of tenants

Answer Options	Response Percent
Less 80%	26.3%
81-90%	55.3%
>90%	18.4%

Table 6: Innovation program focus

Answer Options	Response Percent
Economic development	56.4%
Jobs creation	59.0%
Technology transfer	33.3%
High technology & Patents	23.1%
Entrepreneurship	74.4%
Create ventures	46.2%

Table 7. The rate of fostering entrepreneurship

Answer Options	Response Percent
Below market rate	20.6%
At market rate	61.8%
Low rate	17.6%

Table 8. role of innovation

Answer Options	Response Percent
Very active	38.5%
Present	23.1%
Active	35.9%
Poor	2.6%

Table 9. technology transfer from innovation

Answer Options	Response Percent
Strong	27.0%
Modest	45.9%
Poor	27.0%

Table 10: The innovation program create the entrepreneurial climate

Answer Options	Response Percent
Strongly agree	57.5%
Agree	42.5%
Disagree	0.0%

Table 11: Summary of survey results

No.	Survey Questions	Percentage of high response	
1	Innovation program goals	Entrepreneurial climate	62%
2	Service offered by innovation program	Strong tangible and specialize services	63.2%
3	Financial model via income	Medium income	51.3%
4	Jobs creation from innovation programs	More than fifty jobs created by the program	57.5%
5	Survival rate of tenants	Survival rate ranged between 81 to 90	55.5%
6	Innovation program focus	Entrepreneurship	74.4%
7	Rate of fostering entrepreneurship	At market rate	61.8%
8	Role of innovation	Very active role	38.5%
9	Technology transfer from innovation program	Modest technology transfer from innovation program	45.9%
10	The innovation program create the entrepreneurial climate	Strongly agree the innovation	57.5%

Table 12: Variable of the case studies

[Source: InfoDEV, 2011]

No.	Case	VARIABLES				
		Policy	Industry			Economy
		Goals	Services offered	Funded year	Program Types	No. of startup firms
1	Bahrain	1) Entrepreneurship awareness 2) Export revenues 3) Job creation 4) Policy impact 5) Profitable enterprises 6) Research commercialization	1) Facilities 2) Finance 3) Business information 4) Advisory services 5) Virtual incubation 6) International business services 7) Networking 8) Commercializing technology	2003	Government	35
2	Saudi Arabia 1			2009	Government	6
3	Saudi Arabia 2			2008	Government	12
4	United Arab Emirates 2 Dubai Enterprise Center			2009	Government	0
5	Qatar			2008	Technology park	0
6	Jordan			2004	Technology park	6
7	Morocco			2005	Private sector	8
8	Syrian Arabic Republic			2006	Technology park	7
9	China -1			1998	Government	186
10	Thailand -2			2002	Government	173

Table 13: Summary of three categories similarities

Categories	Key indicators	Similarity
Policy	Program Focus	High focuses on the enterpenership
	Rate of fostering entrepreneurship	High rate at the market level
	Role of Innovation	Very active innovation role
	Program goals	High on the entrepreneurial climate, commercializing technology and employment
Industry	Program Types	Government stakeholder
	Service offered	High tangible services
	Technology transfer	Meduim
	Funded year	Mature (1998-2009)
	Survival rate	High (81%-90%)
Economy	Startup companies	Meduim number of compaines
	Financial model via income	Meduim income
	Jobs creation	Medium creation

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