Abstract

Today’s business environment is characterized by fast and unexpected changes, many of which are driven by technological advancement. In such environment, the ability to respond effectively and adapt to the new requirements is not only desirable but essential to survive. Comprehensive and quick understanding of intricacies of market changes facilitates firm’s faster and better response. Two concepts contribute to the success of this scenario; organizational agility and business intelligence (BI). As of today, despite BI’s capabilities to foster organizational agility and consequently improve organizational performance, a clear link between BI and organizational agility has not been established. In this paper we argue that BI solutions have the potential to be facilitators for achieving agility. We aim at showing how BI capabilities can help achieve agility at operational, portfolio, and strategic levels.

Introduction

Business environment is experiencing an unprecedented volatility and doing business in this environment is becoming increasingly challenging. In these unpredictable and unstable environments, companies need certain capabilities to sustain and survive, such as foresight and responsiveness (Sambamurthy et al. 2003). Agile organizations can sense and respond to predictable and unpredictable events (Overby et al. 2006). Executives have already recognized the importance of agility to business success and are seeking instruments to implement the concept. One instrument that has potentials of becoming a major enabler of agility is business intelligence (BI). Fast analysis, rapid deployment, and real-time monitoring of events via portals and dashboards based on trusted and accurate information are features of holistic BI solutions, which could make agility achievable (Mohanty 2008).

Both agility and BI concepts have received a great deal of attention from scholars and practitioners. Good amount of work has been done to address the role of IT to achieve agility (Lee et al. 2015; Lu and Ramamurthy 2011; Sambamurthy et al. 2003). BI has been discussed as a strategic IT initiative to enhance firm performance (Baars and Kemper 2008; Chaudhuri et al. 2011). There has been an implicit recognition of the synergy between BI and agility; some see agility as enabler of BI and others consider BI having an impact on dynamic capabilities (Kokin et al. 2013; Sidorova and Torres 2014; Isik et al. 2013; Kretzer et al. 2014). Researchers have argued that accessibility of information, data-based decision making and enterprise-wide information sharing are key factors to provide early insight to business opportunities and disruptions (Baars and Kemper 2008; Chen and Siau 2011). Fast analysis and rapid deployment are mentioned to advance agility as well (Lu and Ramamurthy 2011; Mathiassen and Pries-Heje 2006). Mohanty (2008) asserts that the major difference between agile organizations and others is the ability to leverage the cumulative data to make informed decisions. Chen et al. (2011) lightly touched
upon the potential impact of BI on agility. Yet, using BI as a facilitator to achieve agility has drawn little attention and a strong argument mitigating the use of BI in order to realize agility has not been made in the relevant literature.

In this paper, we aim to theorize the role of BI capabilities as an enabler and a catalyst for achieving agility. We argue that the effective use of BI solutions and their relevant capabilities could achieve desired agility by enabling firms to sense and respond to changing business needs in a timely fashion. We have built upon existing research that identifies three levels of agility (Sull 2009) and have shown how business intelligence capabilities can help achieve agility at operational, portfolio, and strategic levels. The organization of the paper is as follows: the next section describes the conceptual bases of the study, i.e., organizational agility and BI, followed by demonstrating how to utilize BI capabilities towards an agile organization. We then conclude by summarizing our arguments, citing the limitations of the application of BI, and presenting the future directions of the current study.

**Conceptual Bases**

**Organizational Agility**

Organizational agility is the capacity to anticipate events and changes and responding to those new conditions appropriately and nimbly. It is also about detecting and seizing opportunities faster than the competition. An agile organization is capable of sensing and responding to changes quickly, is resourceful, and is able to adapt to the changing environment (Mathiassen and Pries-Heje 2006). Sull (2009) identifies three different types of agility: operational agility, portfolio agility, and strategic agility.

**Operational Agility:** Operational agility refers to the company’s ability to realize chances to improve internal operations and processes by reducing cost, improving product/service quality, and refining distribution processes (Sull 2009). Examples of companies that possess operational agility and have been successful are Toyota, FedEx, and Southwest Airlines. The success of operational agility depends upon a number of factors including ability to access and analyze internal data on-demand.

**Portfolio Agility:** Portfolio agility focuses more on recognizing and realizing new business opportunities with existing resources, such as cash, talent, and managerial attention. The goal is to reallocate resources from units with stagnating business to units that have growth potential (Sull 2009). This can be very challenging to achieve because it can disrupt the power balance within an organization. The realization of portfolio agility also depends on information readily available and the capability for fast and accurate analysis of internal and external data and information.

**Strategic Agility:** Strategic agility refers to the ability to detect and decisively seize a long-term opportunity; the game changers. Strategic agility often requires “…rapidly scaling up a new business, aggressively entering a new market, betting heavily on a new technology, or making significant investments in capacity” (Sull 2009, p. 83). Businesses constantly encounter short-term opportunities and act upon them to stay competitive, however the ability to adjust and adapt strategic direction in core business is vital for maintaining and creating value for the firm in the long run.

**Business Intelligence**

Business intelligence (BI) is perceived as a combination of human intelligence and machine intelligence, which primarily allows the accumulating of vast amount of data from various sources and turn them into information and knowledge, and eventually into actionable insights (Matsuda 1992). Although not a new concept, the relevance of BI is further emphasized as it continues to draw attention from business decision makers and Information Systems’ academics (Steininger et al. 2009).

Data entails raw facts, observations, or perceptions lacking context that are commonly generated by business events; transactions with or within the organization. It is the input for data warehouses or similar repositories. Information is data with context and meaning that can be input as well as the result of a business intelligence application. BI is now generally understood to embody integrated approaches to an IT-based management and decision support (Foley and Guillemette 2010).
Business Intelligence and Organizational Agility

A holistic BI comprises of BI capabilities supported by specific tools, which involve organizational memory, information integration, insight creation, and presentation (Sabherwal and Becerra-Fernandez 2011). Those capabilities can be seen as steps that in combination can provide information about the market, identify opportunities, or attain growth through partnerships.

**Organizational Memory:** The first capability is organizational memory that lays the foundation for the BI solution. It is the storage of information and knowledge that the organization has collected in the past. One of the most common tools for this capability is a data warehouse.

**Information Integration:** The second capability is information integration that assimilates and links structured and unstructured data from a variety of sources, such as internal databases and knowledge repositories. Tools that integrate unstructured data are text mining and web mining. Both of these tools atomically analyze large volumes of textual data and extract relevant information from it.

**Insight Creation:** The third capability is insight creation that enables the organization to understand past events and make predictions about the future. Data mining tools provide in-depth analysis of data with the purpose of building predictive models and answering questions. In addition, web analytics examine how users interact and navigate on a company’s website with the help of click stream data (Chaudhuri et al. 2011)

**Presentation Capability:** The last capability is presentation capability that displays these insights in different ways to make them easy to grasp and to utilize. Online Analytical Processing, for example, supports multidimensional data views and allows users to aggregate, filter, drill down, and pivot the data. Dashboards allow users to customize the information they would like to monitor and facilitate display (Chaudhuri et al. 2011). According to Sabherwal and Becerra-Fernandez (2011), these four BI capabilities are distinct and at the same time they are mutually synergistic in nature.

**Theoretical Development: BI Capabilities as Facilitators for Agility**

There are positive relationships among information technology (IT) capabilities, organizational agility, and productivity (Lu and Ramamurthy, 2011; Tambe and Hitt, 2012). IT capabilities can enable organizational agility by helping organizations build attributes necessary for agility in general, namely responsiveness, adaptability, and speed (Lee et al, 2015). Based on prior research, we argue that the BI capabilities abovementioned enable organizations to achieve the three particular types of agility: operational, portfolio, and strategic agility, thus leading to their short-term and long-term performance. Figure 1 shows our research framework.

![Figure 1. Research Framework of BI Capabilities and Agility](image)

**Enabling Operational Agility**

Operational agility improves internal processes and operations. The organizational memory capability of a BI solution captures data within an organization to be processed. This includes the documentation of internal processes. With the help of text mining, users are able to compare processes across the enterprise and detect differences. Based on performance data, managers can then assess which of the process
versions is the most efficient or effective leading to process refinements through implementing a best practice process. Another area of BI enabling operational agility is the monitoring of key performance indicators with dashboards or scorecards. BI tools cannot perform operational improvements, but they can initiate the effort by pointing out deviations and tracking developments. In addition, BI also helps businesses take advantage of synergies with technologies, such as RFID technologies. Costs can be reduced if distribution is shared and goods can be tracked and redirected as needed.

**Enabling Portfolio Agility**

The decisive factor in achieving portfolio agility is to distinguish stagnating business units from units with growth opportunities. Enterprise resource systems and other data repositories hold current and historical data which can be used to visualize trends. These can illustrate the R&D activity of a segment, its sales numbers, its costs and other factors over time. Declining R&D activity and sales paired with increasing costs can indicate a declining segment.

BI tools can also perform macro data collection and analysis with environmental scanning. Results can indicate shifts in the industry or the emergence of new standards in terms of technology or regulations. This can identify segments that might become obsolete or rather gain more importance in the future. Furthermore, external market data combined with internal customer information can be analyzed with data mining techniques. This can reveal unforeseen patterns, such as new preferences or tastes. If the company has the ability to meet those new demands, it can then invest more funds, talent and attention into those segments.

BI can neither overcome political obstacles nor ensure central control over resources. However, it can provide decision makers with the information and insights supporting the most promising course of action.

**Enabling Strategic Agility**

Strategic agility is the ability to seize that rare game changing opportunity by reacting quickly. In order to achieve this type of agility, organizations need to have networks with suppliers in place that provide them with the necessary flexibility. However, the risk of failure is high since large initial investments need to be made. Therefore, the organization has to be certain of the potential of the opportunity. BI can provide organizations with this kind of insight. Due to visualization capabilities, executives are able to assess the firm's financial situation and other resources at one glance. The information is timely and reliable. Thus, they can make their decisions based on the most relevant facts.

In addition, BI enables a firm to share insights with external parties, such as suppliers, in order to make collaborative decisions for its strategic movements. Suppliers are critical for seizing golden opportunities quickly. To ensure their support, the company has to supply them with relevant and timely information about anticipated changes. BI is instrumental in expediting the channel of communication between the business and its suppliers.

**Conclusion and Future Directions**

BI increases responsiveness by providing real-time information, visualization, and flexible analysis capabilities. It can help organizations anticipate trends and changes and empower users. BI also augments adaptability by providing reliable and actionable insights. To optimize benefits, BI solutions have to be aligned with the organization’s goals and deployed properly. In addition, the structure of the organization needs to allow data-driven decision making. Otherwise, the results extracted from BI solutions will not make a difference and the organization will resist the suggested course of action.

Through this study (as a research-in-progress), we have preliminary theorized the link between BI capabilities and organizational agility. Our theoretical perspective should be further developed and validated through our on-going research. First, the link between BI capabilities and agility will be further specified. In particular, our on-going research aims to investigate how the four BI capabilities enable the three types of agility. Second, the proposed relationships will be validated using quantitative data that can be obtained through a large-scale field survey at the organization level. By utilizing secondary performance data of the sample firms, we also plan to examine the direct and indirect impacts of BI...
capabilities on firm performance. In addition, a qualitative research approach, i.e., a multiple-case study, could also be useful to our on-going research. In particular, a qualitative comparison of firms having different levels of BI capabilities would provide deeper understanding of how the BI capabilities can lead to specific types of agility through internal capability-building processes within a firm. The findings through our on-going research will benefit both academics and practitioners who are interested in the strategic value of BI.

REFERENCES


