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The effectiveness of workflow management systems: Predictions and lessons learned

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Abstract

Workflow management systems are widely used and reputable to improve organizational performance. The extent of this effect in practice, however, is not investigated in a quantitative, systematic manner. In this paper, the preliminary results are reported from a longitudinal, multi-case study into the effectiveness of workflow management technology. Business process improvement is measured in terms of lead time, service time, wait time, and resource utilization. Significant improvement of these parameters is predicted for almost all of the 16 investigated business processes from the six Dutch organizations participating in this study. In addition, this paper includes lessons learned with respect to the simulation of administrative business processes, data gathering for performance measurement, the nature of administrative business processes, and workflow management implementation projects.
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1. Introduction

Commercial workflow management (WfM) systems have been around since the early nineties, while their conceptual predecessors range back even further, see e.g. Ellis (1979). They have

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become "one of the most successful genres of systems supporting cooperative working" (Dourish, 2001). The worldwide WfM market, estimated at \$213.6 million in 2002, is expected to redouble by 2008 (Wintergreen, 2003). Furthermore, WfM functionality has been embedded by many other contemporary systems, such as ERP, CRM, and call-center software. WfM technology, in other words, has become quite successful and widespread.

The alleged advantages of WfM systems are clear. By having a dedicated automated system in place for the logistic management of a business process, such processes could theoretically be executed faster and more efficiently (Lawrence, 1997). Yet, very little is known about the *extent* of performance improvement an organization may experience in practice. Single case studies are available, e.g. Goebl, Messner, & Swarzer (2001); and Prinz & Kolvenbach, (1996), but do not easily lend themselves for generalization. Few empirical studies that include multiple implementations are known to us. What is more, their focus is not on performance issues, but on aspects such as the appreciation of the technology by end-users (Kueng, 2000), implementation (Parkes, 2002), or the metamorphosis of the project objectives (Herrmann & Hoffmann, 2003). The study most related to our research is that of Oba, Onada, & Komoda (2000), who developed a regression model on the basis of 20 cases to predict the reduction of lead time as a result of WfM implementation. Other available data on performance improvement comes from WfM vendors, who are perhaps not completely unbiased. A study among 100 clients of Staffware, one of the world's largest WfM vendors, indicates for instance that 62.5% of their clients sees increased efficiency as a result of WfM implementation (Staffware, 2000). Unfortunately, this outcome is not accompanied by indications how this figure is established, how the notion of efficiency is made operational or how much efficiency gains are achieved.

The lack of information on performance improvement through WfM system is awkward. Despite the large number of research papers on the subject of WfM, the research community has not been able to express general statements on this subject. This paper is an interim report on a longitudinal, multi-case study (Yin, 1994) into the effectiveness of WfM technology. Its aim is to quantify the contribution of WfM technology to improved business process performance with respect to lead time, wait time, service time, and utilization of resources. In this way, it is an extension of the scope of Oba et al. (2000). Its findings may be of relevance for both workflow researchers and practitioners.

Our study, which is conducted in the Netherlands, is a joint effort by Eindhoven University and Deloitte Management and ICT Consultants. It started in 2001 and is planned to continue until 2007. So far, six organizations are involved who are in the process of implementing WfM technology to support 16 different business processes. All organizations are administrative organizations, both commercial and not-for-profit, ranging from medium-sized to large.

This paper presents the first half of our longitudinal study. Based on actual measurements of the process before the introduction of the WfM system and detailed simulations, we present our expectations on performance improvement for each involved business process for each of the previously mentioned performance indicators. These expectations serve as a prediction for the effectiveness of WfM technology, which can be validated when the implementation has been completed and the WfM-enabled processes are taken into operation. Also, the execution of this study has confronted us with a number of issues that seem worthwhile to communicate. First of all, the use of discrete event simulation to realistically capture the dynamics of administrative business process turned out to be far more difficult than expected. Secondly, we observed