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A Study of Process Mining-based Business Process Innovation

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Abstract

Businesses have adopted diverse process management approaches such as business process re-engineering (BPR) and Six Sigma for their survival and growth. Even though these approaches have partially made a contribution to the improvement of organizational performances such as cost reduction and value innovation, they have a high possibility of failure. In particular, the failure probability of BPR and process innovation (PI) is as high as 60-70%. Most process management approaches include traditional interviews and observation-dependent business process analysis (BPA). This conventional BPA requires a lot of time. However, it derives subjective and incomplete analysis results and has no tool to measure improvement effects. As a way to overcome this kind of limitation of conventional BPA, this study introduces a process mining technique through the analysis and utilization of a huge amount of process data kept almost unused in domestic information systems. Processing mining is a process management technique which helps users figure out business processes in a fast and objective manner by analyzing these data and automatically visualizing actual process flows. In particular, this study derives a process improvement plan and offers academic and practical implications through analysis on municipality data in the Netherlands.

Keywords: Process mining, Big data, Business process reengineering, Process innovation

1. Introduction

In the 1980s, organizations started to aggressively display their interest in processes (Rummler and Brache, 1995). Even though it's been over 3 decades, however, the problems of conventional BPA aren't solved yet. Furthermore, the success probability of BPR or PI still shows no sign of increase. Package software (e.g., SAP ERP), BPMS and internally developed information system automate business processes or at least support manual operations. In addition, the records (i.e., big process data) stored in the package software or internal information system have become the important sources of big data (Kang Yeong-sik et al., 2015). These data

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include event logs which could be utilized in process mining. An event log includes specific records on when and by whom the business activities which support the information system were performed (Kang Yeong-sik et al., 2013).

Process mining is a process management technique which helps users figure out business processes in a fast and objective manner by analyzing business data which include event logs and automatically visualizing actual process flows. Therefore, this technology can considerably reduce the time and costs needed to understand current processes. The process participants are able to gather and concentrate on why the target processes are handled the way they are. In addition, the same analysis can be repeated anytime almost without additional costs. Therefore, improvement based on continued assessment on the effects of changes can be repeated. This kind of competency of process mining can make a contribution to solving the problems of conventional BPA. In fact, hundreds of organizations around the globe have experienced diverse effects such as cost reduction and value innovation through process mining (Kang Yeong-sik et al., 2015; van der Aalst, 2011).
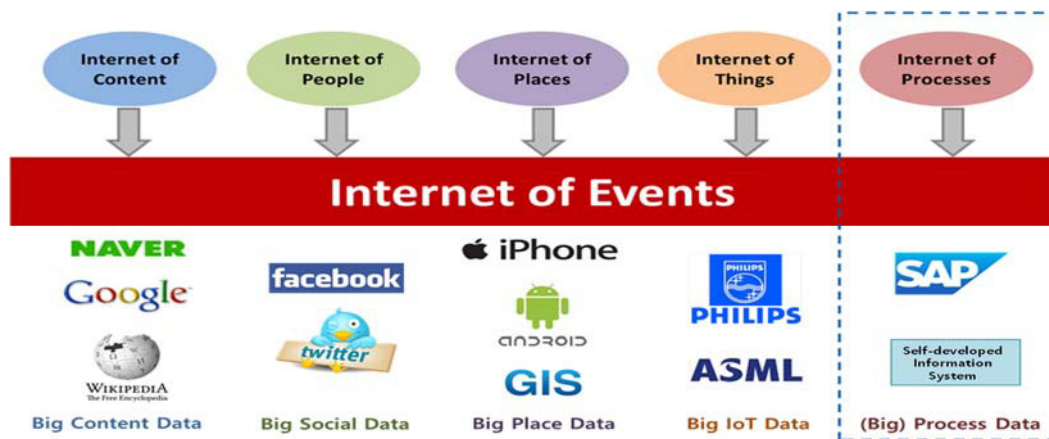

Figure 1. Five Sources of Big Data

2. Concept and Value of Process Mining

2.1. Current position and goals

The goal of process mining analysis is to improve processes, not to analyze data regarding the execution of processes (event log). As shown in Figure below, the improvement of processes can be divided into two perspectives: performance perspective and compliance perspective (van der Aalst, 2011). In general, when a process mining project is started, performance and compliance-centered questions or problems which should be answered through process mining analysis are derived. Then, process mining analysis is performed to find an answer these questions or problems (Mans et al., 2015). Meanwhile, process mining is situated in a position to fill a gap between the analysis techniques (e.g., simulation) focusing on a process model without considering real event data and classical data-centric analyses (e.g., data mining) which do not consider processes (van der Aalst, 2011).