Using operational data for control of on-going operations

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Many organisations invest heavily in information technology (IT) to enhance control over their operations (Raab, 2010). Despite such IT investments, decision makers often lack the necessary information to thoroughly grasp the status of operations under their control.

This research project draws upon the strand of research on the *organisational information processing theory* (OIPT), initiated by Galbraith (1973), to study the short-term decision making processes that control operations during their execution. Collectively, these decision making processes will be referred to as *operational control*. In performing operational control, decision makers seek data elaborating the status of on-going operations. In this research project, such data will be referred to as *operational data.*

It is believed that the adoption of IT for planning and control of operations, often comprising tracking technologies such as RFID (Want, 2006) and GPS (Kaplan & Hegarty, 2006), has the capability to support operational control by providing decision makers with accurate operational data in real-time. Timely and accurate operational data should enhance the ability to detect unexpected events disrupting the execution of pre-planned operations as intended. Accordingly, decision making to mitigate negative impact and exploit opportunities as a result of unexpected events could be improved.

In operations management literature, there is a general consensus that the human role in the control of operations is indispensable (Fransoo & Wiers, 2006; MacCarthy & Wilson, 2001). Hence, the human is required to interpret the data before an informed decision can be made (Daft & Weick, 1984). As the ability of a human to process data is limited, a gap can arise between the vast amount of real-time operational data that is made available by IT, and the information that is actually needed for effective control (Endsley, Bolté, & Jones, 2003). Taking this in consideration, this research project addresses the following question:

> *How can the real-time operational data that is made available by IT be used for effective operational control?*

This research will contribute to the continuing debate in operations management and information systems literature on the use of sophisticated IT for planning, scheduling and control (MacCarthy & Liu, 1993). On the one hand, a vast body of knowledge is focused on implementation of sophisticated optimisation formulae in planning systems. On the other hand, empirical researchers have repeatedly observed that little of that sophistication is actually used in practice (Tenhiälä, 2011). In that debate, we will focus on the use of IT for operational control, rather than planning and scheduling. Moreover, this research will contribute by proposing and validating an extended OIPT model for an operational control context.

References

Daft, R. L., & Weick, K. (1984). Toward a Model of Organizations as Interpretation Systems. The Academy of Management Review, 9, 284-295.

Endsley, M., Bolté, B., & Jones, D. (2003). Designing for situation awareness: an approach to user-centered design. Taylor & Francis.

Fransoo, J., & Wiers, V. (2006). Action variety of planners: Cognitive load and requisite variety. Journal of Operations Management, 24, 813-821.

Galbraith, J. (1973). Designing complex organizations. Addison-Wesley Pub. Co.

Kaplan, E., & Hegarty, C. (2006). Understanding GPS: principles and applications. (E. Kaplan, & C. Hegarty, Eds.) Artech House.

MacCarthy, B., & Liu, J. (1993). Addressing the gap in scheduling research: a review of optimization and heuristic methods in production scheduling. International Journal of Production Research, 31, 59-79.

MacCarthy, B., & Wilson, J. (2001). Human performance in planning and scheduling. MacCarthy, & J. Wilson (Eds.). Taylor & Francis.

Raab, M. (2010). Customer back on top of the supply chain agenda in 2010. Capgemini Consulting.

Tenhiälä, A. (2011). Contingency theory of capacity planning: The link between process types and planning methods. Journal of Operations Management, 29, 65-77.