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## Value Chain Management Through Cloud-based Platforms

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### Abstract

The transformation of traditional value chain processes towards a digital value chain management enables companies to sustainably establish and retain a competitive market position. Digitisation offers the opportunity to design and operate expansive process chains with efficient process operations via co-operative platforms. Increased customer loyalty („lock-in“) via integrated measures at the front-end raises utilization and planning certainty for the technological recovery systems.

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### 1. Introduction

Shorter product life cycles, continuous changes and further development of business processes lead to changes in business models and the everyday work life. Customers expect faster business transactions, one-stop-shop solutions and transparency in the value chain. This is only possible, if companies are able to digitalise information and data concerning products, customers, processes and services and thereby transform their business procedures digitally. With this new working method, a high amount of data is collected about all processes, as well as data about internal and external communication, requiring a high amount of management and data analysis. In addition, the quality of the data is very important to ensure consistency and correctness. (Baumeier 2016)

The following paper will elaborate how to digitalise processes, the role of digital platforms and its influence on the value chain, as well as a case study about the digitalization of a traditional business in the electronic waste (e-waste) recycling business

## 2. A concept on how to digitalize business models

Digitalization of production processes, administration procedures and communication usually results in faster transactions and more reliability in means of quality and security. This leads to higher customer satisfaction.

In order to digitally transform one's business, it is essential to have a strategic plan and a clear goal set. Before implementing the new business model or making company modifications, it is recommended to have a change management plan in place. (Barsh 2016) The reason for this is, that often the culture and employees of a company can be large obstacles when exposed to major changes. Companies, who's culture is driven by entrepreneurship, creativity and innovation are more likely to successfully transform their business model, rather than companies with a traditional and closed-minded mentality. A study of McKinsey from 2008 with top managers and executives showed that a company's culture can be the biggest obstacle and at the same time the main driver of innovation and change. (Kohne 2016 & Mervelskemper 2017)

The digital transformation can be achieved in 5 steps:

1. As-Is Analysis
2. To-Be Definition and goal setting
3. Best Practises and potentials
4. Digital Fit
5. Execution

Step 1 includes an analysis of the current state of the company and its value proposition. The value chain should be analysed as well as the stakeholders. Through this analysis a first indication is given, on what processes, products or services can be digitalized and which can't.

Step 2 is the goal setting process. The company should ask its self where it would like to be positioned in the market, what their priorities are and where it should stand in 5 years. In this manor, the framework for the business development direction is set.

Step 3, Best Practises, involves the potentials of a company. The best practises are analysed, on how these could be integrated in the new digitalized business model. In this phase, the business model is further defined and different alternatives and scenarios of it can be examined.

Step 4 assesses and evaluates the various business model alternatives regarding goals, customer and market demand, investment and the digital feasibility.

Step 5, the final phase, is the implementation phase. This is where the selected business model is implemented. However, this step is recommended to be fulfilled with suitable partners like IT service companies and also change management experts. (Kreutzner 2017 & Schallmo et al. 2017 & Niemann 2016 & Niemann et al. 2016)

## 3. Platforms as a solution for holistic value chain management

The digitalization of processes, products, transactions and machines leads to a high amount of data and information. A network of customers, service provider and OEMs is laid out that needs to be managed. The amount of data and all communication processes require a high amount of management and analysis to ensure correct interpretation of the data. A solution to the high maintenance of data quality and the management of all digitalized processes, services, machines, products and the network of partners and customers is a cloud platform. This would allow a constant exchange of process data and its automated analysis throughout the whole supply chain as well as full value chain management through the platform provider.

Cloud and IT- service provider can help with the setup of a suitable platform. Typical functions of a cloud platform are multi-client capability, scalability, availability and integration possibilities of external databases with and integrated development environment that supports different programming languages (e.g. Python, Java). A core aspect during the development of a platform, is to make sure that the data that is collected is done in a correct and exact manor to ensure high data quality. All automated decisions and analysis are based on this raw data. Furthermore, new value adding services can be created and offered, like for example automated transaction procedures, invoice creation and download, monitoring services of products, machines and processes and even external services, offered by service provider integrated into the platform. (Hahn 2016)

To digitalise the whole value chain, not only must the products and machines be digitalized, but also the logistics, so that the digital image of all objects and their relevant data can be cross-linked to the physical world and thereby communicate with the environment. Relevant information that can be collected is for example status, condition, position, location and weight. This can be achieved through RFID chips (Radio-Frequency Identification chips) and scanning systems that can be placed into the products, the transport boxes and trucks. (Bousonville 2017)

Looking at an entire value chain, we have certain stakeholders: the supplier, the producer, the logistics companies and the customer. By integrating all players, products and services into a cloud-based platform and by digitalizing the value chain (products, machines, trucks etc.) A transparent and fully automated manor of communication between the stakeholder but also between all objects in the value chain can be achieved. For example, a machine of the producer can alert the supplier automatically if more resources are needed. The product can alert the truck driver when it will be ready for pick up. The customer can provide the truck driver with a delivery section by making a status request to find out about the location of the truck and the remaining distance to the delivery site. All this data can be collected through chips and sensors and sent to a cloud platform to which all stakeholders of the value chain have access to, to receive their necessary information. A benefit of the platform is not only the automated communication, but also the integration of customers into one's digital infrastructure. A network of services can be provided, efficient and standardized processes and a transparency in the value chain are in place so that a customer "lock-in" can be achieved through a strategic integration into the platform systems. The key is to transform a straight-lined value chain into an ecosystem that encourages innovation and efficiency. (Hahn 2016 & Bousonville 2017)

Figure 1 shows a depiction of a cloud-platform.

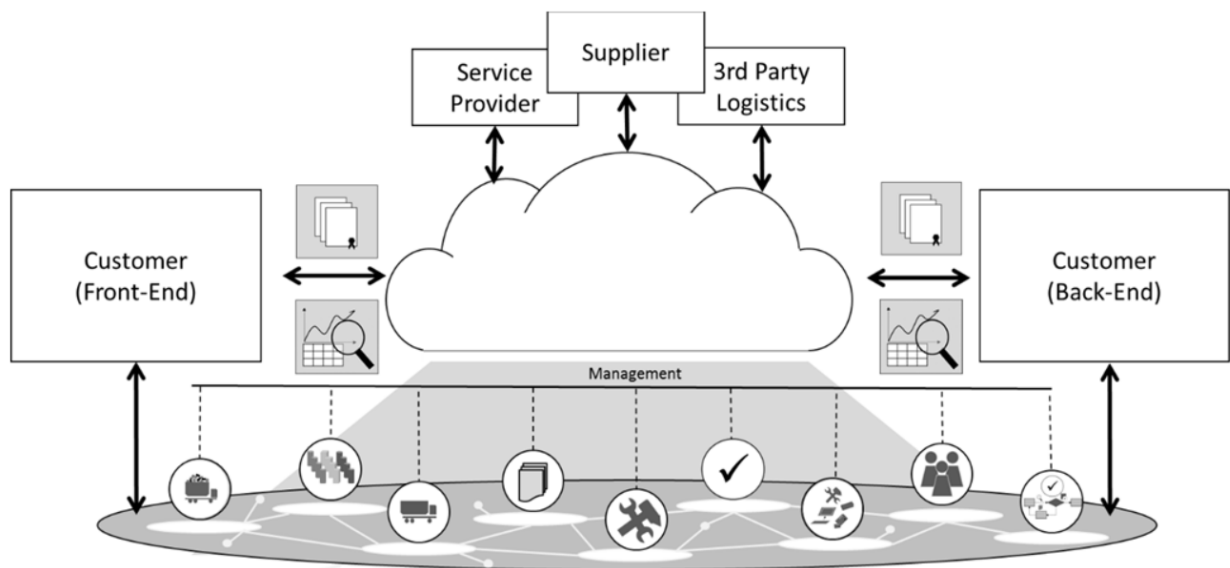


Figure 1: Cloud-based Platform, Source: own representation

#### 4. Case Study - A platform for electrical waste

The following case study shows a digital transformation of a traditional business. Electrical waste (e-waste) recyclers collect e-waste, like for example printers, laptops, mobiles and telephones, from various channels. These can be, public collection points, other recycling companies, OEMs and even retailers. Batteries and other hazardous waste is removed beforehand by specialized companies, as this step requires certain security measures and regulations. The waste is then sorted into different categories and then shredded into a granulate. The granulate is

then processed through a material sorting machine to form categories of the same materials. These are then melted and restored to their original raw state. Metals that are extracted are gold, silver, copper, platinum and iron, which can be sold at market prices. Even plastics and other materials can be reclaimed from the used product and resold. The e-waste business is very fragmented and is losing profitability. On the one hand, it is a globally competitive environment and on the other hand the electrical products are becoming smaller and need less precious metals than 20 years ago. The recycling quotas and the amount of waste that is provided by the consumers is not sufficient any more for the recyclers to stay profitable. Also, recyclers are reliant on many players in the e-waste value chain and have highly fluctuant revenues, due to the market price changes and the unknown content and quantity of waste they will receive. (Magalini et al. 2014)

The solution is to digitally transform the recycling business. Problems to be solved are the number of tons collected per month and the unpredictable material content of the end of life products, as some people remove the valuable parts beforehand along the value chain. Also, OEMs and retailer are now obliged to provide recycling quotas to an e-waste institution and if they are not met, they will be fined. The key, to solve all stakeholders' issues, is to start at the source of the e-waste: the consumers. The consumers need an incentive to bring back their waste, especially if they know about its value. This can be achieved through an e-waste platform. The platform can provide an interface between the consumers, the producers, the retailer, and the recycling companies. A consumer can register his product through the platform and bring it to a suitable return station. This could be any retailer or OEM as they are obliged to take back e-waste within the EU. The end of life product can be identified by an employee and a barcode can be stuck onto it. This code will have all relevant information about the product type, its weight and material content. The retailer can then scan, weigh and check the product and put it in a box ready to be picked up from a logistics company. The information about the product and material content is sent to the recycler who can pay the retailer an adequate price for the box of collected e-waste and then further process it. This is how the recycler can calculate the exact revenues he can expect at the end of the month as well as the volumes to adapt his capacities accordingly. In addition to this, new services can be provided through the platform, for example repair and refurbishment. From the platform, the processed and raw material can be sold back to the producers. Over capacity, can be distributed to other recyclers over the platform, if they are integrated into the system. Thereby, the entire value chain of e-waste of a certain region, country or continent can be managed by one single company providing a platform. This is how long-term contracts with the frontend channels and customer "lock in" as well as a consistent and plannable material flow can be achieved. In other words, full value chain management. (Bousonville 2017)

## **5. Summary**

The transformation of traditional value chain processes towards a digital value chain management enables companies to sustainably establish and retain a competitive market position. The paper has shown the steps on the practical example of electrical waste management. Digitisation offers the opportunity to design and operate expansive process chains with efficient process operations via co-operative platforms. Increased customer loyalty („lock-in“) via integrated measures at the front-end raises utilization and planning certainty for the technological recovery systems.

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