Chapter 4
ASD-BI:
An Agile Methodology for Effective Integration of Data Mining in Business Intelligence Systems

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ABSTRACT

ASD-BI is an agile "marriage" between business intelligence and data mining. It is one of the first attempts to apply an Adaptive Software Development (ASD) agile method to business intelligence systems. The ASD-BI methodology's main characteristics are adaptive to environment changes, enhance knowledge capturing and sharing, and help in implementing and achieving an organization's strategy. The focus of the chapter is to demonstrate how agile methods would enhance the integration of data mining in business intelligence systems. The chapter presents ASD-BI main characteristics and provides two case studies, one on higher education and the other on (Bibliomining). The main result of the chapter is that applying agile methodologies for integrating business intelligence and data mining systems would increase transfer of tacit knowledge and raise the strategic dimension of using the knowledge discovery process.

INTRODUCTION

Business Intelligence (BI) is becoming an important IT framework that can help organizations in managing, developing and communicating their intangible assets such as information and knowledge. Thus, we can consider it as an imperative framework in the current knowledge-based economy arena. (Alnoukari, 2012).

Many researchers consider business intelligence as the best environment for 'marrying' between business knowledge and data mining, which could provide good results (Anand, Bell, & Hughes, 1995; Cody, Kreulen, Krishna, & Spangler, 2002; Weiss, Buckley, Kapoor, & Damgaard, 2003; Graco, Semenova, & Dubossarsky, 2007).

Business Intelligence is an umbrella term that combines architectures, tools, databases, applications, practices, and methodologies (Turban, Aronson, Liang, & Sharda, 2007), (Cody, Kreulen, Krishna, & Spangler, 2002). Weiss considers BI as the integration of data mining, data warehousing,

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knowledge management, and traditional decision support systems (Weiss, Buckley, Kapoor, & Damgaard, 2003).

According to Stevan Dedijer (to many considered as the father of BI), knowledge management emerged in part from thinking of the "intelligence approach" to business. Dedijer thinks that "Intelligence" is more descriptive than knowledge. He considers knowledge to be static, whereas intelligence is dynamic (Marren, 2004).

The main complex part in any business intelligence system is in its intelligence abilities. This is mainly found in the post of data mining phase, where the system has to interpret its data mining results using a visual environment (Alnoukari, 2012). The measure of any business intelligence solution is its ability to derive knowledge from data. The challenge is to meet with the ability to identify patterns, trends, rules, and relationships from volumes of information, which is too large to be processed by human analysis alone.

In summary, business intelligence is the use of all the organization's resources: data, applications, people and processes in order to increase its knowledge, implement and achieve its strategy, and adapt to the environment's dynamism (Alnoukari, Alzoabi, & Hanna, 2008).

Business intelligence systems are mainly characterized by flexibility and adaptability, which traditional process modeling is not able to deal with. Traditional process modeling requires a lot of documentations and reports, this causes traditional methodology to not be able to fulfill dynamic requirement changes in our high-speed, high-change environment (Gersten, Wirth, & Arndt, 2000).

Agile methodology - which means adaptable, not rigid (Keith, 2006) - is based on the following idea: a team can be more effective in responding to change if it can enhance the information flow between members of the team, and reduce the time between taking decision and seeing the consequences of that decision. Enhancing information flow within the development team can be done by creating a community of practices, where the team members can share ideas and knowledge. Reducing the time between taking a decision, and seeing the feedback requires the involvement of expert users within the development team in order to get rapid feedback of developers design choices. Thus, agile process requires responsive people and organizations. Agile people will not be able to work in the rigid organizations, and vice-versa (Cockburn & Highsmith, 2001). Agile processes, unlike traditional ones, "focus more on people interactions and code development rather than on documentation and planning" (Keith, 2006).

Agile modeling has many process centric software management methods, such as: Adaptive Software Development (ASD), Extreme Programming (XP), Lean Development, SCRUM, and Crystal Light methods. Agile shares the same properties by focusing on people, results, minimal methods, and maximum collaboration. All agile methodologies are able to gear with high-speed high change environments (Highsmith, 2000).

The most widely used methodology when applying data mining processes is named "CRISP-DM" (Shearer, 2000; Hofmann, 2003). It was one of the first attempts towards standardizing data mining process modeling (Shearer, 2000). CRISP-DM is one of the traditional Knowledge Discovery Process (KDP) approach, other categorizations suggested by Alnoukari include Ontology-based KDP, Web-based KDP and Agile-based KDP (Alnoukari, 2012).

The main contribution of this chapter is to demonstrate how agile methods would enhance the integration of data mining in business intelligence systems. The chapter will start by providing an overview on the evolution of the business intelligence and data mining concepts. Then, it will provide a brief description about ASD agile methodology and the evolution of agile business intelligence. Then, ASD-BI methodology will be presented and described in details. Finally, this chapter will describe two case studies. The first one in the domain of University Information