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The effect of online tools on ties inside an organization's professional network

Avanthika¹, Sukumar²

ABSTRACT

This article takes a look at how business-to-business (B2B) transactions have changed as a result of digitalization, or the use of digital technologies and apps that are linked to the Internet by organizations. There have been a lot of research on the effects of digital technology on business-to-consumer transactions, but surprisingly few on business-to-business transactions. Drawing on the idea of company-to-company exchanges as consisting of activity linkages, resource ties, and actor bonds, this study proposes to classify "digitalization" into three distinct categories based on the kind of link that is most significantly affected. Here are five examples of digitization in various industries, along with five digital solution providers, to help you understand the three main categories. An alternative to studies based on the characteristics of B2B digital system users is this typology.

Keywords: B2B, Digitalization, Actors/resources/activities model, Business network

1. Introduction

With the proliferation of digital systems, business-to-business (B2B) organizations may now control, or at least assist in managing, their interactions with various network players (Richard & Devinney, 2005). How exactly these technologies are altering, or have altered, a company's relationships with its consumers, suppliers, and other players in the business networks is still up in the air. "Much less research has dealt with the impact of digital communications on the relationships between buyers and suppliers in industrial marketing," stated Obal and Lancioni (2013), in reference to the fact that most published research on customer-firm relationships in the digital age has concentrated on end users and consumer markets. section 851. A B2B-specific theoretical lens is necessary to understand the dynamics of change, its effects on connections inside and between businesses, and how to identify problems stemming from these changes. The study's overarching goal is to learn how digital technology affects corporate networks and, by extension, how digital age players co-create value. To better

compete in the dynamic digital economy and create new value for consumers and workers, we call this process "digital transformation" (Iansiti & Lakhani, 2014). This involves digitizing machine and service operations, organizational tasks, and managerial processes. The following is the outline for our paper. Within the theoretical portion, we demonstrate how the phenomena of digitalization redirects the emphasis towards coordination and how a network method may be used to study it. We find out how changes in a network may be represented in terms of changes at the level of activity linkages, resources ties, and actor bonds by drawing on the literature on the actor - resources - activity model (Hakansson & Johanson, 1992; Hakansson & Snehota, 1995). After that, we break down five examples of business-to-business (B2B) digitalization and examine them based on which B2B exchange layer—actor, resource, or activity—is most affected by digital technology. We provide a potential taxonomy of these digital shifts based on our investigation. The results have both practical and theoretical consequences for managers.

2. Theoretical background

2.1.1 *A network approach of the business relationships digitalization*

It is necessary to maintain strong alliances and establish a value network with the appropriate partners because no one actor can offer consumers an end-to-end solution in the digital market (Barnes, 2002; Canhoto, Quinton, Jackson, & Dibb, 2016; Sabat, 2002). One of the most important skills for new company players to have is the ability to manage partnerships (Dyer & Singh, 1998). (Pigneur, 2000). The consumer and business spheres are seeing structural changes in social connections as a result of digital technology (Orlikowski, 1992). More and more products and services include digital technology (think connected cars or smart home appliances), and it's getting harder to separate business processes from their IT infrastructures (see, for example, El Sawy (2003) and Orlikowski (2009)). In this respect, some scholars (Fine, 1998) have proposed to address the challenge of the digital transformation following the "three-dimensional concurrent engineering" framework adding value chain engineering to augment the traditional two-dimensional concurrent engineering of products and processes (Fleischer & Liker, 1997; Nevins & Whitney, 1989; Ulrich & Eppinger, 1994). This framework focuses on the need to engineer a value chain *simultaneously* with the engineering of the products/services and processes for providing value. Significant value can be created assessing the value of relevant knowledge residing at different points in the network and arranging its transfer to other points in the network where it is needed (Doz, 1996; Gulati, 1999). This implies exploiting resources that are made available through the network relationship (Gulati & Singh, 1998; Inkpen & Dinur, 1998; Kale, Singh, & Perlmutter, 2000; Khanna, Gulati, & Nohria, 1998). Digital business strategies are then calling for coordination across firms along product, process and service domains, thereby creating complex and dynamic ecosystems for growth and innovation (Iansiti & Lakhani, 2014). The whole value network is underpinned by a particular value creating logic and its application results in particular strategic postures. Adopting a network perspective (Burt, 2004; Gulati, 1995; Kogut & Walker, 2001; Marsden & Podolny, 1990) provides an alternative

perspective that is more suited to organizations, particularly for those where both the supply and demand chain are digitized (Peppard & Rylander, 2006). In recent years, there has been considerable discussion and research about the impact of digital business strategies on the evolution of supply chains into value networks and value constellation or ecosystems (Iansiti & Lakhani, 2014; Pagani, 2013). The concept of "value network" has constituted a shift between a traditional vision of value creation anchored in a value chain perspective (Porter, 1985) to a renewed vision of value creation supported by the network perspective (Kothandaraman & Wilson, 2001; Möller & Rajala, 2007; Parolini, 1999). Möller and Rajala (2007) building on Parolini (1999) precisely link the value network to a specific conception of how value is created and base the notion of value network on the idea that "each product/service requires a set of value creating activities performed by a number of actors forming a value-creating system", there the value network. Bitran, Bassetti, and Romano (2003), define a value network as one in which a cluster of actors collaborates to deliver value to the end consumer and where each actor takes some responsibility for the success or failure of the network. This framework agrees with the concept of value constellation introduced by Normann and Ramirez (1993). According to this perspective, the value-creating system is composed of different economic actors who work together to co-produce value. If value network has emerged as a central concept for research in digital contexts, scholars in industrial marketing have for a long time now promoted the use of a network approach to the study of B2B exchanges. This is the case with the Industrial Network Approach or markets-as-networks approach (Gadde, Huemer, & Håkansson, 2003; Håkansson & Snehota, 1995; Johanson & Mattsson, 1992; Mattsson, 1997) associated with the Industrial Marketing and Purchasing (IMP) Group. But, as far as we know, the network approach of markets has not been discussed with a purpose of reporting on the general transformation of markets due to digital technologies.

2.1. *Business relationships changed by digitalization: an Actor-Resource-Activity perspective*

The above-mentioned works all contend the idea that digitalization is profoundly changing the way business is carried out between companies. One important underlying dimension of the digitalization movement as analyzed by scholars is that it clearly refocuses on *co-ordination* between companies.

Peppard and Rylander (2006) already emphasized more than a decade ago the impact of digitalization on the decline of transaction costs (whether transactions happen *within* or *between* companies). In such situation, when the access costs to external resources are low, the "integrated firm" is not

offering any kind of specific benefit. Identifying external resources and having access to them becomes then the central issue. An issue that can be raised in terms of “coordination between companies”. More recently, Iansiti and Lakhani (2014) reaffirmed “coordination between companies” as a central issue with digitalization that is not a topic of “displacement and replacement but connectivity and recombination. Transactions are being digitized, data is being generated and analyzed in new ways, and previously discrete objects, people, and activities are being connected” (p. 93). We thus build on the idea of the centrality of the coordination issues when dealing with digitalization and propose to use a framework that allows a detailed understanding of how companies get connected. The Actor–Resource–Activity model (Håkansson & Johanson, 1992; Håkansson & Snehota, 1995) provides the adapted framework. The ARA model suggests that a business exchange can be described in terms of three “layers”: activity links, resource ties and actor bonds (Håkansson & Snehota, 1995). The model is able to capture “the complex connections between activity coordination and resource combining and the subsequent impact on the actor structure” (Mattsson, 2002, p. 169). ARA considers an activity as a “sequence of acts directed towards a purpose” (Håkansson & Snehota, 1995, p. 52). For instance, “developing a product”, “purchasing”, “selling”, “processing information”... are considered activities. Resources sustain activities. Activities can be raw materials, physical facilities, components, operating systems, products... in short, “various elements, tangible or intangible, material or “symbolic”, can be considered as resources when use can be made of them” (Håkansson & Snehota, 1995, p. 132). Then, Håkansson and Waluszewski (2002) classify resources into four types: products and production facilities (which are both considered as *technical/physical* resources); organizational units and organizational relationships (which are considered *social* resources). Actors interact with others to combine resources and link activities (Lenney & Easton, 2009). Actors in the ARA model can be individuals or organizations. The fact that a company can be considered an actor is to be linked to the idea that a company acquires an identity interacting with others (and not only because companies are considered – just like individuals – able to form intent, have purposes, be an agent). Based on the above-defined “activity”, “resource” and “actor” concepts, any B2B relationship can be described following the way activities resources and actors are connected

3. Methodology

3.1. Research design

between firms. First, companies are connected by *activity links*, which concern technical, administrative, commercial and other activities of a company that can be connected in different ways to those of another company as a relationship develops. The rationale for more adjustments between activities is clearly expressed as a gain in functionality: “the more adjustments, the more fine-tuned the two [activities] become in relation to each other and the better their performance” (Håkansson, Ford, Gadde, Snehota, & Waluszewski, 2009, p. 98). Yet, an excess of “linking” can also be detrimental as it impedes an activity to be reconfigured when new conditions arise (Håkansson et al., 2009, p. 127). At the level of the network, these connected activities shape an activities pattern.

Companies are also connected through *resource ties* that connect together various resources. Resource tying is the source of innovation: “resource ties cause some innovation in the use of resources and are important to the innovation potential of the company” (Håkansson & Snehota, 1995, p. 188). Yet, an excess of “tying” can have negative consequences by creating difficulties for the resource to be redeployed in a combination with other resources. At the network level, these connected resources form a resources constellation.

Finally, companies are interconnected through actors bonds that form a web of actors at the network level. Actors bonds are an important means for a company to mobilize other resources. Tightening bonds with a counterpart support a better access to information and resources. But, too much bonding can also be problematic as it “precludes interaction or bond formation with others” (Håkansson et al., 2009, p. 144).

These three layers of connection are not independent as there is an interplay between them. But the existence of bonds between actors is considered a prerequisite for the development of activity links and resource ties.

The evolution of a business network can be described in terms of changes affecting whether the pattern of activities, the constellations of resources of the web of actors. Activities can be changed by new adjustments and coordination. The resource constellations can be modified when new combination occurs, and the web of actors is modified with actors changing their relationships one with another.

In this paper, we focus on how digital technology impacts differently on the activity links, resource ties, and actor bonds.

The aim of this study is to analyze how IT in the different functional components of the traditional B2B value chain influences the relationships by focusing on bonds and bonding processes and transforming progressively the value chain in a value network. This research employs case studies and in-depth interviews as more practical data collection and analysis level tools. Building on an ARA (Hakansson & Johanson, 1992; Hakansson & Snehota, 1995) representation of business networks, we propose to analyze the changes provoked by digitalization according to which of the actor, resource or activity layer of the B2B exchanges is impacted the most. The explorative survey was conducted by interviewing personnel in global companies having different size and ownership characteristics. The 10 semi-structured interviews (Stake, 1995; Yin, 1993, 1994) were conducted with the digital marketing manager and/or equivalent. The specific criteria for company selection were to provide a mixture of high tech versus manufacturing companies with a global presence; and at least one whose future was closely tied to broadband communication. We applied a case study approach (Yin, 1994) as it is the approach suggested when researchers require deeper understanding, solid contextual sense, and provocation toward theory building (Bonoma, 1985). The companies belonged to five industries, all in the B2B: (1) chemicals and materials; (2) food and beverage; (3) healthcare and diagnostics (4) automotive, (5) insurance. We also conducted 8 semi-structured interviews with five companies providing digital solutions

3.2. Data collection

The main data source consists of interviews (Arksey & Knight, 1999; Kumar, Stern, & Anderson, 1993). The interviewees were accordingly asked to briefly describe the company and to focus on one or more specific functional components of the value chain impacted by the IT. After that, they were asked to highlight the key people and events in the relationships. Finally, they specifically discussed the IT employed and how it has shaped the relationship. The choice of informants was premised on the principle that information is best elicited from people who have knowledge of the phenomenon and who have been involved with the relationship. Altogether 18 semi-structured qualitative interviews have been done, each interview lasting an average of 1 h and a half. Interviews have been conducted with personnel inside each company in charge to implement a digital solution and in some cases also with the CIO. Key informants are critical to the

for businesses operating in 12 industries in order to explore further the impact of digital technologies. Reliability was based on a detailed case study protocol that documented the scheduling, interview procedures, recording, follow-ups, questions, and summary database. The research framework consisted of factors under the groupings of IT adoption, and utilization and the impact on existing activities and resources and the bonds with other players. In this paper, digitalization is considered as the companies adoption of IT-based solutions mainly using the Internet. Thus digitalization covers such things as EDI (Electronic Data Interchange) systems; websites; electronic marketplaces; extranets; electronic auctions; MRP (Manufacturing Resource and Planning) systems; ERP systems; RFID (Radio Frequency Identification) Systems; intelligent agent systems; etc. (Salo & Wendelin, 2013). In this paper, we use the ARA model (Hakansson & Johanson, 1992; Hakansson & Snehota, 1995) to identify the different types of changes provoked by the digitalization of one or another actor in a business network. The digital technology and the different systems and tools that are supported by this technology are – according to the ARA model – considered as a resource. If considered by itself, a resource has no value. Value – as far as resources are concerned – can only be created through the interaction of a resource with other resources. We thus propose to imagine the different “paths” the “digital resource” can follow and subsequently imagine different types of transformation brought by it.

success of case studies (Yin, 1994). The questions of the interviews were semi-structured in order to get the interviewee to answer the questions as completely as possible. The interviews were transcribed in order to get as much use of them as possible. Qualitative data analysis was employed in order to thematize the material (Miles & Huberman, 1984). Field notes of the reactions of people have also been made. Transcribing data and using field notes helped to achieve validity in qualitative research (Eisenhardt, 1989). The researchers had in some cases also access to confidential internal and external documents. In addition to interviews, documents, minutes of meetings, industry reports and internal documents provided by each company were also used to triangulate the respondents' answers, as suggested in the literature (Patton, 1987; Yin, 1994). The validity and reliability of the research were increased with the use of data triangulation

(Denzin, 1978; Eisenhardt, 1989). In parallel a dataset of 30 B2B companies which have adopted digital technologies we also created. 7 main factors of analysis were considered (Industry, Type of technology, Function impacted, Declared benefits/barriers, Means of transformation, Extend

4. Case description

Founded in 2000, SpecialChem is a business and technical network in chemicals and materials engaged through dynamic relationships. This platform plays three main functions: 1) content provider (Webinars, industry news technical information); 2) technology enabler (open innovation; universal selectors; training from experts); 3) knowledge partner (newsletter, innovation polls). SpecialChem is connecting together more than 500,000 profiled members including advertisers, innovators, marketers and business developers. On the one side, they are developing a community of experts in a specific field or topic. These experts join the community

of transformation) and 36 indicators. Companies included in the dataset belong to wholesale trade, advanced manufacturing, oil and gas, utilities, chemical & pharmaceutical, basic goods manufacturing, mining, real estate.

because they have a free access to electronic newsletters, patent monitoring services, technical articles and online support services allowing fast question & answer interaction with leading experts in many specific technical fields. This technical support service ("TechDirect") aims at answering questions within a period of 48 h. On the other side, they offer a Technology Scouting which aims at finding ready-to-use technologies used in external applications/organizations to solve an internal technical challenge (Fig. 1). Biomérieux is a company aiming at contributing to the improvement of public health worldwide through in vitro diagnostics. They

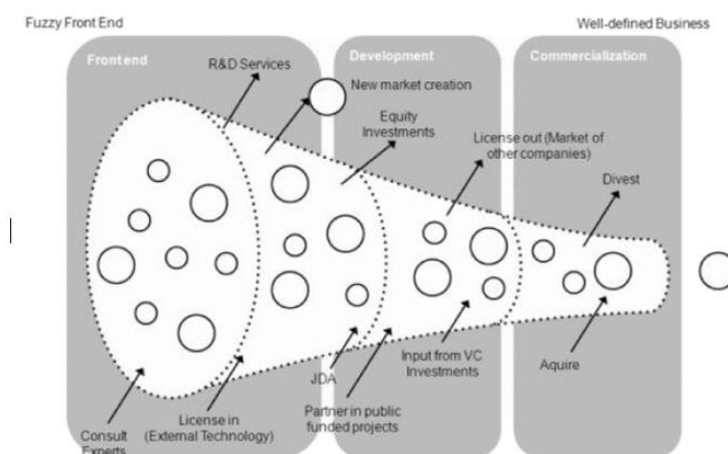


Fig. 1. The activities provided by SpecialChem in the B2B ecosystem. Source: SpecialChem 2015.

offer Business Solutions for the management of infectious & cardiovascular diseases and they take the first position in clinical & industrial microbiology. They offer an integrated end-to-end product (tests, instruments, reagents, software & services...). The adoption of the digital technology inside Biomérieux is based on the principle that customer experiences drive customer perception and it changes how B2B companies sell and service customers. The digital strategy adopted by Biomérieux is to offer an omnichannel experience to their customers keeping the face to face interactions as a critical phase of the transactions. Their digital strategy is aimed at 1) increasing brand awareness and recruitment "...leveraging all customer touch points websites & others, the web, email, FaceBook,

Twitter, Youtube, events sites" to promote the brand and increase recruitment; 2) driving market efficiency and empowering the sales force ("...with the right material for the right customer at right time on right device"); 3) maximizing customer loyalty ("...pro-vide customer online services that are accessible anytime, anywhere"). The Coca-Cola Enterprises is the B2B side of Coca-Cola. It manages a franchising system with 12,000 collaborators (bottling companies) in EU (4400 UK, 5200 NEBY, 3400 FR) and a total of 1,000,000 retailers across CCE territories. The mission of The Coca-Cola Company is to own the brand, produce syrup and define consumer marketing strategy. Bottlers work closely with customers - grocery stores, restaurants, street

vendors, convenience stores, etc. - to implement localized strategies developed in partnership with The Coca-Cola Company. They have a limited territory, produce the final product, define trade marketing (POS), sell and distribute products. The Coca-Cola Enterprises manage these complex relationships through a powerful CRM tool using new technologies and offering one customer view (through field sales activities, master data, reports, campaigns tool). The CRM system allows the company also to provide a useful Customer Portal (social media, website and mobile app) offering an efficient content to serve their ambitions and a connected system to optimize sell-out. The main benefits achieved can be summarized in 1) better customer knowledge, 2) operational efficiency, 3) cost improvement, 4) leadership vs. competitors (Fig. 2).

Volvo Construction Equipment (VCE) is one of the world's largest manufacturers of construction machines. It proposes a full range of machines: loaders, excavators, scrapers, compactors, etc. Ten years ago the customers were continuously calling the service team, and the company considered itself as being only reactive: *"we wanted to be proactive!"*. Customers want predictability on the use of the machines because preventive maintenance and predictable downtime are important factors of performance. Proactivity means *"having information about the use of our products"*. But that kind of information (how an operator uses a product) is not easy to obtain, whether because it is difficult to collect that information or because the operator does not want to describe a usage that sometimes does not follow the guidelines... (for instance, Volvo discovered that certain machine operators were using the reverse gear as a brake, or where overloading the loaders...). So the idea is to separate owners of the

5. Findings

The results emerging from the cases studies and the benchmarking were analyzed applying the ARA model in order to identify the different types of changes provoked by the digitalization of one or another actor in a business network. The digital technology and the different systems and tools that

machines from information on the machines. Machines are thus equipped with sensors and GPRS (mobile network) or satellite technology that are used to send information. In 2015 almost all machines are equipped and VCE now has *"...tons of information about a machine"*. Technology allows fault reporting and activity warnings; it facilitates remote diagnosis. For VCE the central idea is that the sooner problems are identified the faster they are resolved. Machine operation and deployment can be optimized via functions that monitor fuel consumption, location, hours of operation, speed, etc. Renault Trucks offers commercial vehicle users a large choice of innovative services and vehicles (from 2.8 to 120 T) adapted to a wide range of transport activities: local delivery, regional distribution, construction, long distance, special applications, and defense. Renault Trucks vehicles are sturdy and reliable with low fuel consumption that enables them to deliver greater productivity and control operating costs. They use SAP which allows them to follow the truck in the

manufacturing line, make invoices, analyze the sales, the productivity, margin. *"...we can do it globally, only for a country, or even only for a dealer"*. They are also implementing CRM allowing them to follow the activity salesman by salesman. *"...we can analyze the market by competitors, by bodies, by weight of trucks, by running park"*. For salesmen, this tool helps them to plan their prospection and contact their customer at a specific moment. The last IT tool that they are using is the apps and they offer some specific tools dedicated to the drivers to find easily the closest dealer, or to follow the truck consumption. We also have created specific apps for their sales force to help them on training, or on competitor knowledge.

are supported by this technology are – according to the ARA model – considered as a resource. We thus propose to imagine the different "paths" the "digital resource" can follow and subsequently imagine different types of transformation brought by it. We classify the



Fig. 2. CRM tool in Coca-Cola Enterprises.
Source: Coca-Cola 2015.

five cases we reported above, and the case study included in the benchmarking analysis, according to which types of “connections” between actors they

5.1. An activity-links-centred type of digitalization

In this first type of digitalization, the digital resource is used to *optimize already existing activities* by supporting a better (easiest, cost-less) coordination between them. We choose to call this digitalization an “activity-links-centred digitalization” because the primary impact of the digital resource is on the links between activities. Activities that are better coordinated thanks to the digital technology can be “internal activities” or “external activities” (activities between two business actors). For instance, an EDI system does not fundamentally change the nature of the activity between two actors (the exchange of information) but allows doing it in a more efficient way. On the other hand, an MRP system does not change fundamentally the operations of a company

5.2. A resource-ties-centred type of digitalization

This type of digitalization is mainly characterized by a digital resource supporting the creation of *new activities* carried out by *already existing actors*. We choose to call this type of digitalization of the network a “resource-ties-centred digitalization”. In that case, it is the combination of the digital resources possessed by one actor with the resources of another actor, which allows new activities to appear between the actors. This phenomenon leads to the emergence of digital ecosystems (different players collaborate to create value). Connected objects are able to communicate to the manufacturing company

are primarily modifying. We identify three main types:

but allows an effective planning of all necessary resources. We on purpose use the term “does not change *fundamentally* the activities” in the sense that activities are inevitably slightly modified, in different ways, by digitalization, but they can’t be considered “new activities”. The Biomérieux, Renault Trucks, and Coca-Cola Enterprises cases typically illustrate such a B2B digitalization. Biomérieux doesn’t change the sale activities but using digital devices to complete the B2B transactions allows a more efficient communication. Also Coca-Cola Enterprise, thanks to a digital CRM platform is now able to continuously monitor the clients and improve the relationship.

information about how they are used by the customer companies. On the basis of this information, the supplier is in a position to propose new services to the customers such as optimization of the use of products, training of operators, etc. This can be illustrated by the Volvo Construction Equipment case and confirmed by the two companies we further interviewed (IBM and Dassault Systems) providing digital solutions for businesses. For all these companies the digitalization represents a new resource (provided for example by companies as IBM or Dassault

System) which allows to transform traditional business generating new activities. Dassault Systems works with different industries providing digital solutions that integrate and change existing

activities (see digitalized diagnostic tools and augmented reality that allows doctors to explore the heart of the patient, 3D printing machines used to improve efficiency in different businesses, etc.).

5.3. An actor-bonds-centred type of digitalization

In this type of transformation, the digital resource supports new bonds between actors. We choose to call this digitalization an “actor-bonds-centred digitalization” because the primary impact of the use of the digital technology is to create new bonds between actors through a new actor taking a position in the network. In that case, the digital systems used by a new actor allow connections between actors that were not connected before or

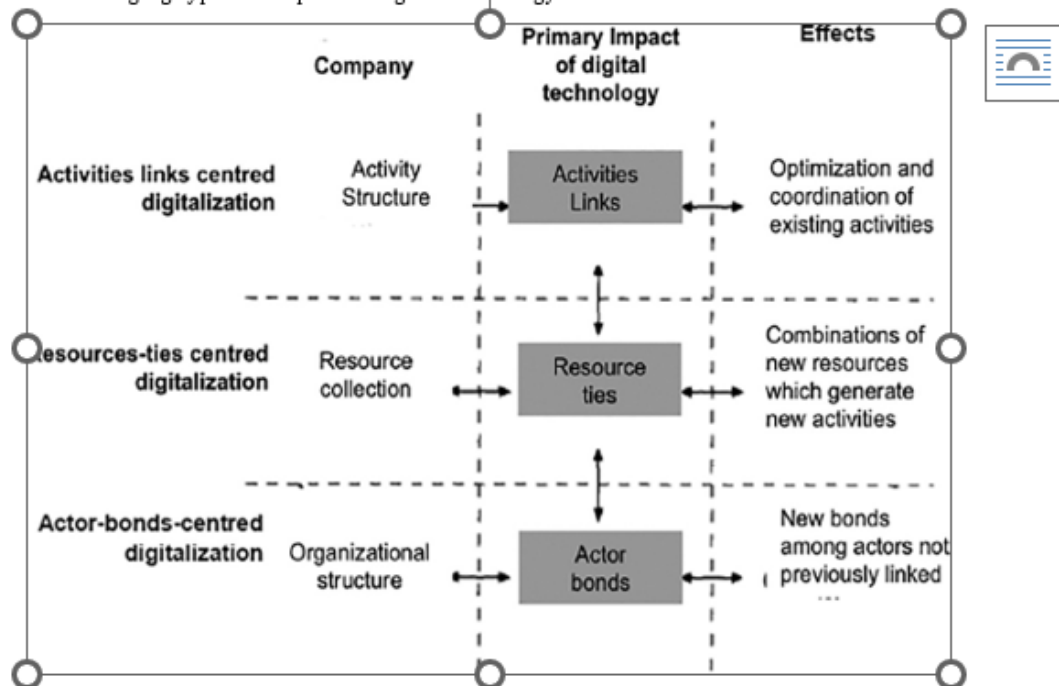
modify sufficiently enough the nature of the bonding. Take for instance a marketplace that uses the digital resource to allow selling and buying companies to meet (what they may not have been able to do in the absence of the marketplace). This can be illustrated by the SpecialChem case which offers to chemical companies the possibility to be connected with other similar companies and benefit from the knowledge sharing (Table 1).

6. Implications, limitations, and further research

Our work is based on the statement that digital technologies are progressively transforming B2B companies, though it remains rather unclear how the

relationships a company has with its customers, its suppliers or with other actors of the business networks are modified by these technologies.

Table 1
The emerging types of impact of digital technology.



We made a proposal to classify digitalization according to three types, and we discussed for each type how value is specifically created. We contend that classifying digital transformation according to

different types may contribute to a better understanding of the digital phenomenon within the B2B context.

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