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HYPOTHESES

RESEARCH METHODOLOGY

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FINDINGS

RECOMMENDATIONS/SUGGESTIONS

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, KurukshetraUniversity, Kurukshetra.

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AGILE BUSINESS INTELLIGENCE FOR AGILE DECISION-MAKING

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ABSTRACT

The ability to respond to changes quickly is critical for an organization in the face of ever changing environment. There is a greater need for speed of decision-making and action as the pace of change has reached new heights. Agility in decision making drives organizational agility. Business Intelligence (BI) is a set of tools and methods, which enables organizations to make fact-based decision-making in an effective way. But traditional BI falls short of meeting the agile needs of the business users and hence emerged the new concept called "Agile BI". Agile BI intends to cater to the ever changing information requirements of the users as well as enable the users to take faster decisions in a volatile environment. The paper explores the concept of agility both in general and with respect to information systems development as a precursor to discussing Agile BI. Arguments for its need are highlighted and issues are identified. A checklist of desirable features for Agile BI solutions is provided and future directions are presented.

KEYWORDS
agility, agile information systems, Business Intelligence, decision-making, enterprise agility.

INTRODUCTION

Change is the only constant –Heraclitus"

The pace of change in today's environment has reached new heights and the organizations are forced to be agile in their operations in order to be successful.

The Merriam-Webster dictionary defines "agility" as "the quality of being agile" where the meaning of agile is given as "marked by ready ability to move with quick grace; having a quick resourceful and adaptable character".

However, agility has been defined in many different ways by researchers and industry analysts. "Agility is a business-wide capability that embraces organizational structures, information systems, logistics processes and, in particular, mindsets" (Christopher, 2000). It can be defined as "the continual readiness of an entity to rapidly or inherently, proactively or reactively, embrace change, through high quality, simplistic, economical components and relationships with the environment" (Conboy & Fitzgerald, 2004).

The term 'agile' was first used in 1991, describing a capability needed in modern manufacturing (Litsikas, 1997) and ever since has become popular in the manufacturing area and later extended to supply chain discipline. Agile manufacturing has its origins in flexible manufacturing system and lean manufacturing and can be thought of as the combination of these two. (Sarkis, 2001).

In fact, flexibility and leanness are the underlying concepts of agility. While flexibility refers to the ability to adapt to change, leanness implies elimination of waste and doing more with less (Conboy & Fitzgerald, 2004). A distinction is also made between leanness and agility. Where lean operations are usually associated with efficient use of resources, agile operations are related to effectively responding to a changing environment while at the same time being productive (Mathiassen & Pries-Heje, 2006). Speed is the corollary feature of agility in that quick response to change is imperative. Agility is a strategic response and a holistic concept and implies much more than speed and flexibility (Kidd, 1996). Speed alone, at the cost of focus and clarity, will only result in many flawed decisions and at the same time being too flexible or agile could make you lose sight of your core business and mission (Gandossy, 2003).

AGILITY IN INFORMATION SYSTEM DEVELOPMENT

Attempts to apply agile principles to other areas like marketing, selling, human resources have also been made (Poolton et.al, 2006; Chonko & Jones, 2005; Joroff et.al, 2003). The agile concept was introduced to the software development field in 2001 in the form of Agile Manifesto (Beck et.al, 2001) put forth by Agile Alliance, which values

- "Individuals and interactions over processes and tools.
- Working software over comprehensive documentation.
- Customer collaboration over contract negotiation.
- Responding to change over following a plan."

This has resulted in a rise in popularity of the agile philosophy in the software development field.

Several surveys of agile methods since 2003 have proved the benefits of agile methodology in terms of productivity, quality, job satisfaction, communication and, learning (Rico, 2008). With the advent of agile methodology, the failure rate of software projects has dramatically reduced over the years. Reported failure rates shrank 20% to 15%, and in cases where agile was used for everything, to close to 0% (Kernochan, 2011, "b"). These results seem to imply that agile software methodology is the wonder solution to all the project delays and failures. But there is no universally accepted definition of an agile method in the field of Information Systems Development and the reason for lack of general agreement is that there is an absence of management theory and philosophy grounding in the principles of agility expressed in the Agile Manifesto (Conboy & Fitzgerald, 2004). The manifesto draws more cynicism with regard to its emphasis on the items on right at the cost of the items on the left. While the items on the right are essential, those on the left serve only as easy excuses for hackers to produce code irresponsibly without any regard for engineering discipline (Ratikin, 2001). There is thus an immense need to apply agile methodology judiciously.

BUSINESS AGILITY

However, in order to leverage the agility concept to the maximum, it should not be confined to a particular functional area or stream within an organization but rather view it as a wholesome approach which enables business agility. Business agility is an organization's ability to rapidly respond to changing business or market conditions (Dove, 2005). Agile enterprise is one which is able to both manage and apply knowledge effectively, and in order to derive the maximum value from either of these capabilities, they must be in balance (Dove, 1999). Considering the fact that agility is basically about improving the cycle time for managerial action, three emerging prerequisites for corporate agility are (Prahalad et.al, 2005):

- "Access to information in context
- Capacity to create new knowledge and insights
- Resource reconfiguration"

This brings attention to the role of information systems in achieving business agility. Agile information systems are intended to enable agile enterprises. The desired characteristics of agile information systems reach far beyond the traditional information systems to truly enable agile decision making (Rouse, 2007).

AGILE DECISION MAKING

Agile decision making is a process aimed at achieving and exploiting agility. Helmuth Von Moltke, a German field marshal who is regarded as the one of the greatest strategists of the latter 19th century had an intuitive understanding of such concept when he said "the problem is to discover the situation in spite of the fog of uncertainty; to evaluate correctly what is known and to estimate what is unknown; to reach a decision quickly, and then carry it out powerfully and unhesitatingly." (Lovatt, 1986).

Agile decision making is being understood in two ways:

- Decision making in agile development environments
- Agility in the decision making process.

While the former perception is narrow in scope, it is being much discussed and studied by agile experts (Zannier, 2006). Given the decentralized and collaborative environment in which software deliverables are dished out regularly in a fast pace with little effort towards documentation, decision making concerning the design, resource management, and the like requires new approaches.

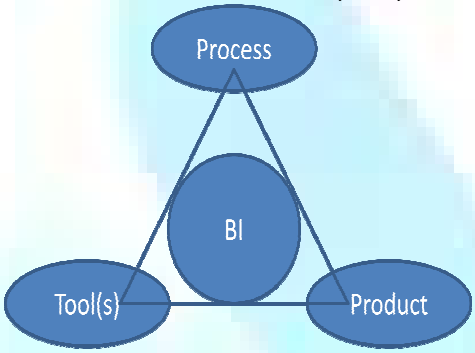
Far more sensible view is that applicable to the whole decision making process (es) in an organization. The Observe-Orient-Decide-Act loop concept developed by US Air Force pilot Colonel John Boyd, when applied to business requires one to see change signals, interpret the signals, formulate an appropriate response and execute the selected response (Haeckel & Nolan 1993). When changes occur in the business environment, enterprises that can complete OODA loops faster than competitors improve their ability to survive (Houghton et.al, 2007). Analyzing the decision making cycle in OODA terms can help organizations become more agile and gain competitive advantage.

Agility in decision making primarily calls for speed in the process of decision making. This requires the availability of the necessary facts and information for the decision makers in the shortest time possible. People need to be empowered to make decisions at the lowest practical level. Decision latency, so far commonly accepted as normal or even inevitable, is no longer admissible for organizations intent to achieve agility.

BUSINESS INTELLIGENCE

Before delving into what the term Agile Business Intelligence implies, let us first look briefly into what constitutes Business Intelligence (BI). The term was first coined by Howard Dresner of Gartner Group in 1989 and has become popular since the 90s (Ou & Peng, 2006). There are different perspectives from which BI can be viewed. It can be thought of as a process, a tool(s) or a product (Fig.1).

FIG. 1: BUSINESS INTELLIGENCE AS A PROCESS, TOOL, AND PRODUCT



BI is the process of collection, treatment and diffusion of information with the objective of reducing uncertainty in the strategic decision-making (defined by Revelli, 1998, cited by Zeng et.al, 2006).

BI is a term that collectively defines technologies and/or applications that generate and distribute dimensional analytics about a given segment of an enterprise (Barbusinski, 2002).

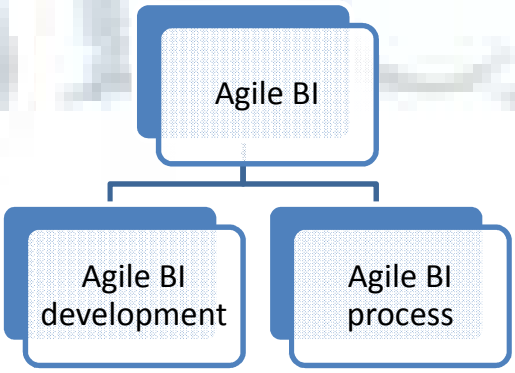
The resultant insight of the above mentioned process can also be thought of as Business Intelligence. BI is the result of in-depth analysis of detailed business data (Gangadharan & Swamy, 2004). It is what one gets out of the process enabled by a myriad of technologies.' BI as a product' perspective is not the most popular one in use though and hence a comprehensive definition of BI as given by The Data Warehousing Institute, a provider of education and training in the data warehouse and BI industry, is

"The processes, technologies, and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business action. Business Intelligence encompasses data warehousing, business analytic tools, and content/knowledge management." (Loshin, 2003, p6)

AGILE BUSINESS INTELLIGENCE (AGILE BI)

At the outset, there is no clarity about what exactly Agile BI means. Two different interpretations of this term can be perceived. One is the application of agile principles to the BI development/implementation projects. The other interpretation of the term Agile BI calls for agility in the process of business intelligence. These two perceptions arise out of two perspectives of BI – BI as a process and BI as a tool (Fig.2).

FIG.2: INTERPRETATIONS OF AGILE BUSINESS INTELLIGENCE



From the development perspective, an agile overall BI process involves three new characteristics (Kernochan, 2011, "a"):

- "It incorporates frequent input from the end user and from the environment;
- It "spirals in on" upgraded solutions, endlessly;

- It emphasizes integration with agile development and innovation."

As business intelligence has become a decision-making tool of great importance to organizations, developing it in agile way makes all the more sense due to the inherent nature of decision support systems (DSS). DSS must evolve or grow to reach a "final" design because no one can predict or anticipate in advance what is required (Sprague & Carlson, 1982).

There are other reasons which emphasize the need for Agile BI though.

The enormous magnitude and diversity of data, people, places, and change pose great challenges, which the traditional BI hasn't solved. There is a pressing need for companies to answer their business questions quickly in a changing world, which calls for agility in business intelligence. (Sonderegger, 2011).

According to Gartner, 70 to 80 percent of business intelligence projects fail. The solution could be a more agile development process — and organization (Kernochan, 2011, "b"). This is an alarmingly high rate of failure which needs to be addressed without any delay. BI projects are similar to any other general software projects and hence agile principles of the Manifesto can be used for their development to deliver better results.

Agile development actually leads to increased business agility. Using agile methodologies within IT reduces BI project failure and thereby increases the pace of introduction of effective new analyses that allow the enterprise to respond to a rapidly changing environment. It also results in instilling a culture of agility in the business users throughout the organization. (Kernochan, 2011, "b").

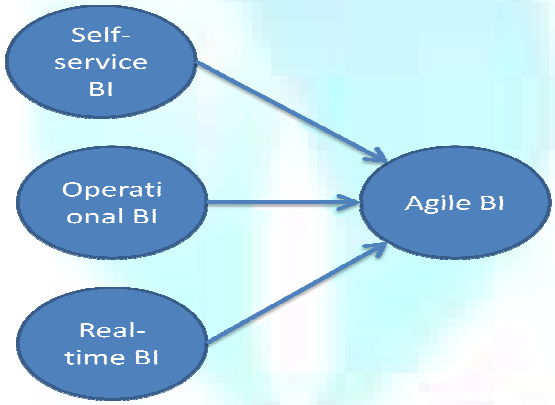
The assumption that more information yields better decisions forms the basis for traditional BI, which works well for highly routine decisions made in mature, stable environments but results in failure in other cases. In contrast, Agile BI focuses on the requirements of the decisions being made, instead of setting out to amass all available data. New data source requirements may emerge as the decision model changes and the information so far deemed as critical may fade in significance. BI must be able to quickly integrate and disintegrate this information for the decision maker in order to be agile (LogiXML, 2011).

The traditional view of BI calls for a single version of truth – the enterprise data to be stored in one place, most likely a data warehouse on the top of which suitable query, reporting and analytical tools are put in place to churn out insights. More often than not, traditional BI is falling short of meeting the information needs of the users in a timely manner. Apart from a few power users, others are required to rely on the IT department for their needs, which results in the inevitable delay in getting what they need. This can be attributed to the specialized skills needed to use the BI systems and also the inflexibility of BI systems to reach a wider pool of users. Though canned reports, dashboards and scorecards cater to the regular information needs, they fail to enable the users to perform further ad-hoc analysis on their own. This shortcoming has given rise to the new phenomenon called "Self-service BI", which aims to empower the users with the ability to access enterprise data and perform their own analyses without having to request IT for the same. In fact, self-service BI is being adopted as the most common strategy for achieving agility (Fig.3) (White & Castellina, 2011).

Self-service BI is defined as the "facilities within the BI environment that enable BI users to become more self-reliant and less dependent on the IT organization" (Imhoff & White, 2011). Traditional BI is also being complemented by tools that provide much more visual and interactive user experience in an attempt to be more agile (White, 2011).

The decision latency inherent in traditional BI has led to the emergence of two other related concepts – Operational BI and Real-time BI. Operational BI views BI functionalities as daily operational transactions and thus involves a large number of decisions in contrast to traditional BI, which caters to strategic and tactical decision making where the decision-making cycle may span a time period of several weeks or months (Sandu, 2008). Real-time BI works on data that is extracted from operational data sources with zero latency, and provides means to propagate actions back into business processes in real-time (Azvine et.al, 2005). In fact, Operational BI evolves into Real-time BI (Sandu, 2008). It is evident that both Operational BI and Real-time BI improve the agility of the enterprise in that they enable faster decision making (Fig.3).

FIG.3: VARIANTS OF BI CONTRIBUTING TO AGILITY



Traditional or current BI is not designed for change. Once in place, it is extremely difficult to incorporate the changes that would inevitably occur in and around the organization. Needless to emphasize, this poses a serious problem in today's rapidly changing environment. Agile BI enables capabilities to be added, changed, or removed without the need to completely re-architect the entire system, thus providing agility to the business (LogiXML, 2011).

There is a fundamental difference between what changes mean in traditional BI and Agile BI. While change in traditional BI involves evolution of previous insights, change in Agile BI implies altering BI processes and solutions constantly to fit the evolving information and decision needs (Kernochan, 2011, "a").

ISSUES

Nevertheless, Agile BI comes with its own issues. By definition, agility requires an enterprise to take a quick decision or action in response to a change in the environment and this usually involves a quick fix. An agile decision expects only to gain limited control over short term situations about which it has relative certainty. Thus, to be agile, deciding must accept choices that involve risks (Lovatt, 1986).

Agility in BI implies that there is no single version of truth anymore, which poses as a threat to the whole BI concept. But in the light of the ongoing debate on whether such a thing exists and whether it is really needed (Bloor, 2010; Jonas, 2006; Chisholm, 2006; Harris, 2010), the absence of a single version of truth doesn't seem so blasphemous. However, the resulting decentralization should not impede the efforts of IT towards achieving data governance[1]. Agile BI methods applied in the framework of BI strategy and governance can help in getting a grip on the situation (Busch, 2011).

AGILE BI SOLUTIONS

Many vendors are catching up with this new phenomenon and are offering solutions with the agile tag. Notable among them are Endeca (acquired by Oracle recently), Tableau and Oryx from Accountagility (Norris, 2011).

[1] As defined by the Data Governance Institute, Data Governance is a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods.

Endeca Latitude is an enterprise BI platform, which provides interactive analytic applications without the constraints of pre-determined drill paths and supports any type of data including structured, unstructured and semi-structured. It also enables fast enterprise data integration by very quickly and painlessly bringing together data sets of all sizes including data from multiple sources. Above all, it allows for IT governance. It allows IT to centrally manage security and data quality (Joseph, 2011).

However, Oryx is only a desktop BI tool. It provides a reliable and robust way for business users to address their information needs and seek out answers to their questions by themselves. It is seen as a valuable addition to the standard BI toolkit rather than a complete replacement (Norris, 2011). Oryx provides on demand analysis, high performance, agility and process automation whilst delivering unrelenting control to the user (Accountagility, 2011).

Tableau is a web browser based visual BI platform which supports huge data and varied data sources and enables easy integration. It offers self-service and collaboration capabilities to its users. Moreover, it provides data visualization capabilities for better analysis of information (Tableau, 2011).

From the above discussion, it is clear that Agile BI solutions should possess certain unique features to enable faster information access and decision-making.

Checklist of essential features of Agile BI:

- Easy interactive interface to enable business users to retrieve and analyze information without IT intervention (data visualization capabilities also help)
- Ability to support all types of data – structured, semi-structured, unstructured
- Ability to integrate with any and all types of data sources on the fly
- Provide In-memory-analytics[2] for better query performance and fast analysis
- Enable IT governance
- Facilitate collaboration

LOOKING AHEAD

Today's competitive world with its accelerating pace of change compels the organizations to be agile. Agility involves not only being capable of identifying opportunities but also be able to deploy assets and resources to react faster than competition and seize the available opportunities. (Lui & Piccoli, 2007). An agile information system is a key enabler of enterprise agility by facilitating faster fact-based decision making. Agile BI is the new approach to legacy BI, which transforms the way information, is consumed throughout the organization. Agile BI promises to overcome the shortcomings of traditional BI in achieving the goal of "right information at the right time to the right person".

One should approach Agile BI not as doing things faster or simpler but as how BI helps in making the organization agile. In addition to focusing on improving the ability of the organization to respond proactively and reactively, real agile BI should focus on improving the ability of BI process to change direction in response to both user needs and environmental changes. Agile BI is far more than a delivery process; it is a way of thinking about every BI process, as well as BI's effects on the business as a whole (Kernochan, 2011, "a").

Even as Agile BI is envisaged as the new avenue for achieving competitive advantage, confusion exists among industry experts and analysts as to what it exactly implies and how to go about attaining it (Aucoin, 2010). More work needs to be done in the following directions:

- Obtaining more clarity about the concept
- Formulating a comprehensive definition
- Developing standard Agile BI processes

Agility in BI must be approached from both ways – BI development and BI usage, in order to derive the maximum benefit. Technology platforms that combine these two capabilities will be the need of tomorrow. Accordingly, more robust Agile BI tools, which offer an integrated solution to achieve agility, are required. Also, the implications of agile BI in terms of decentralization, kind of workforce needed; and its impact on other business functions needs to be properly comprehended.

Agility is a cultural concept and in order to be agile, the organization must think agile. Doing Agile BI is thus more than having the right technology in place.

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[2] In-memory analytics is an approach to querying data when it resides in a computer's random access memory (RAM), as opposed to querying data that is stored on physical disks. This results in vastly shortened query response times, allowing business intelligence (BI} and analytic applications to support faster business decisions. (Source: http://searchbusinessanalytics.techtarget.com/definition/in-memory-analytics)

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