*Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management*
*Kuala Lumpur, Malaysia, January 22 – 24, 2011*

# Study of innovativeness factors in Iranian automotive industry

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## Abstract

It is well documented that innovativeness has a positive relationship with business firms' performance. This study first, focused on investigating the relationships between internal innovation factors such as (i)job satisfaction, (ii)innovation strategy, (iii)organizational culture, (iv)interest in innovation and effective innovativeness factors, second, their influences on Iranian automotive industries research and innovation center (ARIC) performance. We used a standard questionnaire measuring four dimensions was mentioned. Then by using descriptive analysis, effective factors in each dimension were recognized. Finally we described effects of each factors on innovation status and performance of there.

## Keywords

Innovativeness, Performance, AIRIC, Iran

## 1. Introduction

The Automotive Industries Research and Innovation Center (AIRIC) of Saipa is Iran's first automotive design and engineering center, which was established in October 1993. It was officially inaugurated in the second quarter of 1997 following the procurement and installation of necessary equipment and recruitment of skilled workforce. AIRIC was designed to, among other things, design vehicles, render services on engineering analysis and automotive tests, and manufacture prototypes of designed vehicles for both local and international markets.

On the back of successful implementation of vehicle design and research projects, and startup of standard experimental laboratories to test vehicles and auto parts, AIRIC made its presence felt on the automotive stage and secured a special status among automakers, parts manufacturers, and government organizations. AIRIC takes care of A to Z of automotive design and design changes - market assessment and through final stages of vehicle testing. Quality is the name of the game all the way down the line. Presence of skilled workforce, high technical know-how, experience of the past years and well-equipped laboratories have all contributed to the high potential of AIRIC. Taken into account the heavy investment made in the sector, and in order to make optimal use of facilities, which are on hand at these workshops, AIRIC has embarked on rendering services to other industrial firms and organizations in a wide array of fields such as research projects, engineering services and laboratory tests.

AIRIC offers services to a large number of institutions, among them such automakers as Iran Khodro, Saipa, Parskhodro, Sapco, and non-automotive institutes and organizations such as the Iranian Standard and Quality Inspection Company, the Fuel Optimization Organization (an Oil Ministry affiliate), the Industrial Research and Standard Organization, Tehran Air Quality Control Company, the Research Jihad Institute, and the Environment Protection Organization.

## 2. Research Methodology

This study is an applied one based on its goal. The intervening components in organizational innovation were identified and extracted by application of librarian studies, models and the similar researches within organizational innovation. Such elements are placed within four dimensions of strategy of innovation, job satisfaction, and interest in organizational innovation and atmosphere. Afterward, the standard questionnaire was applied as a tool for measurement of the given elements within the framework of 59 entries. The method of response to the questions was formulated within the framework of 7- point Likert scales spectrum. Diagram (1) indicates the given dimensions and elements for each dimensions.

The population of the present study includes the directors and experts who are employing in SAIPA Center of Researches & Innovation. The appropriate statistical sample was collected for research based on access and randomly among the members of the population and through distribution of 70 questionnaires of which 62 questionnaires were filled out and submitted (Recursive rate: 0.89).
By application of Cronbach's Alpha Reliability Coefficient (α), the questionnaire reliability has been measured for each of dimensions and total scale where this coefficient has not been computed for factor of job satisfaction due to its singularity. The results of computations are given in Table- 1.

Table- 1: Test results for reliability

| Dimensions | Number of Questions | Number of Omitted Questions (To increase reliability) | Cronbach's Alpha (α) |
|---|---|---|---|
| *Being Innovative* | *18* | ----- | *0.928* |
| *Strategy of Innovation* | *4* | ----- | *0.784* |
| *Interest in Innovation* | *2* | *4* | *0.621* |
| *Organizational Atmosphere* | *17* | *7* | *0.728* |
| *Total Questionnaire* | *42* | *11* | *0.877* |

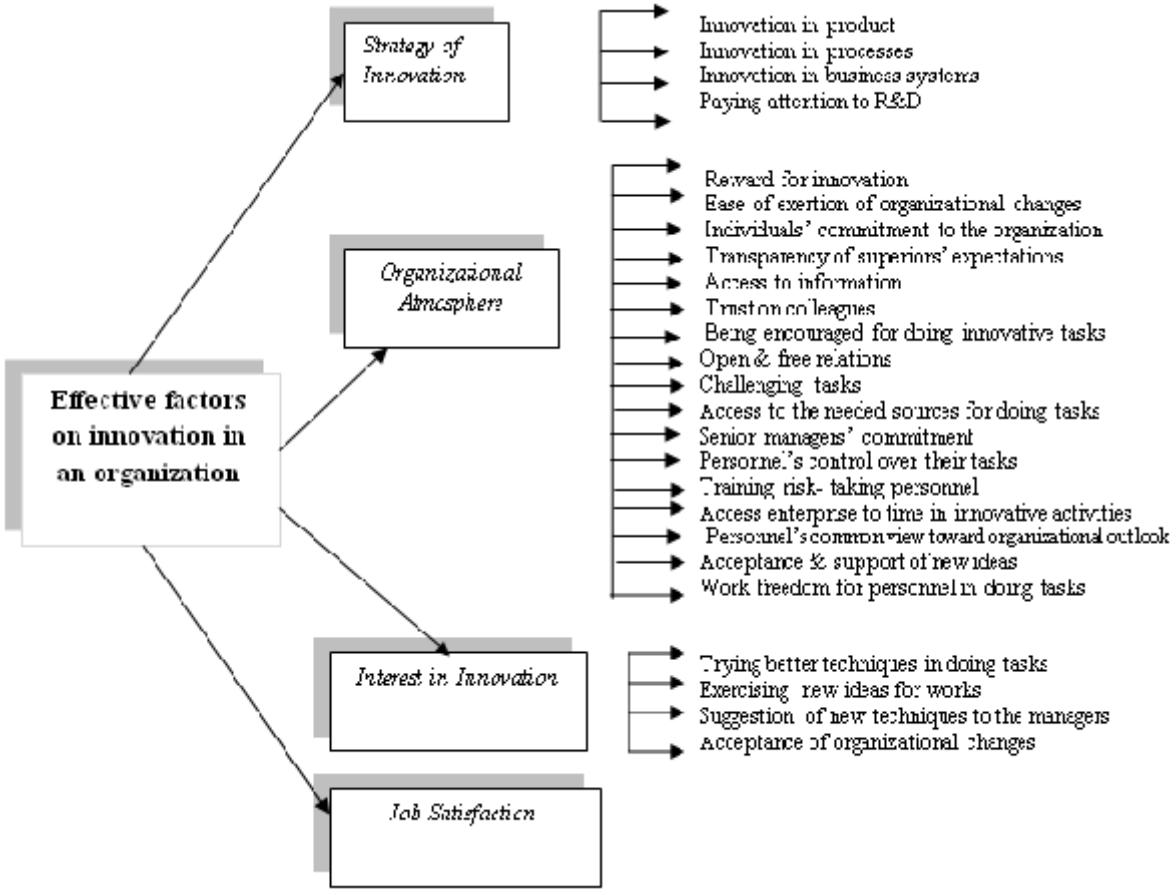


Diagram (1): Tree diagram of effective factors on organizational innovation.

## 3. Results and Discussion

### 3.1.Strategy of Innovation

In a question which concerns to the strategy of innovation based on the enterprise priority toward innovation in production, 69% of the respondents selected the above priorities (1, 2, 3) among 7 option spectrum which ranged from 1 (extremely high) to 7 (extremely low) and between them 40.2% of these individuals deemed this priority as extremely high. But, regarding to "*the enterprise priority for innovation in production processes*" which received 45% of respondents' comments for options nos. 1, 2, and 3 among the other innovative strategy of the enterprise had also lower preference than it, whereas 31.5% of respondents selected the Option-4, namely

neither high nor low priority which given to the enterprise innovative strategies in this process. The innovation in the process means implementation of innovation in production methods, managerial approaches and modern technology which improves the management and production processes. However, the enterprise status in the strategies which correspond to innovation in business, Research and Development (R&D) for acquisition of competitive privileges are almost similar so that 53% of respondents allocated the high priorities to business strategy of innovation. Business innovation focuses on innovation in managerial thinking and the initial aim for creation of new idea, producing wealth for stockholders and improvement of economical aspects which could adapted to environmental changes which is considered as the foremost factor in its success. The innovation strategy in R&D is situated in an almost appropriate condition by allocation of 51% of comments by the respondents on options 1, 2, and 3.

In sum, according to the gathered responses, the enterprise has appropriate conditions in terms of prioritization in innovative strategies for product, business R&D, and such state is more appropriate in product innovation field. But, by comparison of the results for innovative strategy with the innovation sector, the given results become more accurate. The interesting point which is raised in questions on its innovation section is in that the two questions had the highest mean (frequency) which included "*creation of new products is a vital factor in our enterprise*" and "in our firm, we could use manufacturing and operational new processes which are applied in other enterprises"; namely, most of the comments were ranged from *agreed* to *completely agreed* options. Thus, in this enterprise the individuals know that creation of new products is essential for this firm since the organizational strategies have been oriented in this direction (the major percentage of the respondents' comments which concerned to the enterprise higher priorities toward innovative strategy). On the other hand, approximately 66% of the respondents were ranged from agreed to relatively agreed in that their enterprise use the new products that applied by other corporations. This may signify this fact that the innovative strategies in the enterprise product are mainly based on the ideas and innovations which were derived from others than their own creativity. With respect to the existing data, one could conclude such a result for other innovative strategies. One can indicate the authenticity of these results through the low average numbers of the questions based on which the firm is extremely superior in the field of creation of new business systems, processes, and creation of new products.

### 3.2.Job Satisfaction:

The job satisfaction is 60% among personnel, and this shows their relative satisfaction but not the perfect satisfaction, of course. As we know, job satisfaction is considered as one of the preparatory factors for organizational innovation, so it has a relatively appropriate condition. The analyses indicated that the average of job satisfaction is 58% greater in females than in males. Similarly, the highest mean of job satisfaction exists within under- diploma educated personnel while it's the lowest rate is seen among the personnel with associated degree. This occurred while the most of the sampled individuals had bachelor degree at this study, so the job satisfaction is higher in managers than other personnel. Also, the age group 37-50 has been more satisfied by their job.

### 3.3.Interest in Innovation:

Interest in innovation within personnel is considered as one of the factors which its existence and strength may lead the organization toward being innovative. 72% average percentage of questions in section of innovation interest shows that such interest relatively exist among the personnel and strengthening the existing fields may improve innovation within organization. The highest mean in this section corresponds to this question i.e. "*I often try my ideas within the work*" where 80% of the individuals were *agreed* to *completely agreed* in it. As it characterized, this results confirms the openness of the organizational space for innovation and is considered as a clear point in the enterprise. Additionally, since the question concerning to ability for trying a technique for conducting the affairs better and faster is solely accompanied by agreement of 79% of the personnel, so it shows independence spirit among the individuals and may disturb the organization; however, this case is totally considered as a positive point for innovation.

81.4% of personnel have believed that one should give an opportunity to board of directors and senior managers in order to find some solution for conduction of affairs better. Such great percentage indicates that if directors address innovation and its changes, a large number of personnel welcome them, so they will be faced by the least resistance. According to the obtained means, many of resistances were exposed by the women, personnel with diploma degree, and within age group 30- 37 where they had opposed comment toward this question.

### 3.4.Organizational Climate:

Organizational climate may play a vital role in improvement of creativity and innovation among personnel. In fact, the creative climate leads to an environment which increases organizational power. In this study, 24 questions concerning to organizational climate were addressed within the framework of independence dimensions, openness in innovation, challenges, sources, encouragement of observers and team unity where in order to improve reliability, 7 questions were omitted later. The analyses show that the responses mean was lesser than 8 in 23 questions at this section; in other words, for such cases the respondents were ranged from *completely opposed* to *no- comments*.

The results indicate that 81.3% of the individual declared that the personnel would not determine their tasks by themselves at this enterprise, and such a problem contradicts with the question in section of innovation interest based on which the personnel could try the better and faster way to do their tasks alone if we consider that it is due to lack of independence spirit among the personnel; thus, the possibility for non- openness of organizational climate may sufficiently be increased. One of the other cases which allocated the low average rate within two different questions at this part was lack of encouragement of individuals to accept risk. Similarly, 50% of the individuals believed that the innovations were not rewarded and this, in turn, verified lack of an appropriate encouraging system for innovation in the enterprise.

The result of another analysis which denotes the new ideas are generally faced by resistance showed that 69% of individuals declared their opposition. One could explore the result correctness from two aspects. First, there is an open space for creativity and innovation where such impression may be rejected with respect to the analysis result of the question that signifies the personnel are determinant

in their tasks as well as its low mean; while 62% comments of opposition and abstention on open and free relationships among teams may be a strict reason for lack of climate openness toward innovation. But, the correctness of this results has been already proved that is existing 69% opposition toward resistance against new ideas at section of question about interest in innovation by 81.4% pro-comments and within this entry that one should give opportunity to board of directors and senior managers to find better solutions for doing tasks, so this corresponds to the subject of lack of resistance against new ideas by the personnel (*i.e. they allow to exert organizational changes*). The question about hardship (difficulty) of organizational changes has only allotted 26.6% of the affirmative comments, so this is considered as another reason to prove it.

This section is based on the existing commitment of the personnel toward their tasks and is one of the cases that have allocated 64% average of comments. One could not deem this case from negative view, of course. It is because of this fact that innovation, namely change and development, does not occur unless the personnel ignore some of organizational commitments to some extents. In other words, one could imply that innovative personnel are relatively non- committers. But, the concept of question-2 indicates that personnel are not aware of their superiors' expectations where 56% of such individuals, namely more than half of them, opposed to this issue; so this may be deemed as a strength point for the organization since the personnel may exert some changes which are collinearly directed to the organizational comments, expectations, strategies and plans at this time. Therefore, they are rewarded at these occasions so this may proved a motive for further activity by these individuals in further innovations.

But, other part of these questions allotted the low mean at this study where it is related to acquisition to the needed information sources by the personnel within organization in which 50% of the individuals (i.e. half of them) expressed that the achievement to information sources has not be implemented quickly. Of course, 46.7% of these personnel deemed the speed of acquiring information well in the organization, but by considering higher trend of educational level like master degree and higher, the responses mean has been lowered. The given results conform to another question which was designed negatively. However, concerning to sufficient time for implementing of innovation, 85% of respondents implied that there is not time enough and they have to do a lots of work within stipulated deadline.

## References

1. http://www.airic.org.
2. Sternberg, R. J. (2006). The nature of creativity. *Creativity Research Journal, 18*(1), 87-98.
3. Sveiby, K. E. (2001). A knowledge-based theory of the firm to guide in strategy formulation. *Journal of Intellectual Capital, 2*(4), 344-358.
4. Hamner, P., White, M., & Araman, P. (2006). The effect of curve sawing twosided cants from small-diameter hardwood sawlogs on lumber and pallet part yields. *Forest Products Journal, 56*(10), 80-85.
5. Haasen, A., & Shea, G. F. (2003). *New Organizational Cultures that Motivate*.Westport, Connecticut: Praeger.
6. Carlson, D. S., Upton, N., & Seaman, S. (2006). The Impact of Human Resource Practices and Compensation Design on Performance: An Analysis of Family-Owned SMEs. *Journal of Small Business Management, 44*(4), 531-543.
7. Burton, R. M., Lauridsen, J., & Obel, B. (1999). Tension and resistance to change in organizational climate: managerial implications for a fast paced world.
8. Crespell, P., & Hansen, E. (2007). Managing for innovation: Insights into a succesful company. Submitted to Journal of Small Business Management.
9. Elfenbein, H. A., & O'Reilly Iii, C. A. (2007). Fitting In: The Effects of Relational Demography and Person-Culture Fit on Group Process and Performance. Group & Organization Management, 32(1), 109-142.