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Studying the Factors Affecting on Use of Management Information Systems: Case Study - Tehran Municipality

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ABSTRACT

This study aims to examine the factors affecting on use of management information systems (MIS) in 22 Districts of Tehran Municipality. This paper is practical by purpose and it is descriptive-survey in terms of method. It belongs to case study class among types of descriptive study methods. Field library approach is used for collecting information. Statistical population of this study includes 132 managers and assistants of Tehran municipality which are selected by convenient approach. Validity and reliability (Cronbach's alpha) of questionnaires suggest that measurement tool is of appropriate validity and reliability. Results are obtained from analyzing testing the hypotheses by SPSS. v.21 study and using one sample t-test and Friedman test that environmental, organizational, and human factors are respectively the most important factors affecting on use of MIS in 22 Districts of Tehran Municipality.

Keywords: Information and Communication Technology, Human Factors, Environmental Factors, Organizational Factors
JEL Classifications: D83, L2

1. STATEMENT OF PROBLEM

Today use of information technology (IT) is essential for keeping pace with rapid environmental changes and for being flexible. In fact, IT is one of most important components of development that many countries around the world consider IT as cornerstone of their development infrastructure. These technologies have turned into essential part of society structure during a short time, and currently a lot of countries seek to understand IT and achieve to basic skills of IT (Khvilon, 2002). According to experts, as invention of steam engine and occurrence of industrial revolution brought about a great change in people work and personal life, similarly, communication revolution brought some changes in human life (Lorin and Erick, 1997).

Studies have shown that one of the most important reasons of difference of organization from each other, is the degree of using IT by them in organizational activities. Thus, organizations which draw on IT in an extensive and optimized manner have sustainable competitive advantage, and from viewpoint of stakeholders, they enjoy higher advantages when compared with other organizations (Tsiknakis and Kouroubali, 2009). It is obvious that IT play increasingly considerable role in organizations. It is believed that IT can increase organizations capabilities, while simultaneously it comes with costs reduction (Benamati, 2008). Management information system (MIS) is a well-established and appropriate system that provides the organization decision makers with on-time, proper and summarized information at appropriate time and allows managers to take accurate and proper decision. The final objective of establishing these systems is collecting, analyzing, processing and summarizing, storing and finally transferring all of information of the past and present and the phenomena related to them to centralized information bank with fast access possibility for their managers (Naranjo-Gil, 2009).

MIS increases the awareness of managers and even experts of various levels of organization, which raising new concepts not only expand their knowledge extent regarding what tasks they can do and which decisions they want to make, but also help them in better doing their responsibilities and activities (Nasir, 2005). Deficiency of

information cause that organization management lack a proper and complete prospect of the future, but also they fail to identify fully the weaknesses of past and present status, therefore, neither they can set goals properly, nor they can design an appropriate activity for the organization and therefore they fail to draw on the organization resources in an optimized manner. Thus, one can ascribe one of the most important reasons of inefficiency and failure of organization to poor decision making of managers due to lack of sufficient and appropriate information, and this can be due to discounting the information, lack of fitting infrastructures and weakness in production, organization, storage and release of appropriate, accurate, proper, reliable, on-time and thorough information (Khvilon, 2002).

Now given the importance of municipality and its projects in urban region, and necessity of development of its infrastructures, particularly in Tehran province, what increase the importance of the subject is topic of limitation of financial resources. Reliance of country economy on oil incomes which serves as the main source of supplying country financial credit calls for full carefulness in spending construction budgets both in technical and executive area and in backup area through drawing on new technology. Thus, given to all above discussion, that is, diversity of running projects, high amount of credits as well as great number of contract and contractors and consultants working in this field from one side, and significance, knottiness, costly feature and longevity of related backup processes with projects from other side, particularly the discussions raised on importance of construction of infrastructures of municipality projects in Tehran province requires the implementation of MIS with greater power. Thus, it is needed to review the factors affecting on use of MIS in any country and organization independently. On this basis, current paper seeks a scientific answer to the main question: What are factors affecting on use of MIS in management of projects of 22 precincts of Tehran Municipality? And what is priority of these factors?

2. STUDY METHODS

This paper is practical by purpose and it is descriptive-survey by method. Among types of descriptive studies it belongs to case study. Field library method is used for collecting information. For examining the viewpoint of managers and assistants regarding studied variable (factors affecting on use of MIS), one uses researcher-made questionnaire in Likert scale. Along this, for preparing the primary items, one refers to theoretic basics, professors and experts and after preparing the tool primary form (factors affecting on use of MIS at three dimensions of environmental, organizational and human), we run it in a pilot study on 30 persons and one determines the reliability of tool using Cronbach's alpha, and validity (content) and reliability (Cronbach's alpha) of questionnaire suggest that measurement tools are of appropriate validity and reliability. Statistical population of this study includes 132 persons of managers and assistants of Tehran Municipality and as the size of population is limited and countable, and it matches with sample size, one single out the samples in a convenient manner.

In this study, information analysis is taken place at two levels of descriptive statistics and inferential statistics. At descriptive statistic level, the specification of sample members is analyzed by frequency, percentage, and table. Similarly, in inferential statistic level, study hypotheses are tested by one sample t-test, Friedman test under Statistical Software SPSS v.21.

3. STUDY FINDINGS

In this section, information from the questionnaire regarding individual specification including education degree, gender, and background of collaboration with general office are reflected in statistical tables and figures.

Based on study findings in descriptive statistics section, number of 7 persons (5.3%) of sample population have educational degree under diploma, number of 19 persons (14.4%) have associate degree, and number of 86 persons (65.2%) have bachelor degree and number of 20 persons (15.2%) have Master of Science Degree, among which number of 14 persons (10.6%) are female and number of 118 persons (89.4%) are male.

Based on findings of study of descriptive statistics which are presented in Table 1, number of 38 persons (28.8%), of sample population have the background of service/collaboration <5 years, numbers of 49 persons (34.8%) have background of service/collaboration between 5 and 10 years, number of 19 persons (14.4%) have background of service/collaboration between 10 and 15, number of 15 persons (11.4%) have background of service/collaboration between 15 and 20, and number of 3 persons (2.3%) have background of service/collaboration between 20 and 25 and 11 persons (8.3%) have background of service/collaboration 25 years and more.

In inferential statistics, study hypotheses are tested by one sample t-test, Friedman test under SPSS v.21 statistic software.

Based on findings of above table and according to level of significance 0.000, we conclude that there is a statistically significant difference between obtained average from viewpoint of respondents with theoretical average (3), at level <0.001, and as in first hypothesis the obtained average (3.4745) is greater than index average (3) (at much and very much in Likert scale) therefore one can claim that study hypothesis (organizational factors as one of the factors affecting on MIS use in 22 precincts of Tehran Municipality) with confidence 0.99 is statistically confirmed.

At second hypothesis, as obtained average (3.4386) is greater than index average (3) (at much and very much degree of Likert scale), therefore one can claim that study hypothesis (human factors as one of the factors affecting on MIS use in 22 precincts of Tehran Municipality) with confidence 0.99 is statistically confirmed.

At third hypothesis, as obtained average (3.6077) is greater than index average (3) (at much and very much degree of Likert scale), therefore one can claim that study hypothesis (environmental factors as one of the factors affecting on MIS use in 22 precincts of Tehran Municipality) with confidence 0.99 is statistically confirmed.

Table 2 shows the average of scores of each one of most important factors of use of MIS in 22 precincts of Tehran Municipality.

Obtained findings from Friedman variance analysis show that Chi square test ($\chi^2 = 17.845$ and $P < 0.003$, $df = 5$) is significant. On this basis, the difference between ranks average suggests that environmental factors with average 3.95 stands at top of factors, financial factors with average 3.81 at second priority, and organizational factors with average 3.38 at third place represent the most important drivers of use of MIS in 22 precincts of Tehran Municipality.

Table 3 shows the average of scores of each one of organizational factors of use of MIS in 22 precincts of Tehran Municipality. Obtained findings from Friedman variance analysis show that Chi-square test ($\chi^2 = 26.575$ and $P < 0.003$, $df = 7$) is significant. On this basis, the difference between scores average suggests that "lack of incumbent for leading IT" with average 5.05 stands at top of organizational factors of MIS use in 22 precincts of Tehran Municipality, and "instability in administrative team of IT projects" with average 3.86 is at lowest priority among organizational factors.

Table 4 shows the average of scores of each one of human factors of use of MIS in 22 precincts of Tehran Municipality. Obtained findings from Friedman variance analysis show that Chi-square test ($\chi^2 = 15.773$ and $P < 0.046$, $df = 8$) is significant. On this basis, the difference between scores average suggests that "insufficient training for users" with average 5.41 stands at top of human factors of MIS use in 22 precincts of Tehran Municipality, and "perceived difficulty of computer use" with average 4.48 is at lowest priority among organizational factors.

Table 5 shows the average of scores of each one of environmental factors of use of MIS in 22 precincts of Tehran Municipality. Obtained findings from Friedman variance analysis show that Chi-square test ($\chi^2 = 63.108$ and $P < 0.000$, $df = 8$) is significant. On this basis, the difference between scores average suggests that "insufficient training, guidance, consultancy by governing and supervising entities of province regarding information and communication technology (ICT)" with average 5.87 stands at top of environmental factors of MIS use in 22 precincts of Tehran Municipality, and "shortage of qualified suppliers in the area of IT" with average 4.12 is at lowest priority among environmental factors.

4. CONCLUSION

Results that can be discussed based descriptive findings of the study is that in terms of education degree, most of respondents (65.2%) have bachelor degree and least number (5%) have diploma degree. This distribution is reasonable as the majority of statistical sample are of higher education, because basically the addressee of the study are experts which made up roughly 38% of sample society. In terms of gender, 10.6% of respondents are female and 89.4% are male. In terms of background of service, in sum 63.6% of respondents are of 10 years of background and 24.6% of respondents have more than 20 years of background of service.

Similarly, it can be seen that all of three hypotheses of study have been statistically confirmed at 99% confidence. Study question was about priority of influence of organizational, human and environmental factors. The difference between averages and findings obtained from the Friedman variance analysis showed that Chi-square test ($\chi^2 = 17.845$, $P < 0.003$, $df = 5$) is significant. Thus, it is revealed that environmental factors with average 3.95

Table 1: Theoretic average based on 5° Likert scale

Effective factors in using MIS	Frequency	Average	T	Degree of freedom	Significance
Organizational	132	3.4754	9.194	131	./...
Human	132	3.4386	8.047	131	./...
Environmental	132	3.6077	11.600	131	./...

Table 2: Variance analysis results

Priority	Factors	Average of scores
1	Environmental factors	3.95
2	Organizational factors	3.38
3	Human factors	3.37

Table 3: Results of variance analysis for examining the difference between organizational factors

Priority	Organizational factors	Average of scores
1	Lack of incumbent for leading IT in organization	5.05
2	Lack of or deficiency of comprehensive plan for use of IT	4.78
3	Ambiguity in existing procedures	4.78
4	Use of traditional approaches of supplying information	4.47
5	Inefficiency of internal regulations and instructions	4.40
6	Failure of IT enjoying appropriate organizational situation in general office set-up	4.33
7	Inappropriate use of IT in organizations	4.32
8	Instability in administrative team of IT projects	3.86

IT: Information technology

Table 4: Results of variance analysis for examining the difference between human factors

Priority	Human factors	Score average
1	Lack of sufficient training for users	5.41
2	Deficiency of agreement among managers and experts of technology and users regarding ICT use	5.30
3	Deficient familiarity of employees with ICT capabilities and consequences deriving from its establishment in the organization	5.26
4	Sense of risking the job security of users	5.05
5	Conflict in executive team of IT projects	5.05
6	Insufficient experience of working with computer and mechanized systems	4.84
7	Resistance of organization employees against change	4.81
8	Sense of inability among users regarding use of IT	4.79
9	Perceived difficulty of computer use	4.48

ICT: Information and communication technology, IT: Information technology

Table 5: Results of variance analysis for examining the difference between environmental factors

Priority	Environmental factors	Scores average
1	Insuffient support, training and counseling by reigning and supervising entities of the province regarding use of ICT	5.87
2	Low speed of Internet	5.83
3	Lack of qualified consultants regarding design and establishment of IT	5.34
4	Inappropriate and restricting rules and regulations	4.97
5	Inappropriateness of IT infrastructure at province and country level	4.92
6	Expensiveness of IT equipment	4.90
7	Lack of required legal regulations in country	4.58
8	New and emerging feature of use of IT	4.47
9	Shortage of qualified suppliers in the context of IT	4.12

ICT: Information and communication technology, IT: Information technology

stands at top of factors of use of MIS in 22 precincts of Tehran Municipality, organizational factors with average 3.38 at second priority and finally the human factors stands at third priority.

According to the literature review, in Kazemi et al. study abovementioned factors are classified in the same order applied in this study, yet their priority is not specified. In Sarrafzadeh and Rohani study, although the priority of factors is specified, yet due to difference in the classification of factors, the full comparison in this regard is not possible. In other studies, also basically the priority of factors is not specified.

Along proving the effectiveness of organizational, human and environmental factors as factors of use of MIS in 22-precinct Tehran Municipality, it has been revealed that these factors respectively belongs to environmental, organizational and human factors. Identifying environmental factors as the most effective obstacle from one side and identifying the parameter "insufficient support, guidance, consulting by governing and supervising entities regarding ICT use" as the first priority among parameters of this factor from other side, determining organizational factors as second priority can suggest the uncertainty of governmental institutions particularly province-related entities regarding use of new technologies and also suggest that merely issuing administrative circulars cannot result in expansion of utility level of this technology in governmental entities, yet determining appropriate policies, presenting supports and effective guidance by supervising entities, especially organizational and human support are essential part. In most of papers related to the study subject, one emphasizes on the organizational factors, particularly human factors, while in this study, organizational factors are identified at second priority and human factors at the lowest priority.

5. STUDY SUGGESTIONS

5.1. Suggestions from Study Results

As statistical test results regarding study hypotheses have been statistically confirmed, therefore, for expanding the use level of ICT in management, the most important factors of use of MIS in 22 precincts of Tehran Municipality, following recommendations are suggested:

- Devising a comprehensive strategic plan for establishment and use of ICT in municipality by considering the real conditions.
- Organizing coordinative meetings for justifying and attracting the support of Tehran province incumbents especially those of office of IT and planning and governor-general budget.
- Designing operational and practical plans for each one of operational areas of general office of municipality and appointing qualified project manager for each project and lack of change until project actualization.
- Organizing training courses for enhancing the familiarity level and specialized skill of managers and experts regarding ICT.
- Enhancing the confidence of employees for their job security in case of ICT implementation and establishment.
- Enhancing technical level of technical infrastructures of general office and tackling system hitches.

5.2. Research-related Suggestions

This study has been conducted in Tehran Province Municipality, it is recommended to researchers to carry out a similar study at other level of governmental offices and to compare the obtained results with current study.

- It is recommended to shed light on status of IT dispersion based on "Tavakol and Qazinouri" and based on readiness, activity and impact (RAI) model in governmental organization of the province and specific classification in "governmental and supervising organization", "organization of infrastructural and production issues" and "cultural and social organization" etc.
- Considering the existing differences between governmental and private organizations in terms of degree of legal latitude and limitations, this study can be done for private organizations and firms as well.

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