

Product-Service Systems across Life Cycle

The relevance of managerial cognition for IPSS business model development

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Abstract

Facing the potential advantages and specific challenges of IPSS business model development we refer to a critical field for its succession: the hindering and supporting influence of managerial cognition. Related to microfoundations in dynamic capability research, we analyze for the development of IPSS how managerial cognitions influence a firms' capability to realize new business model opportunities and to seize and reorganize its resources in order to take advantage from these opportunities. We apply the research on managerial cognition to the field of IPSS. Our empirical exploration is based on a qualitative case study analysis, comprising of interviews and cognitive mapping. We discover managers' cognitions concerning new market opportunities, their perception of the necessity to change and their coping patterns for resource allocation. Our key finding is that IPSS are not primarily considered as opportunities but rather threats with different strategies of coping mechanisms. There is a high consciousness for increasing sensemaking activities inside and outside the organization to adopt to new ways of value creation.

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Peer-review under responsibility of the scientific committee of the 8th Product-Service Systems across Life Cycle

Keywords: Managerial Cognition, Competitive Theory, New Business Models

1. Introduction

Recent research highlights the potential of new business models related to solution selling instead of product selling. Integrated Product-Service-Systems (IPSS) are considered as especially promising for rather traditional manufacturing or production-oriented companies in order to sustain competitive advantages through new ways of lifecycle management based on service-led growth activities [1,2]. Despite its potential benefits IPSS business models also raise tremendous challenges for organizations [3,4,5]. Even though the competitive advantage could be demonstrated in theoretical outlines or business simulations the level of development in practice is lacking behind. There is an obvious demand for future research to explore the underlying reasons.

IPSS research to this point concentrated predominantly on the tangible layers of business models, neglecting the intangible layer such as the cognitive meaning structures [6,7]

Managerial cognition in its overall relevance for business development is a rather new field of management studies [8]

that came up with the microfoundations movement of the dynamic capability view (DCV) (see also [9,10]). It gives emphasis to human agency in strategic management. Even though Tikkanen et al. [7] mentioned managerial cognition in their relevance for IPSS development a decade ago, there is so far no systematic theoretical and empirical foundation in this field of research. This is the reason why we focus on managerial cognition in the field of IPSS research. Our aim is to specify the managerial prerequisites for realizing the potential of IPSS business models.

2. Definitions and Theoretical Background

Managerial cognitions are a specific field of analysis from the microfoundations movement contributing to the leading paradigm in competitive theory, the DCV. Dynamic capabilities describe a firm's ability to identify new market opportunities, the seize the resource base according to new opportunities, e.g. by setting new goals, and to reconfigure the resources and find new ways of resource allocation in order to

sustain the performance [11,9]. Authors working on managerial cognitions shed light on the concept of how cognitions on the individual level influence a firms' capability to realize these new market opportunities and seize or reorganize its resources in order to take advantage from these opportunities [8]. The core of the microfoundations movement is to broaden the perspective: in addition to organizational routines and capacities for renewal [12] there is a specific interest in actors' contributions in terms of behavior and/or cognition [13]. This so called agentic perspective includes the ordinary employee as well as (top) managers. In the following we are especially interested in managerial cognitions since managers take responsibility for the decision making process in IPSS.

The Oxford Dictionary of Psychology [14] describes cognitions as the mental activities involved in acquiring and processing information and as an item of knowledge or belief. According to Neisser [15] cognitions are mental templates that individuals impose to the information environment in order to give form and meaning to the context [15]. During this process individuals connect the past, the present and the future. The schematic information processing can both be enabling and hindering, leading to a potential impoverished view of the world or create path-dependencies with the respective consequences for decision making within the organization [16,17]). There is a cognition-action relation as cognitions are co-evolved by interactions with the world. The process includes both shaping the surrounding world and being shaped [18].

In the light of the DCV managerial cognition highlights the managerial cognitive ability for (1) *sensing* market opportunities by realizing and understanding the potential, (2) *seizing* activities in terms of sensemaking contributions for mobilizing resources in the direction of new business models and (3) communicative strategies for sustaining new ways of resource allocation, so called *reconfiguring* resources [8].

With respect to IPSS this could be a new employment policy where experts from design and construction are members of a selling team in order to make the process more solution based and increase the interaction and value-co-creation with the customer. The starting point for such a development is managers' conviction that solution-based offerings add value even though they increase the coordination needs tremendously.

Business models can be described as a "design or architecture of the value creation, delivery and capture mechanisms employed" [19, p. 191] in order to crystalize customer needs and their willingness to pay [19]. Rese and colleagues applied this to IPSS by adding the feature of high customization, leading to the point that every customer-provider relationship is defined by one particular business model [20].

Managerial cognitive capabilities are the mental capacity of managers to realize and influence the underlying process of decision making and change [8]. Sensing new opportunities depends on the early perception of market developments and the attention given to related opportunities [8]. With respect to IPSS these are the general recognition and sound evaluation of the value proposition of solution business [21].

Whether this leads to strategic investments in new business fields depends on rationalizing and reasoning new strategic options (seizing). Rationalizing new business activities is important for the decision maker him- or herself. Reasoning goes beyond, it is an interactive communicative process where enactment between different managers involved in decision making and with external stakeholders with heterogeneous demands play an important role [18,8]. The actors involved in decision making convince each other. The crucial point for IPSS is that one has to adapt to new performance indicators during the development process [22,23,24]. This has often consequences for the whole monitoring and feedback process.

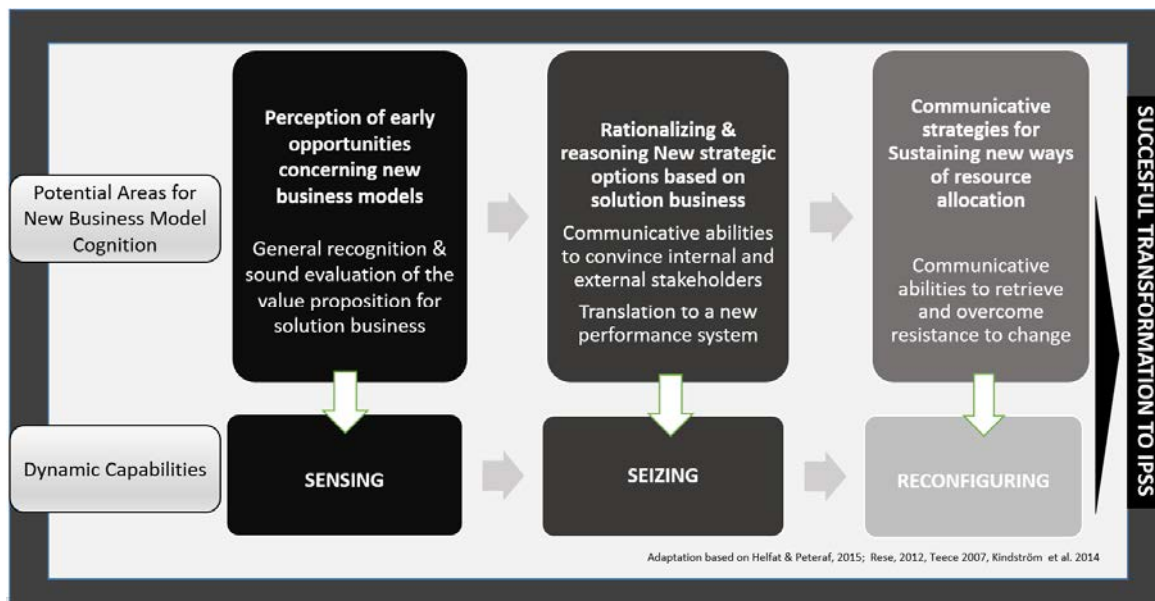


Figure 1: Conceptual Framework

The reconfiguration also depends on communicative skills in order to overcome resistance to change [8]. As previous studies show in the field of IPSS this is not an open resistance – on the surface there seems to be an open minded atmosphere for IPSS– resistance rather results from deeply rooted basic assumptions in organizational cultural that tend to hinder the further development towards IPSS [25]. Based on the reflections of the theoretical background a conceptual framework for the empirical analysis is proposed (see Figure 1).

3. Method

The case company was selected based on the ability to apply the concept of managerial cognitions to various stages within the transition to an IPSS provider. Ericsson was chosen selected according to a long tradition as a product provider but overall potential for solution business. Within the current situation, Ericsson is both expanding to relationship-based or process-centered services, e.g. value-propositions and consulting capability and taking over end-users’ operation e.g. managed services solutions, depending on the different parts of the organization ([26], p. 22). It is a global company, having business in more than 180 countries and employs close to 115.000 people [26]. The company has 24.000 employees in R&D and more than 30.000 patents (16 patents filed daily). Since the 1990’s the services part of the business has grown immensely and in 2014 it came in at 43% of the turnover. As of 2015 the company has separate organizational units for products and services, with separate profit and loss responsibilities. Ericsson has already decided on advancing the IPSS transformation but does not reach the expected acceleration due to hindering routines or even path dependencies [25].

Our research method within the case study analysis is threefold. For the first step we conducted two semi-structured pilot interviews and 14 semi-structured in-depth interviews in January 2015 at the Ericsson headquarters with employees of both service and product related divisions, representing various managerial levels followed by an expert panel with participants from the service systems research unit. The semi-structured interviews focused on the cognition of the value proposition and the status of the transition such as level of customization, integration of services and products as well as inhibitors and enablers within the process.

Table 1: Org. Affiliations of Interviewees

Amount of Interviewees	Business Unit
Product-related Units	
2	Business Unit Support Solutions (BUSS)
3	Business Unit Cloud and IP (BUCI)
2	Business Unit Radio (BURA)
Service-related Units	
4	Business Unit Global Services (BUGS) (2 heads)
3	Region Northern Europe and Central Asia (RECA) (1 head)

Whereas most of the research on managerial cognition focus on the top management, we focus on the autonomous side of strategy processes [27] based on internal ecological, emergent processes that occur at all levels of the organizations, especially among the middle management.

In a second step we applied Chaney’s cognitive mapping process [28] to retrieve in seven steps the current cognitions according to the business model development. In a third step we followed the tradition of action research and presented the cognitive map to selected employees and enabled participants within a world café format to discuss and share their cognitions of the current state and transformation. The world café format is a conference format that is based on small flexible group discussions and conversations in a relaxed atmosphere to retrieve the most possible perspectives to an issue and by discussing the findings of the other groups. It functions also as a process of an interactive data evaluation [29,30].

Table 2: Data Evaluation Scheme

Step	Method	Outcome
1. Planning & Preparation	<ul style="list-style-type: none"> Literature review & review of company data and previous studies 	<ul style="list-style-type: none"> Research Gaps and First Dimensions Specifying and enhancing applicability of dimensions
2. Pilot Interview	<ul style="list-style-type: none"> 2 semi-structured face-to-face pilot interviewees 	<ul style="list-style-type: none"> Adapted interview guideline to the wording of the company
3. Data collection	<ul style="list-style-type: none"> 14 semi-structured interviews, appr. 1h length <ul style="list-style-type: none"> 12 face-to-face 1 interview via Skype 1 interview via mobile phone Expert panel of 1,5h with 3 researchers of the Ericsson global service research team IPSS world café conference with appr. 40 participants 	<ul style="list-style-type: none"> Perspectives from various divisional perspectives Evaluating and discussing the emergent themes and first observations within the expert group The world café format focuses on interaction. By that the development of a shared cognitive map is supported
4. Transcription	<ul style="list-style-type: none"> Intelligent transcription 	<ul style="list-style-type: none"> Over 200 pages of transcribed interviews and discussions.
5. Standardization of Data	<ul style="list-style-type: none"> Coding of the material according to IPSS managerial cognition 	<ul style="list-style-type: none"> Code list Reduced complexity
6. Analysis of Maps	<ul style="list-style-type: none"> Referring back to research gaps and specific company case 	<ul style="list-style-type: none"> Interrelations of codes and structures
7. Output	<ul style="list-style-type: none"> Visualization 	<ul style="list-style-type: none"> Basis for developing practical implications and future research.

As two main action areas of the study, customization and collaboration were set as themes. Participants coming from group function strategy, group function technology, BUGS Business Line Industry & Society, BUGS Finance, BURA, BUCI and RECA could freely discuss the above mentioned theme and a topic of their choice in an open session. In three rounds, each participant could discuss every theme as participants always mixed up in new settings to gain most of the diversity. With this approach we enhanced the quality of the results with the evaluation and feedback of participants and supported the development of a shared cognitive map of the transition [31]. The data evaluation process building on the interactive validation is based on Chaney’s cognitive mapping approach [28].

4. Findings

Cognitions of the current state of the value proposition

a) Perception of IPSS-based opportunities (sensing)

During the interviews it became obvious that cognitions related to opportunity seeking are still limited. Reflections in a proactive manner about new opportunities and unrealized value propositions remained scarce. IPSS rather occurred as a field that has to be considered due to the external pressure from the overall competition or overall necessity to change. It was discussed with a negative connotation of loss, for example as a feeling of insecurity of the employees.

That means that we have to be so much better than our competitors, because I mean, also will they do the next generation radio base station. We have to be better from a cost perspective, we have to be better from a technology perspective, we have to be better on everything, and so far we have been quite successful, but that is a very tight competition. (Interviewee 3)

We are really good at building processes, or have been traditionally, that are focusing on our own delivery, [...] we need to understand now is that what we are delivering [...] is to fit into a customer organisation, into a customer context, so therefore it's much more important and much more interesting to see the journey that the customer goes through when they do a change and thereby also adapting our way of working to them, because they are the ones who are paying our salary at the end of the day. (Interviewee 2)

It was interesting to note that a more vision-based perspective on IPSS business models developed during the world café workshop. Managers exchanged about their desire for a clearer vision for IPSS and a traceable place in the landscape enhancing a balance between strategy and operations.

b) Necessity to change/related sensemaking (seizing)

The dominant business model that could be retrieved is still situated within the traditional telecom industry and mainly product oriented with an ownership based value proposition, selling networks to operators. Although a sense of transition and urgency could be retrieved:

And a strategic answer for quite a long time has been, our customer is telecom. [...] suddenly we understand that the telecom that has brought us here will not bring us to the future. So then our customer need to be something else and there the journey has started. (Interviewee 10)

That Ericsson is in a state of transition is perceived by every interviewee, but the cognition of the state and the urgency of transition differs. Especially the interviewees within the product divisions feel a stronger need for change and stress the importance of meeting the customer to foster their understanding of possible new value propositions within the whole value chain.

I think traditionally the customer is being the operator of a wide area serial networks and I think when we think of the

customer we think about the end users as well because we need to take that perspective you know in future whether they are also customers, I don't think there are customers today, [...] but maybe that could change going forward. (Interviewee 9)

The necessity for sensemaking as a key prerequisite for enforcing new business developments is recognized but not a taken for granted practice in day to day activities.

I think the value is that we can start a conversation with a customer in a new area which internet of things is, in any of those layers, and we have the equivalent service capabilities that can be tailored then, to start where he has the problem [...] (Interviewee 6)

There is rather the consciousness that a higher degree of enactment is necessary for resource mobilization. But the field is characterized as rather underdeveloped. Current key performance indicators (KPIs) build a hindering factor for establishing new practices.

[...] if you want to get creativity and innovation, you need something that allows people to make a mistake, not fear like it'll end up in performance rating and then impact the salary, this kind of stuff. (Interviewee 7)

It was an effect of the world café workshop that the process of seizing enhanced within the group of managers. The workshop led to a serious discussion that the current structures and processes do not support or even hinder a collaboration across divisions. Especially the KPIs foster internal competition and mistrust. Some KPIs “you can't even read” stated one participant.

The discrepancy between strategy and operations was also discussed, as the strategy to become more of a service provider has been pronounced (“what we say”) yet the ways of working (“what we do”) reflects still the old working system. As one participant said, it is “necessary to cheat the system” to collaborate. A lack of leadership that supports collaborative behavior was criticized as well.

The workshop also brought forward the process of seizing in the way that managers convinced each other to look closer at the process of product and service development and take the learnings of where it is especially important to interact with the customer. As two critical phases the starting and the final process phase was detected. Within the starting phase the understanding of the customer needs and the way the development teams are connected to the customer operation center are critical issues, the final phase is not only relevant for follow-up contracts but to retrieve learnings that can be modularized and reapplied on other projects and clients.

c) Coping with change/reconfiguring resources

Managers perceive that new ways of customer interrelation and value co-creation are key issues for a further transition towards a IPSS business model. Moreover, they classify co-creation and customization as totally different concepts to the traditional ways of product selling.

I think on the product side we have a tradition of building things without asking the customer because we know it better and here we have built the tradition when it's ready we go to the customer and say here it is. And here on the other side in the services side we don't start doing anything before the customer signs the contract. (Interviewee 13)

Another area of relevant cognitions focused on the future of budgeting practices, especially the differences in selling products to selling solutions and long-term contracts. Current practices focus on CapEx (capital expenditure). Within the traditional customer segment, operators are not willing to pay a huge amount of one-time money for hardware, but prefer to pay for the usage of the network which is shifting the focus from CapEx to OpEx (operational expenditure).

Within the world café workshop the role of managers for the reconfiguring resources was addressed especially concerning two imbalanced ways of leadership called “finance” and “engineering”. As an outcome of the workshop the need for the diversity of the two ways, one more rigid and stable, the other more flexible and creative, was perceived

Last but not least the cognitions related to “reconfiguring resources” show the high consciousness for an overall change process leading to new forms of value creation in interaction with the customer. Managers are aware of the challenges of a deeper change process and they can specify the most critical fields in the budgeting practices.

Figure 2 visualizes the key findings in a systematic manner. The three steps of IPSS Business Development scanning, enactment and implementation are supported by shaping actively the cognition by addressing the respective levers.

6. Outlook

Considering the development towards IPSS business models from the research perspective of managerial cognition it becomes obvious that the challenges of the underlying change process and the necessity to go into this direction are in the managers’ mind. They also know how to adopt in internal measurement systems. The most critical point is that “sensing opportunities” as an open-minded starting point for business development is rather missing.

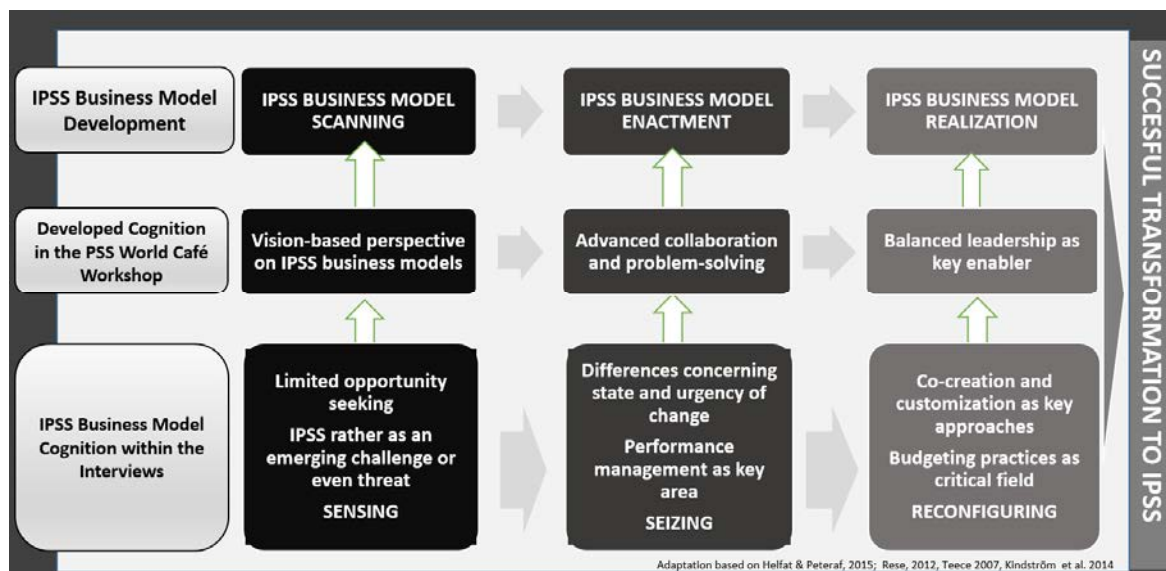


Figure 2: IPSS Business Model Cognition and Capabilities

5. Summary

In the first area “sensing opportunities” we retrieved that IPSS are not discussed as such but rather under a perspective of pressure combined with an inclined feeling of insecurity. A demand for an IPSS-related vision was a key outcome of the workshops.

Within the second area “seizing current activities” the need for a higher level of enactment within the organization and with stakeholders, especially with customers, becomes obvious. There is sensitivity that there is a higher need for sensemaking and the workshop was used as a platform in this regard.

Therefore, our deeper analysis of managerial cognitions brings forward IPSS research. Further convincing examples and research contributions are necessary that proof that the value proposition of IPSS has a real fundament.

With our research approach we could also support the means of a research and practice collaboration. The IPSS world café was a kick-off event for annually reoccurring conferences to foster the cognition and the according actions to successfully approach the transformation. The limitations that are inherent of a qualitative approach can be counterbalanced in quantitative approaches. Due to the current state of the art it was our aim to gain deeper insight from case study analysis in order to specify the most relevant constructs. Future research can build on these constructs.

Acknowledgements

We express our sincere gratitude to the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) for financing this study within the Collaborative Research Center Transregio 29 (CRC/TR 29) on Industrial Product-Service Systems – dynamic interdependencies between products and services in the production area. The travel costs for the research stays in Stockholm, Sweden, were founded by Ruhr-University Bochum Research School.

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