

The Impact of Business Intelligence on Marketing Performance with Moderating Role of Environmental Turbulence

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Abstract. In today's complex, dynamic and constantly changing environment, companies need to design and take systems and methods that can help them adapt themselves to the changeable and dynamic situation of competitive markets, and therefore improving marketing performance and generally the company's performance. In this regard, business intelligence systems as a new method and tool can be considered as an important factor to provide business companies with all the necessary information they need for achieving better marketing performance and mainly furthering the goals of the company. This study aimed to evaluate the influence of business intelligence on marketing performance of pharmaceutical and petrochemical companies considering the role of modifying environmental turbulence by identifying and introducing the most important and effective factors in commercial companies' marketing performance. The objective of this study is practical and the implementation is cross-sectional and field study has been used for collecting data. The statistical population is senior executives or sales and marketing managers of 122 pharmaceutical and petrochemical companies in the country. To

evaluate it in these companies, a questionnaire consisting of 25 questions was prepared. To evaluate the reliability of the measuring tool, 30 people of the statistical population were asked to complete the questionnaire as a pilot and coefficient of Cronbach's alpha and reliability were estimated by examining factor loadings. The results of analysis show that business intelligence (technological and organizational business intelligence) has a positive effect on companies' marketing performance, and environmental turbulence also modify this relationship. The results indicate companies that use the business intelligence system for receiving, analyzing and using data to make decisions, have been able to achieve success in the perfectly competitive environment.

Keywords: Marketing Performance, Environmental Turbulence, Organizational Business Intelligence, Technological Business Intelligence.

1. Introduction

The world is an information society in which knowledge plays the role of capital. The viewpoints of knowledge based on marketing is on this assumption that knowledge is a key resource for creating, strengthening and maintenance of economic interests. In today's business environment that is quickly changing, Need-to-date business information and useful for trading companies not only to acquire successful but also for survival is crucial and Use the information as the basis for many global developments Is undeniable and this accelerated cause in the affairs. In recent years, Art technologies like business intelligence has become as one of the important concepts in management information systems and adoption of appropriate decisions is survival password and success of organizations in today's business world. Adoption of this decisions needs manager awareness from internal and external surroundings of organization and their effects on the organizational performance. Codification of appropriate strategies and predict of environmental changes in the organization deeply linked to awareness and analysis of information from internal and external environment. Meanwhile, identify of opportunities and threats caused by this change in order to respond effectively to succeed in the market, it seems important and necessary.

On the one hand what makes this necessary is the external environment which is constantly changing any business that an organization has little control over them. In continuously research problem has been described that is explain the impact of BI on marketing performance of pharmaceutical and petrochemical companies in Iran and after that the importance and necessity of addressing this issue is expressed. In the current decade, marketing performance measurement tool has been considered of focus. Trade companies have moved to identify and measure marketing performance to response to the market demands (Morgan et al., 2009). Marketing performance refers to the organization's ability to increase sales, improve competitive position, develop new products, improve product quality, reduce product delivery time or customer service, expand market share, etc. Compared with other competitors in a particular industry and measures with Financial and non-financial indicators (Shirkhodae et al., 2013). Marketing performance metrics can be classified into two dimensions as financial and non-financial. Market share, cash flow, sales and profitability are marketing performance metrics and non-financial metrics including customer satisfaction, customer loyalty and brand equity (Idris and Ibrahim, 2015). In order to evaluate of marketing performance and optimize to achieve the objectives and survival in the current changing environment and sustainable competitive advantage, there is necessary to acquire first-hand knowledge of the market environment, competitor internal environment. In the meantime, the BI act as a set of tools, methods, technologies and processes that facilitate the conversion of scattered data into meaningful information and knowledge of decision-making and makes improve decision-making in organizations and improve the quality of the decisions. Using Business Intelligence and successful implementation in the organizations can be improved and continuously increase their Performance and have performance-wised in today's dynamic and highly competitive environment in global market. Business intelligence by the Rouhani and colleagues (2012) includes a set of tools, techniques, approaches and information technology solutions that help managers better understand the current business positioning. Negash (2004), is described BI system to provide decision makers with appropriate practical information, in the right time and correct form.

The general problem for a determinant manager is information selection and strategic decisions according to achieve competitive advantage in marketing performance. This study is relying on past studies on companies and organizations in the field of business intelligence and its impact on the performance of commercial marketing, wants to provide results using this intelligent system over the marketing performance of petrochemical and pharmaceutical industries. Chasalow and Baker (2015) in a study entitled factors of contributing to the success of business intelligence to conclude that organizational process, enterprise technology assets and company experience is very effectiveness for BI successful that this will improve the company's performance. Isik et al (2013) in research under the title role of BI capabilities and decision environments, by examining the technological and organizational of BI and the positive impact of these factors on the success of business intelligence concluded that the decision environment could have a significant impact on firm performance as moderating variable. Environmental disturbance by Pavlou and El Sawy (2011) is defined as scope changes in the environment and overall context of uncertainty which contains two primary sources of market turbulence and technology. This variable is measured with technological and market indices. The moderating role of environmental turbulence is also supported by options theory. El Sawy and Pavlou (2008) determined turbulence environment with unpredictable due to unexpected changes in market demand and customer preferences, develop new technologies and technological advances. They concluded that three types of capability in this turbulent environment makes strategic advantage which include: operations (the ability to run processes), dynamic (planned ability to reconfigure operational capabilities) and optimizing (the perceived ability to reconfigure operational self-capabilities). As a result, another important factor which used in this research is environmental turbulence. This factor creates many opportunities and treats for companies competitive and achieving to competitive advantage and BI makes that the organization very quickly perceive the opportunities and treats (Xiaofeng, 2012). In fact, the innovation of this study is the use of variable named turbulence environment that affects as a moderating on relation between the success of business intelligence

and marketing performance of petrochemical and pharmaceutical companies. Regarding to technological and market indicators to measure environmental turbulence variable can be used in the Iranian market this variable by metrics such as speed of technological change, technological advances and market measures like changing customer product performance, new product introductions, the constant changes and etc.

2. Literature Review

In the age of electronic which is survival and success of the organization depends heavily on customers, competitors and the market, marketing has played a significant role in the performance of the organization. We believe that strategic marketing is an organizational active variable. Marketing strategy should be useful to make appropriate decisions about the market (Aghazadeh, 2015). Marketing performance refers to the ability of the organization to increase sales, improve competitive position, develop new products, improve product quality, reduce product delivery time or customer service, expand market share and this type of work compared to other competitors in a particular industry (Hankun ye, 2014). There are four main approaches to measuring marketing performance, including: 1) Measuring performance relative to past performance (in previous years), 2) Measuring performance relative to predetermined plans, 3) Measuring performance relative to performance of similar companies or competitors and 4) A combination of the above methods. The most important performance indicators or metrics include measures of growth, the strength of competition, innovation, profitability (Mali), use of resources, according to the owners, according to customers, according to the staff and attention to people in society (Walker et al. 2003 According to the Aarabi and Rezvani, 2007). The researches show that companies that are able to detect market share and sales growth and improve profitability without reducing market situation, can achieve higher performance (Vorhies et al., 2009). Market performance insist on level of sales, sales growth and market share (Holley et al., 2003). Marketing performance factors include: customer satisfaction, sales, market share and improve the competitive position (Nickraftar et al., 2015). Marketing performance measurement as a marketing asset helps corporate performance (Sullivan and Ebla, 2007). Companies with a

strong marketing performance measurement capabilities tend to be better than their competitors. Business Intelligence for decision-making process has helped companies improve their marketing performance is (Amir Nawaz, 2015). For modern companies, Business Intelligence is very precious because helps to reduce the information technology infrastructure costs and data mining and Duplicate data in a pool of independent data in the organization (Watson & Wixom, 2007). Business Intelligence as a business information analysis on key business processes, leading to better decisions and activities and to improve business performance results (Chaveesuk, 2010). In order to Ability to respond to rapid changes occurring in the market, Companies need to do more to decision support system whether the possibility of analyzing of organization and their environments which this important thing has been in business intelligence system. Today, business performance management has the greatest growth in business intelligence analyze. Since business intelligence can enhance awareness of production trends and changes in customers, then it can help the organization to provide timely information to detect trends in these changes. Business intelligence in pharmaceutical and petrochemical firms used to be identify profitable goods and monitoring customer behavior in buying products. The system benefits can help the firms in manufacturing industries using the monitor inventory by reducing excess capacity and Guarantee of supply for products and also can help financial management by identify areas where they can increase profitability and productivity and improve. The pharmaceutical companies track sales performance and customer behavior better able to adjust marketing strategy and ensure appropriate allocation of their marketing budget (Chi et al., 2009). With the development of information technology, business intelligence is increasingly being used in companies and many companies treat it as an effective tool for their business and speed of their bases (Yan et al., 2012). Technological point of view, Business Intelligence is a set of data, database independent and data source which provide needed information to give input information such as data interaction and capabilities for analysis and production (seethamraju, 2015). Implement and manage of business intelligence requires a commitment and sophisticated authority for specialized technological

infrastructure and also need resources for long term period. Technological capabilities of business intelligence to present Accuracy, consistency and timeliness of information for all users can enable an organization to improve business agility (Parikh & Haddad, 2009). Technological BI is important because provide executives technologies for operations of data storage, as a result it can offer information and strategic intelligent and business logical to support of decision in organization or industry (Bonney, 2013). Hereof, Traditional data mining tools can easily be applied to structured data sets but for unstructured data sets limitations that this vacuum will be filled by the BI good. In fact, BI has efficiency for both unstructured and structured data. Hannula and pirttimaki (2003) suggest Technological BI including systematic and organized process for acquire, analyze and information report to support operations and strategic decisions. Negash (2004) states technological BI as a system which collected, storage data and knowledge management combine with analysis tool and by the decision makers can convert full information for competitive advantage. Business intelligence can help organizations predict environmental changes and respond quickly to introduce a competitive product (Watson & Wixom, 2007). Flexibility dimension of organizational BI is a powerful to give support of decision, when there is variation in business processes, technology or environment (Gebauer and Schober, 2006). Flexibility directly affects the performance of the company. Lonnqvist and Pirttimaki (2006) stated that organizational BI is a managerial philosophy and a tool to help organizations to manage and information purify to make effective decisions and Williams & Williams (2007) presented that it is as a combination of products, technology and procedure to organized key information to improve and promote of benefits and performance. Jordan et al (2008) suggest organizational BI both process and product to used develop interest information to help survival in the global economy and predict of public behavior of business environment. Turbulence environments are created Opportunities and more threats for companies that compete in them. BI can help companies to quickly sense these opportunities and threats. In a turbulence environment, the organizations has to rely on BI to sense this trend and also on flexibility of information technology infrastructure to

respond to opportunities and threats. In an environment with high turbulence, an appropriate infrastructure of information technology and flexible has a more evaluate than less turbulence environment Providing data integration from different parts of their operations and procedures to help managers to make decisions. General conditions of uncertainty in the modern business environment may be seen from two aspects: market and technology turbulence. Turbulence market refers to change the rate in customer compound and priorities and technology turbulence refers to change the rate in technology (Xiaofeng Chen, 2012).Turbulence environment in this research is considered as a moderating variable on the relation between BI on marketing performance of pharmaceutical and petrochemical in Iran. Shirkhodaei et al (2013) in a study entitled effect of Parsian Bank's marketing performance on financial performance, after determining of factors of MP measurement by collecting about each factor and variable concluded that the increase in market share has been increasing marketing performance. Lajevardi and Rahimipour (2012) in an article entitled Business Intelligence and its impact improving management performance of Ports, stated that the four indicators of business intelligence including technical, organizational, business and operating dimension effects on performance management of ports. Hamidizadeh and kheirkhah (2012) in a research study of the effect of management capabilities of marketing knowledge on the organization performance in petrochemical industry in Iran, stated capabilities of foreign marketing has most effect on the overall organization, market and financial performance. Inter capabilities has a most effect on the customer performance. Imran and Tanveer (2015) in an article entitled decision support system: Create value for marketing decisions in the pharmaceutical industry, by investigation the effect of information technology on pharmaceutical companies marketing performance concluded that Pharmaceutical companies to improve their marketing performance should improve decision support systems and business intelligence. Huhtala et al (2014) in a study known as market orientation, innovation capability and business performance, investigate the role of market orientation and innovation capability in determining business and marketing performance and concluded that innovation capability as a mediator variable has a positive effect on relation

between market orientation and business performance. Xiaofeng Chen (2012) in a research entitled effect of BI and flexibility of IT infrastructure on the competitive advantage: a view organization agile, considered investigate on important effect of BI in fields of trading and agile organization. He stated that information technology and systems has a strategic values for organizations and considered significant resources for agility of organization advantage competitive. Also turbulence environment could have the effect of moderating on the organization performance. The hypotheses of the Research are as follows: BI affect marketing performance of pharmaceutical and petrochemical companies. Technological BI affect marketing performance of pharmaceutical and petrochemical companies. Organizational BI affect marketing performance of pharmaceutical and petrochemical companies. Environmental turbulence moderated relation between technological BI and marketing performance of pharmaceutical and petrochemical companies. Environmental turbulence moderated relation between organizational BI and marketing performance of pharmaceutical and petrochemical companies.

3. Method

This research in terms of target is applied because evaluated impact of BI to improve of marketing performance all of pharmaceutical and petrochemical companies. In terms of execution, is cross-sectional survey because variables of research review and analysis in a given time and in terms of data collection is descriptive because to prove the hypothesis of this study, collected data to be analyzed quantitatively. The population of this research are managers of pharmaceutical and petrochemical companies across the country. Since the research investigate marketing performance of pharmaceutical and petrochemical companies then analysis unit is organization. There are 75 pharmaceutical companies and 47 petrochemical plants in Iran that established in the different provinces and each have implemented a part of BI system. In fact, statistical society is CEO or Marketing\sales manager or IT manager of these companies. This mean a manager of any company who directly communicate with this system is selected. So, statistical society is equal 122 people. In the present study due to the limited size of population, it

has used of census sampling. 122 questionnaires created and for companies in Esfahan province as pharmaceutical companies (Raha, Goldarou, Farabi & Amin) and petrochemical companies (Esfahan & Rejal) presented it verbally and for others firstly send questionnaire by email But after repeated pursued none of the companies did not respond to e-mail then researcher sent questionnaire by post. Finally 86 questionnaires were completed and returned and were based to calculate. In this study used to variety of techniques such as internet research, library studying to acquire information relation with theoretic topics and used to questionnaire to acquire information and experimental data. In terms of model review and analysis of research and related subjects a standard questionnaire was used. In the present study used descriptive and inferential statistical tests. In section of descriptive statistics have been analyzed demography characteristic of respondent such as: age, work experience, education and etc. in section of analyzing statistics to analyze model have been used smart PLS software with 3 approaches as fitting, structure and overall measurement model.

4. Findings

Factor loadings coefficients, after the removal of inappropriate questions is presented in Table 1.

Table 1: factor loadings coefficients

Variable	questions	Factor loadings
Technological BI	1	0.79
	2	0.84
	3	0.78
	6	0.43
	7	0.79
	8	0.88
	9	0.49
Organizational BI	10	0.66
	12	0.4
	13	0.87
	14	0.88
	15	0.88

Variable	questions	Factor loadings
Marketing Performance	21	0.92
	22	0.93
	23	0.93
	24	0.88
	25	0.49

As is clear from the results in Table 2 for all the variables AVE amount is more than 0.5 that showed good convergent validity of the model.

Table 2: Results criteria Cronbach's alpha

Variable	Technological BI	Organizational BI	Marketing Performance
AVE	0.56	0.58	0.72
Composite reliability	0.88	0.87	0.93
Cronbach's alpha	0.86	0.82	0.89

As is clear from Table 3, Amount of square root AVE latent variables in this study who were in the matrix diagonal are more than the correlation between them in the lower and left houses. Hence it can be said that in this study, latent variables in the model have more interaction with their indices to other variables. In other words, divergent validity of the model is appropriately.

Table 3: The results of divergent validity

Technological BI	Organizational BI	Marketing Performance	
		0.85	Marketing Performance
	0.76	0.63	Organizational BI
0.75	0.74	0.54	Technological BI

As is clear from Table 4, Coefficients between latent variables related to all routes is more than 1.96 then it shows routs significant and suitability of structure model.

Table 4: Significant coefficients Z

Path Variables	Organizational BI- Marketing Performance	Technological BI – Marketing Performance
significant coefficient	3.96	2.13

As is clear from Table 5, Obtain the value more than of 0.5 for this measure, Very good fit overall model is confirmed.

Table 5: Shared values of the variables

Variables	Shared values
Technological BI	0.54
Organizational BI	0.58
Marketing Performance	0.72

5. Conclusion

The finding show that Technological BI affects Marketing Performance. Since the Technological BI is set of tools, Methods, technologies and process that facilitates the conversion of scattered data into meaningful information Mass and decision knowledge, improve decision-making in organization and Increase the quality of decisions, using it Organizations can improve marketing performance and added Company performance continuously. Also by using technological BI can be simplified analysis and data mining and this allow decision makers wherever and whenever it easy to access information and better understand and analyze them. BI provides many facilitates for organizations as: Forecast market situation and enhance the competitive ability in the market, reduction of costs, raising the level of customer satisfaction, to enable rapid adoption in the enterprise and etc. so Technological BI as a system can Make correct use of available information to the organization's competitive advantage and market leadership advantage. Therefore, it is suggested that Typically in organizations can be seen many scattered information. Use different tools leads to various databases with different structures in an organization. Coordinator service information in solution of BI provides the possibility to create centralize database for decision from valuable information. Use the dashboard to display information for

decision-making on various reports between units and different process such as: marketing, production, sale to coordinate and determination of clear objects. Share and provide the necessary information among participating employees can be effective in improving marketing performance. Using BI creates a unified view from data and trading process and it is linked between different business applications. The finding show that Organizational BI affects Marketing Performance. Since the organizational business intelligence on the one hand was associated with the firm's suppliers affects operations and activities and On the other hand, the organization is in touch with customers. Therefore, BI allows organizations to gain that insight, correct understanding and macro perspective, Consider the needs of all stakeholders system. Then suggests Created a high degree of IS interactions in the company. When deciding on the issues associated with a high level of risk, such as entry into a new market should to be use of BI. Companies in deal with unexpected events and exceptional use of business intelligence systems. Identify permanent customers who are loyal which can be follow up their treatment to do macro and strategic directions. Increasing the efficiency in the internal affairs and clarifications of key processes procedures. The results shows that Environmental turbulence moderated relation between BI and Marketing performance. Since BI system help company to analysis changes trend in the stock market, changes in the behavior customers and consumption patterns, customer priorities, capabilities and finally company statues. Then environmental changes affects relation between BI and marketing performance. Therefore, it is suggested, when companies introduce new products to the market, by using of BI can depth market analysis and predict market So that they can develop their own market share before competitors to give the new benefits that have arisen in the market. Evaluation of technological changes that created in the industry and using of opportunities. Early identification of risks before bringing the organization to serious risks and identify opportunities of business before their competitors to take them over.

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