A case study on resources structures and digitalization strategies.

(Work in Progress)

-

IMP Conference 2019

INTRODUCTION

It has become difficult to find companies that have not initiated some form of digitalization project. This is the trend that is commonly named with the term Industry 4.0 (Brettel, Friederichsen, & Keller, 2014; Kagermann, Helbig, Hellinger, Wahlster, & Helbig, 2013; Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). The manufacturing industry has been undergoing deep changes, digitalizing internal processes and relationships (Fremont, Frick, Åge, & Osarenkhoe, 2018). The main goals have been to achieve greater efficiencies, to increase competitiveness, and to create more value. Industry 4.0 is articulated around the introduction of new information and communication technologies, such as internet of things, sensor technologies, blockchains, and additive manufacturing (Bartodziej, 2017; Kagermann et al., 2013; Preuveneers, Joosen, & Ilie-Zudor, 2017). The industry hope is that the new technological panacea will allow the adopting firms to transform data into knowledge, business growth and revenues. Companies that were product and hardware driven, are becoming knowledge and data driven. They are developing new ways of working and new business models around digital technologies (Iansiti & Lakhani, 2014).

Digitalization is a phenomenon which is not yet clearly understood or defined (Alcácer & Cruz-Machado, 2019). In order to undertake their digital transformation, firms will need to introduce new resources and competences(Roblek, Meško, & Krapež, 2016). It is expected to affect distribution channels, the way firms conduct innovation, and the way firms relate to each other (Matthyssens, 2019; Ungerman, Dedkova, & Gurinova, 2018). The purpose of this article is to highlight the strategies that different organizations with different resources structures can adopt to address digitalization. Using the lens of the 4R model of resource interactions (Håkan Håkansson, Ford, Gadde, Snehota, & Waluszewski, 2009; Håkan Håkansson & Waluszewski, 2002), this paper will analyze the case of a large manufacturing firm and its industrial network, to investigate how the introduction of new digitalization resources translates into changes in ways of working, challenges and frictions.

IMP theory posits that it is during the interaction process that firms create value, as interacting firms commit some level of mutual adaptations to their resources across business relationships (Håkan Håkansson, 1982). When new resources are introduced, they interface with other present resources. Resource interfaces are defined by how different parties relates their resources to each other. The value of a resource is dependent of how they interface with new and previous resources (Araujo, Dubois, & Gadde, 1999; Håkan Håkansson et al., 2009). Additionally, changes to a resource, or the introduction of a new resource, creates tensions on related resources. Any change intended to produce a positive effect in some resources, such as the development of a new product or the establishment of a new business unit, can also produce negative effects, or frictions, for other resources in terms of costs, efficiency or effectiveness (Håkan Håkansson et al., 2009; Håkan Håkansson & Waluszewski, 2007).

The 4R model (Håkan Håkansson & Waluszewski, 2002) offers a framework to analyze the interaction between resources, which are either tangible or intangible, directly or indirectly connected, and regardless of a direct association to business relationships (Håkan Håkansson

et al., 2009). The 4R model distinguishes resources in four main categories, Products, Production Facilities, organizational units and organizational relationships. The product type includes combinations of tangible resources produced and used by different units in a given business context. They can be moved to different location and relate to different resource structures. The production facility type includes resources that are also combinations of tangible resources but that are more stable in time than products. Their relative sustainability creates a context for other different and successive resource combinations. The organizational units' type of resources can include all experiences and knowledge contained in individuals and groups, such as a corporate cultural element or ways of working. These also includes group's skills in combining and handling resources. Organizational relationships can be relatively more complex than the three previously mentioned. They are a combination of structures of both tangible and intangible resources. They also cross company boundaries, therefore affecting other intangible and tangible resource combinations or structures within different organizations. Their relative complexity can lead to problems and opportunities for organizations managing them (Håkan Håkansson et al., 2009; Håkan Håkansson & Waluszewski, 2002).

The four different resources types are interdependent. To make a product, an organization needs a facility managed by a business unit, and products are sold via business relationships. It is therefore necessary to include them all when analyzing technological development in an industrial setting. This model encourages the investigation of the interplay taking place between these different resource types, and the investigation of how they are affected by other resources within and across organizational boundaries(Håkan Håkansson & Waluszewski, 2002).

METHODOLOGY

This paper studies the case of a large international manufacturing group evolving in a complex industrial network, called Sandvik Machining Solutions (SMS). SMS is currently undergoing important digitalization related changes, which are affecting the way this firm interacts with its suppliers and customers. A qualitative research approach was chosen, as it is seen as appropriate to study technological innovation, and as it allows for developing a deep understanding over actors, interactions, and behaviors taking place within a specific phenomenon over time (Borghini, Carù, & Cova, 2010). Yin (2009) defines a case study as an empirical enquiry investigating a contemporary phenomenon within a real-life context, for which the boundaries between phenomenon and context are not clearly defined. Case study research is also common in IMP related research, as IMP has been focusing on highlighting the complexity and the highly contextual nature of exchanges when investigating specific phenomena such as digitalizaiton (Dubois & Gadde, 2002; Håkan Håkansson & Waluszewski, 2016).

Data was collected through 19 semi-structured interviews (Yin, 2009) lasting between 1h and 1.5h with managers holding key positions within organizations of the studied industrial network. Respondents were selected for their relatedness to issues regarding digitalization at their respective organizations. They were also selected as to gather sufficient data to draw a comprehensive picture of the studied case. Challenges in collecting data stemmed from the complexity of the studied case, as well as from the constant changes undergoing within the organizations investigated. Data was analysed in three steps: data reduction, data display, and conclusion drawing (Miles & Huberman, 1994). Data reduction entails selecting and filtering data in order to focus, discard and organize data in such a way that conclusions can be drawn and verified (Miles & Huberman, 1994).

Interview questions were drawn from structures of IMP theory, and in particular from the 4R model of resource interactions (Håkan Håkansson & Waluszewski, 2002). There is a close relation between theory and methodology in IMP research (Håkansson and Waluszewski, 2016). These two connect around the object of focus of IMP research, which is the business relationship. The challenge stemming from this methodological stance is the ability for IMP research to create representative or generalizable knowledge (Håkansson and Waluszewski, 2016).

CASE DESCRIPTION

Sandvik Machining Solutions (SMS) is a market leading Swedish metal cutting tool manufacturer. It is the largest business area in operating profits of the Sandvik Group (Sandvik, 2017). SMS is organized in a group of different product areas, or brands, named Sandvik Coromant, Walter, Seco Tools and Dormer Pramet. They are of different sizes, have different history, each operates as an independent profit center, and each has developed a different marketing strategy. These differences translate into different strategies regarding addressing digitalization. To these four, the company recently added two more product areas focused on digitalization related ventures, called Advanced Manufacturing Technologies (AMT) and Additive Manufacturing. The later was unfortunately not explored in this case study.

AMT was recently established in the continuation of a business development project initiated a couple of years ago to create a digital center of excellence for the company. This project evolved to become a new product area focused on finding digital solutions to any problems related to the manufacturing chain. This product area is itself structured around different software and tech companies, called TDM Systems, CODE (Center of Digital Excellence), and Metrologic. Sandvik Coromant, by far the largest metal cutting tool product area, has been investing a lot of resources into a new unit called Digital Machining, to support their own growth and to drive a more sustainable business, with a focus on technological innovation. They have created their own portfolio of digital solutions called CoroPlus. Walter, also a large product area, has similarly been investing a large amount of resources in digital solutions. They established a unit called Digital Manufacturing Services, to drive digitalization for their entire organization. This unit led the acquisition a few years ago of a small independent software company called Comara. Seco tools established both Seco Point and more recently Seco Consulting Services (SCS) as part of its strategy to address digitalization. Seco Point was established to handle tool logistics solution activities, while Seco Consulting Services created a new business activity proposing digital solutions as part of a greater service offering. Lastly, Dormer Pramet, smallest metal cutting tool product area, an organization that is the product of several recent mergers, has been addressing digitalization as part of its strategy to support its channel partners (distributors), but also as part of their effort to harmonize internal processes and enterprise systems within the company.

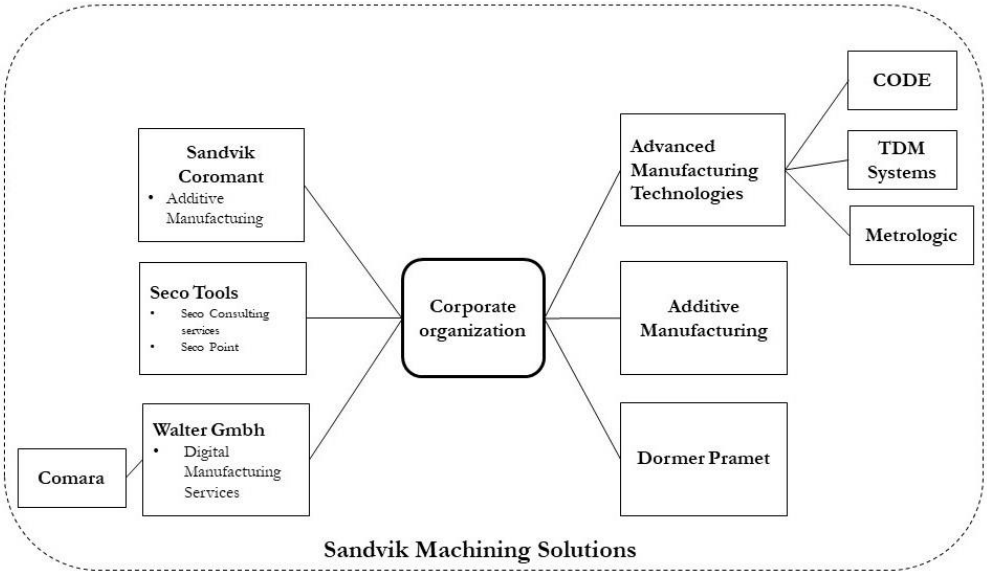

Figure 1: The Sandvik Machining Solutions organization

DIGITALIZATION STRATEGIES

In several instances, Interviewees referred to ways in which they needed to involve new business organizational resources. Managers at CODE explained that a key challenge for their digitalization initiatives resided into getting traditional organizations, such as Coromant and Walter, to "want to be part of a new way of approaching things", to spread new ways of thinking and working among the other product areas that had been focused on selling tangible hardware. As an example of "digital thinking" that CODE wanted to foster, respondents explained that they were trying to change the way individuals related to information within the organization. They wanted to move their thinking from a sense of owning information, to instead feeling responsible for business outcomes. The managers at CODE wanted to foster a culture of transparency among all product areas within SMS, where information should become ubiquitous. They introduced new competences from the digital industry within CODE. The digitally trained individuals would interact with other present competences in metal cutting tools. However, CODE encountered difficulties in developing new ways of working, as in changing established "world class ways of working" organized around metal cutting tools. In several digitalization projects, CODE lacked direct business relationships with customers. CODE was too dependent on other product areas' sales channels to develop a truly agnostic offering. Related to this lack of business relationships, CODE was perceived perhaps also as not enough aware of traditional metal cutting tools customer needs. The fact that they lacked this insight made it difficult to interface their new digital resources to the existing.

The management at CODE assembled an R&D-focused prototyping team, which would interact with other metal cutting tools' product areas, to quickly develop prototypes from product areas' ideas. Interviewees explained that their goal was to be an agnostic digital product area, meaning that they wanted to be able to offer their digital solutions to customers independently of which other product areas they were collaborating with within SMS. CODE had been allocating different digital solutions development projects that had been started by

other products areas. These solutions were perceived by respondents as too much based on other's portfolios to be integrated into an agnostic product offering.

In a similar way to CODE, TDM systems had the goal of recruiting new competences in order to develop a new digital solution offering. Additionally, around the new competences, the management's goal was to introduce new ways of working. TDM had been having difficulties in adapting to the new ways of working of the digital. An interviewee explained that unlike metal cutting tools hardware, developing a digital solution is about constantly discovering and improving. Another issue or friction was that TDM was itself not a "tech company". A respondent explained that TDM was a traditional software company, which also needed to adopt new ways of working for the digital age. The old ways of working made it difficult for TDM's management to drive change and communicate on the value of adopting new ways of working. Respondents at TDM also described challenges related to their business relationships. They explained that their company was perceived as too distant from what traditional cutting tool vendors do. They are perceived by customers as a software company, and not as belonging to SMS, meaning that they were not perceived as having the same knowledge in the metal cutting tools business, a possible disadvantage for interacting with traditional metal cutting tools customers.

To manage their digitalizaiton efforts, Walter established the Digital Manufacturing Services division. Like other similar digitalization focused initiative within SMS, they have been focusing on how Digitalization would affect ways of working for Walter. This unit had been looking at how Walter could be developing new collaborations around their own digitalization projects with other organizations within SMS, such as CODE. They also expected to see their business relationships with channel partners to be changed in the way they interact and communicate with them. In regards to products, they saw an increase demand from their customers for tool data, and they expected that digitalization on the long term would allow them to make their tool data ubiquitous for their customers. Additionally, a manager at Walter explained that customers were increasingly purchasing their tools digitally. Respondents at Walter explained that they had been encountering several challenges in regard to deploying their new digital solutions. Walter's sales representatives didn't have the necessary competencies to sell digital offerings. In combination with an increasingly complex demand from their customers for process knowledge and tool data, and with a decreasing amount of knowledge held internally at customer's organizations, this lack of sales competences created frictions in the deployment of digital solutions.

Walter acquired Comara to obtain new competences. While providing Comara with resources to develop their offerings further, Comara would act as a R&D business unit type of resource for Walter, they would do software development for them. On the other hand, Walter would act as a sales channel for Comara. Like for CODE, a manager at Comara explained that their aim was to position themselves and their offering as agnostic and neutral, independent of SMS and the Walter brand, because they worried about preserving their business relationships with machine tool builders. They didn't want to be perceived as a metal cutting tool seller while interacting with this industry. Furthermore, they have also conscientiously not adopted Walter's support structures for agility and cost purposes. According to a respondent their main challenge being a small size organization, was in fact managing to keep being perceived as a neutral brand by all their machine tool building customers and others, while using the Walter sales channels to increase their visibility.

CONCLUSIONS

An issue that appeared often in the studied case was managing change around ways of working. In several instances, managers hired new competences to import not just digitalizaiton related knowledge, but also new ways of working with the digital. When introducing these new resources, they didn't interface well with the existing. In most cases, actors involved with digitalizaiton were trying to get their metal cutting tools selling counterparts to move away from world-class ways of working within a hardware business, to spread instead the ways of working from the digital business. The knowhow for the tool business has been embedded for a very long time within SMS, and the new ways of working being introduced by the likes of CODE or TDM systems, are causing frictions. Another source of friction was the relative lack of resources within sales and marketing among the different small digital focused business units and organizations. Almost all of them expressed the same will to develop an agnostic offering, as independent from the branding and the image of the metal cutting tool business. They wanted all to develop product resources that would be independent from the resources present at the product organizations. However, their dependence on product areas for their sales channels made achieving a neutral offering problematic. In both instances, sources of friction related to more intangible types of resources, the competences and ways of working of the organizational unit type, and a lack of customer relationships and sales competences of the organizational relationship types.

This paper contributes to business-to-business marketing literature by providing an in-depth insight on how the 4R model can be used to analyze certain phenomena, where a complex combination of tangible and intangible resources is introduced into long-established resource structures. The main managerial implication of this study is an increased understanding for the importance of managing intangible resources when handling changes related to technological developments. Despite being a technology firm, the most important source of friction in this case was not the tangible technology themselves, but the intangible organizational aspects connected to the tangible, such as the ways of working, a lack of sales competences for the digital and a lack of business relationships independent of the main traditional channels.

REFERENCES

Alcácer, V., & Cruz-Machado, V. (2019). Scanning the Industry 4.0: A Literature Review on Technologies for Manufacturing Systems. *Engineering Science and Technology, an International Journal*. https://doi.org/10.1016/J.JESTCH.2019.01.006

Araujo, L., Dubois, A., & Gadde, L.-E. (1999). Managing Interfaces with Suppliers. *Industrial Marketing Management*, *28*(5), 497–506. https://doi.org/10.1016/S0019-8501(99)00077-2

Bartodziej, C. J. (2017). *The Concept Industry 4.0*. https://doi.org/10.1007/978-3-658-16502-4

Borghini, S., Carù, A., & Cova, B. (2010). Representing BtoB reality in case study research: Challenges and new opportunities. *Industrial Marketing Management*, *39*(1), 16–24. Retrieved from https://www-sciencedirect-com.ezproxy.its.uu.se/science/article/pii/S0019850109001527

Brettel, M., Friederichsen, N., & Keller, M. (2014). How virtualization, decentralization and network building change the manufacturing landscape: An industry 4.0 perspective. *International Journal Of*, *8*(1), 37–44.

Dubois, A., & Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560. https://doi.org/10.1016/S0148-2963(00)00195-8

Fremont, V. H. J., Frick, J. E., Åge, L.-J., & Osarenkhoe, A. (2018). Interaction through boundary objects: controversy and friction within digitalization. *Marketing Intelligence & Planning*, MIP-04-2018-0135. https://doi.org/10.1108/MIP-04-2018-0135

Håkansson, Håkan. (1982). International marketing and purchasing of industrial goods : an interaction approach. In Håkan Håkansson (Ed.), *International Journal of Research in Marketing* (IMP Group, Vol. 1). https://doi.org/10.1016/0167-8116(84)90050-8

Håkansson, Håkan, Ford, D., Gadde, L.-E., Snehota, I., & Waluszewski, A. (2009). *Business in networks*. Retrieved from http://swepub.kb.se/bib/swepub:oai:DiVA.org:uu-114518?tab2=abs&language=en

Håkansson, Håkan, & Waluszewski, A. (2002). *Managing Technological Development. IKEA, the environment and technlogy* (Routledge, ed.). Retrieved from http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A71494&dswid=-7176

Håkansson, Håkan, & Waluszewski, A. (2007). *Knowledge and innovation in business and industry : The importance of using others*. London : Routledge.

Håkansson, Håkan, & Waluszewski, A. (2016). "Methodomania"? On the methodological and theoretical challenges of IMP business research. *IMP Journal*, *10*(3), 443–463. https://doi.org/10.1108/IMP-01-2016-0001

Iansiti, M., & Lakhani, K. R. (2014). Digital Ubiquity: How Connections, Sensors, and Data Are Revolutionizing Business. *Havard Business Review*, pp. 90–99. Retrieved from https://www.hbs.edu/faculty/Pages/item.aspx?num=48199

Kagermann, H., Helbig, J., Hellinger, A., Wahlster, W., & Helbig, J. (2013). Securing the future of German manufacturing industry Recommendations for implementing the strategic initiative INDUSTRIE 4.0 Final report of the Industrie 4.0 Working Group. In *Acatech*. https://doi.org/10.13140/RG.2.2.14480.20485

Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business and Information Systems Engineering*, *6*(4), 239–242. https://doi.org/10.1007/s12599-014-0334-4

Matthyssens, P. (2019). Reconceptualizing value innovation for Industry 4.0 and the Industrial Internet of Things. *Journal of Business & Industrial Marketing*, JBIM-11-2018-0348. https://doi.org/10.1108/JBIM-11-2018-0348

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis : an expanded sourcebook*. Sage Publications.

Preuveneers, D., Joosen, W., & Ilie-Zudor, E. (2017). Trustworthy data-driven networked production for customer-centric plants. *Industrial Management & Data Systems*, *117*(10), 2305–2324. https://doi.org/10.1108/IMDS-10-2016-0419

Roblek, V., Meško, M., & Krapež, A. (2016). A Complex View of Industry 4.0. *SAGE Open*, *6*(2). Retrieved from https://doaj.org/article/a09e1f59994c4091835e7d62d015de76

Sandvik. (2017). *Annual Report 2016*. Retrieved from https://www.home.sandvik/globalassets/annual-report-2016/home/sandvik-annual-report-2016.pdf

Ungerman, O., Dedkova, J., & Gurinova, K. (2018). The impact of marketing innovation on the competitiveness of enterprises in the context of industry 4.0. *Journal of Competitiveness*, *10*(2), 132–148. https://doi.org/10.7441/joc.2018.02.09

Yin, R. K. (2009). Case Study Research. Design and Methods. In *Essential guide to qualitative methods in organizational research* (Vol. 5). https://doi.org/10.1097/FCH.0b013e31822dda9e