Chapter XXI
Business Process Intelligence

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ABSTRACT

Business Process Intelligence (BPI) is an emerging area that is getting increasingly popular for enterprises. The need to improve business process efficiency, to react quickly to changes and to meet regulatory compliance is among the main drivers for BPI. BPI refers to the application of Business Intelligence techniques to business processes and comprises a large range of application areas spanning from process monitoring and analysis to process discovery, conformance checking, prediction and optimization. This chapter provides an introductory overview of BPI and its application areas and delivers an understanding of how to apply BPI in one's own setting. In particular, it shows how process mining techniques such as process discovery and conformance checking can be used to support process modeling and process redesign. In addition, it illustrates how processes can be improved and optimized over time using analytics for explanation, prediction, optimization and what-if-analysis. Throughout the chapter, a strong emphasis is given to describe tools that use these techniques to support BPI. Finally, major challenges for applying BPI in practice and future trends are discussed.

1. INTRODUCTION

Business Process Intelligence (BPI) refers to the application of Business Intelligence (BI) techniques to business processes (Grigori et al., 2004). In this context, BI refers to technologies, applications, and practices for the collection, integration, analysis, and presentation of business information and also sometimes to the information itself. The purpose of BI is to support better business decision making (Power 2007). The data source for BI is a so-called data warehouse, i.e., a special data base where an organization stores important historical data. Most of the time the data is collected from different information systems as used in an organization. Data analysis and data mining can be performed using this data. The goal is to translate the data to useful business information that can support the decision making process of the organization. If the data warehouse also contains information about the processes within an organization it is called a process data warehouse (Casati at al., 2007) and can be used as source for BPI analysis.

BPI is an emerging area, that is quickly gaining interest due to the increasing pressure companies are facing to improve the efficiency of their business processes and to quickly react to market changes in order to be competitive in this highly dynamic Internet era. In addition, the need to meet regulatory compliance has recently strengthened this trend (e.g., Sarbanes-Oxley (Sarbanes-Oxley Act 2002)). The large number of buzzwords like Business Activity Monitoring (BAM), Business Operations Management (BOM), Business Process Intelligence (BPI), Process Mining, and Business Operations Intelligence (BOI) is a good indication of the interest of vendors to monitor and analyze business activities to gain insight into the operation of their business and ultimately on their effect on the business goals. In the past the focus of workflow tools has been mostly on process modeling and automation. However, today most vendors of business process management

(BPM) suites have extended their portfolio with BPI functionality (e.g., IBM, SAP, Tibco, Oracle, Pallas Athena, Lombardi, webMethods).

Process-aware information systems (PAIS) such as WFM, ERP, SCM and CRM systems are recording business events occurring during process execution in event logs (Dumas et al., 2005). Typically, event logs contain information about start and completion of activities and the resources that executed them. In many cases relevant data (like the values of data fields linked to tasks) is recorded too. Sometimes, there is no, or only a very primitive process model available. However, in many situations it is possible to gather information about the processes as they take place. For instance, in many hospitals, information about the different treatments of a patient are registered (date, time, treatment, medical staff) for reasons like financial administration. This kind of information in combination with appropriate (mining) techniques can also be used to get more insight in the health care process.

BPI exploits this process information by providing the means for analyzing it to give companies a better understanding of how their business processes are actually executed. It supplies support in the discovery of malfunctions and bottlenecks and helps identifying their causes. Therefore, BPI often triggers process improvement or reengineering efforts. BPI not only serves as a tool for improving business processes performance, but also fosters changes by facilitating decision-making. In addition, BPI is used to monitor the alignment of operational business processes with strategic business goals and to give the visibility that regulatory compliance requires. Furthermore, BPI is not restricted to the analysis of historical data, but can also be used to optimize future efforts (e.g., through predicting future problems). To provide for the above, BPI comprises several application areas, which are detailed in the following.

Process analysis: Refers to the analysis of past and sometimes even current process executions. Process analysis can lead to different kinds

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