

Farsi, Jahangir Yadollahi; Toghraee, Mohammad Taghi

Article

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Journal of Global Entrepreneurship Research

Provided in Cooperation with:

Springer Nature

Suggested Citation: Farsi, Jahangir Yadollahi; Toghraee, Mohammad Taghi (2014) : Identification the main challenges of small and medium sized enterprises in exploiting of innovative opportunities (Case study: Iran SMEs), Journal of Global Entrepreneurship Research, ISSN 2251-7316, Springer, Heidelberg, Vol. 4, Iss. 1, pp. 1-15,
<https://doi.org/10.1186/2251-7316-2-4>

This Version is available at:

<https://hdl.handle.net/10419/161749>

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RESEARCH

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Identification the main challenges of small and medium sized enterprises in exploiting of innovative opportunities (Case study: Iran SMEs)

Jahangir Yadollahi Farsi^{1*} and Mohammad Taghi Toghraee²

* Correspondence: jfarsi@ut.ac.ir

¹Faculty of Entrepreneurship,
University of Tehran, Tehran, Iran
Full list of author information is
available at the end of the article

Abstract

The pace of innovation continues to increase not only in the developed world but also in developed markets. The key issue facing many small medium-sized enterprises is related to how they can foster effective innovation. Innovation in SMEs can be (more) efficient and effective; however, this is not the case in many SMEs. SMEs in Iran are industrial and service enterprises with less than 50 employees, because of their size and resource limitations, they are unable to develop new technologies or to make vital changes in the existing ones. The aim of this study is to identify the most important challenges of small and medium businesses^a in exploitation of innovation opportunities. We used the exploratory factor analysis which demonstrated the following six challenges in the order of importance: managerial and human resource; research and development; technologies, national policy and regulatory environment and lack of market information.

Keywords: Innovation; SMEs; Innovative opportunities; SMEs challenges

Introduction

Today's business environment is probably the most dynamic one that any business has faced (Amit and Zott, 2001). By implication, failure to innovate is likely to result in reduced competitiveness. The importance of innovation as one of the primary means by which a firm can achieve sustainable growth (Senge and Carstedt, 2001; McEvily et al. 2004) as well as addressing the key issues facing firms in today's competitive environment: greater cost efficiency and the provision of new products to meet customers' demands. The role of innovation and its importance as a driver of competitiveness, profitability and productivity is well documented in the literature. The key issue facing many small-to medium-sized enterprises (SMEs) relates to how they can foster effective innovation using organizational supporting mechanisms (McEvily et al. 2004).

Innovation is defined by Linder et al. (2003) as "implementing new ideas that create value". From a practitioner's perspective, this means the adoption of new products and/or processes to increase competitiveness and overall profitability based on customers' needs and requirements (Zahra et al. 1999). In this matter, it should be considered to recognize and exploit innovative opportunities among available opportunities in business. Innovative opportunities refer to a set of different elements within the processes whereby actors identify, act upon and realize new combinations of

resources and market needs—in order to try to benefit from their future economic potential. “Innovation opportunities” consist of three elements: (1) economic value; (2) mobilization of resources; and (3) appropriability.

Present studies on innovation focus largely on drivers of product development such as creativity, resource availability (Dougherty and Hardy, 2006), mergers, acquisitions, divestitures, downsizing, and cost reduction (Hitt et al., 2006), as well as firm size (Acs and Audretsch, 2008). More recently, attention has focused on the need to meet customer demands in shorter product cycles using flexible manufacturing systems (Lu and Chen, 2010). Response to this question, what is the effect of “smallness” on innovative outcomes? also considers positive effects of smallness; for example, some authors argue that SMEs have great ability to utilize external networks (Rothwell and Dodgson, 1994), and to create astute alliances, scarce bureaucracy and clannish structures, great operational expertise and customer knowledge (Dahl and Moreau, 2002). Some authors associate small firms with the commercialization of disruptive technologies that generate discontinuous innovations (Kassicieh et al., 2002; Jimenez and Sanz, 2010).

Small firms usually have good internal communications and many have a dynamic and entrepreneurial management style (Jones and Rowley, 2011). SMEs usually explore new technical spaces. In sum, innovation in small firms can be (more) efficient and effective (Lu and Chen, 2010). On the other hand, many SMEs are not innovative at all. In response to this question, researchers identified key challenges to SMEs innovation including: the challenge of human resource (proficiency and skill) and learning on a small scale to increase innovation speed and decrease cost; the challenge of research and development (R&D) and identifying new emerging technologies; the challenge of macro-technologies, the challenge of National Policy and Regulatory Environment; and the challenge of lack of market information.

The paper is organized as follows. First, we review the literature on SMEs, innovation and innovation in SMEs. Second, we discuss the research methodology employed to carry out the empirical study. Third, the analysis is presented and discussed. Finally, the managerial implications of the results are offered.

Purpose of this study

While the literature outlines a number of barriers to innovation, there is a dearth of research on what encourages and drives product development, management practices and process technologies deployment. In this paper, we identify the main challenges of SMEs with regard to the exploitation of innovation opportunities. We have focused on SMEs importance that is well documented in terms of innovation. This study cannot be generalized to the empirical research examining the relationship between SMEs challenges and innovative opportunities. Therefore, this study fills an important gap in the literature.

Background

In order to provide a theoretical basis for the study, we reviewed previous studies on SMEs in the innovation literature. We attended to the dearth of studies on innovation in SMEs and then extended our review of studies on SMEs to other fields. We found that generally most innovation studies in SMEs fall within two categories: first,

innovation in SMEs linked with performance and economic growth, second, SMEs and innovation types. We found that the former stream of literature has attracted more studies. Plenty of studies have been done on innovation in large firms; however, there is a dearth of studies on the types of innovation that SMEs pursue. We developed our research questions to expose this aspect of the literature.

Previous research has investigated the characteristics and entrepreneurial behavior of owner-managers and how these relate to decisions concerning innovative activities in their organizations (Cosh and Hughes, 2000; Kickul and Gundry, 2001). Innovation often involves informal R&D activities such as experimentation, learning, evaluation and adaptation of technologies (Santamaría et al., 2009). This could result in difficulties in distinguishing innovation development from other business activities, especially in small enterprises in which the development work is integrated into their daily business (Forsman, 2008). What kinds of innovations are typical of small enterprises? It is not an easy question to answer due to the fact that innovation development in small enterprises may be integrated into their daily business, customer collaboration and process optimization, and thus innovation processes may be “hidden” even for the innovators themselves (Forsman, 2008; Hirsch-Kreinsen, 2008). The question is also challenging to researchers who have introduced conflicting results about typical innovation types developed by small enterprises. Damanpour and Wischnevsky (2006) suggest that the generation of radical innovations will be nearest to young and small enterprises while the adoption of innovations and the development of incremental innovations will be the most prevalent in large established enterprises. Contrary to this, Forsman and Annala (2011) found that in micro and small enterprises the development of incremental innovations is more common than the development of radical innovations. Also, De Jong and Marsili (2006) have examined innovations in small enterprises with fewer than 100 employees. They argue that process innovation is more widespread in small enterprises than product innovation while Simon et al. (2002) found that entrepreneurial condense, adaptability, product championing, market emphasis and technological innovation contributed to performance across all new product introductions in small computer firms. Wolff and Pett (2006), suggest that internationalization and innovator’s position have a positive impact on new product improvement in SMEs (Lu and Chen, 2010). While much has been researched about high growth of SMEs, their roles and importance in the economy, what has been lacking in many of the studies in this stream is a dearth of studies relating to the identification of the main challenge of SMEs for exploitation of innovation opportunities and their impact on performance. This is potentially a major contribution to the growth and development of small and medium enterprise literature.

Case description

There is little unanimity regarding the definition of SMEs in Iran. Various ministries, institutions and organizations related to SMEs in one way or another have their own criteria to describe, categorize or define SMEs. As defined by the Ministry of Industry and Mines and the Ministry of Agricultural Jihad, SMEs are (rural) industrial and service enterprises with less than 50 employees, whereas the Ministry of Cooperatives alternately uses the criteria either determined by the Ministry of Industry or Mines, or

by the Statistical Office of Iran in defining SMEs. According to the Iranian Statistical Yearbook for 1385 (2006/7), the latter categorizes businesses into four classes, i.e. businesses with 1-9 employees, 10 to 49 employees, 50 to 99 employees, and more than 100 workers. Although this categorization bears some resemblance to the definitions used by the EU, the Statistical Office of Iran only considers businesses with less than 10 employees to be SMEs; others are regarded as “Large Manufacturing Establishments”. Similarly, the Central Bank of Iran only defines establishments with less than 10 workers as SMEs. In contrast, in the EU, SMEs are defined as non-primary enterprises employing less than 250 employees. They are sub-divided into:

- Micro enterprises (1-9 employees);
- Small enterprises (10-49 employees); and
- Medium-sized enterprises (50-249 employees).

In addition, their turnover should be less than € 40m. With a balance sheet total of less than €27m; finally they should be economically independent, i.e. more than 50% privately owned.

Statistical overview of SMEs in Iran

As shown in Table 1, with regard to various important variables, 98.4% of all businesses are micro enterprises with 1-9 employees, whereas the total of small businesses with 10-49 employees represents only 1.42%. Obviously, there is an imbalance between the large number of micro enterprises and the marginal number of small and medium sized businesses. It can be noted that the absence of areas on cable number of medium-sized enterprises, which represents only 0.1% of the total number of enterprises, negatively affects Iran’s ability to produce for the export market. From an international perspective, it has become to be recognized that medium sized businesses, with 50-250 employees, typically account for a relatively large share of a country’s exports, as they are more readily able to avail themselves of the technical expertise, manpower, marketing skills and financial resources to participate in international business Table 1.

Status of SMEs in Iran

In Iran SMEs (10-99 Emp.), having only four percent of the total number of enterprises, creates almost 15.5 percent of national employment. But large enterprises constituting 13 percent of total enterprises contribute to 0.2 percent of national employment. Growth in the context of employment by SMEs over the 10-year period from 1996 to 2006 has been approximately 0.60 percent across the board. SMEs included 0.06

Table 1 Number of enterprises by size category and sector (Mirbarghkar, 2009)

Business sector	1-5 employees	6-9 employees	10-49 employees	50-90 employees	≤100 employees
Services	878.774	5.631	3.478	231	150
Manufacturing	334.630	17.125	13.236	1055	1207
Totals	1.213.404	22.756	16.714	1.286	1.357
Percent of total	96.6%	1.8%	1.4%	0.1%	0.1%

percent per year which with a workforce of more than 15 million means increase in approximately 9,000 jobs annually; this again adds up to an approximate number of 90,000 jobs over the 10-year reporting period. Indeed, SMEs have recorded unsatisfactory performance as regards the generation of employment. The share and growth of service SMEs (0.085 annually) was even stronger than industrial SMEs (0.021 annually). The industrial SMEs' share of total employment is about two percent (in EU it is 23 percent), whereas the employment share of industrial SMEs is about 1.5 percent and that of the industrial MEs 0.5 percent. Hence, industrial SMEs make a paltry contribution to generating employment in Iran. Growth of employment in industrial SMEs over the 18-year period from 1988 to 2006 has been approximately 0.51 percent across the board (0.03 percent annually), (Mirbarghkar, 2009). Consequently, the industrial SME sector in Iran has a tremendous potential for growth with international standards. Starting a business in Iran is a cumbersome activity. A large number of licensed businesses are not operational at present for lack of access to finance and the very lengthy bureaucratic procedures and arbitrary measures applied by banks to potential borrowers.

Of all loans provided over the past 4 years by the Bank of Industry and Mines (BIM) to industrial firms, 33% was allocated to firms in the metal industry, 21% to firms producing chemicals and 19% to firms in the food sector.

Forward and backward linkages between SMEs and LSEs, in which the former are involved in the co-production and postproduction of goods manufactured by the latter is scarce, with the exception of the automobile sector where there is nevertheless still ample scope for a further increase of backward linkages. Meaningful information and statistics about the SME sector subdivided by size category, type of workers, age of companies, legal forms, technological and financial standing, production volumes, exports, level of certification, etc., is either absent or incomplete, reducing the scope for a thorough analysis of the sector and the ability to fine tune the policy instruments needed to assist the sector effectively (UNIDO, 2003).

Innovative opportunities

An innovative opportunity is here defined as "the possibility to realize a potential economic value inherent in a new combination of resources and market needs, emerging from changes in the scientific or technological knowledge base, customer preferences, or the interrelationships between economic actors". The concept of "innovative opportunities" comprises both aspects related to a potential market as well as aspects related to the scientific and technological knowledge needed to serve this specific market (Magnus et al. 2007). We would argue that this concept is useful to broadly grasp the type of actions and decision-making which diverse actors must engage in to identify and exploit such an opportunity and thereby drive forward an innovation process. Because it is a more comprehensive concept, "innovative opportunities" is somewhat more complex than other concepts that exist in the literature. In other words, in our view, the conceptualization of innovative opportunities has to be more complex than the existing literature would suggest, because innovation is more than a known technology or an individual perception or an internal bundle of resources in the firm. Still, definitions of concepts are often only the beginning of the research process. It is

necessary to go further than just defining concepts, breaking them down into conceptual elements which are more directly and practically useful for research and for analysis for decision-making (Magnus et al. 2007). Consequently, an innovative opportunity must consist of at least the following three conceptual elements in order for actors to have the possibility to identify, act upon and realize the potential inherent in an idea:

- 1) An economic value for someone;
- 2) A possibility that the resources needed to realize the opportunity can be mobilized;
- 3) A possibility that at least some parts of the generated economic value can be appropriated by the actor pursuing the opportunity. Our proposed concept of “innovative opportunities” thus consists of three conceptual elements, that is, economic value, mobilization of resources and appropriability.

SMEs and innovation challenges

Brown (1998) mentioned three research streams in SME innovation research: the economic oriented, organization-oriented and the project-oriented streams. Economic-oriented stream studies showed that small businesses are an important driving force for innovation and that they can be as innovative as larger enterprises. The organization-oriented stream research prescribed a number of factors that small business owners could use to enhance company performance such as networking, making use of regional centers, planning carefully and developing strategies appropriate to their businesses. Similarly, these studies prescribed how SMEs could manage innovation effectively and efficiently through optimizing organizational structure, which will be explained in the next section of this paper. The project-oriented stream suggested that customers were important sources of SMEs innovation. Brown (1998) further commented that innovation studies in SMEs had a large diversity of focuses and much remained unknown about the ingredients for successful innovation in the small business sector. Hisrich and Drnovsek (2002) also revealed that innovation studies in SMEs covered a wide range of issues such as barriers to innovation, regional variations in the level of innovation activities, types and typologies of innovative SMEs (Jones and Rowley, 2011), diffusion and innovation (regional variations (Lin and Chen, 2007), market types (Laforet and Tann, 2006), as mentioned above, as well as innovation management and the mismanagement of innovation in medium-sized firms. Innovation management studies in particular, often focused on hi-tech small firms (Lin and Chen, 2007), and examined in terms of process innovation (Storey and Barnett, 2000), and new product development (Mosey et al., 2002; Mosey, 2005). Recent studies also looked at the number of effective factors which might lead to an increase in company innovative performance such as benchmarking, networking (Mittra, 2000; Terziovski, 2003; Massa and Testa, 2004), R&D (Raymond and St-Pierre, 2004), and organizational learning. At the corporate level, corporate entrepreneurship (Zhara et al. 2000), embodied a company's innovation and venturing was found to be influencing the company performance. Similarly, strategic orientation and competitive structure (Salavou et al., 2004), in which accompany operates, was found to have effects on company innovative performance (Laforet and Tann, 2006). As stated above, innovation studies in SMEs are diverse; our

literature review also showed that research in this area is fragmented as innovation management is concerned new product development and process innovation were often explored in isolation and the research was often done through field studies, questionnaire surveys or case studies focusing on a small sample of companies (Lin and Chen, 2007).

Discussion and evaluation

The aim of this study is to identify the most important challenges of small and medium businesses^a in exploitation of innovation opportunities. This study, therefore, seeks to answer the following questions:

- What are the main challenges of SMEs on exploitation of innovative opportunities?
- What is the relative impact of each challenge on exploitation of innovative opportunities?
- What is the priority of each challenge on exploitation of innovative opportunities?

An email questionnaire was developed to examine the main challenges of small and medium businesses in exploitation of innovation opportunities. A personal email message with a link to the questionnaire was posted to 245 small and medium businesses' owner-managers. It was assumed that owners and managers possess the most complete and up-to-date information about the innovation development of their enterprises. The questionnaire yielded 223 responses from the representatives of small and medium enterprises. The accuracy was checked and the responses with missing values (17 respondents) and, the responses with inconsistencies (6 respondents) were removed from the data resulting in a response rate of 10.3 percent. Respondents were grouped by the size of an enterprise and divided into the manufacturing and services industries. The compliance with the ethical standards requirements was approved by university research committee.

For the purpose of this study, two methods were used to provide a clear account of topic. The first method was known as factor analysis in which SPSS software was applied to extract the main challenges of small and medium businesses for exploitation of innovation opportunities.

In the second method, known as PLS^b method, the sufficiency of measurement model is assessed on the basis of three issues:

- Individual item and construct reliabilities
- Convergent validity
- Discriminant validity (Hulland, 1999). Other tests in this study include composite reliability, and Freidman test.

Descriptive data

According to the descriptive data 45% of respondents were between 30 to 40 years old. SMEs were categorized in two groups such as manufacturing industries and service industries. The surveyed sample has determined that major SMEs have employees fewer than 50 staff. In addition, other data of SMEs have been presented in Table 2.

Table 2 Descriptive data of sample population

Age	Range	20–30	30–40	40–50	50≥	Total		
	Number	19	90	56	35	200		
	percent	9.5	45	28	17.5	100%		
Background	Range	Associate	Bachelor	MS	PhD	Total		
	Number	27	43	74	56	200		
	percent	13.5	21.5	37	28	100%		
Level of voucher	Range	0-5	5–10	10–15	15≥	Total		
	Number	33	45	60	62	200		
	percent	16.5	22.5	30	31	100%		
Type of Firm	Range	Manufacturing			Services		Total	
	Number	100			100		200	
	percent	50			50		100%	
Number of employee	Range	1–9	10–19	20–29	30–39	40–49	50≥	Total
	Number	54	28	35	25	28	30	200
	percent	27	14	17.5	12.5	14	15	100%

In the following sections, the results were closely examined to pave the way for responding the questions raised in this research.

The value of KMO was 83% and test value of Bartlett was significant that demonstrate valuable data for factor analysis. As presented in Table 3. The results of analysis determine that given factors can be divided into 6 types.

The reliability of individual items is presented in Table 4. based on their factor loadings.

The reliability of constructs can be determined by two indexes, First, Composite reliability (CR), and second, Cranach's alpha of the constructs. These indexes are presented in Table 5.

Composite reliability for all constructs should be, more than 0.707 which is considered as cut-off point (Alizadeh et al. 2011). Results of Composite reliability analysis for constructs of this study have shown quite better than the cut-off point and reliability of all six constructs supported. Further, the results of Cronbach's Alpha support the reliability of constructs on well.

Convergent validity can be inferred from Average Variance Extracted (AVE) for any construct. The minimum acceptable amount for this index is 0.5, (Chin, 1998). Results

Table 3 The factors relative to small and medium business challenges in Exploitation of innovation opportunities

Factor Number	Eigen Value	Percent Variance Explained	Cumulative Percent Variance
Lack of Managerial Training and Experience	3.552	20.894	20.894
Inadequate Education and Skills	1.784	16.493	37.386
National Policy and Regulatory Environment	1.524	14.962	52.348
Technological Change	1.435	13.444	65.792
Lack of Markets information	1.135	12.678	78.470
Lack of Credit	1.025	11.022	89.492

Table 4 Reliability of items

Scale Items	Lack of M Training and Experience	Inadequate Education	National Policy and Regulatory	Technological Change	Lack of Markets information	Lack of Credit
management style	0.8433					
poor managerial ability	0.8863					
Lack of educational background	0.8369					
not quite well equipped in education and skills		0.8759				
lack of college level education		0.8759				
Unpredictable government policies			0.8285			
grand corruption			0.8285			
unfamiliarity with new technologies				0.9465		
not either locally available or not affordable or not situated to local conditions				0.9465		
Lack of sufficient market information					0.8364	
Poor connectivity					0.8364	
Lack of access to long-term credit						0.734
lack freedom of choice						0.8812
undeveloped capital market						0.8646

According to Hulland (1999), the least acceptable factor loading for individual items is 0.4, so our results show that item loading for all of items is more than the threshold and items show good reliability.

for this study as presented in Table 6. show that AVE for all constructs is more than 0.5, bringing support for convergent validity of all constructs.

The discriminant validity of a construct is measured by comparing its shared variance with its measures by its shared variance with other constructs (Alizadeh et al. 2011). We extracted the shared variance of all constructs with their constructs and then compared the constructs value in correlation with other latent variables. This concept has been shown in Table 7. Results show that the discriminant validity for all constructs is at a high significant level.

Priority of variables

To determine the importance of variables of this study, we choose a nonparametric approach for dealing with ranking variables based on their mean. The Friedman test is

Table 5 Reliability of constructs

Construct	Composite Reliability	Cronbach's Alpha
Lack of Managerial Training and Experience	0.89	0.82
Inadequate Education and Skills	0.87	0.70
National Policy and Regulatory Environment	0.81	0.54
Technological Change	0.95	0.88
Lack of Market information	0.82	0.57
Lack of Credit	0.87	0.77

Table 6 Convergent validity

Construct	AVE
Lack of Managerial Training and Experience	0.73
Inadequate Education and Skills	0.77
National Policy and Regulatory Environment	0.69
Technological Change	0.90
Lack of Markets information	0.70
Lack of Credit	0.69

a good method for such cases. The results of Friedman test is presented in Table 8. According to the findings, significant results (sig = 0.00) of Friedman test have achieved and proved that the means of items cannot be considered to be the same and we can rank them based on their means.

According to the results of Friedman test, lack of educational background has the highest priority among the items and lack of sufficient market information, has the lowest priority.

Following the research findings in the area of SMEs and innovation importance, the conceptual framework of this study has been shown in Figure 1. this study is an attempt to shed more light on what is considered as the main issue in this study and discuss related items such as:

Inadequate education and skills

Education and skills are needed to run micro and small enterprises. Research shows that the majority of the carrying micro and small enterprises in Iran are not quite well equipped in terms of education and skills. The study suggests that those with more education and training are more likely to be successful in the SME sector (King and McGrath, 2002). As such, for small businesses to do well in Iran, people need to be well informed in terms of skills and management. SMEs appear to be doing well with the sprouting of many commercial colleges offering various computer applications. Further, studies show that most of those running SMEs have at least attained college level education.

Table 7 Discriminant validity

	Lack of M Training and Experience	Inadequate Education	National Policy and Regulatory	Technological Change	Lack of Markets information	Lack of Credit
Lack of Man Training and Experience	0.856					
Inadequate Education	0.257	0.876				
National Policy and Regulatory	-0.008	0.038	0.828			
Technological Change	0.031	-0.054	-0.323	0.946		
Lack of Market information	0.335	-0.214	0.013	-0.098	0.836	
Lack of Credit	0.439	-0.363	0.014	0.031	-0.422	0.829

Table 8 Mean ranking of items

Item	Mean Rank
Lack of educational background	9.14
not quite well equipped in terms of education and skills	8.79
Unpredictable government policies	8.77
poor managerial ability	8.51
lack of college level education	8.17
unfamiliarity with new technologies	7.93
management style	7.83
not either locally available or not affordable or not situated to local conditions	7.62
grand corruption	7.57
lack freedom of choice	7.22
undeveloped capital market	7.07
poor connectivity	6.37
Lack of access to long-term credit	5.48
Lack of sufficient market information	4.52

Lack of managerial training and experience

Many SMEs owners or managers lack managerial training and experience. The typical owner or managers of small businesses develop their own approach to management, through a process of trial and error. As a result, their management style is likely to be more intuitive than analytical, more concerned with day-to-day operations than long-term issues, and more opportunistic than strategic in its concept. Although this attitude is the key strength at the start-up stage of the enterprise, because it provides the creativity needed, it may present problems when complex decisions have to be made. A consequence of poor managerial ability is that SME owners are ill-prepared to face changes in the business environment and to plan appropriate changes in technology.

The majority of those who run SMEs are ordinary lot whose educational background is sadly lacking. Hence, they may not be well equipped to carry out managerial routines for their enterprises (King and McGrath, 2002).

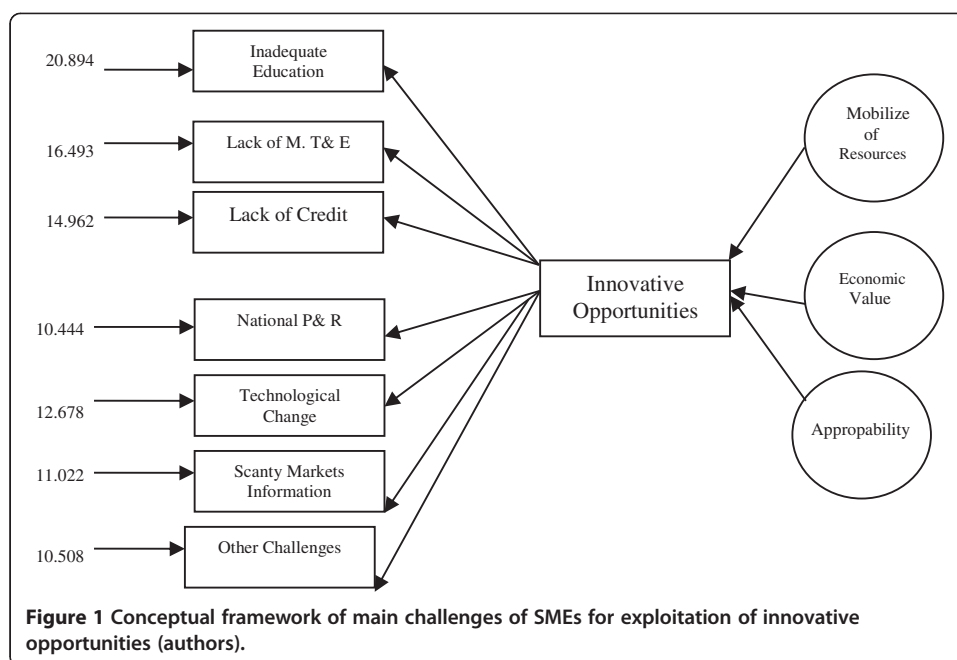
Lack of credit

Lack of access to credit is almost universally indicated as a key problem with SMEs. This affects a technology choice by limiting the number of alternatives that can be considered. Many SMEs may use an inappropriate technology because it is the only one they can afford. In some cases, even where credit is available, the entrepreneur may lack freedom of choice because the lending conditions may force the purchase of heavy, immovable equipment that can serve as collateral for the loan.

Credit constraints operate in a variety of ways in Iran where undeveloped capital market forces entrepreneurs to rely on self-financing or borrowing from friends or relatives. Lack of access to long-term credit for small enterprises forces them to rely on high cost short term finance.

There are other various financial challenges that face small enterprises. They include the high cost of credit, high bank charges and fees.

Numerous money lenders in the name of Pyramid schemes came up, promising hope among the 'little investors,' who thought they can make it with financial freedom through soft borrowing. The rationale behind turning to these schemes among a good



number of entrepreneurs is mainly to seek alternatives and soft credit with low interest rates while making profits. Financial constraint still remains to be a major challenge facing SMEs in Iran.

National policy and regulatory environment

The national policy and regulatory environment has an important impact on technology decisions at an enterprise. The findings in the study by Wanjohi and Mugure (2008) indicate that business environment is among the key factors that affect the growth of SMEs. Unpredictable government policies coupled with 'grand corruption,' high taxation rates, all continue to pose great threat, not only to the sustainability of SMEs, but also to the Iran economy.

Technological changes

Technological advances has posed a great challenge to small businesses. Since the mid-1990s, there has been a growing concern about the impact of technological changes on the work of micro and small enterprises. Even with progress in technology, many small business entrepreneurs appear to be unfamiliar with new technologies. Those who seem to be well positioned are most often unaware of this technology and if they know, it is neither locally available nor affordable nor suited to local conditions. Foreign firms still remain at the forefront accessing the new technologies.

In Iran, the challenge of linking indigenous small enterprises with foreign investors and speeding up technological upgrading still persists. There is a digital division between the rural and urban areas in Iran. With no power supply in most of the rural areas, it is impossible to have Internet connectivity and access to information and networks that are core in any enterprise. Thus technological changes, though meant to bring about economic changes even among the rural population, does not appear to answer to the plight of the rural entrepreneurs. The main obstacles to technology development are:

- A shortage of funds;
- The very lengthy process for allocation of loans;
- The high cost of imported technology (i.e. machinery and tools, know-how and R&D facilities);
- The low profitability of industrial SMEs in Iran, which restrains investment in technology modernization;
- Lack of knowledge of entrepreneurs regarding the importance of technology
- Improvement on productivity and profitability;
- The absence of any particular programmed or policy regarding technology upgrading in industrial SMEs, with the exception of ISO.

Lack of market information

Lack of sufficient market information poses a great challenge to small enterprises. Despite the vast amount of trade-related information available and the possibility of accessing national and international databases, many small enterprises continue to rely heavily on private or even personal contacts for market related information. This is due to inability to interpret the statistical data and poor connectivity especially in rural areas. Since there is a vast amount of information and only lack of statistical knowledge to interpret them, small enterprises entrepreneurs need to be supported. There is a renewed hope for the SMEs with connectivity being enhanced.

Conclusion

One major question we should pose is this: what solution can be offered to the plight of small enterprises in Iran for exploitation of innovative opportunities? **Firstly**, policies should aim to encourage and promote the development of local technologies. Emphasis should be placed on the promotion of the local tools industry to reduce reliance on imports. SMEs are said to face a "liability of smallness". Because of their size and resource limitations, they are unable to develop new technologies or to make vital changes in the existing ones. Still, there is evidence that SMEs have the potential to initiate minor technological innovations to suit their circumstances. However, for SMEs to fully develop and use this potential, they need specific policy measures to ensure that technological services can be provided and requisite infrastructures are available. Further, research and development institutions that are publicly funded should be encouraged to target the technology needs of SMEs.

Secondly, the problem of access to information may be attributed to the inadequacy of SME support institutions. Thus there is a growing need for a supportive policy to encourage the establishment of documentation centers and information networks to provide information to SMEs at an affordable price.

Thirdly, the government should come up with training centers for offering managerial and technical courses for small enterprises entrepreneurs. Equally, there should be business information centers.

Fourthly, the government should come up with proper regulatory policies that are small enterprises friendly. Since many of what we have in Iran hampers every effort made by a junior entrepreneur, the policies we have seemed to care for the well-established businesses. Since a majority of small enterprises lack finance, the

government should establish a friendly small loaning system. This would include low interests rates to ensure the continuity of these businesses. SMEs have the potentiality of transforming the economy of a crippling nation. As such, every effort should be made to boost their growth.

Endnotes

^aWritten informed consent was obtained from the patient for the publication of this report and any accompanying images.

^bPartial least squares.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Both authors read and approved the final manuscript.

Author details

¹Faculty of Entrepreneurship, University of Tehran, Tehran, Iran. ²University of Tehran, Tehran, Iran.

Received: 17 June 2013 Accepted: 1 November 2013

Published: 20 November 2014

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doi:10.1186/2251-7316-2-4

Cite this article as: Yadollahi Farsi and Toghraee: Identification the main challenges of small and medium sized enterprises in exploiting of innovative opportunities (Case study: Iran SMEs). *Journal of Global Entrepreneurship Research* 2014 4:4.

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