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Identifying and Ranking the Effective Factors of Business Intelligence on the Organizational Strategic Decisions

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Abstract

The new technologies are progressing at staggering speed, such that the organizations especially search for the solutions with an indescribable expedition to ensure their survival in this agitated and chaotic condition. So, applying the Business Intelligence in the organization is considered to be an inevitable commitment and necessity for the purpose of dominating over new technologies. The Business Intelligence means a broad dimension of applications and technology for collecting data and knowledge for generating inquiry in the analysis of the organization for the adoption of accurate and intelligent organizational decisions. The questionnaire was designed in Likert scale & distributed among 272 experts in the automotive industry in Iran. Cronbach alpha is calculated as %81, which is well above the minimum desirable limit of 0.70. The study investigates 26 factors & extracts four important ones, which strategic orientation, competitive environment, organizational vision, information tools. In this paper to analyze data has been used factor analysis and Multi-Criteria Decision Making.

Keywords
Business intelligence (BI), Organization Strategic Decisions, Multi-Criteria Decision Making (MCDM)

1. INTRODUCTION

The Business Intelligence can be regarded as a set of mathematical models and analytical methods to elicit information and knowledge from the existing data that is used in the process of complex decision- makings. In big organizations, the decisions are made on an alternative basis. Some decisions may be more or less critical or have short- or long- term effects and may consist of different and hierarchical individuals and roles. BI is an umbrella term that includes applications, infrastructure, tools and best practices that enable access to and analysis of information to improve and optimize decisions and performances. Obtaining BI success is complex, and this complexity carries a cost [1].The main purpose of Business Intelligence Systems is supplying knowledge managers with tools and methods which help them in an effective and apropos decision- making [2]. Regarding competitive environment of the automotive industry in Iran, as a developing country, it seems that absolute attention to the performance of competitors in this industry is necessary. On the other hand, Strategic decisions are large-scale, risky, and hard to reverse and require a systematic approach .they play an important part in the development of individual managers and they cut across functions and academic disciplines [3]. This research attempted to extract effective factors of BI on organizational strategic decisions. In section 2 the literature is presented, followed by an explanation of the methodology employed in Section 3. Section 4 presents the results of the survey, which is followed by the discussion. In the final part, the conclusions are presented.

2. LITERATURE AND BACKGROUND

Presthus [4] believed, the Business Intelligence is neither as a product nor as a system, but as a new intended architecture and approach that, of course, consists of a set of applied and analytical programs which, by relying on operating and analytical databases, help to make decisions for the commercial intelligent activities and marketing.
Wang [5] said, from the architecture and process point of view, the Business Intelligence is seen as a framework which is the factor of increasing the efficiency of the organization and the unity of processes and ultimately concentrates on the decision- making processes at different organizational levels. The market regards the Business Intelligence as a tool for competitive advantage and the monitor and analyst of market and clients. Technology and information systems play an increasingly important role in organizations' today environment [6]. From the technological point of view, the Business Intelligence is also an intelligent system that is considered as an interference point of hardware and software in the brain wares by exact data processing [7]. But, in simple words, the Business Intelligence is nothing except the process of increasing the profit of organization in a competitive market by the use of existing data intelligently in the process of decision-making [8]. If the concept of Business Intelligence is not correctly perceived and transferred, it would cause the expectations of managers to be raised suddenly and the non-fulfillment of these expectations would result in the outcomes such as losing trust of individuals and especially the managers from this system; because the Business Intelligence is just aimed to shorten the paths of enquiry inside the information and it is no ability to present a suggestion or solution independently and without the proper information . Joshi, Majumdar [2] generally, the purposes of this modern approach can be expressed as follows: The specification of the business tendencies of organization encourages the organization to concentrate on its main and great purposes without the waste of time and cost and energy. Deep analysis of the market.

- The anticipation of the market which can provide the new profits created in the market for the organization, before the competitors expand their market share.
- The increase of the level of clients' satisfaction which can result in the continuity of marketing, and losing this trust and satisfaction boost the business at the backwash.
- The identification of permanent and faithful clients that by pursuing their behavior, the strategic and macro-level orientations can be done.
- The classification of clients and subsequently the creation of variety in behaving each group of clients.
- The improvement of the efficiency of the organization in the internal affairs and the elucidation of procedure of key processes.
- The standardization of organization structures and creating consistency among them.
- The facilitation of decision- making which is considered to be one of the main purposes of Business Intelligence.
- The early identification of risks before they involve the organization in serious jeopardy and the specification of marketing opportunities before they were seized by the competitors.

Wang, Wei [9] the sense of the need to the Business Intelligence in an organization for the first time is felt at the high level of management and is transferred from the top of Pyramid of Organizational Structure to the lowest parts, but the creation of that should be started from the lower layers and level. Elbashir, Collier [10] having the exact information is

most important need of a manager to adopt a proper decision. The process of decision- making can be divided into three general parts. According to different kinds of decision- making (on the basis of its being structured), each part of that would have different importance.

- To access, collect and monitor the needed data and information;
- To process, analysis and conclude on the basis of knowledge;
- To apply the conclusion and supervise the outcomes of its performance.

Presthus [4] the strategic importance of Business Intelligence in the decisions of the organization. The progress of decision- making in the organization is usually in this order that the lowest level of fulfillment of commercial activities in an organization, is an operating level at which the process is fulfilled many times and usually in a repetitive form at lower levels of the organization and often dealt with a little volume of data. The taken decisions at these levels are often adopted by lower-level managers and in the range of structured issues. The results of these decisions have short-term and minor effects on the organization [11].

Tseng and Chou [12] the tactical level in an organization is related to the operation which is done in the domain of middle- level managers. This operation can consist of pursuing the operation at a lower level, the procedure of its fulfillment, taking progress report and finally collecting useful data for the adoption of midterm decisions of the organization. The taken decisions at this level are often adopted by the middle-level managers and in the range of semi-structured issues and ultimately the highest strategic level is related to macro decision- makings of the organization that are adopted by top-level managers [13]. These kinds of usages are done few times and in long periods, but it may entail a large amount of information and processes. The taken decisions at these levels are adopted by top-level managers and in the range of non-structured issues and the obtained results have long-term and macro effects on the path of progress of the organization [14].

Applying Business Intelligence at the strategic level can be considered by the way for the help to increase the general efficiency of the organization and to optimize the processes with each other. These systems concentrate on some important material features and the other significant effective parameters in increasing the efficiency of the organization. It is obvious that at these levels, the system should entail the external process of the organization. The analytical and intelligent tools are more used at high levels that need high processes with a large amount of access to information at the strategic and tactical levels in comparison with the operational level. The operational part of Business Intelligence has more the function of collecting information and saving them in the private databases.

Gilad and Gilad [15] in an era in which, the time is the main key in business; the companies have come toward the use of information tools so that they can quickly elicit the intended information from the recourses. The Business Intelligence provides many facilities in the decision-making at different levels of the organization, especially the level of top-managers; by the analysis of information and inquiry method that the most prevalent of them are as follows:

- ✓ On-Line Analytical Processing (OLAP)
- ✓ On-Line Transaction Processing (OLTP)
- ✓ Data Warehousing (DW)
- ✓ Data Mining (DM)
- ✓ Intelligent Decision Support System (IDSS)
- ✓ Intelligent Agent (IA)
- ✓ Knowledge Management System (KMS)
- ✓ Supply Chain Management (SCM)
- ✓ Customer Relationship Management (CRM)
- ✓ Enterprise Resource Planning (ERP)
- ✓ Enterprise Information Management (EIM)

Bastan, Ramazani Khorshid-Doust[١٦] show that applying the system approach in decision making can be lead to reaching a more efficient solution, almost in all of the mentioned systems in above. They believe using the system dynamics approach as a good tool for implementing system thinking, can Overcome the limitations of traditional decision making [17]. There is some application of this approach in the literature for solving a complex problem, policy evaluation and efficient decision-making and [14, 17-25].

3. RESEARCH METHODOLOGY

3.1. Data collection and sample

This study attempts to find the impact of business intelligence. The proposed study uses factor analysis to extract most influential factors and sample size has been chosen from experts in the automotive industry. The questionnaire was designed in Likert scale & distribute among 270 persons. To analyze the data, descriptive statistics were used to sort the data in the second part of the data analysis is performed based on statistical inference. In this paper to analyze the data use from SPSS and MCDM software. Factor analysis and structural equation analysis of the presumptive test was used.

3.2. Assessing reliability

The reliability of the measurements in the survey was tested using Cronbach's a. Hair et al. (1998) stated that a value of 0.70 and higher is often "considered the criterion for internally consistent established factor Cronbach alpha is calculated as 0/81, which is well above the minimum desirable limit of 0.70. The Cronbach's a coefficient in parentheses indicating the internal consistency reliability of the measures (a = 0.819).

There are 26 variables and using factor analysis, We extract five factors where Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.71 (Approx. Chi-Square= 1.759E3, df=300, Sig. = 0.000), which also confirms the results of our survey.

4. RESULTS

The proposed study designs a questionnaire and distributes it among 272 experts in the automobile industry. Cronbach alpha is calculated as 0.81, which is well above the minimum desirable limit of 0.70. Cronbach alpha has been calculated as 0.81 and Table 1 demonstrates the results.

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.819	0.819	26

We extract factors where Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.82 (Approx. Chi-Square=1526.038, df=465, Sig.=0.000), which also confirms the results of our survey. Table2 demonstrates the results.

Table 2: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.705**
Bartlett's Test of Sphericity	Approx. Chi-Square	1.759E3
	df	300
	Sig.	0.000

In this section, research data using scientific methods are investigated and they are analyzed in two parts. First, descriptive statistics are used to sort the data & then part of the data analysis is performed based on statistical inference. Factor analysis and MCDM of the presumptive test was used and the primary question is to find out about important factors influencing business intelligence. To answer the first question the exploratory factor analysis has been used. Table 3 & 4 present the results of analyzing the data.

Table 3: Descriptive Statistics

	N	Range	Minimum	Maximum	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
VAR00001	272	3.00	2.00	5.00	-.575	.148	.825	.294
VAR00002	272	3.00	2.00	5.00	-.781	.148	.134	.294
VAR00003	272	3.00	2.00	5.00	-.641	.148	-.402	.294
VAR00004	272	3.00	2.00	5.00	.322	.148	-.220	.294
VAR00005	272	4.00	1.00	5.00	-.184	.148	.051	.294
VAR00006	272	4.00	1.00	5.00	-.467	.148	-.132	.294
VAR00007	272	4.00	1.00	5.00	-.316	.148	.389	.294
VAR00008	272	4.00	1.00	5.00	-.132	.148	-.009	.294
VAR00009	272	4.00	1.00	5.00	-.527	.148	.509	.294
VAR00010	272	4.00	1.00	5.00	-.528	.148	.141	.294
VAR00011	272	4.00	1.00	5.00	-.491	.148	1.033	.294
VAR00012	272	4.00	1.00	5.00	-.953	.148	.528	.294
VAR00013	272	4.00	1.00	5.00	.076	.148	-.407	.294
VAR00014	272	3.00	2.00	5.00	-.212	.148	.067	.294
VAR00015	272	3.00	2.00	5.00	.219	.148	-.315	.294
VAR00016	272	4.00	1.00	5.00	-.417	.148	-.459	.294
VAR00017	272	3.00	2.00	5.00	-.016	.148	-.755	.294
VAR00018	272	3.00	2.00	5.00	.002	.148	-.504	.294
VAR00019	272	4.00	1.00	5.00	-.938	.148	.573	.294
VAR00020	272	4.00	1.00	5.00	-.284	.148	-.264	.294
VAR00021	272	3.00	2.00	5.00	-.222	.148	-.485	.294
VAR00022	272	4.00	1.00	5.00	.144	.148	-.537	.294
VAR00023	272	3.00	2.00	5.00	-.365	.148	-.727	.294
VAR00024	272	4.00	1.00	5.00	-.690	.148	.721	.294
VAR00025	272	3.00	2.00	5.00	-.433	.148	-.330	.294
VAR00026	272	4.00	1.00	5.00	-.270	.148	-.198	.294
Valid N (list wise)	272							

Table 4: Total Variance Explained

Component	Total	% of Variance	Cumulative %
1	2.430	9.718	9.718
2	2.313	9.251	18.969
3	2.290	9.161	28.130
4	1.779	7.116	35.246
5	1.729	6.915	42.161
6	1.623	6.492	48.653
7	1.613	6.453	55.106
8	1.376	5.506	60.611

Fig. 1 demonstrates Eigenvalues for each factor and a special agent with the highest value indicates that after eight factors, the curve becomes smooth & we choose four factors for the proposed study.

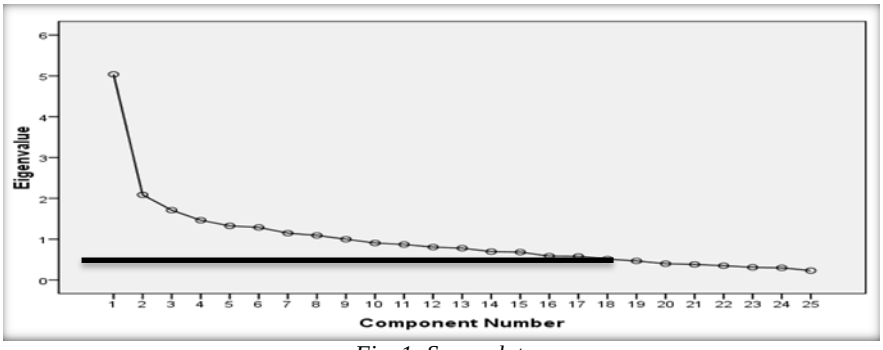


Fig. 1: Scree plot

4.1. Interpretation of the results of the factor analysis

The following table has been prepared based on the standard model (See Table 5).

Table 5: Interpretation of the results of the factor analysis

Factor weight	Variable	Factor
784	Sources Relationship	Strategic Orientation
524	Management Experience	
548	Operational Performance	
503	Technical Expertise	
498	Long-term Relationship	
753	Sustainable Change Processes	Competitive Environment
723	Dynamic Change Processes	
507	Competitive Advantage	

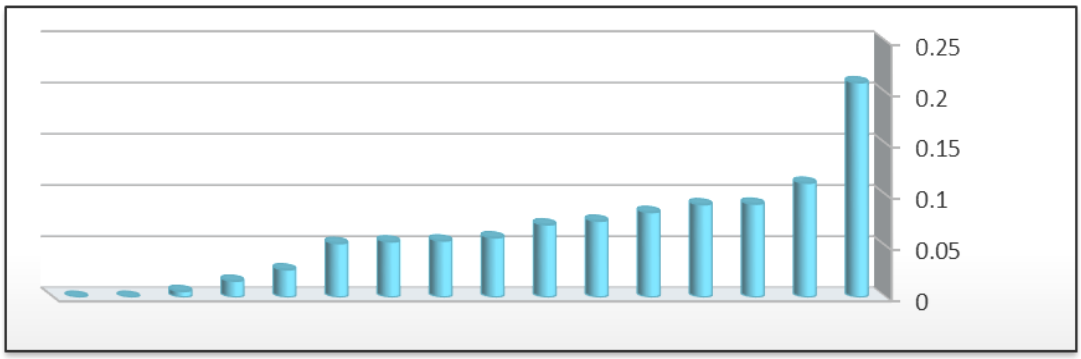
649	Integration Specialists	
574	Organizational Decisions	Organizational Vision
774	Information Competitors.	
821	Knowledge of Staff	
561	IT Skills	
502	Information Storage Technology	Information Tools

Regarding the results, we ranking of each of rebranding process (See tables 6)

Table 6: The summary of factor associated with business intelligence

Result	Important coefficient	Components
3	0.214	Strategic Orientation
2	0.301	Competitive Environment
1	0.345	Organizational Vision
4	0.14	Information Tools

Result	Important coefficient	Variable	Components
7	0.074	C_{11}	Strategic Orientation
9	0.0552	C_{12}	
13	0.0062	C_{13}	
15	0.0008	C_{14}	
6	0.0776	C_{15}	
3	0.0911	C_{21}	Competitive Environment
16	0	C_{22}	
1	0.2096	C_{23}	
4	0.0905	C_{31}	Organizational Vision
11	0.0542	C_{32}	
2	0.1115	C_{33}	
5	0.083	C_{34}	
14	0.0058	C_{35}	
8	0.0583	C_{41}	Information Tools
12	0.027	C_{42}	
10	0.0551	C_{43}	



5. CONCLUSIONS

the present article aims to analyze the difficulties of today's marketing by identifying the effective factors in Business Intelligence and its concentration on the organization decisions so that they could be anticipated and resolved by evaluating and analyzing this new intelligent technology, before the jeopardies threat the organization and their exorbitant economic injuries obstruct proper market and also the market opportunities advantages were taken, before they were identified by the competitors' accurate and meticulous eyes and before the organization be deprived of the opportunity of progress and development.

The proposed study of this paper has extracted four important factors including strategic orientation, competitive environment, organizational vision, information tools. A critical component of business intelligence is the most important factor in organizational vision (by a factor of 0.345), competitive environment (by a factor of 0.301) and Strategic orientation (by a factor of 0.214) respectively the second & third priorities which can be considered the custodians of this section.

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