MEASURING EFFICIENCY OF AUTOMOTIVE PARTS SUPPLIERS FROM ENTREPRENEURIAL ORIENTATION BY USING DATA ENVELOPMENT ANALYSIS

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To Mahdi, the promised savior of mankind and his rightful successor...
ACKNOWLEDGEMENT

It is only by the strength and love of God that I have been blessed with this opportunity to obtain my doctoral degree. I just thank God for all of the blessing. Peace be upon our prophet, the teacher of all mankind.

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ABSTRACT

Entrepreneurship indices should be considered for measuring efficiency in parallel with rapid growth in manufacturing technology industry. However, in Iran, automotive industries lack entrepreneurship and effective methods for measuring efficiency. To address the problem, the study has three main aims: firstly, to examine the relationship between enabler factors of entrepreneurial orientation and entrepreneurial orientation of automotive parts suppliers, secondly, to rank and identify inefficient suppliers through measuring efficiency from an entrepreneurial orientation perspective, and finally, to find ways to improve inefficient suppliers. This study applied both quantitative and qualitative approaches. In the quantitative phase, 422 out of 510 sets of questionnaire focusing on enabler factors of entrepreneurial orientation and entrepreneurial orientation were collected from middle and lower managers as well as technicians of 51 Iranian automotive parts supplier firms. SPSS was used to statistically analyze data and data envelopment analysis method was applied specifically to measure efficiency. The results revealed that two (structure and policy) out of six enabler factors of entrepreneurial orientation, were not significant predictors of entrepreneurial orientation. Scores of efficiency indicated that 16 of these firms were inefficient from an entrepreneurial orientation viewpoint. The data envelopment analysis not only showed the inefficient suppliers but also revealed quantitative suggestions. Besides that, qualitative data collection based on open-ended questionnaires to seek the opinions of nine industry and entrepreneurship experts were carried out. Based on the findings, it is suggested that attention be drawn to the components of entrepreneurial orientation, namely innovation, risk-taking, pro-activeness, autonomy, competitive and aggressiveness. They have roles with various degrees of importance in entrepreneurship and consequently in the improvement of efficiency score of inefficient suppliers. Recommendations based on data envelopment analysis and experts’ opinions to improve the efficiency of the inefficient firms have been made in the study by suggesting ways to eliminate inefficiency due to lack of entrepreneurial orientation among suppliers.
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<td>DMUs</td>
<td>Decision making units</td>
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<td>CE</td>
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<td>IKCO</td>
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CHAPTER 1

INTRODUCTION

1.1 Background

Over the past several years, entrepreneurship has been widely used by scholars and practitioners as an efficient means of revitalizing companies and enhancing their performance (Zahra and Covin, 1995). Developed and developing countries have paid a serious attention to entrepreneurship since late 1970s and late 1980s respectively (Ruef and Lounsbury, 2007). In the Islamic Republic of Iran, entrepreneurship has been taken into consideration by both politicians and scholars over the last three decades. The first inclination in this area started from the third development plan of the country (Moghimi, 2007). However, the unemployment problem has become worse in the last decade leading the government to focus on entrepreneurship development (Rasem and Hassan, 2011). In the country’s fourth and fifth plans, Iran has increased the development of entrepreneurship in all aspects and tried to develop entrepreneurial policies throughout the country due to its likely significant impact on efficiency and productivity (Mazdeh et al., 2012).

Having recognized the need to implement entrepreneurship orientation (EO), all Iranian organizations have developed strategic plans for product entrepreneurship and production process entrepreneurship (Dehghan and Haghighi, 2008). This need has arisen in response to a number of pressing problems including a rapidly growing number of new and sophisticated competitors, presence of a sense of distrust regarding the traditional methods of corporate management, missing skillful human resource at
managerial levels who are leaving corporations to become small-business entrepreneurs, international competition, downsizing of major corporations, and an overall desire to improve efficiency and productivity (Merrifield, 1993 and Kuratko, 1993).

Based on the aforementioned discussion, one of the reasons highlighting the necessity of practicing entrepreneurship in organization is “an overall desire to improve efficiency and productivity”. Therefore, there is call for incorporating the entrepreneurial orientation to boost efficiency in organizations and industries like automotive industry.

1.1.1 Automotive industry: Current State in Iran

Automotive industry called as "industry of industries" (Peter Drucker, 1946) is still regarded as one of the important and fundamental industries in the world (Nag et al., 2007). It deals with designing, developing, manufacturing, marketing, and selling the world’s motor vehicles. This industry is characterized by certain factors such as competitiveness, the requirements of customer, etc. Furthermore, automobile industry creates many job opportunities. According to Forouzan and Mirassadallah (2009), the automobile industry makes a significant contribution in everyone’s life. Over the last fifty years, this industry has changed the human's view on how to manufacture and produce artifacts (Reed et al., 2004). These changes have led to innovations in work style, life style and even thinking style. The main product of this industry has increasingly attracted the attention of people and governments due to the various roles played by this product in society, such as facilitation of relation in vital activities within the society (Forouzan et al., 2009). The importance of this industry has been emphasized as owning an automobile has turned to be the criteria in measuring and assessing the degree of development in the world.

According to annual report of “Organisation Internationale des Constructeurs d’Automobiles” (OICA) in 2012, Iran is the sixteenth largest automaker in the world
and the biggest among Middle East countries. According to Iran's "Twenty-Year Vision Document, the objectives of the automotive industry are: (1) To gain the market share of value added of the automotive industry at least 2.6% of GDP; (2) To gain the market share of value added of the automotive industry at least 19% of the total value of the industry; (3) To preserve at least 80% of the total units of the automotive market share; (4) To gain the export share of 40% of Rial volume of the sold automobiles by concentrating on global markets; (5) To gain the share of at least 3.5% of the total units of global automobile manufacturing. Iran’s automotive sector dates back to more than 45 years ago, and is the second most active industry after its oil and gas industry. According to Forouzan et al. (2009) the production of automobile is around 50,500,000 units a year and engages approximately 100,000,000 workers, in the world.

According to Rahmati and Yousefi (2011), the automobile market in Iran is supplied by two major automotive companies named I.K. Co. (Iran Khodro Company) and Saipa as the two major automakers in Iranian automotive market. The other companies are relatively small producers and importers. These two companies are considered as the two largest companies with more than 95% of the total market share, however their products are often viewed as low quality products (Arumugam and Mojtahedzadeh, 2011). Therefore, the Iranian automotive industry should take into consideration competitive strategies like entrepreneurial orientation for its survival in the competitive market (Abrishamkar et al., 2011; Khaksar et al., 2011). Considering the fact that taking advantage of entrepreneurial indicators facilitates the path of IKCO and Saipa-Yadak toward enhancing the EO, the companies should provide suitable grounds to promote plans for entrepreneurial orientation utilizing all required facilities. In fact, the unity of automotive industry coming from commitment of IKCO and Saipa-Yadak is an issue of high importance in carrying out the factors of EO (Forozanfar et al., 2011).

According to Abedini and Peridy (2009), there are many advantages in Iranian Automobile Industry. The capacity in this industry is very high, and it has easy access to Middle East market due to Iran’s geographical position. Despite these advantages, this industry has not achieved an appropriate status, and the products of Iran's
automakers have not been widely exported yet. According to Arumugam and Mojtahedzadeh (2011), the gap between production and export can be explained by several reasons such as the lack of competition in domestic market, lacking in product design, suffering from the lack of team working, low quality of suppliers, lack of strong and capable leaders, lack of customer focus, lack of training, lack of performance, high protection levels and weak international marketing programs as well as quality culture. In addition, there are other related problems such as the lack of adequate innovation or proactiveness and change in demand creating the need for recruiting properly trained staff, which have not been dealt with properly due to the automotive industries’ limited capacity to respond and react to these changing global and nationalized priorities (Arumugam and Mojtahedzadeh, 2011).

On the other hand, as cited by Morris and Kuratko (2002), global economy is creating substantial changes for industries and organizations such as automotive industry throughout the world. Automotive industry like other organizations is prone to changes and evolutions. Therefore, there is a call for adopting new strategies with which companies can be revitalized in competitive environment (Zahra and Covin, 1995). EO is an appropriate response to these concerns in Iran (Mazdeh et al., 2012). Additionally, regarding the fact that EO is a strategy used for gaining competitive advantage (Dehghan and Haghighi, 2008), its implementation in companies applying such strategy should be measured (Shepherd and Günter, 2006). Thus, there is a call for controlling and assessing EO as it is considered as a key success factor (Kuratko et al., 1993).

Need for practicing EO can also be highlighted considering the fact that automotive industry is a big supplier in economy of Iran, in fact this industry should move toward entrepreneurial orientation so that it can learn how to manage it more effectively and efficiently. However, It would not be achieved unless appropriate tools and instruments are employed in order to measure performance of suppliers (Beamon, 1996; Shah and Singh, 2001). So far, many scholarly activities have been carried out in terms of performance and efficiency as the key factors contributing to automotive
industry. However, the difference between efficiency and performance has not been taken into account practically by researchers (Prokopenko and North, 1996).

Performance measurement systems (PMSs) as a stage of controlling and also a Performance measurement (PM) tool have been increasingly gaining significance in business, through which any potential issue resulting in improvement of the business can be detected. (Kittelson and Associates, 2003). According to Beamon (1999), and Shah and Singh (2001), the improvement of a proper PM tool is absolutely essential since it helps the business to operate effectively. Furthermore, other authors have emphasized that a PMS plays a significant role in controlling performance, improving incentive, enhancing communications and detecting issues (Beamon, 1996; Brewer, 2000; Holmberg, 2000; Lau, 2001; Morash, 2001; Bullinger, 2002; Bullinger, 2002; Tan, 2002; Otto, 2003; Gunasekaran, 2004). Neely et al. (1995) has also explained PM as a process of evaluating both the efficiency and the effectiveness of events.

The new performance evaluation systems are contingent upon new expansion of performance indices (Holmberg, 2000). Many criticisms to traditional performance evaluation are comprehensively focusing on financial indices (Atkinson et al., 1997). In order to achieve organizational integration, companies and organizations are exploring ways such as quality management, sustainability of the business, attention to customer, research development and innovation in continuous evaluation of performance. Traditional indices have been incomplete in offering general definitions that are not suitable for new environments of business and competitive affairs (Laats et al., 2011). Based on the Iran Khodro Company’s rule, the outmoded methods and indicators for performance measurement are being replaced by competitive methods and indicators.

Considering the involvement of organizations in upstream and downstream stages of supply chain has turned the organizations and their supply chain into a single entity, as they can have a mutual contribution to their customers and internal operation of the company, which are known as two drivers of business strategy (Hugos, 2008). In this regard, scholars believe that each strategy should be measured after
implementation. In addition, referring to the fact that EO is a strategy for gaining competitive advantage (Dehghan and Haghighi, 2008), implementation of EO should be measured (Shepherd and Günter, 2006). In fact, it should be investigated if there is an alignment between EO as the strategy and management and suppliers as one of the components of automotive company. Therefore, there is a call for control and assessment of EO as the vital success factor of companies (Kuratko et al., 1993).

As a result, this study is not only focusing on seeking ways of improving the efficiency in Iranian automotive parts suppliers, but also is shedding new insight in measuring efficiency since it has applied the EO approach as a new indicator instead of some financial indicators.

### 1.2 Research Problem

The necessity of pursuing EO in an organization (like Iranian automotive industry) has resulted from a diversity of pressing issues comprising: scientific changes, innovations, and developments in the market, observed weakness in the traditional approaches of corporate management, repeated downsizing of businesses seeking more efficiency, the loss of entrepreneurial-minded personnel who are disenchanted with bureaucratic corporations, and increasing ranks of global competition (Merrifield, 1993; Kuratko and Hodgetts, 1998; Morris and Kuratko, 2002).

It can be noted that EO has been accepted as a potentially viable methods for promoting and supporting corporate competitiveness and innovation in Iranian automotive industry, due to the fact that Lumpkin and Dess (1996) noted that EO can be employed to develop competitive positioning and renovate companies, marketplaces and industries. Efficiency’s position of automotive industry in Iran is prone to many challenges, issues and threats.
Lastly, the patterns across various global areas concerning how entrepreneurial firms generate, foster, and deploy new value creation occasions is of particular and special interest (Kickul et al., 2011). While studies on entrepreneurship have significantly grown during the past decades, studies on the intersection between entrepreneurship and operations management (like measuring efficiency) are scarce (Goodale et al., 2011; Kickul et al., 2011). The concept of entrepreneurship is new especially for practitioners and also in developing countries like Iran. As mentioned before, entrepreneurship has been ignored by academic organizations and industrial organizations like automotive industries (Mazdeh et al., 2012). Whereas, automotive market is a competitive market which encompasses a lots of markets and also effects on a lot of industries and resources. Low market share has arisen from missing market opportunities and lack of aggressiveness. Speaking on this matter, despite quick changes in innovations in products and services in global automotive industry, Iran is suffering from lag in innovativeness in product and designs policies (Arumugam and Mojtahedzadeh, 2011). Further, in developing countries (like Iran), despite of allocating many subsidies and supports by government, producers are not committed to government for doing R&D activities, as drivers of innovativeness and risk taking, since there are some weakness of the control policy in this industry (Fuangkajonsak, 2006). As a result, the producers feel there is no competitive environment and there is no motivation for achieving to competitive advantages. This condition, undoubtedly, leads to not only unsustainability in entrepreneurial orientation (since innovation, risk taking, proactiveness, autonomy and competitive aggressiveness are dimensions of EO (Lumpkin and Dess (2005)) but also inefficiency.

Cultivating from the above, this study was prompted to investigate three interesting issues:

1. Measuring the degree of EO.
2. Investigation of the relationship between behavioral and organizational factors and EO.
3. Measuring efficiency of suppliers from the viewpoint of EO.
1.2.1 Issue 1: Measuring Degree of EO

One of the things that is really important for government is to make sure that the environment is such that the entrepreneurial spirit remains strong (Bush, 2005). Sustainable entrepreneurship is needed to explore and assess entrepreneurial actions and strategies as a mechanism for making existing business practices more sustainable while providing economic and non-economic gains for investors, entrepreneurs, and communities. In other words, based on Morris and Kuratko (2002), sustainable entrepreneurship requires that managers are involved in ongoing efforts at assessment. The entire concept of assessment revolves around the measurement of processes and outputs. The necessity of measuring the level of EO can be explained by referring to contribution of automotive company management in business strategy considering the organization as a single entity and emergence of the concept of strategic management (Hugos, 2008). Additionally, the author pointed out that firms can achieve competitive advantage as long as their company is in alignment with their strategies in doing business. In fact, the company performs, based on the type of strategy. EO, as conceptualized by Lumpkin and Dess (1996, 2005), has five dimensions. As a result, EO should be monitored from the viewpoint of its five dimensions.

It can be seen that there is a relation between management and strategy (Hugos, 2008). Among different strategies adopted by firms, entrepreneurship can be considered as one of the strategies whose alignment with organization (or suppliers) can be considered in order to gain competitive advantage (Covin and Miles, 1999). Investigation on how EO strategy works can provide the firms with the information on the efficiency suppliers.

Improving EO in current organizations and creating appropriate base for their development is a tool for economic development of countries, especially developing countries (Rodriguez and Martí, 2006). Increasing importance of EO as a driver of strategy leading to success and competitive advantage of firms in supplier's industry needs for research to be done on measuring their level of EO (Davis, 2006). The author noted that the necessity of investigating on applying degree of EO as a way of
measuring the efficiency of supplier firms can be shown by referring to the fact that there is a gap in area of measuring the full performance of the whole automotive company network’s attributes of collaboration, integration, cohesion and ability. As a means of achieving the unified business objectives leading to continuous improvement which has created a challenging issue.

From the other standpoint, creating and maintaining a long-term work relationship leading to developing relation with fewer reliable suppliers is essential. Thus, choosing the best supplier is beyond considering the price, which encompasses a lot of quantitative and qualitative indicators (Ho et al., 2010). It is related to the fact that selecting and measuring the suppliers is one of the important concerns in automotive company management since making the wrong choice of supplier leads to loss of company performance and financial position, and conversely a good choice of suppliers leads to lower supply cost, competitive advantage and customer satisfaction (Liu et al., 2000; Hugos, 2008). The potentiality of EO’s being used as a means of performance measurement can be highlighted by referring to the fact that, at the beginning of the 80s, with the sudden development in the industry field and competitive world, the importance of entrepreneurial processes have been considered in big companies more than ever (Stevenson et al., 1985). Today, organizations are facing rapid technological change, complex competition, fast-growing number of new competitors, a sense of distrust in management of traditional methods, a large of the best company's employees leaving, an international competition, corporate downsizing and an overall desire to increase efficiency and productivity. So, today, a lot of companies are recognizing the requirement for EO and corporate entrepreneuring (Kuratko, 2009). It means that the key performance indicators for choosing the best performers are getting change and moving toward EO.

Speaking to this matter, making a comparison with earlier decades shows that changes, innovations, and development are now more widespread in the marketplace. Companies and organizations are trying to become entrepreneurs in order to be flexible to change and retain opportunities in market. As a result, under these conditions, companies have to be innovator, otherwise they become outmoded (Abrishamkar et
In every organization, there are potential entrepreneurs seeking to improve their abilities. Therefore, advocating and fostering entrepreneurship and creating a platform is one of the real sources of competitiveness for all organizations (Edmiston, 2007; Moosakhani et al., 2011). Additionally, in case organizations are prepared with productive knowledge and also productive entrepreneurial skill, they can move forward and accelerate on the development path. Therefore, by using these abilities, other resource of organizations and society can be led to create value and achieve growth and development (Rodriguez and Martí, 2006).

Thus, it can be stated that EO is one of the strategic approaches to achieve success (Antoncic and Hisrich, 2004) for suppliers. Yet, the implementation of EO is becoming a vital action for organizations (Zahra, 1996). Successful EO is related to each factor in organization. Defining measurement criteria of EO and tools of entrepreneurship strategic management is one of the most important subjects of dispute in industry and organization because of the many factors involved in efficiency (Davis, 2006). The current state of Iranian automotive industry, as mentioned before, is not in acceptable from viewpoint of manufacturing and export. Hence, Iran has adopted plans of supremacy, named “fifth plan of development” and “2025 vision plan”, which have emphasized promotion of domestic production, especially in strategic products and services and also increased efficiency in economic activity, improvement of economic competitiveness. In fact, the existent lack of entrepreneurship in Iran led to emphasis on learning entrepreneurship as a key objective of the presented plan of development. Entrepreneurship should be touted in all subjects, “mentioned in 2025 vision plan of Iran”. In addition, as Iran is under sanction, lack of entrepreneurship leads to unsuccessful wealth creation in country, as a result hazy future for industries and economy. Therefore, Iranian automotive industry will encounter more problem if could not pave the way for acting and thinking entrepreneurially. Simply viewed, large industries and organizations like automotive industries need to provide for entrepreneurial behavior within, to cope with the challenges and changes their internal and external environment brings (Allens, 2009).
Entrepreneurship in existing firms takes on many forms and occurs throughout the organization, therefore companies can differ significantly how entrepreneurial they are (Covin et al., 2008). Many scholars (e.g. Davis (2006) and Hornsby et al., (2002)) recommended that EO performs as a strategy and the effectiveness of the key internal organizational factors and the climate influencing innovative activities and behaviors should be measured. Therefore, the adoption of comprehensive and multidimensional instrument for assessing EO is a significant help to measure degree of EO of automotive parts supplier firms.

1.2.2 Issue 2: Investigation of the Relationship between Behavioral and Organizational Factors and EO

This issue deals with investigation of any significant relationship between organizational factors (including: structure, policy, HR, and strategy) and behavioural factors (including: culture and leadership) as independent variables and EO in automotive parts suppliers. This issue is raised since there is need on understanding the encouraging factors with which EO can be developed or enhanced in firms (Dhliwayo, 2010). This issue can also be considered with regard to contribution of these factors in achieving entrepreneurship point of view in suppliers as a part of the automotive company. Because the major players in automotive supplier industry in Iran are suffering from inefficiency (Alizadeh and Hakimian (2013); Arumugam and Mojtahedzadeh (2011)), therefore, investigation on encouraging factors of EO leading to development of EO can be viewed as a way of eliminating the inefficiency among automotive parts supplier (Arumugam and Mojtahedzadeh, 2011).

Turker and Selcuk (2009) pointed out that there are many factors fostering the entrepreneurship which are appeared in organization. Organizational behavior is a function of structural and contextual factors. The structural and contextual factors should be managed to make entrepreneurial organizational behavior since the organization can achieve its developmental goals through an entrepreneurial approach.
Antonic and Hisrich (2001) suggested a model in which the environmental and the organizational factors fostered entrepreneurship which, in turn, increased organizational performance. Peterson and Berger (1972) published the results of their groundbreaking research on identifying the organizational and environmental factors influencing on the entrepreneurial actions taken by companies. Miller’s study in 1983 also made a significant contribution to the field. He sets out some powerful arguments which were used by other researchers. In fact, researchers have used Miller’s theory and research instruments to examine the linkages between environmental, organizational, and behavioral factors and variables, and a company’s entrepreneurial activities (Zahra et al., 1999). Considering the new perspective drawn by the above researchers, a new conceptualization of EO in Iranian suppliers is suggested in which the organizational and behavioral factors make a significant contribution in developing the necessary context for EO. As antecedents of EO are not same for each organization, automotive industry in Iran should investigate drivers of EO. In other words, each of these antecedents or any combination of them may considered the prerequisite an important forepart for EO efforts. Because, they affect the internal environment of the organization in which inclination to entrepreneurial activities are determined and supported.

Based on the above, this study found it very important to investigate the impact of organizational and behavioral factors on EO among automotive parts supplier.

1.2.3 Issue 3: Measuring Efficiency of Suppliers by Using DEA from the Perspective of Entrepreneurial Orientation

The last issue of the study highlighted the importance of drawing attention to the antecedents of EO. In fact, determining the antecedents (or prerequisites) of EO in automotive parts suppliers leads to pave the ways for boosting and strengthening EO efforts. Therefore, boosting EO should be taken as a strategy for suppliers and this strategy should be assessed in order to monitoring efficiency of suppliers, otherwise making the wrong choice of supplier leads to loss of company performance and
financial position, and as a result higher supply cost, lag in competitiveness and customer satisfaction (Liu et al., 2000; Hugos, 2008).

Rising significance of international competitive market has lead performance measurement to become a key research field in industry and academic world. Measuring performance is connected to practices of business, which makes it possible for companies to be successful in their initiatives (Brewer and Speh, 2000). In the realm of measuring performance and efficiency, two major questions must be addressed. First, what indexes (or criterion) should be applied and second, what methods can be utilized to compare (or evaluate) suppliers (Amindoust et al., 2012). The recent researches which are using an index approach to evaluate business performance are widespread (Ip, 2011; Faisal, 2007; Simatupang, 2005).

Light (1998) in supporting a wider range of performance measures to achieve alignment with strategy stated that intangibles such as “management performance, quality of strategy, customer satisfaction and employee retention” must be addressed. He argued, along with Dangayach and Deshmukh (2001), that measurement, monitoring and control of these aspects helps to “pinpoint problems, improve processes and achieve company goals”.

In addition, in order to define the level of efficiency in the organizations, and level of the mentioned criteria, an efficient method should be applied. In this regard, Data Envelopment Analysis (DEA) as an efficient mathematical model which is based on linear programming, efficiency of a set of decision making units (DMUs) is evaluated based on the indexes of input and output, as compared with each other, to determine the efficient and inefficient units (Charnes et al., 1978; Cooper et al., 2007). Based on Li et al. (2014), choosing the most proper inputs and outputs is of vital importance when conducting all DEA researches, but so far, there is no generally agreed technique for the selection. Various DEA studies have applied different inputs and outputs (Premachandra et al., 2009). Inputs and outputs should be meaningful in the framework of the competitive environment (Oral and Yolalan, 1990). Applying
DEA by new inputs and outputs (CE approach) leads to new approach to efficiency and meaningful related to competitive environment.

According to Cooper et al. (2007), DEA divides all units into two groups: efficient and inefficient. A unit is efficient if its efficiency score equals to 1. Inefficient units can be ranked if they gain efficiency score. Finally, inefficient and weak organizations should be promoted and improved. For this purpose, a road map and pattern of successful organizations are needed. Therefore, identifying and helping the inefficient automotive parts suppliers to improve their efficiency were deemed necessary through the obtained suggestion from DEA and recommendations of experts and consultants in Iranian automotive industry.

1.3 Research Questions

Considering the concerns raised in the problem statement, hence, the research questions recognized in this study are:

RQ1: What is the degree of entrepreneurial orientation among automotive parts supplier firms?

RQ2: To what extent can the EO-enabler factors be significant predictors of EO in automotive parts supplier firms?

RQ3: To what extent is the efficiency of the automotive parts supplier firms from the perspective of EO by using DEA method?

RQ4: Which supplier are performance models of each inefficient automotive parts supplier firms from EO point of view?
RQ5: What are the ways to improve inefficient automotive parts supplier firms?

1.4 Purpose of Study

The aim of this study is threefold: first, to examine the relationship between enabler factors of EO (EO-enablers) and EO in automotive parts suppliers, second, to rank the suppliers through measuring efficiency from EO and identifying the inefficient suppliers by Data Envelopment Analysis (DEA). And finally, to find the ways which can improve the efficiency of inefficient suppliers.

1.5 Objectives of Study

This study focused on the following research objectives:

1. To identify the degree entrepreneurial orientation among automotive parts suppliers.
2. To investigate the extent of the relationship between EO-enabler factors and EO in automotive parts suppliers.
3. To evaluate the efficiency of automotive parts supplier firms from EO by using DEA method.
4. To determine the inefficient automotive parts supplier firms and identify relevant peers for each supplier that can serve as performance models of each supplier.
5. To suggest the method to improve the efficiency of inefficient automotive parts suppliers from EO.
1.6 Scope of Study

The scope of this study is twofold: knowledge and location scope. Knowledge scope of this study is limited to measuring efficiency of Iranian automotive parts suppliers from EO by using DEA. The location scope of this study is limited to the investigated suppliers in Iran. The sample of this study was all automotive parts suppliers that were subordinates and under direct contract of Iran Khodro (IKCO) which were located in Khorasan province. All mentioned suppliers are classified into large size company since they had more than 200 personnel. To find the extent to which each of the EO-enabler factors is related with EO, a set of questionnaire were distributed among 510 middle managers, lower managers and technicians of selected automotive parts supplier firms in Khorasan. Nine experts in entrepreneurship and those who are experts in automotive field were interviewed through open ended questionnaire to provide supportive and clarifying suggestions regarding how EO can be improved (or how automotive parts suppliers' efficiency can be improved).

1.7 Significance of Study

Enhancement of the performance is one of the challenging issues to organizations in public, private and governmental sectors. Active organizations in private sectors need to develop entrepreneurship and adopt an entrepreneurial approach for several reasons. The following are the most important ones: continuous intensification of competition in the market and need for innovative activities, fast environmental changes, fast advancement of technology, efficacious forces, pressures of lowering the costs, existence of high potentialities and quick paces to take advantage of opportunities (Kraatz and Zajac, 2001; Morris and Kuratko, 2002a; Twomey and Harris, 2000).

The result of this study can also be important since it is an attempt in identifying the non-financial indicators capable of being used in measurement of success of different parts of automotive company including the suppliers. It is hoped
that the findings of this study provide more insight in the way automotive companies and organizations are viewed as a single entity. Indeed, it will provide more insight on a strategic approach toward automotive companies.

Due to the attention paid by the Iranian economy players to the automotive industry and the rapid growth of this area in Iran, existence of domestic competitions, possibility of foreign competition emergence to maintain a competitive position in the market and attract loyal customers, it seems necessary to conduct performance measurement for selection and promotion of suppliers by competitive indices, with which the weaknesses will be identified and eliminated (Hemati et al., 2010).

In the view of Dhliwayo (2010), companies and organizations are trying to become entrepreneurs in order to be flexible to change and retain opportunities in market. Confirmation of the relationship between EO-enabler factors and EO is another significance of this study. EO occurs in entrepreneurial organizations provided that improving the prerequisites of EO with which organizations progress toward entrepreneurial practicing. Therefore, recognition of these prerequisites enables organizations to modify behaviours in acting more entrepreneurial strategic orientation and better performance. In addition, the findings of this study are important in evaluating the efficiency of suppliers from the perspective of EO. Further, the results allow the managers to distinguish and recognize the entrepreneurial weaknesses in suppliers.

Considering the fact that today, organizations are considered as a single entity, they can have a mutual contribution to customers and internal operation of the company, known as two drivers of business strategy (Hugos, 2008). An effective automotive company management and high performance of its subordinate part such as suppliers requires considering both customers and internal efficiency of the organization to make the automotive companies and suppliers in alignment with such business strategy (like CE).
The most important significance of this study is not only to identify the inefficient firms through DEA but also to provide suggestions how inefficient firms can be improved. The findings highlighted that how EO constructs can be improved to the extent suggested by DEA. This stage of the present study can be considered a contribution to research community since this study contributes to the literature by offering a rather novel, qualitative, case-based approach to screening EO and the processes and contributory factors that cause to boost it.

1.8 Definition of Terms

The following are the operational definitions of all terms which were used in this study.

i. Entrepreneurship: Nasution et al. (2011) define that entrepreneurship is a process of creating wealth through innovation and taking advantage of opportunities that requires venturing, autonomy and proactiveness. In addition, Hornaday (1992) states that the basis of entrepreneurship is innovation and economic value creation that leads to more profit in the market.

ii. Entrepreneurial Orientation (EO): EO is a strategic construct whose conceptual domain includes certain firm-level outcomes and management-related preferences, beliefs, and behaviors as expressed among a firm’s top-level managers. As originally proposed by Lumpkin and Dess (1996, 2005), EO is revealed through an organization’s exhibition of risk taking, innovativeness, and proactiveness, autonomy, and competitive aggressiveness.

iii. Organizational factors: Include the aspects related to physical and non-human components and the organization's conditions that are bounded together via particular order, with which the structure is ruled and established. In fact, organizational factors include non-alive factors of the organization (Sarlak et al., 2009; Sarlak and Mirzaei, 2005).
Organizational factors comprises: Politics (Dhliwayo, 2010; Tushman and Nadler, 1997), organizational structure (Covin, 1991; Dess, 1999; Naman, 1993; Dhliwayo, 2010; Tushman, 1997; Randall, 1986; Dess, 1997), organizational strategy (Dhliwayo, 2010; Karimi et al., 2011), and human resource (Bishop et al., 2005; Dhliwayo, 2010; Karimi et al., 2011; Schuler, 1986).

iv. Behavioral factors: The organization's behavioral factors indicating human’s conduct and behavior in the organization conjoined together by specific patterns, informal interactions and behavioral norms, with which the organization's main content are established are considered as the organization's alive factors (Sarla et al., 2009; Sarlak and Mirzaei, 2005). Behavioral factors comprises: culture (Burgelman, 1983; Hornsby, 2002; Wong, 2005; Johnson, 2002; McGrath, 2000; Dhliwayo, 2010; Bishop, 2005; Hornsby, 2002), and leadership (Dhliwayo, 2010; Hill, 2003; Karimi et al., 2011).

v. Efficiency: Efficiency refer to inputs, i.e. actual source consumption over expected source consumption (Prokopenko and North, 1996).

vi. Data Envelopment Analysis (DEA): DEA is an efficient mathematical model which is based on linear programming. Through DEA, efficiency of a set of decision making units is evaluated based on the indexes of input and output, as compared with each other, to determine the efficient and inefficient units (Cooper et al., 2007).

1.9 Organization of the Thesis

This chapter (Chapter 1) is the foremost chapter of the three chapters of this proposal. It presents the overview of the study background, statement of the research problem, research questions, research objectives that are stated in consonant with the research questions, the significance and limitations of study. Chapter 2 presents the review of the related literature of the construct as well as research findings done by previous researchers. In other words, second chapter describes entrepreneurship, EO,
EO-enablers factors, measuring intensity of EO, efficiency and various models of efficiency. DEA as a mathematical method for measuring efficiency is introduced. Previously conducted studies on DEA applications are investigated. In accordance with one of the conducted studies, DEA applies entrepreneurial oriented input and output. The conceptual framework of this study is interpreted in the end of Chapter 2. The method for the study, which is the research design and procedure were presented in chapter 3. This chapter demonstrates the selection of the respondents, sample types and size, the development of the questionnaire and data collection procedure or method. Chapter 3 ends with a brief description of the strategies and procedures that are employed to evaluate data collected from the survey as well as the most popular models of DEA method (CCR and BCC methods). The results and findings of quantitative and qualitative analyses are represented by Chapter 4. This journey is ended by discussion and conclusion of the findings, recommendation for future studies, and highlighting the limitations and contributions.
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APPENDIX A

SURVEY QUESTIONNAIRE

FACULTY OF MANAGEMENT
UNIVERSITI TEKNOLOGI MALAYSIA

QUESTIONNAIRE OF A PhD RESEARCH:

“MEASURING EFFICIENCY OF AUTOMOTIVE PARTS SUPPLIERS FROM ENTREPRENEURIAL ORIENTATION BY USING DATA ENVELOPMENT ANALYSIS”
Dear Sir/ Madam:

This questionnaire serves as part of a management Ph.D research project, which aims to measure the intensity of EO qualities and behavior in organizations. This questionnaire consists of two parts: Part A consists of 43 statements about EO-enabler factors; Part B consists of 18 statements about EO. This should take only 25 minutes of your time. The completion of this questionnaire is completely voluntary, but your co-operation would be greatly appreciated. Confidentiality will be strictly adhered to, and there will be no mention of your personal name or your organization. Thank you in advance for your participation in this study. All information will be treated as confidential and only used exclusively for the purpose of this study.

Regards
Amir Hosein Moradi Deluyi
Ph.D. candidate
Faculty of Management
Universiti Teknologi Malaysia
Instruction:

This questionnaire has two parts, Part A and B. Part A refers to constructs of EO-enabler factors, human resource, structure, politics, leadership, culture and strategy. Please, state your opinions on each item by ticking (✓) one point from points 1 to 5 (strongly agree=5, agree=4, unsure=3, disagree=2 and strongly disagree=1). The higher the rate each participant gives to each item from one to five, the higher the entrepreneurial quality of the concept is.

Part B refers to constructs of EO. Please, state your opinions on each item by ticking (✓) one point from points 1 to 5 (strongly agree=5, agree=4, unsure=3, disagree=2 and strongly disagree=1).


Organizational factors include the aspects related to physical and non-human components and the organization's conditions that are bounded together via particular order, with which the structure is ruled and established. In fact, organizational factors include non-alive factors of the organization.

Behavioral Factors: Leadership, Culture.

The organization's behavioral factors indicating human's conduct and behavior in the organization conjoined together by specific patterns, informal interactions and behavioral norms, with which the organization's main content are established are considered as the organization's alive factors.

Entrepreneurial orientation (EO): EO is commonly implied as a multi-dimensional structure comprised of risk taking, innovativeness, proactiveness, autonomy and competitive aggressiveness.
General Information

**Supplier Information:**
Name of your firm:
Number of personnel (or size):
Type of products:
Years of supplier establishment:

**Part A: Organizational and Behavioral Factors (EO-enabler factors)**

List below are a series of statements that represent possible feelings that individuals might have about the firm for which the work. With respect to your own feelings about the particular supplier for which you are now working, please indicate the degree of your agreement or disagreement with each statement by checking one of the five alternatives below each statement.

1=Strongly Disagree (SD), 2=Disagree (D), 3=Somewhat (S), 4=Agree (A), 5=Strongly Agree (SA)
### Part A: Organizational and Behavioral (EO-enabler) factors

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Our organization's compensation and reward system is value-based with unlimited earning potential for employees</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>The organization sets and regularly evaluates goals related to innovative, risky and proactive behaviour.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Employees are rewarded for taking calculated risks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Our organization has clear goals, which have been mutually agreed upon by employees and management.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Employees receive recognition from the organization for innovative ideas and suggestions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Our organization can be described as a non-bureaucratic organization.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>7</td>
<td>Our organization's structure allows for resource sharing and encourages flexibility.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Our organization has flexible job designs rather than formal job descriptions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>The ideas and suggestions of lower level employees are taken seriously and valued.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Employees are allowed to performing a task in a different way.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Management allows to employees to participate in making important decisions for our organization.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>In our organization, people have to follow lines of authority and skipping levels is strongly discouraged.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>Employees are encouraged to manage their own work and have the flexibility to resolve problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>Our organization has a widely held belief that innovation is an absolute necessity for the organization's future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>People in our organization are continuously encouraged to expand their capacities to achieve more.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>Our organization nurtures new and expansive patterns of thinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>We are encouraged to continually look at things in new ways.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>There is a strong emphasis on teamwork in the organization.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>Confidence, trust and accountability are words, which describe how management treats the employees at our organization.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### Part B: Entrepreneurial orientation (EO)
Below are 18 statements about entrepreneurial orientation (EO).

Please read each statement carefully and select the response for each statement that best describes how you feel about your entrepreneurial orientation. For each of the

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>There is continual recruitment of individual entrepreneurs into the organization.</td>
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<tr>
<td>21</td>
<td>Our leader takes calculated risks with regard to exploring and seizing growth opportunities.</td>
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<td>22</td>
<td>Our leader can be described as charismatic.</td>
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<td>23</td>
<td>Our senior executives solve problems by brainstorming together.</td>
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<tr>
<td>24</td>
<td>Our leader continually examines potential new market opportunities.</td>
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<tr>
<td>25</td>
<td>Our leader never appears to tire or lose enthusiasm for the organization.</td>
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<tr>
<td>26</td>
<td>Our leader has a great ability to persuade others to achieve a certain goal.</td>
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<td>27</td>
<td>Our leader encourages open discussion with all employees.</td>
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<tr>
<td>28</td>
<td>Our leader has instilled an entrepreneurial philosophy in all employees in the organization.</td>
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<tr>
<td>29</td>
<td>Our leader can be described as visionary and flexible.</td>
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<tr>
<td>30</td>
<td>Our leader's enthusiasm rubs off on all employees within the organization.</td>
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<tr>
<td>31</td>
<td>I am able to achieve my objectives even when there are few guidelines or systems in place.</td>
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<tr>
<td>32</td>
<td>I am willing to be criticised for breaking with tradition, if this is what it takes to succeed.</td>
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<tr>
<td>33</td>
<td>My biggest successes have resulted from my refusal to give up.</td>
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<tr>
<td>34</td>
<td>I tackle problems with enthusiasm and zest.</td>
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<tr>
<td>35</td>
<td>I look for new and innovative ways to improve the way we do things.</td>
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<tr>
<td>36</td>
<td>I am excited and full of enthusiasm when new opportunities arise.</td>
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<tr>
<td>37</td>
<td>I view change as an opportunity for improvement rather than as a threat to my identity.</td>
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<tr>
<td>38</td>
<td>I like to try different approaches to things even if there is a chance I might fail.</td>
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<tr>
<td>39</td>
<td>When things go wrong I am able to bounce back very quickly.</td>
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<tr>
<td>40</td>
<td>It is better to have attempted a difficult task and failed, than not to have tackled it at all.</td>
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<tr>
<td>41</td>
<td>As we define our strategies, we are driven by our perception of opportunity. We are not constrained by the resources at (or not at) hand.</td>
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</table>
following questions stated below, please mark the appropriate number which is based on the following scale:

1=Strongly Disagree (SD), 2=Disagree (D), 3=Somewhat (S), 4=Agree (A), 5= Strongly Agree (SA)

We want your honest opinion.

### Part B: Entrepreneurial orientation (EO)

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>S</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Company’s emphasis on developing new products.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>2</td>
<td>Our company is creative in its methods of operation.</td>
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<td>2</td>
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<tr>
<td>3</td>
<td>Our company seeks out new ways to do things.</td>
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<td>2</td>
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<td>4</td>
<td>Relative to our competitors, our company has higher propensity to take risks.</td>
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<td>5</td>
<td>Our company has shown a great deal of tolerance for high risk projects.</td>
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<td>6</td>
<td>In general, the top managers of my firm favor a bold, aggressive posture in order to maximize the probability of exploiting potential when faced with uncertainty.</td>
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<td>7</td>
<td>Most people in this organization are willing to take risks.</td>
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<td>8</td>
<td>People are often encouraged to take calculated risks with new ideas around here.</td>
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<td>5</td>
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<td>9</td>
<td>Our firms implement necessary structural changes such as small, autonomous groups to stimulate new ideas.</td>
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<td>5</td>
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<td>10</td>
<td>When using autonomous work units, our firms ensure adequate coordination to minimize inefficiencies and duplication of efforts.</td>
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<td>5</td>
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<tr>
<td>11</td>
<td>Our firms have a proper balance between patience and tolerance for autonomous groups and the forbearance to reduce or eliminate initiatives that are not succeeding.</td>
<td>1</td>
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<td>12</td>
<td>Our firms foster the necessary culture, rewards, and processes to support product champions.</td>
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<td></td>
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<tr>
<td>13</td>
<td>Typically initiates actions to which competitors then respond.</td>
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<td>14</td>
<td>The first firm is very often to introduce new products/services operating technologies, etc.</td>
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<td>15</td>
<td>In dealing with its competitors, my firm has a strong tendency to be ahead of other competitors in introducing novel idea or products.</td>
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<td>16</td>
<td>Owing to the nature of the environment, bold, wide ranging acts are necessary to achieve the firm’s objectives.</td>
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<tr>
<td>17</td>
<td>Typically adopts a very competitive, “undo-the-competitor” posture.</td>
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<tr>
<td>18</td>
<td>My firm has a strong tendency to increase the market share by reducing the competitors.</td>
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