Identifying key objectives when going through a Digital Transformation

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The thesis aimed to identify the key-objectives for a company going through a digital transformation by describing and analysing a production process at the case company. Two theoretical models were combined to serve as a framework to fulfil the purpose. The framework was shown successful and can serve as a tool for other companies of similar characteristics that intend to investigate where they are in their digital transformation and how to proceed.

Introduction

Digital technologies provide businesses and processes with intelligence, connection, communication, and automation (Li et al., 2020; Núñez-Merino et al., 2020). Examples can be Radio Frequency Identification (RFID), Internet of Things (IoT), Cloud Computing and Big Data Analytics (Raut et al., 2020). Digital technologies are thought to provide benefits in a wide range of aspects for businesses, e.g., improved productivity, quality assurance and energy savings (Fatorachian & Kazemi, 2018).

New business opportunities enabled by digital technologies require modified value chains and re-structures in business culture and business strategies (Ebert & Duarte, 2016; Parviainen et al., 2017). The changes that digital technologies entail result in challenges for mature companies to fully utilise the new technologies (Lichtblau et al., 2015). Hence, *Digital transformation* has become a concept to describe the change the business will need to go through to align the corporate, operational, and functional strategy. The difficulties of achieving this alignment lie in balancing the use of technology, value creation, structural changes in the company, and financial aspects. (Matt et al., 2015)

Technology- and information-intensive firms are stated to be most vulnerable to the changes. However, industrial companies will be forced to undergo this transformation as well. (Downes & Nunes, 2013) This has resulted in that most industries and businesses elaborate on opportunities for how digital technologies can be utilised and how to manage the change (Matt et al., 2015).

Purpose and delimitations

The purpose of the master thesis was to describe and analyse production processes to identify key-objectives for a company going through a digital transformation.

The study was delimited to focus on a *specific production process* within the case company, rather than on a company-wide perspective. Furthermore, the study did assess the technical aspects when describing and analysing the production process. Organisational and strategic aspects were not included.

Methodology

The research purpose of this master thesis was descriptive and exploratory. A case study was deemed suitable for exploring and gaining an in-depth understanding of a production process at the case company LKAB. Some criteria were important in the selection of the case company. It had to be a manufacturing company, or similar, where

production processes are critical. Additionally, there had to be an ongoing digital transformation in the company.

The research approach was abductive. Hence, the working procedure was iterative from a continuous interplay back and forth between literature search and real-life observations. The qualitative data collection was performed through interviews, observations, a questionnaire, and archive analysis on material provided by the case company.

Theory

The theoretical framework used is based on mainly two different theoretical concepts thought to complement each other in understanding the digital transformation.

Value-based process modelling

First, process management and process mapping are presented. The model by Ljungberg and Larsson (2012) called value-based process modelling, VPM, was described and thought to describe and visualise the production process. It is broken down into three categories: *process, sub-process* and *activity*. An activity is the actual work or tasks being performed. An activity is described with the support of *components*, shown in Figure 1. The components are *information*, that supports or control the activity, and *resources*, what is needed for the activity to be performed, and *object in* and *object out*.

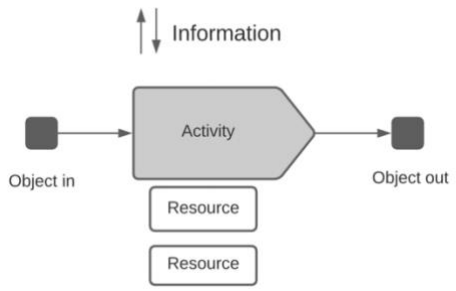

Figure 1. The components in the value-based process modelling.

Digital Readiness model (IMPULS)

It is essential to understand what state in the digital transformation a company is and what path that must be pursued to achieve its fullest potential (Schumacher et al., 2016). Consequently, a model called IMPULS, created by Lichtblau et al. (2015), was used. IMPULS intended to analyse the *digital readiness* of the production process.

IMPULS is a classification framework consisting of six *dimensions* representing an area of importance for digital transformation. Each dimension is divided into *fields* that have criteria to measure digital readiness for each dimension.

The model was adjusted to suit the purpose of this master thesis. Four dimensions were deemed important to analyse. These are smart factory, smart operations, smart products and employees. The dimensions are shown in Figure 2.

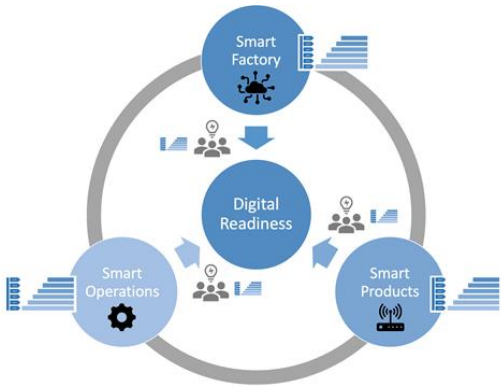

Figure 2. Showing the dimensions for the adapted IMPULS model.

The theoretical framework developed

To identify the key-objectives for a company going through a digital transformation, a theoretical framework was designed that combined the two models.

VPM was used to understand, describe and visualise the production process for in-depth knowledge, while IMPULS was used to provide insights into what activities, features or tools needed to be improved and how.

IMPULS complements the VPM by guiding the practitioner on what to focus on when investigating the production process in a

context of progress in digital transformation. VPM complements IMPULS to gain in-depth knowledge on an activity that is investigated in terms of digital readiness.

An illustration of the theoretical framework that visualises the interplay and connections of the two models is shown in Figure 3.

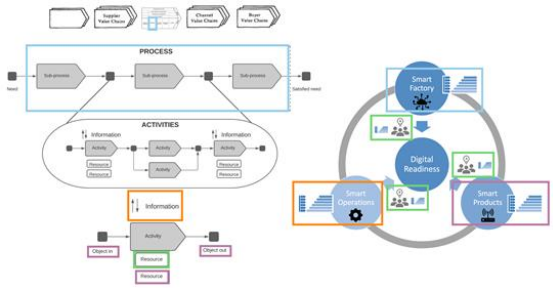

Figure 3. Visualisation of the interplay between the theoretical models used.

Conclusions

To *describe* the production process at the case company, VPM was used. The model did succeed to give a comprehensive picture of the relation between the process, its sub-processes and its activities. In addition, it was successful in having the right components to investigate to gain an in-depth understanding of each activity. Some components were more helpful than others. E.g., *information* is extra important in the context of a digital transformation since it highlights what data is collected and how the data is used.

To *analyse* the production process, the adjusted IMPULS model was used. The assessed level of digital readiness for LKAB was of a Learner. Combining the two models, VPM and IMPULS, were useful for highlighting relevant areas for the case company to focus on when going through a digital transformation.

Three particular interesting areas, key-objectives, were found. These key-objectives were identified specifically for the case company, LKAB. However, it is thought that the key-objectives can be applicable for any company scoring the same or similar level in IMPULS. Consequently, the majority of companies within the manufacturing or production industry can take advantage of these insights.

Understand the full potential of collected data and use it optimally. Focus on collecting the right data from the production and use the data to optimise the process, not only as support.

Enable full potential of equipment by integration. An integrated equipment infrastructure enables a higher level of autonomy in the production system, and it makes the system receptive to upgrades as digital technologies are constantly developing.

Simplify and improve the flow of information. Integrate the data flows in IT systems to eliminate manual updating and double work as well as unnecessary downtimes in production due to time-consuming communication.

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