

## **The Role of Artifacts In Shaping Service Markets**

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**Abstract (max 250 ord)**

Mundane services related to daily activities such as commuting, parking, paying, accessing buildings etc. are to an increasing extent partly provided by the use of a mobile phone. A new technology, NFC (Near Field Communication) extends the number of such services and affects market network structures and thereby contributes to shaping of service markets. The mobile phone can be seen as primarily an operant resource, interacting as an intermediary between other resources, both human and non-human.

*Purpose* – The purpose of the paper is to analyze how new mobile phone services based on a new technology standard might affect and be affected by market practices regarding these mundane services.

*Methodology and approach* – The paper is based on a set of previous, empirical studies (e.g. Andersson, Markendahl & Mattsson 2010) that have looked at how the mobile phone has a role as sorting device. The starting point for the discussion is the recently emerging market practice perspective (related to the STS, Science and Technology Studies). Especially, the paper considers normalizing, exchange and representational practices.

*Findings* – The paper shows that artefacts, like the mobile phone, affects various resource and actor constellations in networks. Various market practices, during the market shaping processes, may assign operant and/or operand roles to the “product” mobile phone.

*Originality/value*: The paper aspires to connect a *service dominant logic*, a business network approach, and service innovation studies when discussing the role of material artifacts in service processes. This is combined with a market practice perspective from Science and Technology studies.

**Category:** Research paper

**Keywords:** mobile, payment models, mobile service platforms

# **The Role of Artifacts In Shaping Service Markets**

## **Market Devices**

Science and Technology Studies (STS) have introduced the idea that market devices play a crucial role in the shaping of markets. In their “Introduction to market devices, Callon, Muniesa and Millo (2007) describe its usefulness in the study of market and economic activities and concerns: “We believe that the notion of ‘market device’ – a simple way of referring to the material and discursive assemblages that intervene in the construction of markets – can be useful in addressing these concerns. After all, can a market exist without a set of market devices? From analytical techniques to pricing models, from purchase settings to merchandising tools, from trading protocols to aggregate indicators, the topic of market devices includes a wide array of objects. As crucial as market devices are in practice, they have often been overlooked by social scientists.” (p.2). In line with this, Muniesa (2008), states that market devices play a crucial role in the formation and deformation of economic configurations, but the role that they play can be ambiguous (p.291). He builds on the idea of actors in general, being: “compound arrangements, artificial beings mixing persons and things, but mixing them in a way that allows them (the resulting agencement) to act in a particular economic way.”(p.292). Using the example of financial markets, he directs attention to one important market device, the telephone.

## **The Mobile Phone as a Market Device**

In a similar fashion, in this paper we draw attention to a similar market device and its role in the formation of markets, the mobile phone. During the last two decades, the mobile phone has become a central device in the daily lives of billions of individuals, successively replacing, co-existing or complementary to other devices: fixed phones, music players and other entertainment devices, calendars, wrist watches, calculators, note books, and more. Instead of seeing the mobile phone as a passive medium for a constantly increasing number of new, added services and activities, we continue in the footsteps of e.g. Mallard (2004) and Muniesa (2008). The paper - rather than considering the mobile phone merely as an instrument serving human interaction, a tool for voice calls, SMS traffic and other activities - draws attention to certain technical features of the mobile phone and associated actions and how they affect the shaping of markets.

A large number of heterogeneous entities participate in creating this new situation and the central, but ambiguous, role of the mobile phone as market device. To consider the mobile phone (and its user) to be the central source of an increasing number of actions, implies that a large number of heterogeneous entities are engaged and participate, and hence are channeled to this market making device. In line with Callon (2008), we can conceive of sequences of action that converge, here to the consumer and her mobile phone. At the center of this complex, collective action and distributed agency we find an individual with a device that becomes a tool for her actions and interactions. We also find a technical device which is constantly changing, and hence, is suggesting new ways of acting. The changing wireless and wireline information and communication technologies generate new connections, interactions and networks for the mobile phone user, but they also have a role in configuring and re-configuring the associated economic ordering and markets. In the paper we address the role of

the mobile phone as a market shaping device, and the role of new emerging technologies in the process of converging successively more actions to the mobile phone and its user.

### **Purpose and Outline of the Paper**

*The purpose of the paper is to analyze how new mobile phone services based on a new technology standard might affect and be affected by market practices regarding these mundane services.* Hence, we explore the market shaping role of a material device, the mobile phone, when technical innovation and service innovation interact. In addition, various market practices, during market shaping processes involving the mobile phone, may assign operand and/or operand roles to the “product” mobile phone. The aim is also to *introduce a market practice approach* to the study of these processes.

Mundane services related to daily activities such as commuting, parking, paying, accessing buildings etc. are to an increasing extent partly provided by the use of a mobile phone. A new technology, NFC (Near Field Communication, described below) extends the number of such services and affects market network structures and thereby contributes to shaping of service markets. The mobile phone is an element, interacting in resource constellations that provide value in the performance of the daily activities. The mobile phone can be seen as primarily an operand resource, interacting as an intermediary between other resources, both human and non-human.

The theoretical aim of the paper is to the discussion on a *service dominant logic* when we discuss the role of material artifacts in service processes. These involve *networks of actors* and the new ICT technology involves service innovations (relating also to service science). Seeing the mobile phone as an important intermediary in these networks, we aspire to connect these service research related themes to theoretical approaches in marketing and sociology for which *intermediaries* and *intermediation* and *assortment* and *sorting processes* are important structure and process phenomena. In sociology we relate to STS (Science and Technology Studies), that, originating in studies of science and technology practices has been applied to and to an increasing degree inspired studies of *market practices* by scholars in both sociology and marketing. (The starting point for our discussion is the recently emerging market practice perspective related to STS, see e.g. Araujo et al., 2010). We also relate to functionalist marketing theory, as represented by Alderson (e.g.1957).

The outline of the paper is as follows: We begin by a brief presentation of the data sources, followed by an introduction of our market practice approach. The theoretical framework is then introduced. This is followed by the empirical introduction of the new technology in focus, NFC, assumed to open up for a wide set of new mobile services. Finally, the framework is applied in a discussion of the new, emerging, NFC based services. The paper is mainly conceptual, suggesting some roads ahead for the study of service innovation processes in networks and the emergence of new service markets. It also connects to discussions on a service dominant logic.

### **Data Sources**

This is basically a conceptual paper, but it is based on a set of previous, empirical studies (e.g. Andersson, Markendahl & Mattsson 2010; 2011) that have looked at how the mobile phone has a role as sorting device, changing connections between service markets such as personal

transportation, parking, paying, buying etc., thereby also changing the opportunities for new service business ventures, new cooperative and competitive network structures. Background material has been collected from mobile technology specific web sites and from white papers and specifications presented by industry associations and organizations. (These include: MobeyForum, NFC Forum, GSM association (GSMA) and European Payment Council (EPC)). We have also collected information on ongoing NFC projects and trials with NFC services.

Industry analyses has resulted in a large number of industry descriptions and representations on “what might happen and how it might work” in the near future. Several of the industry organizations were early to provide visions of the new technology and the new innovative services and systems that would result from it. The market descriptions presented in the white papers entail many types of cooperating actors; banks, credit card companies, mobile operators, mobile service providers, trusted third parties, specialized service providers – all connected in networks, often labeled “eco systems”. Our analyses of the secondary data includes a comparison between these different types of market descriptions of the industry associations (the maps and associated descriptions) where the focus is on the business roles that can or need to be taken by various new or established *intermediaries*.

### **Methodological Approach: Introducing a Practice Turn on the Study of Service Markets**

We suggest that to learn more about market shaping processes a *practice perspective* is useful. We introduce a general ”practice turn” (Schatzki et al. 2001), a practice based perspective which puts in focus what business people actually do in practice. We relate the practice approach to the management issues in focus in the paper, how services, artefacts, networks and markets are shaped and reshaped in business practice. A “practice turn” on markets is introduced. Our argument is that by linking a general practice perspective on business interactions in service markets we may achieve a better understanding of such markets emerge and are shaped.

Schatzki et al (2001) introduce their edited volume on ”the practice turn in contemporary theory” by stating that: “It is through action and interaction within practices that mind, rationality and knowledge are constituted and social life is organized, reproduced and transformed. During the past two decades, practice theory has emerged as a potent challenger to prevalent ways of thinking about human life and sociality, which have until now focused either on individual minds and actions or social structures, systems and discourses.”(p.1) Varied reference to practices can be traced to a diverse set of disciplines and practice theorists are making decisive contributions to contemporary understandings of diverse issues, as described e.g. by Schatzki (2001, p. 10).

A central idea is that practices are embodied, often connected to shared skills or understandings, and are materially mediated, or as stated by Schatzki: ”Practice theory also joins a variety of ’materialist approaches in highlighting how bundled activities interweave with ordered constellations of nonhuman entities.”(p.12). Transferred to our focus on service markets, service innovations and business interactions, the implications of a practice approach is consequently that business individuals, interactions, actions, systems, institutions, and structures can only be studied via the field of practices, as they are all embedded in practices.

### *A market practice approach*

Also in various marketing science fields, the practice perspective has been applied in a set of studies (e.g. Araujo & Kjellberg 2009). An important part of this research emerging research stream is based on researchers belonging to the IMP Group. An edited volume, entitled “Reconnecting marketing to markets” (Araujo et al. 2010) give evidence that marketing practices shape (perform) markets and especially that formal and informal theories, calculation and various types of measurements and classification schemes, often linked to interaction between humans and non-human artifacts are important (Callon et al, 2007). The empirical studies cover a wide variety of markets and types of processes, changing and stabilizing markets, without however explicitly treating managerial handling of time/space interdependencies.

To analyze market practices it is possible to draw on the conceptual model proposed by Kjellberg and Helgesson (2006) distinguishing three broad subcategories of market practice: exchange practice, representational practice, and normative practice (see Figure 1).

*Exchange practice* refers to the continuous activities that purport to temporarily stabilise certain conditions (the parties to the exchange, the exchange object, the price, the terms of exchange) so that an economic exchange becomes possible. This includes both highly idiosyncratic activities and more general ones that go into creating a specific economic exchange. We can interpret, for our purposes, the concept also to include practices of a “strategic action” nature such as market entry, establishing and breaking exchange relationships, etc.

*Representational practice* refers to activities that contribute to depict markets and/or how they work. In order to speak of the market for a certain type of good, it is necessary to bridge temporal and spatial distances between individual exchanges. Representational practice is therefore just as fundamental to shaping markets as is exchange practice. The “network theory” concept referred to in IMP research is an important aspect of representational practice. In the case of environmental and sustainability issues, the representational practices that organizations engage in through interactions involve not solely the creation of “commercial markets”, but the creation of pictures – representations - of the issues, the geographical regions that should be involved (i.e. what parts should be encompassed in “the Baltic region”), of the actors and networks that should be involved, et.

*Normative practice* refers to activities that contribute to establish objectives for how a “market” (in our case, the market will be an environmental situation and network) should be (re)shaped or work according to some(group of) actor(s). It reflects the observation that many attempts are made to affect the situation in specific directions. Some examples are reforms, general rules of competition and strategic planning performed by individual firms, etc.

The practices that contribute to shaping these market situations are linked to each other through chains of translations involving various intermediaries (Callon 1998). Thus, normative practice may produce rules and tools that become employed in exchange practice, as well as indicate measures and methods of measurement to be used in representational practice. Representational practice will produce both market descriptions that can be drawn upon in normative practice, and different types of results that feed back into on-going exchange practice. Exchange practice, finally, enter into representational practice through more or less systematic measurements and into normative practice through the interests it creates among (groups of) actor(s). Thus, we can assume that the construction of markets associated with new innovations in services will encompass not solely economic exchange

practicess but be intertwined with representational and normative practices in the interactions between the involved actors. We can also assume that the early stages of interactions will involve much interaction around both common and diverging representations, pictures of the situation and issue, of industry norms, and of existing and new exchanges.

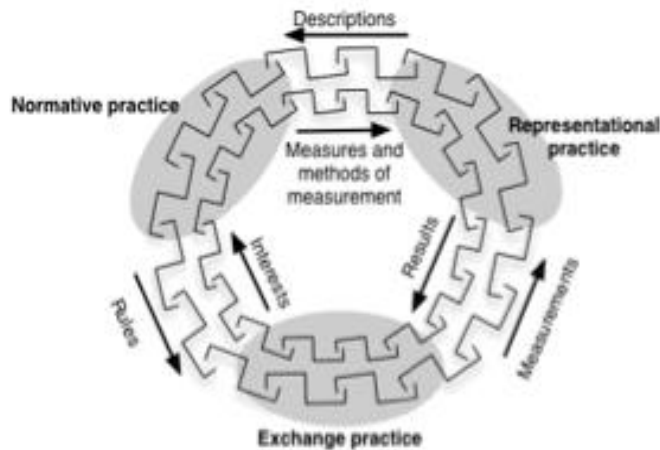


Figure 1. Market practice as exchange, representational and normative practices linked in chains of translations ( Kjellberg and Helgesson 2006; 2007).

With the market practice model as background, we next introduce our theoretical framework.

## Theoretical Framework

### *Focus on "intermediaries"*

From a theoretical and conceptual point of view, multiple scientific fields converge in the *intermediary* concept. We draw attention to the mobile phone as an intermediary sorting device. Here, the mobile phone can be viewed as a new intervening intermediary. Here, we will take the intermediary concept as the common denominator when linking ideas from service science to marketing and to the sociology of science and technology. Although used in different ways and from different historical backgrounds, there are some apparent complementarities between these different fields:

With the starting point in marketing science and Alderson's (1957; 1965) conceptualization of the intermediary concept (and its links to *sorting* processes and *assortments*), his ideas provides a clear link to the functioning of *markets*. According to Alderson (1957) the advanced marketing economy is characterized by intermediary sellers who intervene between the original source of supply and the ultimate consumer and the number of and character of these intermediaries is determined primarily by the requirements of sorting and by the opportunity to effect economics by suitable sorting arrangements (p.211).

Secondly, in line with the markets-as-networks tradition (Johanson & Mattsson 1992) in industrial marketing certain daily consumer situations involving a mobile phone embrace elements of long-term relationships between organizations across what some economists

might define as “industrial sectors” or markets. Strong interdependencies and complementarities develop between the organizations and constellations involved in facilitating consumer’s use of mobile phones and services. Unique and heterogeneous constellations of organizations emerge for his different activities, held together by long-term interactions. Interdependencies create situations where the industrial networks become drivers for continuous change (Mattsson 1998). In the middle of these processes, consumers and their mobile phones become important intermediaries for connecting activities in networks. The market as networks perspective provides substance to the concept in terms of deepening the understanding of the complexity of the exchange practices and of the positioning of intermediaries in markets as networks.

Thirdly, Science and Technology Studies (STS), or sometimes labeled sociology of science and techniques (e.g. Latour 1987), studies science and techniques in the making, not as an end result. Materiality is an important aspect of the actors in STS research. Human actors are equipped with material and immaterial devices that participate in and affect the outcome of the scientific process. Agency is also allowed non-humans. In line with Callon (2008), we can conceive of sequences of action that converge to the consumer and her mobile phone. Agency in these complex systems is highly distributed. At the center of this complex collective action and distributed agency, there is an individual with a phone that becomes a device used for her actions and interactions. The phone is a technically advanced and complicated device that is constantly changing, and hence, is suggesting new ways of acting. In their introduction to an edited volume on market devices, Muniesa et al. (2007, p.2) believe that the notion of ‘market device’ is useful in addressing various issues concerning markets but that despite being crucial in practice they have often been overlooked by social scientists. In line with this, Muniesa (2008), argues that market devices play a crucial, albeit ambiguous, role in the formation and deformation of economic configurations.

To sum up, the mobile phone is a resource that in the hand of actors is used to perform activities. When technical change enables the mobile phone to perform other activities than before, this has network effects, and, in our terms contributes to shape the market. Also the industrial network approaches to market studies, highlights the role of intermediaries and intermediating which makes it suitable to understand the role of the mobile phone that by its very nature has an interconnecting function. It is involved in economic organizing in which the mobile phone has a central role to organize economic transactions and communications. In terms of distribution theory in the marketing literature, the mobile phone can be viewed as an “intermediary” or “middleman”, where the function of “sorting” appears as a central one (Alderson 1957). The consumer and her mobile phone becomes a “mediator” (Latour 2005) in this matching process (Alderson, *ibid*), partly transforming, translating, modifying (maybe sometimes also distorting) the input turned into some form of output. Intermediators in the distribution literature always are in Latour’s sense mediators.

#### *Intermediaries and operant and operand resources*

Intermediators in the distribution literature always are in Latour’s sense mediators, that is have an active role to transform. The idea of the consumer and her mobile phone becoming an active, transforming intermediary resource (a “mediator” in Latour’s terms) or a more passive



”intermediary” (according to Latour’s definition) in this matching process partly transforming, provides a link to Vargo & Lusch’s (2004) reasoning on the roles and logics of *operand and operant resources*. According to a service dominant logic goods are transmitters of operant resources (embedded knowledge), they are intermediate “products” that are used by other operant resources (for example mobile phone users/customers) as appliances in value creation processes. Instead of viewing the customer as a passive receiver (or intermediary), the customer is primarily an operant resource. The customer is primarily an operant resource, and active participant in relational exchanges and coproduction, in Latour’s terms, acting more as an active, transforming and translating mediator. Value results from the beneficial application of operant resources sometimes transmitted through operand resources (Vargo and Lusch, *ibid*). Hence, when we speak of the mobile phone as a (service) market shaping device, we can assume that depending on what role the consumer and her mobile phone (in associations with other artefact and resources) takes as more ”active” operant resource or ”passive” operand resource will have effects on their role as mediator or intermediary in their networks.

Summary of our theoretical framework for analysis of the mobile phone as a market shaping device:

*Alderson’s functionalism:*

The function of the market is to enable exchanges by which heterogeneous supply and heterogeneous demand match. This is achieved through a sorting process in many stages where intermediaries build and transform assortments of goods and services.

*Industrial network approach:*

The market functions as a dynamic network connecting directly and indirectly interdependent actors, activities and resources. Indirect interdependence makes the notion of intermediary and intermediation important.

*STS related practice studies:*

The market is performed and shaped in processes that are seen as practices implemented in marketing collectives. Material and immaterial devices are important components in such practices. The process aims at stabilizing the outcome of a change process and involves intermediaries and intermediation. The stabilization process is affected by ambiguities that may create tensions and conflicts among involved actors.

*Service dominant logic approach:*

In markets there are operand and operant resources. Goods are transmitters of operant resources (embedded knowledge), they are intermediate “products” that are used by other operant resources (for example mobile phone users/customers) as appliances in value creation processes.

## **Empirical Background: A New Technical Standard - Near Field Communication (NFC)**

Our empirical material comes from a study of a new, partly “disrupting”, wireless communication technology, Near Field Communication (NFC). NFC is defined as a short-range high frequency wireless communication standard. It enables the exchange of data between devices over short distances. One common use example described is a contactless electronic ticketing system used in public transportation such as subway or in buses. Upon entering the subway station, the customer sweeps a mobile phone, equipped with NFC-

technology, and a prepaid refillable plastic card over a surface containing a reader/writer that charges the card. Ease of use and speed as well as lower operating cost for the infrastructure operator are often quoted benefits and customer value by actors in the mobile phone industry. Mobile phone NFC is an emerging area for NFC technology and NFC mobile services spread in the contactless infrastructures.

The diffusion of NFC based mobile services has directed attention also to the need for extensive collaboration between industries previously not directly engaged in joint activities and markets, including telecom operators, banks, credit card companies, transportation companies, restaurant chains and super markets to name a few. Existing NFC applications include for example identification (student/employee ID cards, e-keys), ticketing (e-ticketing, public transportation tickets), payment (e-money, online payment), marketing (tokens, advertisement), loyalty programs (points/coupons/stamps), access services (electronic locks, etc.), and more.

NFC technology can potentially reshape the markets for many every-day “mundane” services. Building on predictions, hopes and marketing efforts among proponents of the new technology, a typical day in the life of an NFC mobile phone user as described in the box below, indicates how the industry actors perceive the way in which an NFC enabled mobile phone could be integrated into everyday life of a typical mobile phone user (adapted from research report 2009).

*The mobile phone user gets on a train to go to her office and uses her NFC mobile phone to pass the gate. She sees a poster announcing a free concert this evening. She touches her NFC mobile phone to the NFC mark on the poster and transfers the detailed information onto her phone. She reserves seats for the concert with her mobile phone, using mobile communications (e.g., SMS, internet), and the complimentary tickets are sent to her mobile phone. She sends a text message to her husband to invite him to the concert and dinner. When he arrives at her office, she touches her NFC mobile phone to the office gate and opens the door. At lunchtime, she pays for her meal using one of the credit cards stored in her phone. After lunch, she visits the office of her new business partner for a meeting. Those attending the meeting exchange their business cards stored in their NFC mobile phones by touching their phones together. She meets her husband at 6 PM, and they go to the concert venue. She touches her NFC mobile phone to a turnstile at the entrance to the concert, their reservations are confirmed, and they are admitted. They visit a shopping centre after the concert, where they go shopping and have dinner and pay with the credit cards stored in their phone. When they arrive at their house, she realizes that she has left her NFC mobile phone on the train. She immediately calls the mobile network operator and makes a request to disable all active NFC services in the phone. If her NFC mobile phone is later found, she will be able to reactivate these services. (Adapted from NFC white paper by NFC Forum 200X)*

Although these are still mostly predictions, NFC is already established as a new technical standard. Actors in several different “markets” have begun to adopt the new technology. However, for these markets and for the mobile phone users’ actions to converge in the mobile phone, a number of heterogeneous participating entities have to be mobilized and (re)organized. New connections and interaction need to be established. In line with Muniesa’s (2008, p.292) observation of the role of the telephone in financial markets, instead of considering the mobile NFC phone as a passive medium and device we draw attention also to the way in which the phone’s technical features - including alternative technical features and

solutions - shape the functioning, connecting, and demarcation of markets, whether banking, mobile telephony, transportation or other markets involved in the new technology. Different alternatives will have significant, and different, implications for the shaping of the associated markets.

### **Discussion: Market Practices, Market Devices, Operant Resources, and the Shaping of New Service Markets**

Our analysis refers to the theoretical framework and to the empirical section. In the analysis we focus on intermediaries and intermediation, two important constructs for the analysis. The mobile phone is an intermediary in the Aldersonian sorting processes, an intermediary affecting interdependencies in industrial networks, an intermediary in market practices as well as more generally in social and technical processes. Latour (2005) makes a distinction between “intermediators” and “mediators”. Intermediators are passive agents for exchange of material or immaterial objects. Mediators actively transform the attributes of the objects and their connections to other objects. In line with literature on distribution, both in the functionalist (Alderson 1957) and the industrial network perspective (Snehota and Gadde 2001) we see intermediaries as mediators in Latour’s sense, actively transforming elements exchanged. Depending on what role the consumer and her mobile phone (in associations with other artefact and resources) takes as more “active” operant resource or “passive” operand resource will have effects on their role as mediator or intermediary in their networks.

We begin with the role of the mobile in shaping the assortment of mobile services and then analyze

#### *1. The shaping and framing of devices*

Devices and organizations compete in the processes for status as intermediary devices. Like the mobile phone can be a device shaping new emerging markets, we have seen apparent signs of the opposite. That is, devices like mobile phones are strongly affected by other actors’ attempts to reshape them, to a better fit with other representations and norms related to new, emerging ideas about exchanges. Market shaping processes actively try to re-shape the device, its definition and representations, its internal structure and external links to other devices, and its role as intermediary and sorting device. It can be anticipated that as mobile payment services and systems become more widespread, we will also see how consumers will take a more active role in processes of re-shaping the device.

#### *2. Consumers’ role in the continued re-shaping of exchange practices.*

In this article focus has been on emerging new technology and services, and on the normalizing and representational practices by industry associations that create new “maps” of the emerging industrial landscapes and technology infrastructures. These include also ideas of how consumers could (or even should) benefit from new mobile payment services. Next, if and when mobile payments take off, to increase our understanding of the mobile phone as a market shaping device we should study how the exchange practices are affected by consumers’ representative and normalizing practices.

### *3. Shaping assortments*

A mobile phone provides an assortment of services, determined by technical features, what service applications that suppliers and consumers download and the infrastructure in which the mobile phone is embedded. In Alderson's terms through "assorting", unlike supplies are put together, to provide an assortment available for users. Actors compete and/or cooperate in promoting different technical solutions that affect assorting and how to attach complementary activities to these alternative solutions. The assortment of services available by the use of the phone changes over time. The market shaping processes continue, and attempts to re-shape the mobile phone and to mobilize it as an intermediary, sorting device for an increasing number of services, that might be perceived to belong to "different markets" continues. Also two other Aldersonian sorting processes are engaged. From collections of similar services, e.g. of payments, or of ticketing, such a service is "sorted out" and attached to assortments composed of unlike but complementary services. Furthermore, through "accumulation", individual service processes might be aggregated by the use of the phone such as data flows between consumers, mobile operators, and financial actors, and others. Technology, involving artifacts within and outside of the shell of the mobile phone have a central role in these sorting processes, and how mobile services in general and the user's activities become attached to or detached from her mobile phone. What networks of cooperating firms that will be connected to the mobile in the hands of the user for the user's daily activities will be intertwined with "the technical solution" that (temporarily) will dominate the phone. To sum up, processes of mediation and sorting, engages the mobile phone in "market agencements" (Callon 2007), as it becomes a device for attaching "things" (e.g. services) to the device. This process is embedded in dynamic networks of inter-organizational interactions in which new and established intermediaries take on new roles in economic organizing.

### *4. Sorting devices*

The mobile phone as a sorting device directs attention to the ambiguities, and to the tensions, struggles and contradictions around the assorting aspects of sorting (Alderson 1957), when several "sellers" concurrently strive to affect these processes by framing what activities and technology (SIM card, etc.) that should be associated with the phone. Hence, sorting processes and the associated devices form together an important part of the shaping of markets. "Competition" in these market shaping processes, what dominating network constellations of companies that will be linked to the buyer and her phone, is in many ways a strive to associate large sets of actors and activities to competing and complementary technologies related to these "sorting devices", here the mobile phone. Devices that are part of these sorting processes can, as has been described, be given central positions as attractors of activities and actors in the networks, serving important roles as intermediaries. Here, we have focused on the role of the mobile phone and on the associated industry actors in the sorting processes of shaping assortments. Future studies should take into account the role of consumers and their devices in the sorting processes. That is, when moving from the industry actors' representations of the consumers and their anticipated behavior in relation to the new services, to the actual situation when consumers equipped themselves in their exchange practices engage to affect the processes of sorting.

## 5. Market Shaping Practices

The empirical study indicates efforts to re-shape the role of the mobile phone in market practice, thereby shaping the market. We will discuss this with reference to the framework suggested by Kjellberg and Helgesson (2007) that recognizes three interdependent practices (normalizing, representational and exchange practices). The actual use of the phone in exchange practice is dependent on and interacting with the other two practices. The idea of the mobile phone as not only, or even mainly, a “phone” but as a potential “wallet”, came to dominate the interactions regarding mobile payments, and was given priority over the somewhat less complicated processes to give the mobile phone other new roles e.g. as “key”, “ticket”, “information reader”. Efforts to turn the phone into a more complex intermediary, a “sorting device” to an important extent concerned negotiations on the role and the organization of the very heart of the phone. Such efforts to reshape the technical aspects of the device, and thereby also affecting the market shaping role of the phone are: 1) Re-organize the market shaping devices and *their mutual interaction* in relation to each other. For example, the mobile phone needs to be able to communicate and interact with databases handling tickets, 2) *Completely new market devices need to be created* with which the existing devices can interact and communicate, e.g. NFC prepared readers, 3) *The roles of other market devices, which the focal device assumes, might have to be re-organized*. For example, a consumer needs to re-organize her assortment of devices as she substitutes existing keys, access cards, credit cards, wallet etc., with the mobile phone, and 4) The device might also have to be *re-organized internally*, and some components have to be replaced by others, or single components re-organized. Or the internal components might have to be replaced by components outside of the device, taking over certain functions. The discussion above about security of payments provides examples of that.

The effect of such re-organizations efforts of devices can be substantial. Technical objects can become central intermediaries in techno-economic networks, being awarded powerful capacities to re-shape markets<sup>1</sup>. In our case, the network can be read in the “assortment” that successively is being associated with the technical object or device. It becomes a “sorting device” with the ability and power to connect and disconnect different networks of actors in markets. For the “sorting device” to be able to assume the role to attract and link different “markets” with different “industrial logics” (telecommunications, banking, access, etc.), it needs to be able to manage both diversity, cooperation (and competition). We will therefore discuss how the phone as sorting device might affect perceived market classifications and market boundaries. The efforts to turn the mobile phone into a device for “sorting” and the building of new service assortments embrace efforts to create and manage the mobile phone as an intermediary. In order to develop and maintain coherence across the intersecting worlds – i.e. different markets with different industrial logics and different underlying infrastructures and knowledge systems – a key process was how to re-organize the device. Many attempts are

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<sup>1</sup> “This capacity of technical objects to distribute roles to humans and non-humans (in more or less constraining and explicit way) and to link them together (that is to say, to create a network) means that they can be assimilated within programmes for action which necessarily produce literary record, even if these may take various different forms. Here again, the network can be read in the object.” (Callon 1992, p. 77)

made to reshape its *material* constitution; linking it to other, old or new devices, re-organizing and re-making its general construction, re-organizing and managing its various components. Also its conceptual representation is discussed. What is this material device? Is it still a “mobile phone”, or is it a “mobile wallet”, or both, or maybe something else? We argue that such ambiguities regarding the conceptual representation of the device emerge and will affect market practice in all its three aspects.

### **Concluding words**

With the general idea that the mobile phone can be viewed as a material “market shaping device”, the paper took its starting-point in descriptions of how the mobile phone is becoming part of processes shaping the emerging markets for many new mobile services. Special attention was drawn to how the shaping of markets and organizing of economic activities are associated with various forms of “intermediaries”, among these also material devices like the mobile phone. The paper introduced central concepts in marketing theory and in sociology of science and technology studies, which were combined with ideas on operand and operant resources according to the service dominant logic perspective. To conclude this discussion, we summed up the analysis by commenting on some of the main findings, which at the same time have opened up for a set of new issues.

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