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ANALYSIS OF INTERACTION BETWEEN BUSINESS INTELLIGENCE AND SMES: LEARN FROM EACH OTHER

Shaheb Ali
RMIT University, Melbourne, Australia
Shah J. Miah
Victoria University, Melbourne, Australia
Shahadat Khan
RMIT University, Melbourne, Australia

ABSTRACT

Business Intelligence (BI) and SMEs are two distinctive research domains but greater interaction between these two entities can offer the effective learn from each other. This interaction has been consider in conducting the changing environment. This interaction does only strengthen individual insights of BI and SMEs, it contributes to the business environmental performance. Although research on BI and SMEs is vast to date, limited focus was given on learning aspect between BI and SMEs. Therefore, this study is aimed to analyse literature and explore an integrated view of literature analysed on how BI and SMEs learn from each other and contributes to the business environmental performance. A qualitative content analysis was conducted for the procedure, which considers 43 articles for data source. Findings of the literature review suggest enhancing capability of SMEs and new innovation of BI, which may affect each other. Findings of this study may become useful for further research in terms of BI implementation success.

Keywords: Business intelligence, SMEs, change adaptation, capability, decision making, interactive relation, and learning.

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Address for correspondence / Endereço para correspondência:

MD Shaheb Ali, School of BITL, RMIT University, Melbourne, Australia, E-mail: mdsali80@gmail.com

Shahadat Khan, School o BITL, RMIT University, Melbourne, Australia, E-mail: shahadat.khan@rmit.edu.au

Shah Jahan Miah, College of Business, Victoria University, Melbourne, Australia E-mail: Shah.Miah@vu.edu.au

1. INTRODUCTION

Business intelligence (BI) has been proliferated due to its increasing contribution to such as business performance determination, data integration from disparate sources, data warehousing, planning, forecasting, budgeting, and the decision making that guides business operation toward desired performance (Singh and Singh, 2013). BI's growing contribution to the business growing performance has been recognized particularly for small and medium enterprises (SMEs) (Guarda et al., 2013) through improving decision support (Singh and Singh, 2013). Nowadays BI becomes an emerging trend in administering the decision making for conducting the changing environment (Isık et al., 2013), and learning to take opportunities emerging form changing circumstances (Guarda et al., 2013).

BI is an information system (IS) led application that integrates the process and technology to lead to the decision making for managers and end users (Miah, 2014). It plays a significant role in analysing the business environment and providing the decision making in achieving competitive advantages emerging from uncertain often changes within the environment (Burton et al., 2006, Isık et al., 2013). The current business environment is characterised with geopolitics and economic power (Lenssen et al., 2012), complexity of new information, free market trading, and high intensity of competition because of rapid acceleration of technological advancement (Chi et al., 2009). The growing rate of technological advancement amplified industrial revolution in the world (Orlikowski and Barley, 2001). Growing effects of information systems, new emergent in technology, rapid industrial revolution, and the globalization (Al-ma, 2013) cause business environment is progressively being more turbulent (Cavalcante et al., 2011), which is beyond the management capacity of SMEs. Newness in the business competition creates new opportunities and threats for businesses (Stodder, 2013), which become the issue of business survival and development. Taking opportunities and encountering unexpected threats open a challenge for SMEs. Therefore, reviewing and restructuring the business decision become on priority.

The decision making is an emerging trend for practical solution in conducting the changing environment (Chai et al., 2013). As BI is the decision making aid, SMEs require reconfiguring BI for new decision making in conducting new changes within the environment (Stodder, 2013). It is important to note that SMEs have not only begun using BI in improving decision support (Guarda et al., 2013), they occupy a big portion of BI users. For example, approximately 85 percent of BI user firms are SMEs in Southwest China (Zhi and Guixian, 2010). Precisely, it is evident that an appropriate level of BI application and SME's rigor position have significant effects in enhancing insights to each other. However, SMEs are characterised with limited capability that constrains new innovation of BI in businesses (Ponelis and Britz, 2011) although it is vital for new decision of SMEs.

From the viewpoint of interaction, BI and SMEs can be considered as two distinct entities. In analysing the above discussion, two limitations are apparent that BI may face lack of reconfiguration or new innovation due to SME's incapability and SMEs face difficulties to restructure decision making due to lack of BI reconfiguration. In effects, both entities fail to benefit each other, which confine integrated contribution to national economic development. Considering this issue, our study aims to identify the social reality view of relevant interaction between BI and SMEs that may enable them learn from each other for their individual development. We conducted a theoretical analysis for building a theoretical framework that

may represent an integrated view of previous studies relevant to this study context. Although research on theoretical link among BI and SMEs is vast to date (e.g. Grabova et al., 2010, Zhi and Guixian, 2010, Ponelis and Britz, 2011, Guarda et al., 2013, Ponis and Christou, 2013, Tarek and Adel, 2016), research on how BI and SMEs learn from each other, that produces new contribution into IS-led business domain, is sparse. Therefore, this study is entailed to generate new understanding on learning issue among BI and SMEs.

2. STUDY BACKGROUND

2.1. SMEs and decision environment

SMEs are defined as relatively small sized industries are (a) actively managed by their owners, (b) highly personalised, (c) largely local in their area of operations, and (d) largely dependent on internal sources of capital to finance their growth (Wiklund et al., 2009, Antlova, 2009, Faitira et al., 2012). SMEs have been recognized for their growing contributions to a country's economic development (Wiklund et al., 2009, Apulu et al., 2011). The steady and increasing contribution of SMEs can be seen "in providing income generating activities thus increase the rate of growth of real per capita income, balance income distribution and improve economic stability" (Nkwe, 2012, p.29). They have been taking a large portion of the world economic development since 1940s (Ionita, 2013). However, owners/managers of SMEs continuously face a range of issues related to unexpected changes within the environment (e.g. market competition, technological innovation, and business dynamisms), (Zainun Tuanmat and Smith, 2011, Cavalcante et al., 2011, Karanasios, 2011, Ponelis and Britz, 2011).

Rapidity of technological upgrading accumulate new competitors, market, new products, and new business policy in a large network. The fast rate of technological transition creates the source of uncertainty, global competition, and competitive intensity for businesses (Harraf et al., 2015). On the other hand, competitive intensity influences new emergent in the technological sector, while factors such as market competition, business policy and global partnership are interconnected (Roldan et al., 2014). In effect, changes in customer interests, market demands, pricing, and supply chain management are evident (Zainun Tuanmat and Smith, 2011, Cavalcante et al., 2011, Karanasios, 2011, Ponelis and Britz, 2011). Those changes offer both opportunities (such as flexibility, low cost networking, cost reduction, and rapid communication) (Guarda et al., 2013) and threates (e.g. information security threat, discontinuation of business order) (Trinh et al., 2012, Chen and Siau, 2012), which become the issue of business survivla and development of SMEs (Irjayanti and Azis, 2012). However, taking opportunities and encountering threats become a challeng for SMEs for adjusting businesses beyond those changes. Therefore, strategic decision making seems important that guides managers in this regard (Stodder, 2013).

The decision making is defined as the selection of action and method managers/organizations use to conduct the changing environment associated with speedy responsiveness (Guarda et al., 2013). It is an integrated process of determining business performance measurement, differentiating decision problems, assimilating information, forecasting business future, and planning actions toward the desired performance (Singh and Singh, 2013). For effectiveness of the decision making, it is important to understand the decision environment. Decision environment considers the source of decision problem, decision goals, and relevant resources (Chai et al., 2013). Therefore, businesses are

increasingly and largely depending on adequacy and accuracy of information supply chain (Keh et al., 2007). Indeed, information management appears important for the decision making in SMEs.

Information management refers to managing requiring information supply chain, its assimilation, and its conversion into a meaningful form to creates its usability (Polasky et al., 2011). Information management provides the substantial approach in satisfying organizations' information based needs (Doucek, 2015). Because, information management provides originating, collecting, storing, recording, analysing, synthesising, and transforming information, which generate knowledge relevant to the decision making (Guarda et al., 2013, Roldan et al., 2014). Information management integrates three application for three impacts such as technology infrastructure satisfies material based needs, information organization creates its usability, and information administration for its actual use into the decision making application (Rodionov and Tsvetkova, 2015). Although it has been recognized for the decision making effectiveness, the study raises a concern to conduct information management in businesses. Thus, IS-led application becomes on necessity that may provide a rigor of information management for and decision support (Wixom et al., 2014). As earlier stated that BI has been signified as IS-led corporate application (Richards et al., 2011) that incorporates both information management for and the decision making support (Guarda et al., 2013). Eventually, BI implementation becomes business imperative for playing two interrelated roles such information management and the decision making for change adaptation (Chen and Siau, 2012, Singh and Singh, 2013) in SMEs.

2.2. Role of BI

Business intelligence (BI) is defined as "the process of integration of data from disparate internal and external data sources, applying analysis tools and techniques to understand the information within the data, making decisions, and taking actions based on this gained insight" (Gangadharan and Swami, 2004, p.139). The importance of BI can be imagined by understanding the questions that why does BI continue retaining its top rating position and why have businesses not completed the implementation of BI-led application? (Bijker and Hart, 2013). Incorporation of information from disparate sources, message extraction from given information for and the decision making creates the value of BI application (Gangadharan and Swami, 2004, Dodson et al., 2008, Guarda et al., 2013). The above discussion represents that BI plays in significant role of a corporate performance management (Richards et al., 2011) by conducting information management and the decision making organizations need for conducting the changing environment.

With regards to the information management, new and complex information emerging from constantly occurring changes in the environment open a challenge for SMEs. Therefore, organizations require assimilating and processing information for detecting the degree of effects of those changes that may help organizations to take the dynamic decision (Guarda et al., 2013). BI has been proliferated due to its effective application for disseminating, assimilating, and processing information businesses use to sense issues related to the decision making (Singh and Singh, 2013). For substantiality of the decision making, BI as an IS led application provides the appropriate level of data accuracy and confidentiality of information (Brinkhues et al., 2014) which produces relevant knowledge. Knowledge presents about what has happened; what is happening and what could happen (Stodder, 2013). According to Olszak

and Ziemba (2006), knowledge provides foundation of the decision making in relation to what to be done and how. Indeed, BI has become evident as logical enabler of information management that is a key necessity of the decision making.

With regards to the decision making, BI creates the business value followed by customer cooperation, change adaptation, and speedy responsiveness to competitive requirements (Pourshahid et al., 2011). Furthermore, the decision making provides the cost deduction, flexibility of logistics, new technology adoption, business operation regulation (Harraf et al., 2015). Quality information becomes imperative for the quality decision (Ponelis and Britz, 2011, Citroen, 2011). Quality information emerges from a rigorous analysis between historical background and current environment (Ponelis and Britz, 2011, Citroen, 2011). Learning historical context and current situation provides the real source of knowledge extraction (Olszak and Ziemba, 2006). BI uses certain technologies (Singh and Singh, 2013) to integrate historical and current data recording, synthesises, data transformation into information, knowledge generation, and its exploitation into the decision making to improve the business potency (Gangadharan and Swami, 2004, Pourshahid et al., 2011). In essence, the discussion represents that BI becomes a leading factor of conducting the decision making associated with proper information management. The interrelation among BI, information management, and the decision making has been focussed with presenting the following figure.

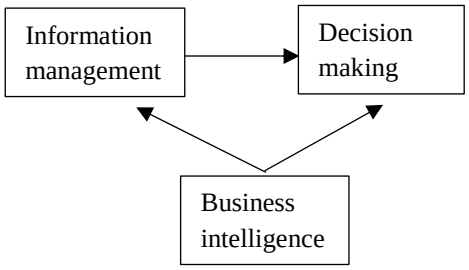

Figure 1. Role of BI

As shown in figure 1, information management and the decision making have been acknowledged as two key necessities for conducting the changing environment. BI enables information dispersion reduction, user interaction, easy access to information, information dissemination in timely manner, and the decision making in relation to change adaptation in businesses (Popovic et al., 2012, Guarda et al., 2013). Although BI appears the corporate conductor of both necessities, information management has influence on the decision making. Because, information management provides structured information for the decision making (Rodionov and Tsvetkova, 2015). Although BI provides SMEs the decision making aid, our study remains a concern how BI fits SMEs as same technological application does not fit all (Avgerou, 2008). Therefore, focussing the relation between BI and SMEs seems important.

2.3. Correlation between SME and BI

Wrong or poor decision may be threat of business survival and development (Shollo and Kautz, 2010). Therefore, BI discovers issues related to the decision making through managing information (Ponelis and Britz, 2011) and generates the quality decision (Guarda et al., 2013). However, it is not guaranteed that same BI is suitable for all industries (Isık et al.,

2013). Because, different businesses have different entities and different views of BI performance (Guarda et al., 2013). Thus, same BI is not suitable for SMEs as used in large industries. Because, disparate limitation such as number of employees, annual turnover, investment on IS, and return on investment are the criteria to consider the organizational entity of SMEs (Faitira et al., 2012). Precisely, BI formation needs to suits SME's organizational standard.

In analysis, BI provides the decision making aid SMEs require for conducting change adaption in businesses. Further, SMEs require new innovation or reformation of BI for requiring new decision in conducting new changes occur within the environment. In contrast, SMEs are weakened in terms of required capability for relevant BI implementation. It seems that SME's new decision depends on BI innovation and new innovation of BI depends on SME's relevant capability. Therefore, our study attempts to identify and explore an integrated view of IS literature in relation to how BI and SMEs learn from each other, which may contribute to the IS-led business development. Therefore, we conducted a literature review to derive contents relevant to this study context and create a thematic relation among those contents for identifying desired endpoint of this study.

3. METHODOLOGY

3.1. Study design

Structured literature review discovers the current state of research in the proposed research field and extent to which more research is needed (Webster and Watson, 2002). We therefore conduct a literature review that offers building a theoretical framework considering a correlation between BI and SMEs, which may contribute to strengthen individual insights of both entities. From this concept-centric literature review we aim to explore cooperative interaction of BI and SMEs and its integrated effects into IS-led business development. As our study conducts the content based analysis for understanding the social view of given contents in subjective manner rather than counting manner (Zhang and Wildemuth, 2016), the qualitative content analysis has been conducted for the procedure. Qualitative content analysis integrates thematic views of selected articles and proposes a theoretical framework based on thematic relation. Thus, we considered quality journal and conference databases for reviewing quality articles relevant to the study context.

3.2. Literature searching

"A complete review covers relevant literature on the topic and is not confined to one research methodology, one set of journals, or one geographic region" (Webster and Watson, 2002, p. XV). Therefore, the topic was screened on the top in searching relevant literature using electronic databases in the field. We tried to use key impactful journals (e.g. MIS quarterly, Information Systems Journal, Information & Management, Decision Support Systems, International Journal of Information Management, communications of the association for information systems, Business Intelligence Journal, Journal of Global Information Technology Management, International Journal of Operations & Production Management, International Journal of Business Information Systems, and so on) and conference proceedings (e.g. IEEE conference, ACIS, Scientific and Technical Information Processing, AMCIS, and AISel). As BI and SMEs are main area of our study, we started literature search using "BI AND SMEs"

as primary keyword. It is important to note that prior search offers a number of keyword for following searches (Smith et al., 2009). Therefore, our first search proposed a number of keywords such as change adaptation, capability, decision making, interactive relation, learning performance. We used these keywords for searching literature and a number of relevant literature was finally selected for data sources.

3.3. Literature selection procedure

Literature selection procedure has been conducted by considering insights of searched articles. The summary of article selection procedure has been presented into the following figure 2. Although a number of hits was taken to search relevant articles, 52 articles were downloaded from those hits. All downloaded articles were saved in an individual folder namely "BI and SMEs". Firstly, those articles were screened by conducting abstract review. After critically reviewed of all selected articles, 11 articles were excluded because of not matching exactly to our study context. Remaining 41 articles were primarily selected for the data source, which are closely related to desired findings. A combination of insights and bibliography list of selected articles proposed further search, which added more 2 articles into the pool. Finally, 41+2=43 articles were selected for the contribution to this study.

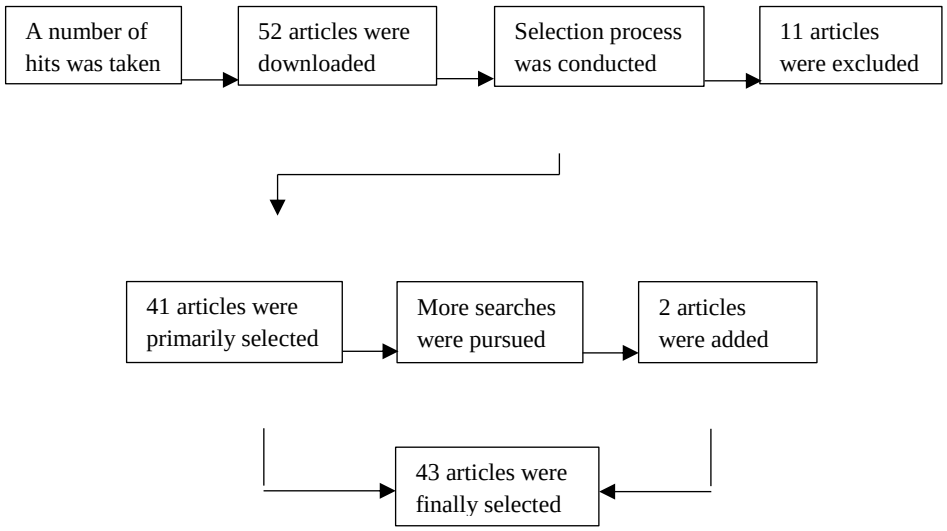

Figure 2. Literature selection process

3.4. Data analysis process

This paper has been guided by Orlikowski and Barley (2001) in terms of concept generation. Orlikowski and Barley (2001) focussed on epistemological relation between two distinct entities such as information technology (IT) and organization, which interact each other cooperatively. We hired this concept to identify epistemological relation between BI and SMEs as are two entities, which would benefit each other. BI owns merits with such as data warehousing, data mining, message extraction for decision support (Singh and Singh, 2013) and SMEs provide extent to which BI gains access (Grabova et al., 2010). As mentioned earlier that our study looks for how they can be cooperatively interacted that causes improvement of their individual insights and how this interaction causes new contribution into the IS-business

domain. Therefore, an integrative data analysis has been undertaken for extracting the current state of knowledge related to above-mentioned desired outcomes within selected sample articles (Smith et al., 2009). Although 43 articles were selected for review, 26 articles were finalized and reported into the following table for content analysis, which are matched through to remaining articles. Paper finalization for being reported was processed based on thematic relation.

Table 1. Literature related to the study context

Issues/Keywords	**Key findings**	**Sample references**
SMEs perspective.	• SME's contribution to socio-economic development. • Owner/manager's goals to SMEs success. • SMEs face issues related to business survival and development.	Nkwe (2012); Ionita (2013); Wiklund et al. (2009); Headd (2010); Yu and Ramanathan (2012).
Uncertain changes within environment.	• Technological advancement causes competitive environment.	Sook-Ling et al. (2015); Fitzgerald et al. (2014).
Change adaptation.	• It is required for attaining advantages of technological and environmental changes.	Baden-Fuller and Haefliger (2013).
Decision making for change adaptation.	• Importance of the decision making in change adaptation. • Decision making is an ongoing process because of constant changes.	Weaver et al. (2013), Ghattas et al. (2014); Trinh et al. (2012); BUSTOS and VICUÑA (2016); Engle et al. (2014).
Methodology of the decision making.	• BI is identified as an IS driven conductor of IM and DM.	Negash (2004); Citroen (2011); Chen et al. (2012); Isık et al. (2013); Guillemette et al. (2014).
Capability for BI success.	• Decision making depends on firm's required capability. • IS based (e.g. information management) capability becomes an issue of BI success.	Blome et al. (2013); Mithas et al. (2011); Brinkhues et al. (2014).
Routinization of BI application.	• Constant BI refining is important for routinizing data process for the decision making iteration.	Lyytinen et al. (2009); Tran et al. (2014); Wixom et al. (2014).
Entities learn from each other.	• Interaction between organizations and IS-led application (BI) that affects each other.	Orlikowski and Barley (2001); Baptista (2009); Anjariny et al. (2012).

As shown in table 1, contents of selected articles were reported for analysis inductively. This content analysis procedure was guided by Elo and Kyngäs (2008). By following Elo and Kyngäs (2008), we conducted open coding system, categorization, and abstraction for the findings. Data were coded based on thematic relation among given data. Subsequently coded themes were named as "unit of analysis" for interpretation. Individual theme or group of themes was used as the unit in qualitative approach rather than unit of words, sentence or paragraph are used in quantitative approach (Zhang and Wildemuth, 2016). Finally, units analysed has become abstraction was presented into categorization for findings of this study.

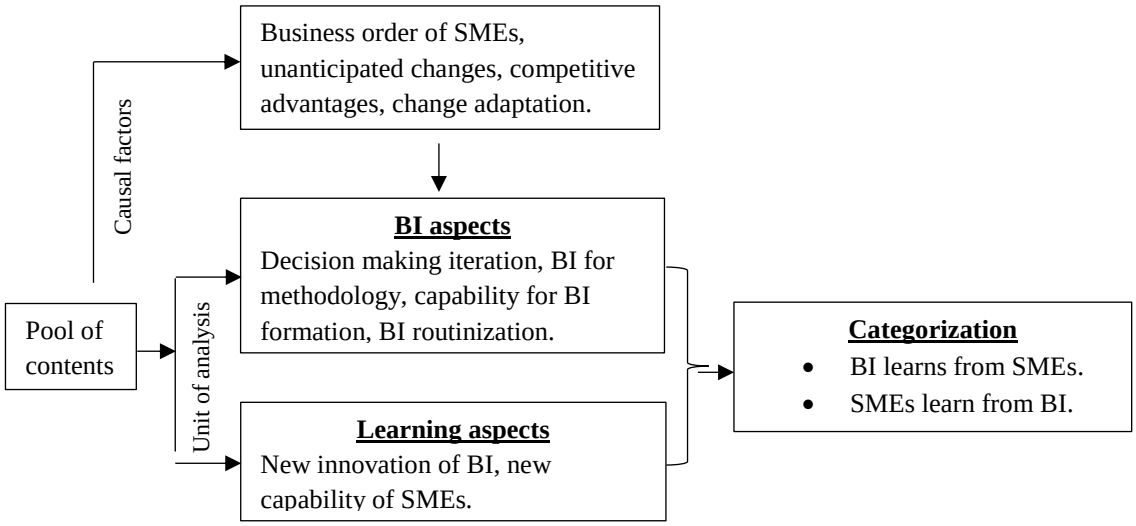

Figure 3: Data analysis and categorization

As shown in figure 3, given contents in table 1 have been presented into two sets such as causal factors and unit of analysis. Although the first set (causal factors) has not direct contribution to the data analysis, it has been reported into the above figure for focussing why BI is important for the decision making in SMEs. Second set (unit of analysis) represents coded themes derived from given contents, analysis of themes, and abstraction of analysed themes. The categorization represents the key findings of this study.

4. RESULTS

The set of causal factors describes integrated view of literature (such as Wiklund et al., 2009, Headd, 2010, Nkwe, 2012, Yu and Ramanathan, 2012, Trinh et al., 2012, Chen et al., 2012, Ionita, 2013, Baden-Fuller and Haefliger, 2013, Weaver et al., 2013, Ghattas et al., 2014, Fitzgerald et al., 2014, Sook-Ling et al., 2015) that effects of rapid technological advancement in and environmental changes constrain SMEs' growing contribution to the socio-economic development. Therefore, BI has been recognized as the business imperative for the decision making in conducting change adaptation in SMEs. Because, BI is the best conductor of information management for and the decision making (Negash, 2004, Citroen, 2011, Chen et al., 2012, Isık et al., 2013, Guillemette et al., 2014), which generates the business potency of SMEs (Guarda et. Al., 2013). However, how BI can be suggested for SMEs yet to address.

As discussed earlier that information management is the key necessity of the decision making and BI is the best conductor of information management (Citroen, 2011, Chen et al., 2012, Isık et al., 2013). Therefore, required capability relevant to information management seems vital (Mithas et al., 2011, Brinkhues et al., 2014) for BI implementation in SMEs. The components of information management are information management technology, information organization, and information administration (Rodionov and Tsvetkova, 2015). Although information infrastructure provides material based support, it cannot be used itself for creating the usability of given information. As a result, skilled personnel seems important for selecting and using relevant technology and producing meaningful use of given information into the decision making (Fink and Neumann, 2007). Finally, technological and skilled personnel based capabilities are suggested for information management capability that leads to BI implementation. As SMEs are characterised with less capability (discussed earlier), our study suggests information management capability for SMEs in terms of BI implementation.

Informaiton management capability depends on organizational capability (Brinkhues et al., 2014 cited from, Rumelt, 1991). Organisational capability is defined with combination of firm's insights (e.g. managerial skills, experiences, stability, and relevant attributes, which must be rare, inimitable, and non-substitutable so that they cannot be sold and transferable to others) (Barney, 1991), and organisations' tangible and intangible resource-based ability (e.g. computer, handheld device, internet) (Isık et al., 2013). Firm's resources also integrate other physical assets and regulatory. Although technological and personnel capabilities are two components of information management capability, firm's insights cover the aspect of personnel capability and firm's resources cover technological capability. Therefore, information management seems logical dependent construct of organizational capability. Organizational capability does not only provide businesses material and skill based support for proper information management (Brinkhues et al., 2014), it also allocates required support for BI implementation in businesses. The interrelation among organizational capability, information management capability, and BI implementation is presented into the figure below:

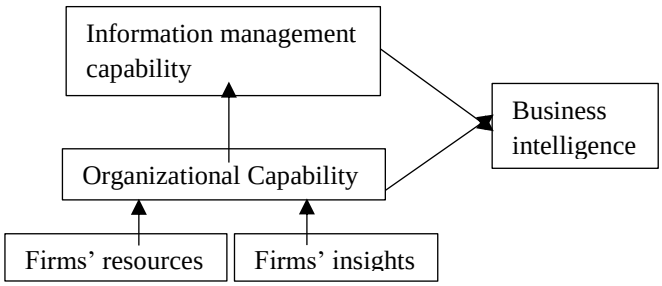

Figure 4: BI organization

Figure 4 represents antecedents are required for BI formation in the context of SMEs. Limited capability of SMEs causes the attention of identifying capability-centric requirements of BI implementation in businesses. From this point of view, information management capability and organizational capability have been identified as two constructs of BI

implementation. As organizational capability leads to both information management capability and BI implementation, it seems a leading antecedent of BI implementation in SMEs. It integrates firm's resources and insights. Although capability based antecedents have been identified for BI implementation in SMEs, how BI and SMEs learn from each other yet to discuss. It is important to note that BI implementation is an ongoing process (Guarda et al., 2013). Business environmnet is always dynamic (Rolfe, 2010), which requires constantly new decision for taking advantages emerging from the changing environemnt. New decision requires reconfiguration of BI in SMEs. Further, SMEs have limited capability in terms of BI implementation. Thus, "ongoing process of BI implementation" and "limitation of SMEs" have been considered as learning centric issues in our study.

4.1. What BI learns from SMEs

A permanent solution of BI implementation in SMEs cannot be hoped (Guarda et al., 2013). Because, constant changes within the environment is not static. As discussed earlier that current business environment is characterized with rapidity, consistency, uncertainty of changes in diverse instances. Continuous diverse changes (e.g. climate change, market competition, technological innovation, and business dynamisms) create newness in customer interests, market demands, competitive pressure, pricing and supply chain management (Zainun Tuanmat and Smith, 2011, Cavalcante et al., 2011, Karanasios, 2011, Ponelis and Britz, 2011). Complex and new information emerging from new changes necessitate new decision for conducting the changing environment. BI is the process of determining business performance measurement, differentiating business problems, integrating information, forecasting the business future, and making the required decision for conducting those changes (Singh and Singh, 2013). Thus, BI is an integrated decision support systems (DSS) that helps businesses in detecting, gathering, warehousing, mining, and analysing raw data (Isık et al., 2013) as well as transforming raw data into the meaningful information for the decision making aids (Guarda et al., 2013). As BI concerns with planning change adaptation in future, it is considered as an early warning system in businesses (Shollo and Kautz, 2010, Trinh et al., 2012). As new changes require new decision and BI is an integrated decision making aid, new decision offers new innovation of BI.

As same BI does not fit all (Guarda et al., 2013), same BI is not suitable for SMEs as used in large industries. SME is defined as smaller than large scale business often with an informal or simple organizational structure (Antlova, 2009). Thus, different entity of BI become on demand relevant to the entity of SMEs. It is evident that constant changing phenomena enforce SMEs to consider new decision making in businesses. Further, new decision requires pertinent formation of BI in SMEs. In essence, our findings explore that BI gains new innovation in terms of change adaptation in SMEs, which indicates BI learns from SMEs.

4.2. What SMEs learn from BI

Although BI has been identified as the best conductor of information management for and the decision making in SMEs, Ramayah and Omar (2010) raise concern about information quality. Because, the amount of information has never been important, quality information is rather for the decision making (Burton et al., 2006). Therefore, an appropriate level of information management that assists in producing quality information for the quality decision

(Mithas et al., 2011). Information management creates value of information infrastructure with its appropriate use in organizing and administering information into the decision making. In conducting information management and the decision making, BI integrates business skills, IS skills, and analytic skills (Burton et al., 2006). In this regard, information management capability and organizational capability have been suggest for BI success.

Although large industries have readiness of these constructs, the entity of SME is characterised with limited capability (Ponelis and Britz, 2011). SMEs still stay in inferior position of required skills and capabilities (Mathrani, 2014). Nevertheless, BI implementation becomes important for SMEs in order to conduct diverse changes, which affect business performance order. Therefore, these capabilities were suggested for BI implementation particularly in SME industries. Information management capability does not only provide SMEs the solution of information based needs, it also generates issue-based, quality, and reliable information for the decision making (Mithas et al., 2011). However, information management capability depends on organizational capability (Brinkhues et al., 2014).

As organizational capability is identified as the leading factor of information management in SMEs (Matthews, 2007, Low et al., 2011), it appears main construct of BI implementation for the decision making (Wei, 2010, Bijker and Hart, 2013, Brinkhues et al., 2014). Organisational capability allows SMEs to gain effort-free access to information (Burton et al., 2006). Further, organizations use relevant skills in conducting BI implementation. As organizational capability leads to both information management capability and BI implementation, it becomes a leading construct of BI implementation in SMEs. The discussion summarizes that the need of BI implementation enforces SMEs to adopt required capability (information management and organizational capabilities) in businesses. As requiring BI implementation strengthen SME's organizational structure, our findings suggest that SMEs learn from BI in terms of capability. In effects, their sharing contributions produce performance accumulation into the business environment. For example, SME's capability adoption facilitates BI implementation. BI implementation assists in taking the relevant decision, Strategic decision making enables SMEs meet changing requirements within the business environment (e.g. customer preferences, supply chain management, products and services, pricing, cost reduction). Eventually, SMEs and BI do not only affect each other in relation to their individual development, their cooperative relation generates positive impacts on business environmental performance.

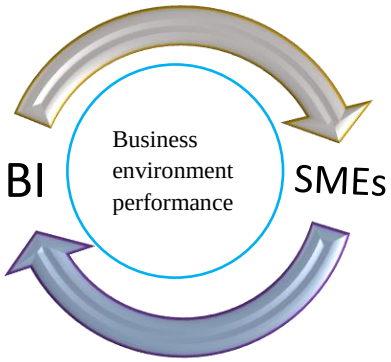

Figure 5: Integrated contribution of BI and SMEs

The contribution of this study has been summarized and presented into figure 5. It represents that our study identifies new decision for conducing new changes within the environment. New decision requires reformation of BI implementation. Reformation of BI generates new innovation. Therefore, new innovation of BI provides new contribution to the field of IS research and practices for business performance. On the other hand, SMEs need to adopt new capability for new innovation of BI. Capability adoption strengthen organizational structure of SMEs. Thus, adoption of capability in SMEs adds new inclusion into the business domain, which may provide significant impact on business development and national economic development. Finally, it is evident that both BI and SMEs learn from each other, which contributes to business environmental performance.

5. DISCUSSION AND CONCLUSION

The aim of this study was to explore an integrated view of previous studies through a theoretical analysis that how BI and SMEs interact each other, which may have positive effects in such as strengthening individual insights of them, improving business environmental performance, and new knowledge generation into the research field of IS. There are two issue were primarily considered in initiating this study. First, SMEs are characterised with disparate limitations, which constrain business hoped performance. Second, uncertain often environmental changes affect SMEs discontinue their business performance order. For new understanding of how SMEs can gain opportunities emerging from those changes offers a study. Therefore, this study has been entailed and attempted to review literature in relation to a theoretical outcomes in this regard.

Our literature review identifies that business owners/managers of SMEs are pursued to undertake new business policy because growing changes within the environment. Rapidity and consistency of new emergent in technology and its rapid effects in industrial revolution cause more turbulent within the current business environment. New and complex information because of technological sophistication creates new changes in such as customer preferences, products and services, supply chain management, business policy, and market strategy. Those uncertain often changes create diverse opportunities and threats, which become the issue of business survival and development of SMEs. However, change adaptation become a challenge for taking opportunities and encountering unexpected threats. Change adaptation necessitates reviewing and reshaping existing business decision that guides managers in conducting change adaption.

The decision making requires an appropriate level of information management. Therefore, two issues such as information management and the decision making have become on necessity for change adaptation. As BI provides corporate performance management (Richards et al., 2011), our study considered BI implementation in SMEs for conducting information management and the decision making. Therefore, information management capability has logically been recognized for BI implementation. As SMEs have diverse limitation in terms of required capability, our findings suggest attaining information management capability that integrates technological and personnel capabilities for BI implementation in SMEs. Further literature reviewed identified that information management capability depends on organizational capability that integrates firm's resources and insights.

From the above discussion, our study has learned that the need of BI implementation for change adaptation in businesses allows SMEs to learn in changing their organizational structure followed by adoption of required capability. Although SMEs learn for BI implementation for the decision making in terms of change adaptation, the consistency of changing phenomena remains a concern.

In order to conduct uncertain often changes, SMEs require new decision. As BI is the best conductor of the decision making, iterating the decision making necessitates the repetition of BI application. Therefore, reformation or new innovation of BI becomes imperative for iterating the decision to conduct occurring changes. Further, SMEs demand different formation of BI as same BI does fit all. In essence, the study has recognized two issues from literature analysed such as new decision for conducting new changes and organizational entity of SMEs, which raised the issue of new innovation of BI. As a result, BI learns from SMEs.

In addition, our study has also recognized that the interactive relation of BI and SMEs provides the source of learning aspect, which strengthens their individual position. The interactive learning process generates an integrated contribution to the business environmental performance. For example, SME's strong capability causes BI performance in iterating the decision making and new innovation of BI enhances SME's performance in conducting the decision making relevant to change adaptation. Eventually, business environment attains benefits from this interactive relation. In conclusion, our findings suggest enhancing relevant capability of SMEs and identifying appropriate application of BI for achieving competitive advantages emerging from constantly changing environment. Although what type of capability SMEs require has been discussed above, the application type of BI yet to focus. Therefore, further research is suggested in identifying relevant formation of BI application in terms of changes adaptation in businesses.

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