Study of Indices of Research and Development Management for the Scholar Performance of Scientific Board Members

Amir Khalili, Fereshteh Kordestani*, Yalda Delgoshaei, Ali Hosseini Khah

Abstract: The present research was done with the aim of presenting the aspects and indices of research and development management for the scholar performance of Islamic Azad university scientific board members of Tehran. As a mixed survey, this research is a combination of the quantitative and qualitative research methods. The qualitative part population is the commentators' member of scientific board in Islamic Azad University of Tehran and its sample is 14 people of higher education experts that reached theoretical salivation by 10 people. Data analysis method in qualitative part was done using open, axial and selective coding via interview and Delphi fan methods. The results obtained from the qualitative part showed that the named indices were composed of nine scholar literacy, scientific factors, technical and informational skills, methodological literacy, environmental factors, organizational factors, managerial factors, technological factors and individual properties. This way, totally, 9 aspects, 25 indices and 80 categories were finalized to identify the aspects, indices and categories of research and development management for scientific board member scholar performance of university. In total, management and development indices are among the scholar literacy, scientific factors, technical and informational skills, methodological literacy and environmental factors.

Keywords: Content Analysis; Fuzzy Delphi Analysis; Research and Development Management; Research Performance

1 INTRODUCTION

The origin of many industrial, cultural, social and even military transformation is the knowledge production using the regular and progressive surveys in [1]. Commentators have drawn five major tasks for universities and higher education institutes internationally, having explained their role from mono-entity to multi-role and multi-entity. The most important of these include: educational performance, survey performance, service performance, publication tasks and stuffs occupational growth [2]. In this way, survey performance improvement is one of the university systems missions [3]. In this way, universities and higher education centres attempt to obtain a proper ranking in academic ratings at national and international levels by improving the surveying performance of their scientific board members [4]. Therefore, finding ways to attract, improve and educate committed scholars and the creation of the proper research space are the most important targets of any state universities. According to Van Dinther examination of the scientific board members' performance includes a process that plans the improvement of scientific board members [5]. Thus, as organizations in charge of educating expert human force besides science production, universities require examining their scientific board members' performance. That is because scientific board performance examination causes the clarification of the strengths and weaknesses and provides the grounds for scientific development and achieving the university goals. Despite the variation of the existing examination patterns, most of them are not useful and fully proper to examine the scientific board members' performance at different situations [6].

The scholar seeks to answer the question as to how the proper pattern of survey development and research management activities of Islamic Azad University scientific board members is and what are its aspects, indices and categories, along with filling a part of the existing theoretical gap?

2 RESEARCH PROBLEM STATEMENT AND LITERATURE REVIEW

Khodaey et al. [7] identified 14 aspects, 48 categories and 118 indices as contribution, education, motivation, cognition, self-efficacy, encouragement, structural, managerial factors, clarification, facilities and infrastructures as significant explanations to predict the scientific board members' performance. Shabani Bahar, Qarre and Siavashi [8] introduced survey indices, professional services, scientific publications, education, communication network and English language, as professional aspect indices, organizational communications, documentation, leadership, time management, cost management and team-making as organizational aspect indices and inter-individual, communications, innovation, self-efficacy, autonomy of action and professional ethics as individual excellence indices.

Rastegar et al. [9] consider job performance indices including educational, surveying, professional and individual competence. They examine the existing situation of surveying and professional indices as undesirable, proposing that the regulations related to job performance improvement of professors must be revised and modified. In the research by Ijtihadi et al. [1] presentation of a united system of survey performance examination, without attending the various essence of the majors, neglecting the global experiences over the performance examination and lack of a proper motivation system have caused driving the survey behaviour of scientific board members towards quantity-orientation in research, weak innovation in research and a lack of attending the scientific, research and social responsibilities. Guan Ho, Gowling, Feng and Kai How [10] concluded that formal domestic and international boundaries may impact the

scholars' participation in improving research activities. In line with the findings of Shaban Kareh et al. [6] consider the survey activities indices of scientific board members as follows: formation of scientific seminars and conferences, re-printing the books, arbitration of MA and PhD theses, designing and setting up educational workshops, MA theses and PhD theses director assistant, arbitration of papers and codifying the set of papers, book translation and edition, presentation and execution of research plans, papers published in credible domestic and foreign journals, ability to use electronic resources and databases, and domestic and foreign scientific memorandum.

In addition, in its annual report of survey performance, university of Tarbiyat Modarres has introduced the survey performance indices as follows: participation and presentation of paper in foreign forums, domestic and foreign research plans, grants and activities, received awards for printing scientific-survey papers, participation and presentation of paper in domestic forums, receiving incentive survey bonus, observation of the cases related to safety in projects, laboratory works, using the workshop, laboratory and library space, connection with foreign research institutes, documentations [11] in Scopus, Clarivate and Laden, number of domestic inventions, number of international inventions, number of membership in international forums, number of study opportunities, number of contributing to superior theses, number of intra-university research plans, searching for research needs of various organizations, cooperation with busy employers of university survey projects, participation in improving quality indices of university library, electronic publications, electronic content and its update, personal strategies and prosperity, authorizing the superior books of the year, presence in web and virtual research.

It should be noted, in turn, that the university survey system is facing numerous problems that make improving and research and development management performance of survey activities difficult. Weakness of informing system and deficiency in information management and classification [12] and inaccessibility to the surveys done at national and international levels, along with shortage of research budget, lack of transparency, lack of application are among the unique problems our scientific and survey system suffers from. As a result, due to inability in collecting, documenting, organizing, storing, sharing and spreading information on time, many survey activities become iterative and decisions are not made influenced by information shortage and a lack of on-time and proper information sharing and enough power [13].

It should be noted that asymmetrical distribution of knowledge resources, technology and the requires of activity in the globalization era, have made universities tending to novel methods to improve research development management activities, thus increasing interaction in national and international levels to access such resources. It has provided further grounds to improve and examine survey performance until reaching the global standards level [14].

In this way, it seems that in the Islamic Azad University, too, the central organization can be effective on accelerating the move to reach a logical balance in improving the research

and development management. Creation of scientism research grounds, grounds for further communications of scholars and the grounds for quantitative and qualitative improvement of survey performance and the eventual creation of a competitive space, take a constructive and effective step in the order of university excellence in the area of conducting various scientific surveys [11].

3 RESEARCH METHOD

The present research is qualitative in terms of nature. It is library and field and cross-sectional study in terms of data collection method. It is descriptive in terms of research execution method and it is fundamental based on objective. The data investigated in the survey is a mixture of quantitative and quantitative type. Data analysis method is interview, of content analysis type. For this purpose, keywords were determined and searching the related resources and papers was done in databases (ProQuest, Springer, Science Direct, Sage, Eric, Google Scholar) and Persian databases (JADA, MAGIRAN, DANESHYAR, NOORMAGS) in 2000 to 2020.

Table 1 Terms of criterion and databases searched in survey

Terms searched	Databases searched	Number of papers obtained		Papers selected
		Research	Review	
Research performance, research performance of board, research performance of university	ProQuest Springer Science Direct Emerald Sage Eric Google Scholar	33	17	14

The papers obtained were investigated and verified by two experts. In addition, by investigating the papers and theoretical backgrounds, the essential variables of this area were extracted. Initial pattern, questions of interview with experts were codified to explain the aspects, indices and categories of research management and development. Experts' sampling was done from purposive sampling. The number of experts in the scientific board performance was ten. Whereas interviews were done until 14 people. The main criteria of experts' selection were enrichment in terms of survey problem and objectives, research experience, membership of university or research centres scientific boards in the areas of education, survey and research management. The reason for selecting people was that they are directly involved in scientific board performance and have the motivation required to explain research and development management to examine the scientific board members' performance and the examinations thereof. The semi-structured interviews were employed for qualitative data collection of the survey. During the interview, by asking guidance questions, the scholar controlled the correctness of his/her impressions from interviewees' speeches. To ensure similar data sufficiency and qualitative data analysis, MAXQDA12 software was used for coding and classification.

Data analysis methods of the present research were the content analysis based on fuzzy Delphi analysis. By analysing and summing the attempts of other scholars of content analysis, presented a three-phase process for content analysis that includes open, axial and selective coding for integration through prevalent contents. In open coding, an attempt was made to describe and code the categories of participants' speeches of importance. However, the interpretation of the meanings of such categories was not considered. In this survey, in the axial coding level, the reproduced codes in the previous stage were integrated or placed below one another by interpreting the open codes meanings and over progressive and iterative comparisons with them. In the third level, namely the selective coding, a number of prevalent contents were identified that expressed the key research concepts. Such contents were based on interpretative contents and had a higher level of singularity. In this stage, any theoretical ideas that form the research foundation, were directly employed. In the following, an attempt was made to make the number of prevalent codes constrained as much as possible and to make them relevant to a reasonable minimum of interviews. It can be noted that the triple levels of descriptive and interpretative coding were done integrated. It means that at first, all codes were coded as descriptive at all interviews. After the completion of descriptive coding, their progressive comparison would drive the scholar to interpretative codes. In this way, the set of clusters would be gradually completed. And prevalent contents emerged by interpreting and clustering them at a higher level. Delphi techniques are a robust process based on the group communicating structure that is used with the aim of achieving collective census among experts in cases where incomplete or uncertain knowledge is available. Since the possibility of uncertainty is compatible with fuzzy sets, it is thus better that data are taken from experts in the form of natural languages and are analysed using fuzzy sets. For this purpose, the proposal of integrating traditional Delphi method with fuzzy theory has been provided under the name of fuzzy Delphi method.

3.1 Research Findings
3.1.1 Content Analysis Findings

Through careful, line-by-line studying of interviews, descriptive contents were attributed to every piece of sentences by the scholar. Often, the sentences took various codes from various perspectives and were labelled to data identical to each other in terms of concept with proper names. The concepts extracted in this section have been classified in Tab. 1. The outcome of this level was the production and extraction of 209 references to interviews in the form of 87 codes.

Table 2 Referenced Codes

Employment in organizations	Connection with schools	Recruiting and selection type
Examinations and critiques	Connection with industry	Book criticism and correction
Clear organizational objectives	Connection with media	Discipline in work

Social communications and community criteria	Conduction of joint survey activities with university students	General skills of the web and social networks context
Familiarity with search methods	Commercialization of researches results	Speech-making skills
Email	Joint book composition and translation	Basic research skills
Book translation	Endurance and continuation	Advanced research skills
Research-orientation of organization	Rewards	Skill in applying information
Research-orientation of leader	Creation and management of research teams	Paper in non-professional journals
Scientific single-notes	Participatory decision-making	Interpretive papers
Occupational and organizational commitment	Critical book correction	Positive participation
Technical knowledge generation	Recognition of information required	Private section participation
Sufficient personal motivation	Mastery over English language	Responsibility
Being welcome	Globalization of the research and scholar	Control center
Self-efficacy	Organizational atmosphere	Participatory management
Inherent creativity	Survey plans arbitration	Information management
Creativity in research	Research papers and journals arbitration	Speech-making in public forums
Professional Curriculum design	Obtaining ranking in national survey festivals	Joint survey activity with abroad
Self-esteem	Decentralized structure	Organizational culture
Lack of pride and arrogance	Executive record in holding conference	Membership in professional forums
Decentralization in organization	Participatory leadership	Research publications scientific board member
Connection with professional research networks	Correct and updated information finding behaviours	Professional social networks such as Research Gate, Medley, LinkedIn, Academy
Having professional software of work domain	Not involving personal biases in research	Designing and setting up of laboratory and workshop
Number of papers indexed in foreign databases	Ability to use electronic resources and databases	Advanced, rather than general, information search
Promotion of employing novel research technologies	Number of documentations as per papers and book	Having general skills of working with computer
Presentation of paper in international forums	MA and PhD these arbitration	Theses guidance and consultation
Publicly perceivable books composition- such as children and youths	Scientific investigation, criticism and revision of books and papers	Holding annual research exhibitions
Attending entrepreneurship at all sections, such as agriculture, sports	Presentation and execution of research plans inside and outside the university	Familiarity with novel science and technology advances
Familiarity with quantitative and qualitative research methods	Familiarity with statistical and analytical software	Re-printing and revising the books composed

In the axial coding level, interpretive codes were generated using the progressive and iterative comparison of the descriptive codes produced in the previous stage. To produce interpretive codes, several descriptive codes were collected in the sub-set of an interpretive code and formed it. These axes include the following:

Table 3 Surveys

Survey	Technical skills	Scholarly
Bounding of industry with university	Speech-making	Scientific arbitration and assessment
Communications	Personality characteristics	Laboratory experience
Participatory management	Working skills	Informational literacy
Leadership properties	Organization culture	Globalization
Software skills	Structural factors	Professional publications
Research method skill	Occupational factors	Composing book
IT	Incentive systems	Scientific papers
Computer literacy	Critical perspective	

Given the concepts obtained from the previous level, in the selective coding level, by conducting several studies, re-investigating and the commutation process among the notions and categories, the results of the main and fundamental studies related to that category were located near each other given the studies specific to any category. And by investigating the role of factors and their impact on research and development management for survey performance, the relation between categories and strategies was identified and analysed. Finally, the result was 9 main codes that denote the surveying performance aspects and 25 axial codes that denote the categories of aspects. In addition, 80 open codes were specified that reduced to 60 open codes after integration. A full description of the formation of aspects, categories and indices have been shown in table4.

Table 4 Selective coding

Aspects	Categories	Indices
Environmental factors	Research globalization	Globalization of survey and scholar Bounding of industry with university
Managerial factors	Bounding of industry with university	Existence of widespread survey connections Commercialization of researches results Contribution of private and industrial sector
	Communications	Connection of scholars with media Connection of scholars with educational centres and schools Social connections and community criteria Relation with professional research networks
	Participatory management	Participatory decision-making Participatory management Research-oriented leader
	Leadership properties	Participatory-oriented leadership Familiarity with statistical and quantitative and qualitative research software
Methodological literacy		Participatory-oriented leadership
Technological factors	Software skills	Familiarity with statistical and quantitative and qualitative research software Using working domain professional software
	Research method skill	Advanced research skills Basic research skills Familiarity with research methods and quantitative and qualitative analysis
	IT	Familiarity with novel science and technology advances Promotion of using novel research technologies
	Computer literacy	General skills of web domain and social networks Having general skills of working with computer Email and using it
Surveying literacy	Scientific papers	Papers indexed in foreign databases Interpretive papers
	Scholarly	Presenting paper in international forums Paper in non-professional publications
	Ability to examine and scientific arbitration	Professional research networks such as Research Gate
	Laboratory experience	Executing research plans inside and outside university Conduction of joint research activities with students
	Informational literacy	Number of documentations as per papers and book Scientific single-notes
	Technical skills	Creation and management of research teams MA and PhD theses guidance and consultation
Technical and informational skill	Having speech-making skills	Joint survey activity with abroad Survey plans arbitration Survey publications and papers arbitration
	Personality characteristics	Arbitration in forums and conferences Setting up laboratory and workshop in the professional domain
	Working skills	Research (methodology) training workshops Recognition of information required Using electronic resources and databases Advanced, rather than general information search Obtained information management
	Organization culture	Correct and updated information finding behaviours Technical knowledge production Mastery over English language Having rhetorical skills Making speech in public forums
Individual properties	Structural factors	Creativity Self-esteem Self-efficacy Control centre Openness

Organizational culture	Occupational factors	Lack of pride and arrogance Sufficient personal motivation and ability Responsibility Discipline at work Endurance and continuation
	Incentive systems	Vivid organizational objectives Research-oriented organizational atmosphere Survey-oriented organizational culture Decentralized structure
	Critical perspective	Decentralization in assigning survey affairs Recruiting type Job and organizational commitment Existence of types of rewards Existence of systems to resolve scholars' barriers Scientific investigation, criticism and revision of papers Students' theses arbitration
Scientific factors	Composing book	Book criticism and correction Criticism and commenting on social problems in professional context in newspapers Publicly perceivable book composition Book composition and publication in professional domain Re-printing and revising the composed books Translating updated books in professional domain Scientific board member of research publications
	Membership in professional publications	Membership in professional forums Gaining ranking in national survey festivals

3.1.2 Fuzzy Delphi Findings

For this purpose, the view of the experts interviewed on the importance and priority of each of the indices was collected. On this basis, the indices effective on survey performance were identified and research management pattern was codified. In this survey, triangular fuzzy numbers were employed to make experts' views fuzzy.

Table 5 10-degrees fuzzy spectrum for indices valuation

Finite equivalent	Lingual variable	Fuzzy number scale
1	Very unimportant	(1,1,1)
2	Very unimportant to unimportant	(1,2,3)
3	Unimportant	(2,3,4)
4	Unimportant to medium importance	(3,4,5)
5	Medium	(4,5,6)
6	Medium to important	(5,6,7)
7	Important	(6,7,8)
8	Important to very important	(7,8,9)
9	Very important	(9,9,8)

In the next step, fuzzy average and fuzzy means of people's scores must be computed. To compute the average opinions of n respondents, fuzzy average was computed as

follows: Every triangular fuzzy number has been displayed for each of the indices as follows in Eq. (1) to Eq. (4):

$$\hat{f}_j = (l_i^k, m_i^k, u_i^k) \tag{1}$$

$$L_j = \min(X_{ij}) \tag{2}$$

$$M_j = \sqrt[n]{\prod_{i=1}^{n} X_{ij}} \tag{3}$$

$$U_j = \max(X_{ij}) \tag{4}$$

Index i refer to the expert, such that τ_j is fuzzy average of JTH criterion, X_{ij} is examination value of ITH expert from JTH criterion, L_j is minimum value of examinations for JTH criterion, M_j is geometrical average of experts examination value of JTH criterion performance, U_j is maximum examinations value for JTH criterion.
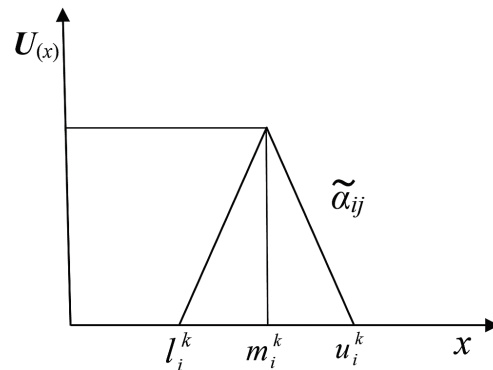

Figure 1 Valuation of indices relative to each other using triangular fuzzy numbers

In fact, these aggregation methods are experimental methods provided by various scholars. For example, they have considered a conventional method to aggregate a set of triangular fuzzy numbers as minimum i and average m and maximum u that is shown in Eq. (5)

$$F_{AGR} = \left(\min\{1\}, \left\{ \frac{\sum m}{n} \right\}, \max\{u\} \right) \tag{5}$$

In this study, fuzzy average method has been employed. Fuzzy average of n triangular fuzzy numbers was computed using Eq. (6):

$$F_{AVE} = (L, M, U) = \frac{\sum_{i}^{k} l}{n}, \frac{\sum_{i}^{k} m}{n}, \frac{\sum_{k}^{i} u}{n} \tag{6}$$

Where triangular fuzzy number of $\hat{f}_j = \left(l_i^k, m_i^k, u_i^k \right)$ is the fuzzy equivalent of KTH expert opinion over ITH criterion. Fuzzy average of experts' panel view for each of the research indices has been brought in the table. In addition, Eq. (7) was used for defuzzification.

$$DF_{ij} = \frac{\left[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})\right]}{3} + l_{ij} \qquad (7)$$

In the executive phase of fuzzy Delphi, after the codification of the initial model, the questionnaire containing questions over the aspects and indices was codified and assigned to the selected people. To investigate the validity of the model designed, model number 2 was codified and was again sent to experts for the second round. In this way, all experts became aware of the outcome of the opinions of one another. The results implied that 9 factors and their indices were effective on research and development management and survey performance examination and all experts were census on it.

Fuzzy average and the de-fuzzified outcome of the values related to indices were computed. The threshold value was set as 0/7 in this research. The de-fuzzified value greater than 0/7 is accepted and any index having a score lower than 0/7 is rejected. At the end of the first level, all the items having a score lower than 0/7 were eliminated. In the second level, fuzzy Delphi analysis continued for the remaining indices. The results obtained from the elements de-fuzzification in the second level and the difference of the fuzzified values of the first stage and second level have been reported in table6. Evidently, due to the high number of categories and indices, bringing fuzzified averages tables as per fuzzified values (U, M, L) has been refused.

Tab. 6. Fuzzified values of the first and second level and their difference

Table 6 Fuzzified values of the first and second level and their difference

Indices	First round	Second round	Difference
Holding annual research exhibitions	6.09	6.09	0
Globalization of research and scholar	6.09	6.09	0
Participatory decision-making	5.96	6.09	−0.13
Participatory management	6.09	5.96	0.13
Ability to use electronic sources and informational databases	5.96	6.09	−0.13
Participatory leadership	6.05	6.09	−0.04
Commercialization of research results	6.09	6.09	0
Private sector contribution	6.09	6.05	−0.04
Rewards	6.13	6.09	.0
Designing and setting up research training workshops and laboratories	5.92	6.09	−0.17
Familiarity with search methods	6.09	6.09	0
Recognition of information required	6.09	6.05	0.04
Research-oriented leader	6.09	6.09	0
Advanced, rather than general search	5.92	6.09	−0.17
Information management	6.09	6.09	0
Information skill	6.09	6.09	0
Mastery over English language	6.09	5.97	0.12
Technical knowledge production	.5	.5	-
Creativity and innovation in survey	7.15	6.8	0.35
Self-esteem	5.3	5.96	−0.66
Having work domain professional software	6.09	6.09	0
Control centre	6.09	6.09	0
Sufficient personal motivation and ability	6.09	6.09	0
Responsibility	5.92	5.72	0.2
Having general skills of working with computer	6.27	6.09	0.18
Lack of centrality in organization	6.09	6.09	0
Email	7.15	6.96	0.19
Presenting paper in international forums	6.8	5.92	0.88
Paper in non-professional publications	6.06	6.09	−0.03
Number of papers indexed in foreign databases	6.17	6.09	0.08
Interpretive papers	2.31	6.09	−3.78
Number of documentations as per papers and book	6.41	6.09	0.32
Scientific single-notes	7.54	6.77	0.77
Presenting and executing survey plans inside and outside university	6.47	6.89	−0.42
Conducting joint survey activities with students	7.31	6.58	0.73
Creation and management of survey teams	5.96	5.96	0
Book translation	5.92	5.68	0.24
Papers and surveys plan arbitration	6.09	6.09	0
Professional curriculum designing	6.09	5.92	0.17
Scientific board member of survey publications	5.33	5.68	−0.35
Membership in professional forums	6.22	6.11	0.11
Obtaining ranking in national survey festivals	6.55	6.17	0.38
Familiarity with statistical and analytical software-qualitative research software	5.96	6.09	−0.13
Self-efficacy	6.09	5.92	0.17
Advanced research skills	6.06	6.09	−0.03
Basic research skills	5.86	6.09	−0.23
Familiarity with quantitative and qualitative research methods-statistics analyse	5.96	6.53	−0.57
Connection with media	6.09	5.97	0.12
Connection with industry	6.15	6.27	−0.12
Research-oriented organization	6.3	5.96	0.34
Connection with professional research networks	7	6.96	0.04
Speech-making skills	7.24	6.92	0.32
Making speech in public forums	6.53	6.09	0.44
Familiarity with novel science and technology advances	6.31	6.09	0.22
Promoting the usage of new research technologies	7.41	6.72	0.69
Organizational atmosphere	6.09	5.92	0.17
General skills of web domain and social networks	7.15	6.89	0.26

Decentralized structure	5.91	6.09	−0.18
Correct and updated information finding behaviours	6.96	6.09	0.87
Inherent creativity	6.72	6.27	0.45
Discipline at work	5.96	5.92	0.04
Endurance and continuity	5.92	6.09	−0.17
Vivid organizational objectives	5.92	6.09	−0.17
Social communications and community criteria	6.09	6.8	−0.71
Professional social networks such as Research Gate, Medley, LinkedIn, Academy	5.97	5.92	0.05
Organizational culture	6.09	6.09	0
Papers and survey publications arbitration	6.09	6.09	0
Executive record in holding conference	5.72	5.96	−0.24
Laboratory and workshop designing and setting up	5.92	6.09	−0.17
Occupational and organizational commitment	5.68	6.09	−0.41
Examinations and criticisms	5.92	5.96	−0.04
Critical book correction	5.72	6.09	−0.37
Scientific investigation, criticism and revision of books and papers	5.57	5.92	−0.35
Book critique and correction	5.92	5.96	−0.04
Publicly perceivable book composition- scientific book composition in children and youth's language	5.92	5.92	0
Book composition, translation and conference	5.74	6.09	−0.35
Re-print and revision of the books composed	6.09	5.79	0.3
Joint survey activity with abroad	5.92	6.09	−0.17
MA and PhD theses arbitration	5.92	5.72	0.2
Theses guidance and consultation	6.09	5.92	0.17

The difference of the fuzzified average of the experts' opinion is lower than 0/7 in both levels, experts have reached census in terms of the aspects, categories and indices of research and development management to assess the scientific board members' performance and the enquiry ceased in this level and all the aspects, indices and categories were verified in the second level and 80 out of 87 content analysis indices were recognized as proper.

4 CONCLUSION

In this section, 9 aspects such as survey literacy, scientific factors, technical and informational skill, methodological literacy, environmental factors, organizational factors, managerial factors, technological factors and individual property were extracted with 25 indices, as explained in Tab. 3. Five main aspects were considered.

The first aspect is the survey literacy that expresses the scientific papers composition, scholarly and the ability to arbitrate, assess and laboratory experience. These results are in line with the surveys by Shabani et al. [8], Forutan and Reshadatjou [15], Shaban Kareh et al. [6] and the formal report of the university of Tarbiyat Modares [11] that highlight survey papers composition, professional books, papers indexed in professional databases, conduction of survey plans inside and outside the university, creation and management of survey teams, joint survey activities with abroad, arbitration of survey plans and the papers of the others in the professional context and the setting up of various workshops and laboratories. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The second aspect is the scientific factors that express publicly perceivable books composition, conferences and the book and paper translation, guidance and arbitration of theses, professional publications and journals and receiving national and international rewards and they are in line with the surveys by Shams [16] and Chen et al. [10] that highlight the scientific criticism and revision, theses arbitration, book criticism and correction, social opinion and criticism, scientific books composition in plain language, re-printing the books and the globally updated books. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The third aspect is technical and informational skill that expresses the informational literacy and technical and speech-making skills. These results are in line with the surveys by Shabani et al. [8], Cherani et al. [2], Shams [16] and Riahi and Sharafi [17] that highlight the recognition of the information required, the ability to use electronic resources and databases, advanced information search, obtained information management, technical knowledge production, mastery of English and having rhetorical skills and making speech in public forums. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The fourth aspect is methodological literacy that expresses the software skills and research method skill. These results are in line with Shams [16], Jacob et al. [18], Rastegar et al. [9], Ijtihadi et al. [1] and Riahi and Sharafi [17] that highlight the familiarity with statistical and analytical software, quantitative and qualitative software, having professional context mining software and employing them, advanced and basic research skills. The only difference

that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The fifth aspect is environmental factors that expresses the globalization of the survey and the bounding of industry with university and widespread communications. These results are in line with the surveys by Shaban Kareh et al. [6], and the report by the university of Tarbiyat Modares [11] that highlight the globalization of the scholar and survey, the bounding of the industry with university, the existence of widespread survey connection, commercialization of researches results, contribution of private and industrial sectors, communications of scholars with media, industry, educational, research centres (technology parks), as well as social communications and community criteria. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The sixth aspect is organizational factors that expresses the organizational culture, structural factors (personality and individual features), occupational factors and incentive systems. These results are in line with Forutan and Reshadat Jou [15], Khodaey et al. [7], and Asnafi, et al. [19] that imply such indices as clear organizational objectives, research-oriented organizational atmosphere, survey-oriented organizational culture, decentralized structure, occupational commitment, creativity, heuristics, organizational innovation, existence of types of rewards and the existence of systems to resolve the scholars' barriers. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys.

The seventh aspect is managerial factors that expresses the participatory management and the features of leadership. These results are in line with the researches by Khodaey et al. [7], Haustein et al. [20], Shams et al. [21], Muhammadi and Qazanfari [22], Shaban Kareh et al. [6] and Benbow et al. [23] that highlight participatory decision-making, participatory management, research and development orientation of the leader and participatory-oriented leadership. The only difference that can be found between the previous works done and the present survey is the extraction of indices as a set and the identification of their indices to advance, improve and assess the survey performance research and development management among the scientific board members when they have been attended in a dispersed manner in the past surveys. The previously mentioned surveys that were in line with the results of present research, differ from the present research in that each of them has investigated some aspects of the present survey and a united

survey has not been conducted in the name of the present survey. Each of them has investigated separate variables and different aspects of the research and development management to improve and examine the surveying performance. And a background over the identification of the indices and categories of surveying performance thoroughly is barely seen. In this way, the present survey has been done given the importance of the subject of research development and management to improve and assess the surveying performance, and given the lack of the conduction of university studies in this context. The tendency of scientific and scholarly communities domestically and abroad will be towards research and development with scientific management.

5 REFERENCES

[1] Yáñez, S., Uruburu, Á., Moreno, A., & Lumbreras, J. (2019). The sustainability report as an essential tool for the holistic and strategic vision of higher education institutions. *Journal of cleaner production, 207*(1), 57-66. https://doi.org/10.1016/j.jclepro.2018.09.171

[2] Chenari, Ali Reza and Sharifi, Hedye and Qourchian, Nader Ali (2011). A Model to Assess the Professional Capabilities of the Islamic Azad University Faculty Members in the Humanities and Engineering. *Journal of Innovation in Management Education (Journal of Modern Thoughts in Education), 6*(2), 47-68.

[3] Safdari, R., Ghazisaeidi, M., Ehtesham, H. A. M. I. D. E. H., Robiaty, M., & Ziaee, N. (2016). Barriers to research in medical sciences from the viewpoints of faculty members of Birjand University of Medical Sciences in 2012. *Journal of Rafsanjan University of Medical Sciences, 15*(6), 515-526.

[4] Iranmanesh, P., Khazaei, S., Nasri, N., Moeini, A., & Shakour, M. (2015). The Effect of Educational Research Workshop on Learning Statistics and Research by Dental Students of Isfahan University of Medical Sciences. *Interdisciplinary Journal of Virtual Learning in Medical Sciences, 6*(2), 63-68.

[5] Van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational research review, 6*(2), 95-108. https://doi.org/10.1016/j.edurev.2010.10.003

[6] Shabankareh, K., Mansourzadeh, M. J., & Hamidi, A. (2018). Scientific impact of Iranian medical sciences universities' research journals in google scholar. *Iranian Journal of Information processing and Management, 33*(2), 745-774.

[7] Khodaey, L., Ghaffari, R., Baradaran Binazir, M., Behshid, M., & Sharifi, Z. (2021). Faculty Members' Experiences of Empowerment Programs in Tabriz University of Medical Sciences-A Qualitative Study. *Journal of Medical Education Development, 14*(42), 54-66. https://doi.org/10.52547/edcj.14.42.54

[8] Shabani Bahar, G., & GHare, A., & SIAVASHI, M. (2020). Designing Structural Model of Development Professional, Organizational and Personal Faculty members of Physical Education and Sports Science. *Applied Research of Sport Management, 8*(4), 99-112.

[9] Enayati, T. (2020). Relationship between Ethical Leadership and Job Performance of Faculty Members of Universities. *Ethics in Science & Technology, 15*(1), 99-107.

[10] Chen, G., Yang, G., He, F., & Chen, K. (2019). Exploring the effect of political borders on university-industry collaborative

research performance: Evidence from China's Guangdong province. *Technovation, 82*(1), 58-69. https://doi.org/10.1016/j.technovation.2019.02.001

[11] Rasoul Abadi, Masoud, Khezri, Adib, Heydari, Ata ullah (2012). Scientific outcome status of Kurdistan University of medical sciences based on scientometric indices till the end of 2011. *Scientific journal of Kurdistan University of medical sciences, 17*(1), 1-14.

[12] Li, C., Peters, G. F., Richardson, V. J., & Watson, M. W. (2012). The consequences of information technology control weaknesses on management information systems: The case of Sarbanes. *Oxley internal control reports, 2*(2), 179-203. https://doi.org/10.2307/41410413

[13] Norouzi, A., Abulghasemi, M., & Ghahremani, M. (2015). Exploring Barriers to Science Production from the Viewpoint of Shahid Beheshti University Faculty Members. *Journal of New Approaches in Educational Administration, 6*(22), 77-108.

[14] Ramazani, A., Qahramani, M., Pardakht, C., Muhamad, H., Zaker, S., & Qulam, R. (2017). Strategic analysis of international scientific cooperation of superior Iranian universities from their scientific board members' perspective with fuzzy technique. *Journal of training development in medical sciences, 10*(28). 39-52. https://doi.org/10.29252/edcj.10.28.39

[15] Forutan, M. & Reshadatjou, H. (2015). Conceptualization of professional identity of scientific board members, presenting a qualitative model. *Journal of training and learning studies, 7*(1), 100-123.

[16] Shams, Abdul Hamid (2015). Solutions of increasing scientific board members' productivity. *Journal of Management and development process, 2*(1). 71-97.

[17] Riahi Asl, J., & Sharafi, A. (2015). Scientific outputs of the medical sciences faculty members of the Shahed University in Scopus citation database (2000–2011). *Scientometrics Research Journal, 1*(2), 15-30.

[18] Jacob, B. A., Rockoff, J. E., Taylor, E. S., Lindy, B., & Rosen, R. (2018). Teacher applicant hiring and teacher performance: Evidence from DC public schools. *Journal of Public Economics, 166*(1), 81-97. https://doi.org/10.1016/j.jpubeco.2018.08.011

[19] Asnafi, A. R., Salami, M., Sayyah, B. M., & Hosseini, A. S. A. (2015). Presence of Ahavz Universities (Medical Science, Azad and Governmental) Scholars Iranian library and information science scholars in academic social network: research gate. *Educational Development of Jundishapur, 1*(6), 67-73.

[20] Haustein, S., Peters, I., Bar-Ilan, J., Priem, J., Shema, H., & Terliesner, J. (2014). Coverage and adoption of altmetrics sources in the bibliometric community. *Scientometrics, 101*(2), 1145-1163. https://doi.org/10.1007/s11192-013-1221-3

[21] Shams, Jesus and Irwani, Houshang and Rezvan Far, Ahmad and Yazdani, Saeid (2008). Identification and explanation of the indices related to survey productivity of Iranian state agricultural faculties scientific board members. *Journal of Iranian agricultural sciences, 2*(1), 117-125.

[22] Muhammadi, Teymour, Imani, Muhammad Taqi, Kebrya Baharak, Shirzad and Hosseini, Syed Rasoul (2017). Comparison of surveying activities of scientific board members of state and Islamic Azad Universities in Tehran to provide ways of increasing scientific board member's empowerment. *Journal of Educational assessment and measurement studies, 18*(1). 147-167.

[23] Benbow, R. J., Lee, C., & Hora, M. T. (2021). Exploring college faculty development in 21st-century skill instruction:

an analysis of teaching-focused personal networks. *Journal of Further and Higher Education*, *45*(6), 818-835. https://doi.org/10.1080/0309877X.2020.1826032

Authors' contacts:

Amir Khalili, PhD student
Department of Educational Management,
Faculty of Psychology and Educational Sciences,
Central Tehran Branch, Islamic Azad University,
Shahid Khandan St., Sohanak, Tehran, Iran
E-mail: amir_khalili2010@yahoo.com

Fereshteh Kordestani, Assistant Professor Dr.
(Corresponding author)
Department of Educational Management,
Faculty of Psychology and Educational Sciences,
Central Tehran Branch, Islamic Azad University,
Shahid Khandan St., Sohanak, Tehran, Iran
E-mail: fe.kordestani92@gmail.com

Yalda Delgoshaei, Assistant Professor Dr.
Department of Educational Management,
Faculty of Psychology and Educational Sciences,
Central Tehran Branch, Islamic Azad University,
Shahid Khandan St., Sohanak, Tehran, Iran
E-mail: y.delgoshaei@gmail.com

Ali Hosseini Khah, Assistant Professor Dr.
Kharazmi University, Mofateh St., Tehran, Iran
E-mail: h.ali@khu.ac.ir