

1 A Study of Levels and Characteristics of Innovation Activity

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5

6 **Abstract**

7 The importance of innovation in organizations' competitiveness is an undeniable
8 fact. Innovations reflect a critical way in which organizations respond to either technological or
9 market challenges. Small and Medium sized enterprises (SMEs) constitute 94

10

11 *Index terms*— innovation, Barriers to innovation and SMEs,

12 **1 Introduction**

13 The importance of innovation in organizations' competitiveness is an undeniable fact. Rogers defined innovation
14 as "an idea, practice, or object that is perceived as new by an individual or unit of adoption". Innovations
15 reflect a critical way in which organizations respond to either technological or market challenges ??Brenner
16 1987 ?? Comes-Casserres 1994, 1996 ?? Smith et al, 1992 ?? Hage, 1988). The survival and growth of business
17 enterprises increasingly depends on their ability to respond to globalization and rapidly changing in market
18 demands, technologies and consumer expectations. Emerging opportunities and threats forced companies to
19 investigate and invest more on innovation to decrease risk of becoming uncompetitive.

20 As Debdulal Dutt'a Roy(2008) noted" innovations may be directed to change the organizational structure
21 (the degree of complexity, formalization, and centralization), technology (introduction of new equipment, tools
22 or methods, automation, or computerization) and human resources (changing the attitudes and behavior of
23 organizational members through processes of communication, decision making, and problem solving)".

24 With increasing global competition and quickly spreading of knowledge, the future of many businesses depends
25 upon their ability to innovate. The ability of a company to not only keep up with its current business practices,
26 but to exceed its own -and its competition's expectations are critical to survival (<http://www.realinnovation.com>).

27 Due to the great contribution of the innovative activities to the firms' competitiveness and success, it is
28 of great interest to identify the barriers and obstacles that limit the development of innovative activities in
29 firms. A number of studies show that firm differences in barriers to innovation were related to cost, institutional
30 constraints, human resources, organizational culture, flow of information and government policy (Mohen and
31 Roller 2005; Baldwin and Lin 2002). There are many good reasons for paying attention to small and medium
32 sized enterprises (SMEs). They constitute the 94 percent of Iranian firms (amar.org), they are a main source
33 of employment, and they are flexible. Iran defines SMEs as independent businesses that employ less than 250
34 people ??Iranian Commission, 2003).

35 This paper reports the results of a study that examined barriers to innovation among a sample of 86 SMEs in
36 the Sistan and Baluchestan. Sistan and Baluchestan economy has not been growing in terms of GDP in compare
37 with other provinces in Iran during the period 2006-2008. Innovation contributes to sustained long-run economic
38 growth through industry-wide spillover (Grossman and Helpman 1990; ??omer 1986). The value added of 94 %
39 of Iranian firms is just about 10 % of the whole value added in country (amar.org). John Cantwell (2003) defined
40 Competitiveness as the possession of the capabilities needed for sustained economic growth in an internationally
41 competitive environment. The importance of innovation in organizations' competitiveness is an undeniable fact.
42 This study assumes the lag of innovation is the reason of uncompetitive nature of Iranian SMEs. Finding the
43 current innovation situation and primary obstacles to innovation in Sistan and Baluchestan province of Iran are
44 the main goals of this study. In particular, by using empirical data, the paper sheds light on the issue: the
45 characteristics and behaviors that distinguish innovator firms and non-innovator firms. The remaining sections
46 of the paper are organized as follows: the second section presents previous research on innovation and barriers

47 to innovation, the third section describes the methodology used in the analysis, which is discussed in the fourth
48 section. The fifth section concludes the paper.

49 **2 II.**

50 Innovation and its importance for Enterprises "Innovation . . . is generally understood as the successful
51 introduction of a new thing or method . . . Innovation is the embodiment, combination, or synthesis of
52 knowledge in original, relevant, valued new products, processes, or services". (Luecke and Katz, 2003). Rogers
53 defined innovation as "an idea, practice, or object that is perceived as new by an individual or unit of adoption".
54 ??Swanson, 1994). To attain the business environmental policy goals, enterprises will either have to bring about
55 modifies in the way people do something, or changes in technology. Innovation is one of the main processes by
56 which those changes come about.

57 Innovation is not fully about the development of new product (services). Enterprises can also take advantages
58 administrative innovation (improving internal control, coordination, and structure), and technical innovations
59 (changes to technology or work processes). Davila et al (2006) organized reasons why enterprises undertake
60 innovation in the following way: 1. Improved quality 2. Creation of new markets 3. Extension of the product
61 range 4. Reduced labour costs 5. Improved production processes 6. Reduced materials 7. Reduced environmental
62 damage 8. Replacement of products/services 9. Reduced energy consumption 10. Conformance to regulations
63 Community innovation survey (2007) defined nine factors as motivation factors to innovation, increased range
64 of goods or services, Entered new markets or increased market share, Improved quality of goods or services,
65 Improved flexibility of production or service provision, Increased capacity for production or service provision,
66 Reduced costs per unit produced or provided, reduced environmental impacts or improved health and safety,
67 Met regulatory requirements, Increased value added. Organizations which generate and implement more good
68 ideas about better, more efficient ways of working have a distinct advantage in a competitive environment.
69 To achieve success over a long period of time, all organizations need to hold innovation (Andy ??ouchman
70 et al, 2004). With The globalization phenomena, market expansion, and increased customers' expectations and
71 competition among firms, innovation has become more marketdriven, more rapid and intense, more closely
72 linked to scientific progress, more widely spread throughout the economy ??OECD, 2000). Organizations may
73 also facilitate innovation through project teams or R & D departments ??Morton 1971, Zaltman, Duncan, and
74 ??olbek 1973). Services sector R&D, for example, rose from less than 5% of total business enterprise R&D for
75 the OECD area as a whole in 1980 to more than 15% in 1995. In countries that measure services R&D well, such
76 as Canada, it now amounts to about 30% of total business enterprise R&D ??OECD, 2000). Steve Jobs defined
77 Innovation has nothing to do with how many R&D dollars you have... It's not about money. It's about the
78 people you have, how you're led, and how much you get it. He argued that there are no definitive metrics for
79 innovation. Measures of innovative success vary by company and industry. He defined R&D and patent creation
80 as the most common metrics of innovation:

81 ? R&D -This metric assumes that the amount of money spent on research and development directly correlates
82 to the amount of innovative products, processes and services that get to the public. ? Patent creation -Some
83 companies create patent after patent and boast of their innovative capabilities. While this may be well and true
84 for a few, if the numbers of patented products, processes, and services are now making it to the marketplace, then
85 their relevance diminishes. The propensity of countries to seek sources of innovation and knowledge wherever they
86 are present has increased considerably in terms of patenting in the 1990s. The internationalization of patenting
87 has not been equally rapid in all countries: the available evidence shows that US patents have a larger, and
88 more rapidly growing, proportion of foreign co-inventors than those of Europe or Japan. An interesting point
89 about innovation was found in Paul Windrum (2006) "Innovation begets further innovation ". He argued that
90 Through organizational innovation, managers gain a more specific view of the different activities of the firm,
91 and see the potential creative opportunities that arise through breaking down 'departmental silos' and creating
92 novel synergistic activities. Rogers argue that any innovations have characteristics which explain the rate of
93 their adoption: ? Relative advantage: "the degree to which an innovation is perceived as better than the idea
94 it supersedes" ; ? Compatibility: "the degree to which an innovation is perceived as being consistent with
95 existing values, past experiences, needs of potential adopters" ? Complexity: "the degree to which an innovation
96 is perceived as difficult to understand and use" ? Trial ability: "the degree to which an innovation may be
97 experimented with on a limited basis" ? Observability : "the degree to which the results of an innovation are
98 visible to others."

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101 Innovations are considered as a major engine to enhance their performance and to strengthen their competitive
102 position in the market by companies (Vareska van de Vrande, 2008).
103 III.

104 4 Barriers to innovation

105 As many studies show, innovation has positive effects on the firm; it is interesting to find out why not all
106 firms engaged in innovation activities. Laura Palmer-Noone discussed that Most of these leaders believed that
107 their greatest challenges to innovation were to be found inside their institution. In her findings traditional
108 institutional culture, or institutional inertia cited as a significant barrier to innovation. A number of studies show
109 that firm differences in barriers to innovation were related to cost, institutional constraints, human resources,
110 organizational culture, flow of information, and government policy (Mohen and Roller 2005; Baldwin and Lin
111 2002). Support of employees for changes in their firms depends on the kind of innovation implemented. While
112 changes in the organization of work that are introduced independently of investments in new machinery are
113 encountered by resistance, investments in new machines, production sites, etc. are supported by employees
114 (Thomas Zwick). It is not always a barrier against innovation but it may retard or change the innovation plans
115 ??Schaefer, 1998). Antonia Madrid-Guijarro ET. Al (2009) emphasized on a resource-based view of organizations.
116 They introduced financial resources, human resources and external resources as barriers to innovation. Cost has
117 been mentioned as one of the most important barriers to innovation. High innovation costs have a negative
118 and significant effect on the innovation propensity (Lim et al, 2007 and ??ilva et. al, 2007). Arguments can
119 arise between the need to invest in innovation and the risk aversion common among managers/owners (Hausman
120 2005; ??renkel 2003), with small firms being especially subject to such conflicts because of their limited financial
121 resources. A study in Canada reveals that set up costs, rather than the running costs, are of greater concern for
122 those that intend to engage in innovation activities (CSLS, 2005). Understanding of economic risks associated
123 with innovation activities would have a low degree of association with firms' experience in innovation activities
124 (Lim et al, 2007). The most financial theories such as transaction cost theory and agency theory linked risk and
125 financial exposure, in the way that with higher risk being associated with higher financial exposure and lower
126 risk with lower financial exposure (Brigham and Ehrhardii, 2005). Transaction cost theory analyzes the fact
127 that the intangibility and specificity combined with investment in technology, by increasing transaction costs,
128 may decrease the firms' propensity to financing innovation with debt. Agency theory argues that the high risk of
129 innovative activities and the existence of information asymmetries can increase problems with debt financing. An
130 increase in debt may lead to an increase in conflicts between lenders and the firm. Several previous studies point
131 to the negative influence of debt on innovation activity (Giudici and Paleari 2000). But Dr Xavier L. Comtesse
132 et al ??2002) argued that financial issues were not considered to be major barriers to innovation in Switzerland.
133 C.C. Colton viewed the company culture and leadership as two prominent barriers to innovation. He argued that
134 if the company's culture isn't set-up to accept new ideas and creative contributions from its staff then inventions
135 will be unable to break through to the marketplace. Employee commitment and effort is required in adaption
136 of innovation (Acemoglu and Pishke, 1999). Resistance to change which results from poor employee skills and
137 inadequate training is viewed as an important organizational challenge by many researchers. It also argued that
138 small business managers often lack the types of education and training that have been linked with a successful
139 innovation strategy (Hausman, 2005). Shanteau and Rohrbaugh (2000) argued that Weak management support
140 is another innovation choke point because innovation can disrupt established routines and schedules.

141 Barriers to innovation also included organizational inertia and structured routines that may limit the ability of
142 incumbent firms to identify new opportunities and adapt to environmental changes (Nelson and Winter (1982);
143 Hannan and Freeman (1984)). Obstacles that were external to the firm are clearly more important than internal
144 ones, perhaps because most internal issues can be resolved by a firm that is committed to its innovation activity
145 (Lim et al, 2007). Global competition, government policy, and economic uncertainty require that firms effectively
146 communicate to managers the importance of innovation as a core firm strategy that will help maintain market
147 competitiveness (Antonia Madrid-Guijarro et al, 2009). Because of high competitive pressures, firms are forced
148 to adopt new technologies so as to gain a competitive advantage ??Porter, 1985). Many researchers suggested
149 that firms in more turbulent external environments have higher potential for innovation, because turbulent
150 environments trigger firms to incorporate innovation into their business strategy in order to remain competitive
151 and, ultimately, survive (Antonia Madrid-Guijarro et al, 2009). Lack of information about market opportunities,
152 changes in technology, and government policy _which impact managers' adoption of innovation as a strategy to
153 better meet customer needs and to help make the firm more competitive_is viewed as other barriers to innovation.
154 Lack of market information related to the potential requirement and preferences of the end-user may lead to a firm
155 producing products that are not meeting the users' needs, and hence may lead to lack of customer responsiveness
156 towards firms' innovative of potential customers is important to ensure the success of firms' innovation process
157 (Lim et al, 2007). Lack of government assistance was defined as the third most important barrier to innovation in
158 European countries by ??iatier (1984) In what concerns the significance of each restraining factor of innovation,
159 four significant variables are detected. The high economic risk and high cost of innovation are defined as economic
160 factors that prevent innovation in Portuguese firms. The first important point is that the firm can't innovate
161 and grow unless you're willing to take risks. However, in the current regulatory and tort environment, companies
162 are more focused on risk reduction than ever before. The lack of financing sources has a negative and significant
163 effect on the innovation propensity. For its turn, the lack of qualified personnel restrains the propensity of the
164 firm for innovating and also for developing the innovation process. The lack of customers' responsiveness to new
165 products has also a negative and significant impact on the propensity for innovating. The study of Lim et al
166 (2007) investigates empirically the obstacles to innovation faced by manufacturing firms in Malaysia based on

11 WHY ENTERPRISES DID NOT INNOVATE

167 data from the Third National Survey of Innovation (NSI-3). NSI_3 defined nine obstacles to innovation same
168 as the Portuguese research (cost of innovation, economic risks, lack of sources of finance, lack of information on
169 markets, lack of information on technology, lack of skilled personnel, lack of customers' response, legislation and
170 regulation and organizational rigidities). The results provide insights that high innovation costs have a negative
171 and significant effect on the innovation propensity. The same is detected for the barrier associated with excessive
172 perceived economic risks. For its turn, the lack of information on the market restrains the propensity of the firm
173 for innovating and also for developing the innovation process. The lack of

174 5 Research methodology

175 The data for this study was gathered from questionnaires surveyed to a sample of 86 SMEs of the Sistan and
176 Baluchestan. The questionnaires were distributed among the managers because previous studies reported that
177 managers' attitude significantly impacted innovation climate (Storey 2000; Lefebvre, Mason, and Lefebvre 1997;
178 West and Anderson 1996). The questionnaire which is used is the same as the UK innovation survey questionnaire
179 2007. Some changes is made in questions such as Geographical locations. In order to increase confidence in the
180 validity of the measures, the questionnaire was distributed to five managers for the purpose of pilot testing and
181 led to modifications in some part of questions. Reliability of the inequity scale was $\alpha = 0.9$. Construct reliability
182 hence appear adequate.

183 V.

184 6 Description of Sampling

185 From the 86 distributed questionnaires, 50 were completed and returned for the response rate 58.13 %.

186 7 Level of innovation activities among smes

187 According to the result of questions four and eight, From 50 respondents, 64 % were innovators and the 36 % rest
188 were non-innovators. Innovation takes place through a wide variety of business practices, and a range of indicators
189 can be used to measure its level within the enterprise or in the economy as a whole. These include the levels
190 of effort employed (measured through resources allocated to innovation) and of achievement (the introduction of
191 new or improved products and processes). This section reports on the types and levels of innovation activity over
192 the three Around 17.6 % of SMEs report abandoned projects. The proportion of enterprises having participated
193 in some innovation-related activity (64 per cent) shows that SMEs recognize the need to assign resources to
194 innovation. The most commonly reported activities were in marketing research, followed by a considerable
195 investment in all form of design.

196 8 Area of activities

197 The businesses surveyed were asked which markets they operated in. Figure ?? show that 80 % of Sistan and
198 Baluchestan enterprises operate at a regional level, about 44 % at Iran level and 0 % worldwide. Just under a
199 quarter (20 per cent) of businesses reported any exports for the years 2006_2008.

200 9 May

201 VIII.

202 10 Barrier to innovation

203 Successful and evidence-based policy interventions require an understanding of the barriers to business innovation.
204 These barriers can be internal obstacles that the enterprise encounters while carrying out innovation activities
205 as well as external factors preventing innovation.

206 The survey asked about a range of constraining factors and their effect on the ability to innovate. Table
207 4.3 shows the mean and standard deviation of each category of constraints. The results provide insights that high
208 excessive perceived economic risk have a negative and significant effect on the innovation propensity. The same
209 is detected for the barrier associated with the lack of financing sources. For its turn, uncertain demand restrains
210 the propensity of the SMEs for innovating and also for developing the innovation process. The high innovation
211 cost has also a negative and significant impact on the propensity for innovating.

212 Few enterprises felt constrained by a lack of information on market, while a lack of qualified personnel was
213 viewed as one of the most important constraining factor by half of the SMEs.

214 11 Why enterprises did not innovate

215 The survey also attempts to gain an appreciation of the possible reasons why businesses were not involved in
216 innovation activity during the period 2006 to 2008. A Study of Levels and Characteristics of Innovation Activity
217 conditions is reported as important factor by 29.4 of SMEs.

218 X.

219 **12 Driving forces of innovation**

220 On this occasion, the survey sought information about motivation factors for innovation. Respondents were asked
221 to rank a number of drivers for innovating on a scale from no impact, through low, medium or high. (2tailed)

222 **13 Mean Difference**

223 According to Table 4, from the respondents view there is a significant mean difference among driving factors
224 of innovation. Improved quality of goods or services is reported as the main motivational factor of innovation.
225 Entered new markets or increased market share, Met regulatory requirements and Increased value added were
226 wildly reported.

227 **14 XI. Methods to protect the value of innovation**

228 The survey collected data on business perceptions of the relative importance of different means of protecting
229 intellectual property, reported in table 5. These included formal intellectual property rights as well as strategic
230 mechanisms such as being first to market. The data show that Trademarks are the most important factors and
231 it is followed by Patents and Registration of design.

232 XII.

233 **15 Information Sources of innovation**

234 Respondents were asked to rank a number of potential information sources on a scale from 'no relationship' to
235 'high importance'. The mean and standard deviation of each category (information source) is shown in Table 4
236 The results show that client or customers were cited as the most important source of information by Sistan and
237 Baluchestan SMEs and it is followed by suppliers of equipments.

238 **16 XIII.**

239 **17 Co-operation agreements (Attitudes of smes respect to types 240 of partners)**

241 As it is displayed in the table below (Table 7), the smaller and greater means are for Universities or other
242 higher education institutions and Suppliers of equipment, materials, services, or software respectively. From the
243 information provided by table 7, this can be suggested that SMEs have fewer propensities about cooperation
244 with universities or other higher education institutions while the most frequent partners for cooperation were
245 suppliers of equipment. XIV.

246 **18 Wider forms of innovation**

247 Innovation is not wholly about the development or use of technology or other forms of product (goods and services)
248 and process change. Enterprises can also change their behavior or business strategies to make themselves more
249 competitive, often in conjunction with product or process innovation, but also as independent means of improving
250 competitiveness. Enterprises were asked whether they had made major changes to their business structure and
251 practices in the three-year period 2004 to 2006. The findings are summarized in Table 8. The results were
252 initially summarized using statistics (means and frequencies percentages) to provide a better understanding of
253 the respondents and characteristics of the responding companies.

254 From the 86 distributed questionnaires, 50 were completed and returned for the response rate 58.13 %. 80 %
255 of Sistan and Baluchestan SMEs operate at a regional level, about 44 % at Iran level and 0 % worldwide. Just
256 under a quarter (20 per cent) of businesses reported any exports for the years 2006_2008 (see figure ??).

257 Innovation takes place through a wide variety of business practices, and a range of indicators can be used to
258 measure its level within the enterprise or in the economy as a whole. These include Internal R & D, External R &
259 D, Acquisition of machinery equipment and software and hardware, Acquisition of external knowledge, Training,
260 All forms of design, Changes to product or service design, Market research, Changes to marketing methods,
261 launch advertising.

262 According to Table 3, overall, 64 % of enterprises were classed as being innovation-active during 2006-2008.
263 The proportion of enterprises having participated in some innovation-related activity (64 %) shows that firms
264 recognize the need to assign resources to innovation. The most commonly reported activities were in market
265 research, followed by a considerable investment all forms of design. The internationalization of R&D seems to be
266 a useful instrument to mitigate the effects of barriers to innovation often faced by SMEs (Tiwari and Buse 2007).
267 During 2006-2009, about 45 % of enterprises participated in Internal and External R & D. Summing up; these
268 early results seem to suggest that a larger share of enterprises is participating in just one mode of innovation
269 behavior but the innovation which was occurred in Sistan and Baluchestan SMEs was new to the SME not to
270 the national market..

271 In accordance with the total of the sample SMEs and the analysis of the Figure 4, we observe that the main
272 barriers to innovation are economic factors namely, excessive economic risk, lack of financing, cost of financing
273 and high cost to innovation. In what concerns the internal factors the lack of skilled personnel should be stressed.

274 The factors associated with the lack of information on markets and governmental regulations are less restraining
275 to innovation. Among all obstacles, 'Excessive perceived economic risks' seems to be the foremost important
276 obstacle faced by all SMEs. The Excessive perceived economic risk was cited being of 'high' importance by 75
277 per cent of the SMEs. On the other hand, only about 4.2 per cent of SMEs perceived this obstacle as 'not
278 relevant' to their innovation activities.

279 'Lack of appropriate sources of finance' was cited as being of high importance by about 66.7 per cent of the
280 SMEs and not relevant by about 4.2 per cent of them. These findings are consistent with the findings of Baldwin
281 and Lin (2001) who in their study of impediments to advance technology adoption found cost-related problems
282 being the most frequently reported by the Canadian manufacturing firms.

283 As recently as 2003 a report from the prestigious Gartner Research and Consulting Group suggested that 25
284 per cent of IT projects were not producing a realistic return on investment. In the same year, the UK Ministry
285 of Defence was criticized for wasting £120m on a failed inventory project. For this reason Iranian SMEs are
286 not interested in investment in costly projects (such as IT/IS) as the survey shows it. Worsening financial
287 position of the firm suggests that when companies increase debt and reduce liquidity, then innovation activities
288 decrease. This result is consistent with those of Freel (2000) and Chiao (2002). Additionally, because of higher
289 risk exposure, firms may opt against using debt to finance innovation. Lenders who are risk averse may also be
290 averse to funding risky innovation initiatives. As a result, SMEs might pursue relatively safe and non-innovative
291 projects through use of internal capital (Galende and De la Fuente, 2003).

292 The lack of financial resources hinders many SMEs from initiating or -even worse -completing their innovative
293 ideas. As reported in Table 3, 17.6 % of SMEs had abounded innovation activities. SMEs have problems to
294 acquire loans because financial institutions are often reluctant to (co-)finance risky innovation projects. Another
295 financial constraint refers to the problem of getting access to public funding for innovative ideas and bureaucratic
296 application procedures associated with them. Further, it was pointed out that innovation projects must be
297 delayed owing to regulatory reasons until the application has been approved.

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299 However due to limited resources SMEs, in contrast to larger ones, rarely have the chance to establish the
300 relationships needed.

301 'Innovation costs too high' was cited as being of 'high' importance by about 58.3 per cent of the SMEs and
302 'not relevant' by about 4.2 per cent of them.

303 Shifting from an inward to a more outward orientation was raised because the costs and risks of innovation have
304 increased and firms have become more specialized. The role played by research in firms' commercial strategies
305 has also changed. As the range of technologies necessitated for innovation has spread out and technologies have
306 become more complex, companies can no longer cover all relevant disciplines. Many key developments draw on
307 a wide range of scientific and commercial knowledge, so that the need for co-operation among participants in
308 different fields of expertise has become greater in order to reduce uncertainty, share costs and knowledge and
309 bring innovative products and services to the market ??OECD, 2000). According to table 7, The results of the
310 survey on Sistan and Baluchestan province of Iran shows that in Iranian SMEs the most frequent partners for
311 cooperation were suppliers (76 per cent of enterprises with co-operation agreements) and other business in their
312 enterprise (72 per cent). Around 44 per cent of collaborators included universities amongst their partners.

313 SMEs that perceive "lack of customer's responsiveness to new products" show fewer propensities to innovate.
314 This result is in accordance with the interactive model of innovation, with the marketpull approach and the
315 Porter model. These approaches demonstrate that the satisfaction of the market requires the incorporation of
316 innovations. Therefore, if the SMEs believe the market is not accepting the new products, it has no incentive to
317 innovate, and then this consciousness ends up creating a barrier to innovation.

318 The business Dominated by established enterprise was cited as being of high importance by about 58 % of the
319 SMEs.

320 In many cases, ICT significantly reduced the costs of outsourcing and co-operation with entities outside the
321 firm. It has helped go down the natural monopoly character of services such as telecommunications; it is a key
322 technology for speeding up the innovation process and reducing cycle times. It has played an important role in
323 making science more efficient and linking it more closely to business When 58 % of the SMEs see the monopoly
324 as a barrier to innovation, it shows that in the area of study, SMEs do not use ICT as much as they should.

325 The lack of qualified personnel was viewed as one of the most important constraining factor by about half of
326 the SMEs. The study of ??offman et Lack of information on market, governmental and international regulations
327 were reported as the least important obstacles o innovation.

328 The survey sought information about motivation factors for innovation (Table 4). Respondents were asked
329 to rank a number of drivers for innovating on a scale from no impact, through low, medium or high. Improved
330 quality of products or services was cited as the main motivation factor by 64 % of SMEs and Improved flexibility
331 of production or service provision and Reduced environmental impacts or improved health and safety are seen as
332 important by almost 30 % of SMEs. The objectives of Reduced costs per unit produced or provided (61 %) and
333 meeting regulatory requirements (by 59 %) were also widely reported.

334 Successful innovations often generate intellectual property that businesses will try to protect. The survey
335 collected data on business perceptions of the relative importance of different means of protecting intellectual

336 property such as registration of design, trademark, patent, copyright, secrecy, and complexity of design.
337 Registration of design is cited as the most important way of protecting innovation by 71.4 % of Sistan and
338 Baluchestan SMEs. Patent and Trademark are viewed as high important by 68.2 and 66.7 % of SMEs (see table
339 5).

340 Table 6 can show the overall status of each of Information resources more clearly. By a quick look at the table,
341 it becomes obvious that the main Information source for Sistan and Baluchestan SMEs is clients or customers
342 and followed by suppliers of equipment.

343 In the United States, the Bayh-Dole Act (1980) helped to strengthen the role of science in the innovation
344 process and facilitate industry-university collaboration. But there is evidence that Universities and other higher
345 education and Conferences, trade fairs, exhibitions are cited as important information resource to just about 20
346 % of studied SMEs. Also as it is cited before Sistan and Baluchestan SMEs have the least partnership with
347 universities.

348 20 Conclusion

349 Innovation affects firms' ability to compete successfully in an increasingly global market. This paper examines
350 forces to innovation, and product, process, and management innovation activities and barriers to innovation
351 among a sample of 88 Sistan and Baluchestan manufacturing SMEs located in the Sistan and Baluchestan
352 province of Iran. The Sistan and Baluchestan province economic situation is interesting due to the need to
353 increase the investment in innovation by manufacturing SMEs. This need is because recent regional GDP has
354 not been growth in compare with three years ago.

355 In the selected case (Sistan and Baluchestan SMEs), an in-depth study of eleven barriers to innovation
356 were done through distributing questionnaire. The research results revealed that the economic factors such
357 as excessive economic risk, lack of financial resources, lack of availability of finance, and high cost of innovation
358 have determined the propensity of SMEs about innovation.

359 However, Lack of customer responsiveness and lack of qualified personnel were viewed as other important
360 constraints to innovation.

361 The survey results indicate that innovation is also becoming increasingly popular among SMEs. After all, small
362 SMEs often lack resources to develop and commercialize new product in house and as a result are more often
363 inclined to collaborate with other enterprises in their own business. There is growing evidence that innovation
364 in areas such as ICT or biotechnology draws increasingly and more directly on scientific progress. The idea of
365 facilitating industry-university collaboration strengthens. The survey results show that Iranian SMEs are not
366 collaborating with universities and higher education institutions nevertheless we expected based on the literature.
367 Van de Ven (1986) argues that as individuals have access to more information about available innovations and
368 are more globally informed about the implications of innovative ideas, they are better able to relate the "parts to
369 the whole." In general, individuals with a broader awareness of the consequences and implications of innovative
370 ideas facilitate the process of organizational innovation.

371 The survey results indicate that Sistan and Baluchestan SMEs prefer to engage more in market research,
372 followed by a considerable investment in changes all forms of design. According to Morton (1971) Enterprises
373 reported market and internal sources as most important for information on innovation. This suggests that
374 enterprises tend to rely on their own experience and knowledge coupled with information from customers and
375 clients, suppliers.

376 The survey discovered that improved quality of goods/services increase the propensity of SMEs to innovate.
377 And Also in the field of protection of innovation, Registration of design and Trademark were viewed as important
378 ways of protecting innovation in Sistan and Baluchestan SMEs.

379 The results of the study may be useful for both government and SMEs. The finding can be used in the
380 development of public policy aimed at supporting and encouraging innovation among SMEs in Sistan and
381 Baluchestan.

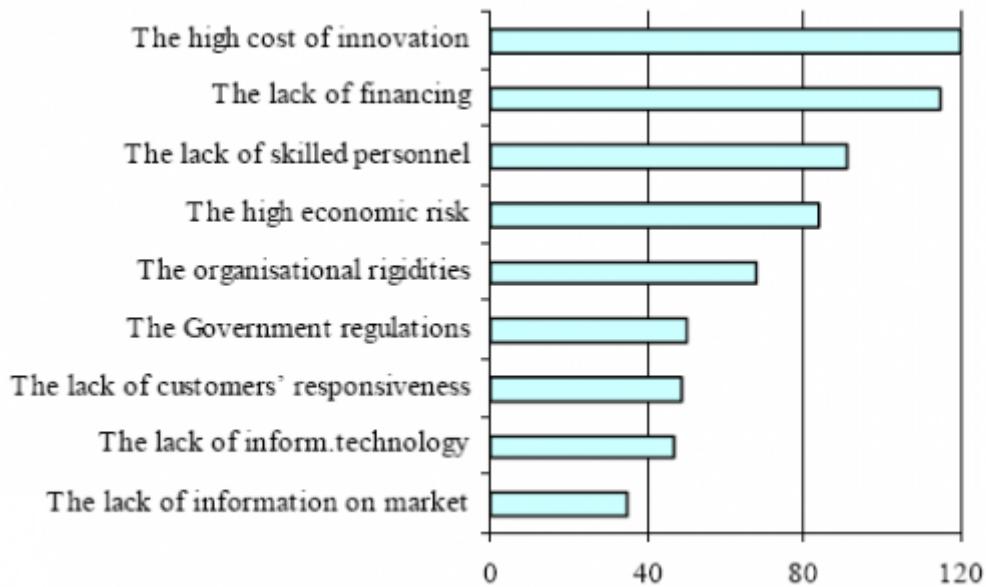
382 When conducting a research, occurrences of some obstacle are inevitable and in fact it is difficult to find a
383 research that has been carried out easily without facing any problem. This study is not an exception and some
384 problems came up as well. The expectation about the response rate was not met. And also, there were financial
385 questions about the amount of investment in innovation activities but none of the SMEs answered these kinds of
386 questions.

387 It took more time than the estimated time (3 week), for the respondents to return the questionnaires. This
388 alone resulted in change in the plans and the study fell a few days behind the schedule. The size of the sample
389 is such that it is difficult to generate the finding of this study to the whole population of SMEs in Iran.

390 For further research it would be interesting to examine why Lack of unskilled labour is cited as an important
391 barrier to innovation by 50 % of SMEs; however the unemployment of educated people is reported 29.0 % in



Figure 1:



1

Figure 2: Figure 1 :

Obstacles to Innovation	All Firms			
	High Importance	Medium Importance	Low Importance	Not Relevant
Innovation costs too high	49.3	27.9	5.2	17.6
Excessive perceived economic risks	32.4	33.8	12.5	21.3
Lack of appropriate sources of finance	29.4	34.6	13.2	22.8
Lack of information on markets	30.9	30.9	19.9	18.3
Lack of information on technology	25.0	28.7	16.2	30.1
Lack of customer responsiveness to new products	24.3	30.9	19.1	25.7
Lack of skilled personnel	21.3	30.9	21.3	26.5
Insufficient flexibility of regulations and standards	14.0	35.3	12.5	38.2
Organizational rigidities	8.8	30.9	19.1	41.2

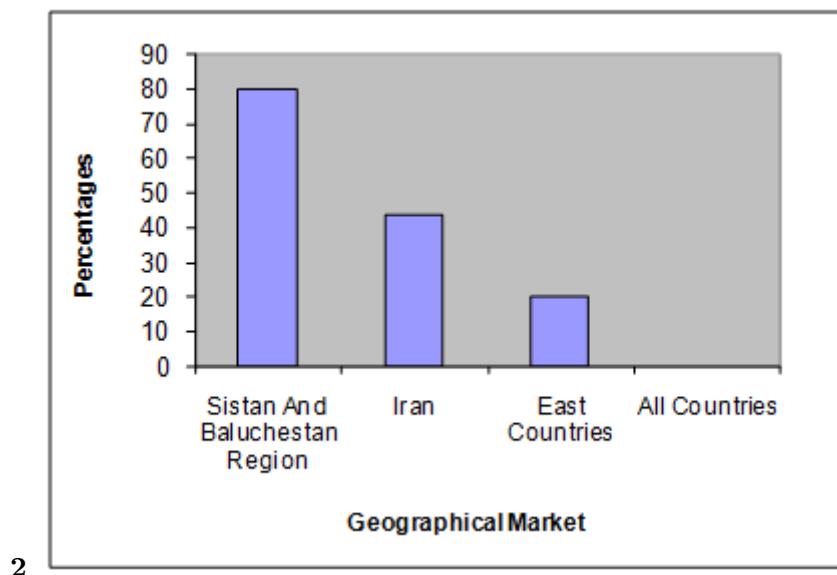
Figure 3: Global

Reasons why enterprises did not innovate(2006_2008)



No need due to prior innovations No need due to market conditions Factors constraining innovation

Figure 4:



2

Figure 5: Trends in introduction of innovations Changes to producers
ervicesFigure 2 :

1

Figure 6: Table 1 :

2

Percentages of all respondents

Figure 7: Table 2 :

3

: Innovation-active enterprises: by type of activity, 2006 to 2008

Percentages

Innovation -activities	64
Product(good/service) innovator	50
Process innovator	64
Abandoned activities	17.6

Figure 8: Table 3

3

Barriers to innovation Factors	N	Mean	Std. Deviation
Excessive perceived economic risk	50	3.48	1.035
Direct innovation costs too high	50	3.28	1.051
Cost of finance	50	3.44	.951
Availability of finance	50	3.40	1.030
Lack of qualified personnel	50	3.20	.990
Lack of information on technology	50	3.12	1.043
Lack of information on markets	50	2.84	1.057
Dominated by established enterprise	50	3.20	1.069
Uncertain demand	50	3.08	1.243
Governmental regulations	50	2.64	1.306
International regulations	50	2.76	1.188

Figure 9: Table 3 :

4

Driving Factors	T	Sig.	Df
One-Sample Test			

Figure 10: Table 4

5

.7

These sources are:

- ? Internal -from within the enterprise itself or other enterprises within the enterprise group
- ? Market -from suppliers, customers, clients, consultants, competitors, commercial laboratories or research and development enterprises
- ? Institutional -from the public sector such as government research organizations and universities or private research institutes, and
- ? Other -from conferences, trade fairs and exhibitions; scientific journals, trade/technical

Figure 11: Table 5 :

6

Information sources	N	Mean	Std. Deviation
Within your enterprise group	50	2.88	1.547
Suppliers of equipment	50	3.40	1.143
Clients or customers	50	3.52	1.111
Competitors or other enterprises within your industry	50	3.00	1.429
Consultants, commercial labs or private R&D institutes	50	2.28	1.526
Universities or other higher education institutes	50	1.80	1.457
Government or public research institutes	50	2.04	1.603
Conferences, trade fairs, exhibitions	50	1.80	1.429
Scientific journals and trade/technical publications	50	2.32	1.477
Professional and industry associations	50	2.24	1.492
Technical, industry or service standards	50	2.64	1.613

Figure 12: Table 6 :

7

Different type of partners	Mean Rank
Other business within your enterprise group	4.56
Suppliers of equipment, materials, services, or software	4.64
Clients or customers	4.40
Competitors or other businesses in your industry	4.28
Consultants, commercial labs, or private R&D institutes	3.26
Universities or other higher education institutions	2.88
Government or public research institutes.	3.98

Figure 13: Table 7 :

8

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Figure 14: Table 8 :

The study of Tiwari and Buse October (2007) indicated two reasons for scarcity of skilled labour:
a) Demographic developments ("aging population") (Reinberg & Hummel, 2004)
b) Lack of student interest in engineering and natural sciences (IWD (2007))
But the condition is different in Sistan and Baluchestan. Unemployment rate was reported 13.8 % in Spring 2009 and unemployment rate of people between 15_24 years old was reported 29.0 % in Spring 2009 (see www.amar.org.ir).

Figure 15:

, Zaltman, Duncan, and Holbek(1973)

Figure 16:

³⁹² Spring 2009. It would be also helpful to conduct researches which examine and compare barriers to innovation
³⁹³ between SMEs in other countries and Iranian SMEs. ^{1 2 3}

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²© 2012 Global Journals Inc. (US)

³© 2012 Global Journals Inc. (US) A Study of Levels and Characteristics of Innovation Activity

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