Explaining the Effects of Data Analysis Approach Compared with the Intuitive Approach on the Strategic Decisions of Government Managers

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Abstract
How is the quantity and quality of data analysis approach to strategic decision making? This study has been aimed to explain the answer. The quantity means the amount of approach application. And the quality is related to the approach comparison with the intuitive one as well as its application in four strategic decision making situations – decision making based on little information, fast decision making, risky and ambiguous conditions.
Methodology
In this study, target population includes senior managers of the relevant public and private institutions. Predictor (i.e. analysis approach) and criterion (i.e. strategic decision making) variables have three and four components, respectively. Data were collected by Likert questionnaire including multiple choice questions. The method of data collection was direct. The questionnaire reliability and validity were approved. Data was analyzed by descriptive and inferential statistical techniques such as t-test.
Results
Three methods of analysis approach are used in senior managers' strategic decision making process, but the application of this approach is less than intuitive one. Senior government and non-government managers tend to use intuitive approach.
Keywords: Quantitative and qualitative data analysis approach, data analysis approach, Intuitive data analysis approach, Strategic decision making.

Scientific principles and theoretical framework

Analysis approach to decision making

Decision making is the selection of one or more options among several ones. Managers use at least two general approaches to make decisions. Analysis approach is one of them (Jafari, 2011, p. 11).

Analysis approach as a process of a scientific method forms one of the research methods bases. Analysis is generally a way through which the entire research process proceeds from selecting problem to achieving results. The researcher uses different analysis methods to address the stated problem and to confirm or reject the formulated hypothesis. They can be classified into three types of descriptive, comparative and causal analysis (Taheri, 2001, p. 225).

Statistical data analysis is not only purpose of this approach. It is one of the important methods applied for data and researches having statistical aspects. There are many researches with no statistical aspects, which are mainly based on rational analysis, perception, intuition and evidence. These are also subject to the entire process of scientific research and have the analysis stage (Hafezniya, 2010, p. 126). Therefore, analysis is generally twofold: quantitative analysis and qualitative analysis.

Some methodologists have classified quantitative analysis into descriptive and explanatory (causal) ones. How to distribute the experimental data of dependent and independent variables through statistical indicators is expressed by descriptive analysis. Explanatory analysis deals with cause finding and explores the causal relationship between variables. But some others have also added comparative analysis to the types of quantitative analyses (Delavar, 2001, p. 141).

Analytical skills

Skills such as computer and organizational ones support largely analytical approach to problem solving (Paprika, 2013). The qualitative analysis can be performed at three levels of description, explanation and interpretation (Saei, 2007, p. 141).
Thus, an overview of different analysis types can be showed in the chart below:
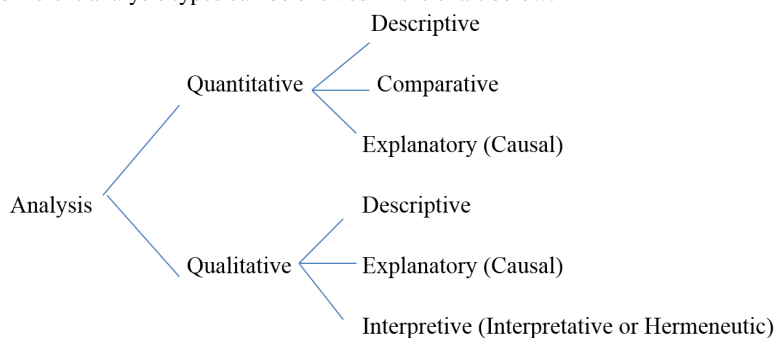

Figure 17

Quantitative analysis

Descriptive and explanatory analyses are consistent with descriptive and explanatory researches, respectively. However,

descriptive analysis is also performed for explanatory research.

Quantitative analysis is applied to conditions under which the concepts are to be measured by empirical indicators quantitatively. Statistical techniques are an instrument for quantitative analysis.

Quantitative analysis is one of the empirical reasoning methods on scientific assumptions. It is a statistical reasoning. This reasoning provides empirical evidence to confirm or reject theoretical solution of the problem. The result requires a theoretical analysis. Semantic mining can even be conducted. Quantitative analysis is dependent on qualitative one. In order to complete the analysis and achieve the sufficient semantics, researcher needs to perform quantitative analysis with qualitative one. Qualitative analysis makes the semantic of quantitative findings clearer.

Descriptive statistics such as mean, variance, standard deviation, median and mode is used in descriptive analysis. In the explanatory analysis, multivariate statistical techniques are applied (Saei, 2007, p. 139-40, 144, 148).

Qualitative analysis

Generally, in cases where more attention is paid to the individual attributes, none of the quantitative analysis methods can probably be used (Galton, 1995, p. 89).

In the qualitative analysis, qualitative data are collected and there can also be a little experimental data. In this case, this data should be analyzed according to qualitative logic (Saei, 2007, p. 141).

Important requirements of qualitative analysis

Since the researcher is the main instrument in the collection and qualitative data analysis, he must have some features at the beginning. The most important feature is that the researcher must try to reduce prejudices, views, or assumptions which may interfere in data analysis or at least to be aware of them. This helps less involvement of his personal views in investigating a phenomenon (Biyabangard, 2009, p. 116).

Areas of qualitative analysis

(Hafezniya, 2010, p.235-6, 233) Qualitative analysis should be the dominant approach to postmodern researches and the product of Frankfurt School criticisms with a wide range of Humanities. "Basically, most of the studies on the effect of ideology, religion, culture, politics, ethics and the like on the human action and behavior can be analyzed using qualitative and rational analysis." The anthropological and social relationships studies as well as studies related to content analysis are all in the area of qualitative research; however, they may also benefit from quantitative methods. In general, theoretical and library researches where data is collected by measurement devices such as table, card, etc. are qualitative.

Qualitative analysis methods

(Hafezniya, 2010, p. 236,233) In the qualitative researches, data evaluation and analysis can be performed through inductive and deductive reasoning, allegory and metaphor, abstraction, difference and distinction recognition, and comparison that all are done with the aid of thinking, reasoning and logic and researcher can conclude using revelation of his mind.

General scientific propositions as well as divine criteria stated in theoretical literature section are one of the qualitative and quantitative principles. The researcher can compare obtained data with these and then conclude. Because they are certain human and social laws reflecting the relations between human and social variables, the researcher can use them as a comparison basis in qualitative analysis. For example, a historical researcher studying on the causes of governments fall can compare obtained documents and evidence from data collection with General scientific propositions and divine criteria and thus evaluate them. Of course, evidence indicating cruelty or lethargy and sloth and luxury in the government's behavior can be used to relate independent variable (i.e. cruelty) and dependent one (i.e. fall).

Descriptive analysis

In this type of analysis, the researcher describes, summarizes and classifies collected data using descriptive statistical indicators if the analysis is quantitative. In other words, he first summarizes obtained data in the form of frequency distribution table and displays them in the chart and finally summarizes them using other descriptive statistical indicators. The best and still most widely descriptive statistical indicators include mean, median and standard deviation (Delavar, 2001, p. 292).

But if the analysis is qualitative, the characteristics of each variable are illustrated in descriptive analysis. At this level, semantics of the text or event is analyzed apart from its social contexts (Saei, 2007, p. 141).

Comparative analysis

In the comparative analysis, the collected data are analyzed and compared with each other. The question that is raised in this analysis is whether calculated statistical indicator is larger than other one. It means that two or more descriptive statistical indicators- the mean, median, standard deviation and variance - are compared. For example, you may compare two or more math classes and specify whether there is a significant difference between these classes. In other words, we are interested in comparing the mean of two classes using a statistical test and determining statistically significant difference between them. In such circumstances, the significant difference between two classes' means implies that the study is valid and obtained results are not by chance (Delavar, 2001, p. 293-4).

Explanatory or causal analysis

The same statistical indicators or instruments used in the comparative analysis are applied to causal quantitative one. The major difference between these two methods is that cause and effect relationships between independent and dependent variables are discussed and examined in the causal analysis, and the researcher confirms or rejects them by statistical assumptions (Delavar, 2001, p. 294).

In order to explain and find cause, the causal qualitative analysis studies and analyzes socio-historical contexts affecting the text or event by theory and states the event in the form of a general law (Saei, 2007, p. 141).

Interpretive analysis

Interpretive analysis is also called hermeneutical or interpretative. It has been provided in response to analytical quantitative methods affected by two dogmas of empiricism. In this analysis, man and his social behaviors are interpreted based on the single-minded and free man. It believes that any behavior has an intellectual and voluntary basis and an unknown infrastructure incentive that must be discovered. Therefore, "interpretive analysis presumes that social phenomena and acts of people are meaningful. And essentially, it is as an analysis method of empirical evidence seeking to illustrate the implications behind the text or the event.

There are two key elements in the interpretative analysis: the text or event and context. The text is related to researches with a written or spoken problem such as discourse analysis. The event means people behaviors and social phenomena such as rituals, democratization, revolution and social inequalities.

Interpretative analysis refers to the context and realizes the text or event within the context. It goes from the outer reality to the inner one finds a way to the text. The context can be considered in two dimensions methodologically: 1) cognitive context, 2) social context. The former is a larger and more general context where the text is considered a specific part and its implications are interpreted within a wider and more general text. It means to find the meaning of a word within a sentence structure. Cognitive context can be a written or spoken text." (Saei, 2007, p. 142)

Intuitive analysis

Nobel laureate, in his bestselling book "thinking, fast and slow" refers to two ways of thinking. The first method or System 1 is automatic, emotional and quick. And the second one or System 2 is deliberate, rational and slow. Most of the daily decisions are made based on System 1 decision making. Only in n cases where further evaluations and calculations are needed, System 2 is used to make decisions (Kahnemann, 2011, 49).

Analysis and Intuitive decision making

In 1988, Hamm proposed that intuition is one of different thinking ways in decision making. The concept of his cognitive continuum was that different tasks are set for applying to various cognitive ways ranging from intuition to analysis. According to this reasoning, decision makers need to ensure that the methodology is appropriate to the situation. In this case, analysis is defined as follows: slow, conscious and consistent, almost exact (even if it sometimes makes big mistakes) and partly tending to combine information using principles more complicated than simple averaging (Hamm, 1988, p. 158).

When there is no match between task structure and methodology, the accuracy is less likely to decide the outcome. This theory suggests that intuition is the most appropriate methodology for all tasks with undesirable structures, further indications, and short time. For tasks with desired structures, little indications, and long time, analysis would be the best methodology. However, most tasks are a combination of desirable and undesirable structures and are placed in the middle of continuum.

The most appropriate cognition is a combination of analysis and intuition that might be demonstrated using the system, evaluation and decisions. In 1996, Davy proposed that cognitive continuum framework may be applied to explaining not to use the empirical evidence on health care decisions. He also suggested that many health care professionals act based on intuition, but most researchers often work on analysis. Physicians likely study and understand but do not know how to accept or combine the results with methods.

Analysis and intuitive approach to decision making

In 1988, Dowie reported that research consistently shows that statistical approaches are as good as or even better than intuitive evaluation. For example, Elstein et al. (1988) examined 50 physicians and compared intuitive decisions with analytical ones to prescribe estrogen treatment decisions. Physicians applied subjective estimation of existing risks (e.g. endometrial cancer) and benefits (e.g. osteoporosis prevention) for patients to the decision tree. The results show that due to their low propensity to determine the type of treatment, their intuitive decisions are significantly different from what was proposed in the model. The authors suggested that the results are affected by great attention on preventing endometrial cancer (Elstein et al., 1988, 95). This review has been written based on case studies and in fact, physicians' decisions may be different from studies observations.

Methodology
Design
This study is a survey research in terms of its explanatory goal, applied results, correlation between the variables and cross-sectional method.

Variables
Main (predictor) and secondary independent variables are "analysis approach" and "intuitive approach", respectively. Dependent variable is "strategic decisions of senior managers".

Components of variables
Four components of strategic decision making
A. decision making based on little information
When existing problem includes a number of uncontrollable variables, but there is no data from the past to make predictions for these variables and therefore it is not possible to calculate their occurring contingency. This kind of decision making will

be mostly modeled by decision matrix. In this case, decision maker also refers to creative and intuitive methods. Creativity is a factor for better understanding the problem and identifying alternatives.

B. risky conditions

When existing problem includes a number of uncontrollable variables as well and there is their occurring data from the past, so it will be possible to calculate their occurring contingency.

C. fast decision making

This kind of decision is when all effective variables are constant. In other words, the decision maker knows the result of decision making. The conditions of decision making are mainly modeled based on specific and mathematical models such as cost-benefit analysis, classic optimization models, inventory control, alternative model, work allocation and linear and dynamic programming.

D. ambiguous conditions

The problems and alternative solutions are often vague and not well known under these conditions. Uncertainty is usually due to two reasons. First, managers may be faced with external conditions almost or completely out of the control such as weather conditions which can have a substantial impact on implementation of many projects. Second, managers may not be able to access key information about the problem. For this reason, they can calculate the consequences probability of each solution. Thus, uncertainty makes the future unpredictable.

Hypotheses

First hypothesis

More than half of the managers apply data analysis to decision making.

Second hypothesis

The effect of "data analysis" and "intuitive analysis" methods on strategic decisions of senior managers is not the same.

Validity and reliability

At one week interval, the questionnaire was distributed among ten managers two times and results were compared. Then an acceptable reliability of 87% was calculated by test-retest.

The consistency of a questionnaire is measured in two ways: the validity of components consistency and the validity of two test halves.

The consistency of peoples' response with all elements of the measurement instrument is obtained by Cronbach's alpha coefficient. The questionnaire consistency was 0.917.

Biographical characteristics of the target population

Gender

Table 1- Respondents' distribution by gender

gender	female	male	Total
frequency	3	114	117
percentage	2.6	97.4	100

Table 1 indicates that females have a small proportion in decision-making areas, and men have hold of nearly 98% of higher posts at decision making.

Age

Table 2- Respondents' distribution by age

age	31-377	38-44	45-51	52-58	59-65	total
frequency	11	19	65	14	8	117
percentage	9.4	16.2	55.6	12	6.8	100
statistics	Mean: 46.95	Variance: 45.57	Median: 46	Mode: 45	Minimum: 31	Maximum: 65

In Table 2, mean age of 46.95, mode of 45 and age group of 45-51 are most frequent. These results suggest that most managers are often more than 31 years old.

Education

Table 3- Respondents' distribution by education

education	M.S.	M.A.	Ph.D.	total
frequency	57	48	12	117
percentage	48.7	41	10.3	100

Table 3 shows that more than 51% of managers have M.A. degree or higher.

Years of service

Table 4- Respondents' distribution by years of service

years of service	Lower than 10 years	11-20 years	21-30 years	31-40 years	total
frequency	4	73	32	8	117
percentage	30.4	62.4	27.4	6.8	100
statistics	Mean: 18.62	Variance: 36.60	Median: 18	Minimum: 6	Maximum: 37

According to Table 4, most managers have a long work experience and mean of 18.62 confirms it.

Service location

Table 5- Respondents' distribution by service location

service location	organization	office	company	other	total
frequency	15	28	52	22	117
percentage	12.8	24	44.4	18.8	100

Table 5 shows that the number of managers in private companies, public offices and public organizations was 44.4, 24 and 12.8%, respectively.

Service sector

Table 6- Respondents' distribution by service sector

service sector	public	private	total
frequency	58	59	117
percentage	49.5	50.5	100

Table 6 indicates that 50.5% of managers work in private sector and the others work in public one.

Job posting

Table 7- Respondents' distribution by job posting

job posting	executive manager	general manager	manager	supervisor	assistant	other	total
frequency	35	9	26	2	31	14	117
percentage	30	7.7	22.2	1.7	26.5	11.9	100

Table 7 shows that number of executive managers, general managers, supervisors, managers and assistants is 30, 7.7, 26.5, 22.2 and 1.7%, respectively.

Results

The results of the first hypothesis testing

The first hypothesis (H1) was that managers use analysis approach to strategic decision making. The first hypothesis testing results have been showed in Table 8.

Table 8- t-test analysis for variable

variable	N	Mean	t	df	Sig.	Mean Difference
Analysis approach	117	3.44	23.43	116	0.000	1.19

Based on data shown in Table 8 and considering t=23.43 and p<0.01, *it was concluded that the difference between true mean (3.44) and hypothesized one (2.25) is significant* and the former is higher. As a result, H1 hypothesis is confirmed. The results show that managers use analysis approach to decision making in Zanjan province.

The results of the second hypothesis testing

The second hypothesis states that the effect of two analysis and intuitive approaches on strategic decisions of senior managers is not the same. Friedman test or Kendall's W is used to test the hypothesis. Since Kendall's W is normalized form of Friedman test, coefficient of concordance is applied to assess the degree of score agreement among respondents. In this test, each respondent is considered a judge or rater and any statement or question is considered a variable. Then, the mean score of each variable is calculated. The mean difference is checked by comparison of test scores among the variables. Kendall's W test score varies between 0 and 1. Values close to 0 and 1 indicate, respectively, less and more agreement on the variables of interest among respondents. Table 9 shows the second hypothesis testing results.

Table 9- Kendall's W test scores

variable	N	Mean score	Kendall's W value	Chi-square	df	Sig.
intuition	117	1.71	0.396	46.296	1	0.000
analysis		1.29				

According to Table 9, the chi-square test (46.296) with p<0.01, *it was concluded that the effect of two analysis and intuition approaches on managers decision making is not the same. Mean scores show that senior managers use intuition approach.*

Conclusions

Senior managers use three methods of analysis approach to strategic decision making process. The findings suggest that analysis approach is more used in managers' decision making. It indicates the importance of analysis in daily life and even decision making areas.

The effectiveness of two analysis and intuitive approaches on managers' strategic decisions is not the same. Intuitive approach has a great impact on decision making processes of senior managers compared with analysis one. In this study, dominant approach to target population strategic decision making is intuitionism.

Considering the importance of analysis in managers' strategic decision making, the results show that intuition is more important. This finding along with Sinclair & Ashkanasy (2002) results indicates senior executives and managers use analytical decision making, but sometimes also use intuition. Eisenhardt states that decision makers act based on reasoning logic in some respects.

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