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Relationship Building in IoT Platform Models - the Case of the Danfoss Group

Dr. Svend Hollensen[1,*], Dr. Pernille Eskerod[2] and Dr. Anna Marie Dyhr Ulrich[3]

Abstract

Purpose: This paper investigates the implications for a manufacturer's relationship building towards B2B customers and suppliers as a consequence of Internet-of-Things (IoT) platform models.

Design/Methodology/Approach: Explorative single case study with embedded sub-cases. Qualitative research approach. Semi-structured interviews.

Findings: The paper identifies two ways of doing relationship building when it comes to IoT platform models. Relationship building can take place through a Classic Relationship IoT platform model (characterized by low complexity) or a New Relationship IoT platform model (characterized by high complexity). In both models, the manufacturer aims for high stickiness towards the customers. In the New Relationship model, however, low stickiness towards suppliers is aimed for in order to enable the manufacturer to orchestrate the stakeholder constellation dynamically. In addition, a driver for the low stickiness aim towards suppliers can be found in a motive to outsource risks to suppliers in IoT markets characterized by high degrees of turbulence and growth.

Research limitations/implications: The study points to the fact that a manufacturer should consider how the new technology IoT gives opportunities for different ways of relating to stakeholders, e.g. customers and suppliers, in the business model.

Originality/Value: Based on primary data collection the research shows how strategic relationship building can help a manufacturer create value with customers and suppliers within IoT platform models. The paper expands the business model literature by investigating consequences of a new technology, i.e. IoT.

1 Dept. of Entrepreneurship and Relationship Management, University of Southern Denmark, Faculty of Social Science, Alsion 2, DK-6400 Sønderborg, Denmark, email: svend@sam.sdu.dk
2 Dept. of Business and Management, Webster Vienna Private University, Palais Wenkheim, Praterstr. 23, A-1020 Vienna, Austria.
3 Dept. of Entrepreneurship and Relationship Management, University of Southern Denmark, Faculty of Social Science, Alsion 2, DK-6400 Sønderborg, Denmark.
* corresponding author

Introduction

The current digital transformation, called Industry 4.0 and representing the fourth industrial revolution in manufacturing and industry, influences production of goods and services as well as value chains and business models. Automation, Big Data, AI (artificial intelligence) and IoT (Internet-of-Things) are technologies within Industry 4.0 that create so-called Smart Factories "allowing the manufacturer to control the entire production from one platform" (Danish Institute of Industry, n.d.). In the future, IoT will play a central role in everyday life (Gershenfeld & Vasseur, 2014), and it will open new business and market opportunities (Miorandi, Sicari, De Pellegrini & Chlamtac, 2012) as well as it will give market actors room for being active creators (Alvarez & Barney, 2007).

A British technology pioneer, Kevin Ashton, introduced the term IoT in 1999 (Ashton, 2009), and today it describes "a network of entities that are connected through any form of sensor, enabling these entities to be located, identified and even operated upon without any human interference" (Falkenreck & Wagner, 2017, p. 1). Opportunities for changing and sharing digital data give companies options for creating additional value for their customers (Kannan & Hongshuang, 2017) and for maintaining relationships in new ways. Lately, classical manufacturers have been transforming themselves from selling products and add-on services towards integrated service solutions packages, with combinations of products, services and software/data. Fast technological development, fierce competition and 'plug-and-play' opportunities through IoT create fast-changing and dynamic B2B market conditions. The IoT technology is radically changing the way manufacturers are creating value for their customers and offering new opportunities for IoT services to form a more substantial part of the company's business model and profits. Accordingly, there is a need to shift research focus from enabling technologies to a business platform model, where joint efforts are considered for value creation and capture among all stakeholders. In the context of IoT platform technology, business models are concerned with how technological potential can be translated into how organizations create and capture value (Iivari, Ahokangas, Komi, Tihinen & Valtanen, 2016). On an IoT platform, several stakeholders will participate, and the platform offers the opportunity for the single company to develop its own IoT service solutions in accordance with the overall IoT business model (Ionut Pirvan, Dedehayir & Le Fever, 2019). Therefore we refer to 'IoT business models' and 'IoT platforms' as interchangeably.

The transformation from a product to a service dominant business model (Woodside & Sood, 2017) is described by the term Service-Dominant Logic (Vargo & Lusch, 2008; Vargo & Lusch, 2017). The Service-Dominant Logic can be helped underway by IoT solutions by which B2B companies in a partner network can align their total offerings to support customers' value creation processes, rather than selling products through an arm's length market transaction. An IoT platform is seen as a configuration design for products, services and infrastructure, facilitating stakeholders' (e.g. suppliers, platform owners, customers) interaction (Löfberg & Åkesson, 2018). The value co-creation process is complex and the IoT platform needs to reflect this complexity, in form of advanced combination of physical products and software (service solutions).

Stakeholder theory can be applied when studying IoT platforms as it suggests that any business should be seen as an interconnected and interdependent system, where all stakeholders must contribute in order to flourish collectively (Freeman, Phillips & Sisodia, 2020). On an IoT platform, the constellation of stakeholders can change over time. The various stakeholders have potential for adding value or harming value creation, depending on the alignment of stakeholder capabilities and expectations (Savage, Bunn, Gray, Xiao, Wang, Wilson & Williams, 2010). To become successful within the context of IoT platforms it is necessary to figure out how to add value through explicit strategic decisions about relationships to stakeholders involved in the value creation process (Ulrich, Hollensen & Eskerod, 2019). The strength of a relationship can be expressed through the term stickiness. The term 'platform stickiness' refers to *"[the] central actor's [i.e. a focal company's] ability to continuously attract new and maintain existing stakeholders within a platform through the effective orchestration of value co-creation"* (Laczko, Hullova, Needham, Rossiter & Battisti, 2019, p. 216). We allow ourselves to replace the term 'ability' with 'aim' in our research as we think this gives the concept more relevance in a strategic context.

IoT provides the opportunity to create a number of different business models (Boehmer, Shukla, Kapletia & Tiwari, 2020; Iivari *et al.*, 2016). Platforms face the challenging task to balance openness and 'stickiness' in such a way that the right set of suppliers and complementary service providers are matched to the right set of customers using the right selection of product categories and channels.

A research gap exists on how a manufacturer relates to its core stakeholders, e.g. customers and suppliers, under these changed market conditions. Examples of suppliers are firms offering complementary products and services as well as installers. This leads us to the following research question:

How do manufacturers build relationships, in the form of stickiness, with its customers and suppliers on IoT platforms in B2B markets?

The research question is addressed by literature studies as well as empirical studies. Our contribution is to determine a company's aimed level of IoT platform 'stickiness' towards suppliers and customers, depending on the market complexity.

The research involves explorative, qualitative, embedded case studies (Eisenhardt, 1989; Eisenhardt & Graebner, 2007: Yin, 2017). The case company is the Danfoss Group (www.danfoss.com), a Danish traditional manufacturer that has worked with IoT platforms for 10+ years, in order to transform themselves to a more service-oriented company.

The paper is organized as follows: In the next section, we present the theoretical framework, which is built on platform theory as well as stakeholder theory. Hereafter, we present the research methodology. The section includes a presentation of the case company. Afterwards, we present findings from the empirical study. The paper concludes with a discussion and conclusion section that answers the research question as well as it points to a future outlook.

Theoretical Framework

The theoretical framework of the research draws on an integration of platform theory and stakeholder theory.

A platform is defined as a configuration design for products, services and infrastructure, facilitating stakeholders' interaction (Löfberg & Åkesson, 2018). An organization's stakeholders can be defined as "those groups without whose support the organization would cease to exist"(Stanford Research Institute cited in Freeman, 1984, p. 31) and "those groups to whom the firm owes an obligation based on their participation in the cooperative scheme that constitute the organization and makes it a going concern" (Harrison & Wicks, 2013, p. 102). In this paper, we allow ourselves to change the word 'organization' with 'platform' implying that the platform stakeholders are the ones that are necessary for the platform's continuous existence and at the same time the ones for which, in our case, the manufacturer has an obligation.

A platform is used for sharing data and other resources that can be used by all stakeholders. Some platforms have led to significant disruption in the way of doing business, e.g. the retailing platform Amazon, the accommodation platform airbnb, the communication platform Facebook, and the transportation platform Uber.

Four different platform types exist (Smedlund, 2012): leading platforms (e.g. the ones mentioned above), open platforms (e.g. open source applications), closed platforms (e.g. for logistic transactions across companies) and internal platforms (e.g. company-wide). Each type of platform has its own characteristics, tasks and challenges. In an open platform, the end user of the offerings may not be known, whereas a closed platform requires a conscious decision from one or more decision makers on whom to invite to the platform.

Based on a literature review, Smedlund & Faghankhani (2015) propose that successful platforms are characterized by 1) co-creation of value, 2) interdependency and complementarity of components, 3) surplus value for the whole system (i.e. synergy) and 4) evolutionary growth.

Stakeholder theory builds on a systems perspective, implying that the value created by a system (or we can also say a network of stakeholders) is dependent on the contributions provided by each stakeholder (Rhenman, 1968). Each stakeholder involved must benefit from participating in the system in order to ensure its long-run viability (see e.g. Freeman, 1984; Freeman *et*

al., 2020). This is due to the fact that participation in the system is voluntary as stakeholders - whether it is customers, suppliers or platform partners producing products and services - have 'the freedom of choice' (Barnard, 1938) to continue the relationship or not.

The various stakeholders have potential for both promoting and harming the value creation, depending on the alignment of the stakeholder capabilities and expectations (Savage *et al.*, 2010). As the need for the individual stakeholder's contribution can vary, it is a strategic task of the focal organization which is leading the value creation system to decide how to relate to each stakeholder.

Tuominen (1995) proposes the concept 'ladder of stakeholder loyalty' to describe the relationship between the focal organization and the stakeholders within the value creation system. The author differentiates between neutral, cooperative and allied stakeholders, whereas allied stakeholders are on top of the stakeholder loyalty ladder (Tuominen, 1995). The underlying idea is that "... it may not be possible, desirable or efficient to position every positively oriented stakeholder on the top of the ladder, i.e. to have a true allied relationship with every stakeholder. ... [it] may not be an effective utilization of resources" (Polonsky, Schuppisser & Beldona, 2002, p. 122).

Multiple diverse stakeholders on both the supply and the demand sides are involved (Constantiou, Marton & Tuunainen, 2017), and the value created depends on the so-called value constellation (Normann & Ramirez, 1993; Ceccagnoli, Forman, Huang & Wu, 2012),

i.e. the specific constellation of stakeholders involved in the creation of a specific offering for a customer. In the platform literature, two roles are defined: orchestrators and offering builders (Ulkuniemi, Pekkarinen, Bask, Lipponen, Rajahonka & Tinnilä, 2011; Eloranta & Turunen, 2016). Due to the dynamic nature of platforms, orchestration challenges exist for a central actor (Nambisan & Sawhney, 2011), i.e. the orchestrator that facilitates the co-creation of value by providing interaction possibilities for value-adding offerings and transactions among the core stakeholders (suppliers, platform partners, customers).

A multi-sided platform is mediating different groups of stakeholders. Digital platforms are often multisided, providing interfaces with and among two or more groups of economic actors on different 'sides' of the platform, including providers of complementary assets. In our case, the platform operates on two-sided markets. The popularity of platforms on two-sided markets has increased radically in recent years (Parker, Van Alstyne & Choudary, 2016; de Reuver, Sørensen & Basole, 2018).

On two-sided markets, groups on both the supplier and customer side interact with each other through a common platform. The two-sided market platform is a business ecosystem, which is being made up of coevolving interdependent and interconnected stakeholders: customers, suppliers, agents and channels, sellers of complementary products and services, and the platform owner (Salmela & Nurkka, 2018). In our two-sided platform case, the ecosystem consists primarily of the
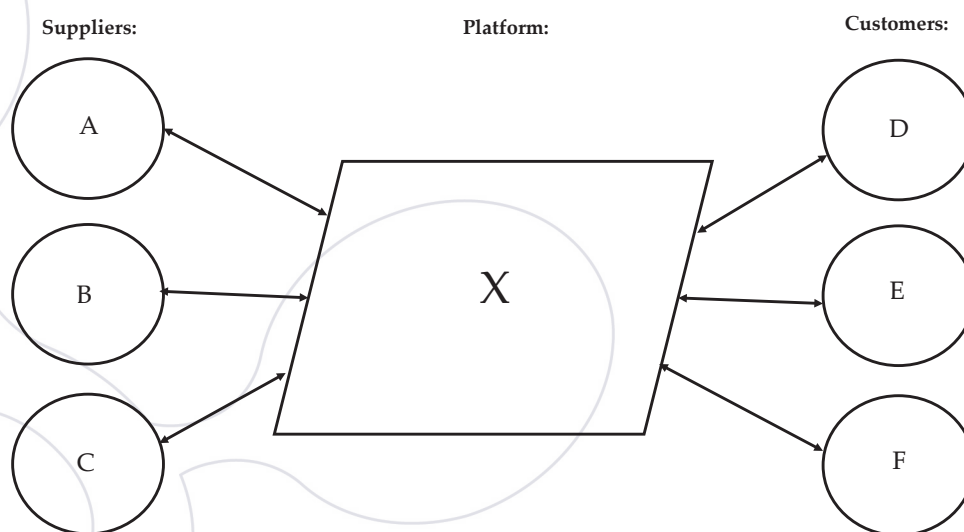

Figure 1: Multiple Diverse Stakeholders on both the Supply and the Demand Sides

suppliers, the platform partners and the customers, see Figure 1.

Fehrer, Woratschek & Brodie (2018) differentiate between the following business model platforms: Firm-centered networks (which builds on Porter's (1980; 1985) philosophy, in which a company chooses an attractive market, enters this market and holds a competitive position there); solution networks (which could be a typical B2B network, which includes a limited number of stakeholders that aims to exploit a business opportunity); and open networks (which include the large scale B2C multi-sided platforms, like airbnb and Uber). The platform business models emphasize value creation between stakeholders, rather than value being created within the boundaries of a single firm. This can only be done if the trust between stakeholders on the platform is built, and consequently the transaction costs between the multiple stakeholders on the platform are being reduced.

As mentioned in the Introduction, a central concept for this article is 'platform stickiness', meaning *"[the] central actor's ability [which we replace with aim in our research] to continuously attract new and maintain existing stakeholders within a platform through the effective orchestration of value co-creation"* (Laczko *et al.*, 2019, p. 216). In contrast to 'stickiness' the concept of 'platform openness' indicates how easy it is to access a platform. More specifically, we define 'platform openness' as the extent to which the platform owner places many or few restrictions on participation, development or use across the distinct roles related to the platform, whether for supplier or customer (Broekhuizen, Emrich, Gijsenberg, Broekhuis, Donkers & Sloot, 2020).

Research Methodology
Research Approach

The research involves literature reviews as well as an explorative, qualitative, single case study with embedded sub-cases (Eisenhardt, 1989; Eisenhardt & Graebner, 2007: Yin, 2017).

The aim is to contribute to the conceptual understanding of relationship building with core stakeholders in the context of IoT platforms in B2B markets by applying an abductive approach (Dubois & Gadde, 2002). In an abductive approach, empirical observations and concepts from existing literature are systematically combined in an evolving manner in order to develop descriptive theory propositions through observation, categorization, and association (Christensen, 2006). Abduction starts from individual observations and the aim is to reach the perceived 'best explanation' from those observations. A guiding principle based partly on intuition and partly facts is created at the beginning of the research (Dubois & Gadde, 2002). It is typical for the abductive logic that relevant theories are identified along the way due to the fact that unexpected findings are an essential part of this logic. The empirical data and the theories are in continuous dialogue during the research. The premises do not guarantee the conclusion, but inference to the perceived best explanation with the inputs at hand (Christensen, 2006).

Selection of Case

An important part of a case study approach is to select a case that can be powerful and rich for analysis of the conceptual problem at hand (Siggelkow, 2007).

As a powerful and rich case company for this research, a Danish manufacturer, the Danfoss Group (www.danfoss.com), was selected. The company, which is one of the largest industrial companies in Denmark, is in digital transformation and have used IoT platforms for 10+ years. Danfoss Group is a family-owned, globally leading component supplier. 80% of its sales is on the B2B market, where it operates as a classical OEM sub supplier (Danfoss, n.d.). See Figure 2.

In 2019, the Danfoss sales was EUR 6.3 billion. The operating profit (EBIT) amounted to EUR 771 million, leading to an EBITA margin of 12.3%. From 2018 to 2019 net profit improved 8% to EUR 502 million. In 2019 Danfoss had 27,871 employees (Danfoss, n.d.).

In 2015, decision makers within Danfoss asked themselves strategic questions about which positioning and future role(s) related to IoT platforms that would be attractive for the company's fields (interview, December 2018), while acknowledging that *"[in popular terms] the intelligence moves from what we call advanced components to the cloud; ... a part of the revenue should come from innovative services; .. and we should have a clear opinion about where our role is in the control system"* (interview, May 2019).
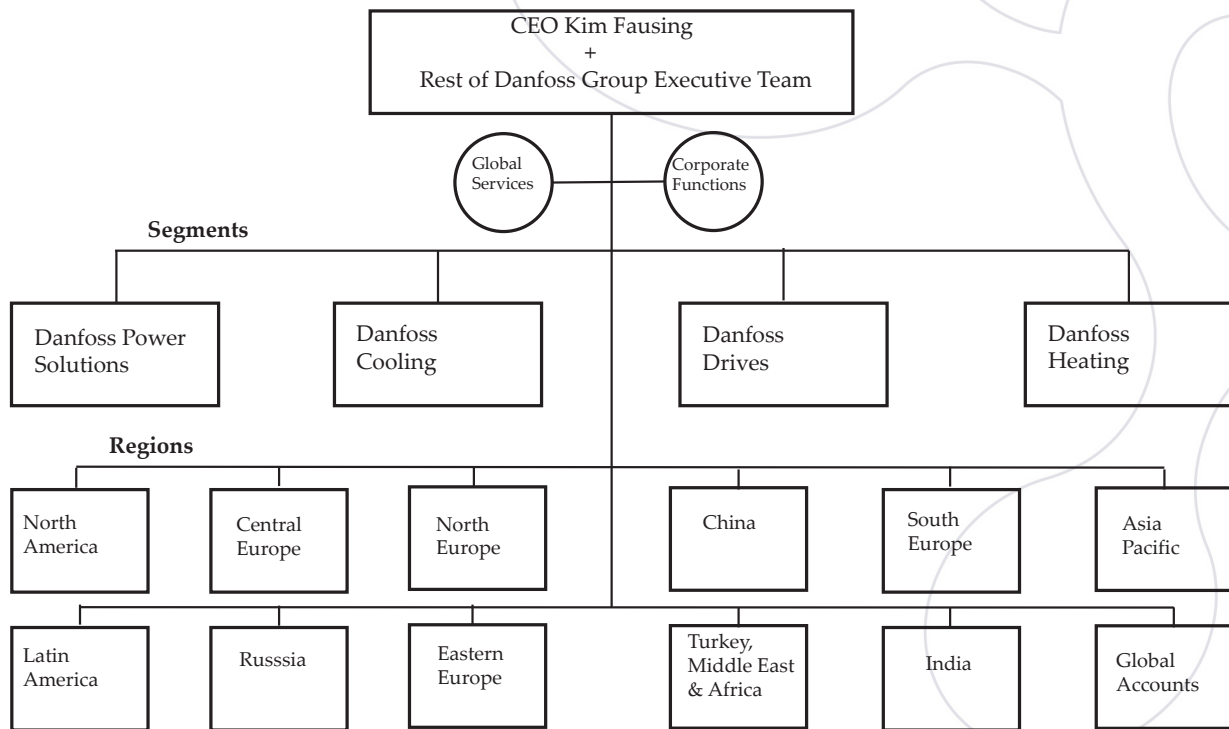
Figure 2: The Danfoss Group (March, 2020) – based on www.danfoss.com

The Danfoss Group has a number of IoT platform initiatives (involving customers and suppliers from around the world), which makes it possible to do comparative studies of sub-cases (Danfoss, n.d.). Danfoss is chosen as the case, because the company provides a variety of possible sub-cases in the B2B IoT area. After interviews with different divisions in Danfoss (e.g. Cooling), the authors have chosen to work with two sub-cases within the Heating division, because they represent different levels of complexity and market turbulence, so different levels of 'Stickiness' could be expected in these two cases.

Data Collection and Analysis
Two IoT platforms within the Danfoss Group were selected for embedded sub-case studies, i.e. the Danfoss-Leanheat IoT Platform and the The Danfoss-Schneider-Somfy IoT Alliance Platform. Both sub-cases are current strategic initiatives under the attention of top management. Both involve collaboration with more suppliers, as well as they address non-domestic customers on B2B markets. The cases were expected to have both similarities and differences - and thereby being suitable for sharpening the view and enabling conceptual sensitivity in the analyses.

Primary and secondary data were collected through interviews with seven IoT directors and employees in Danfoss Heating, Cooling and Drives, and through online sources and internal documents. Semi-structured interview guides were applied. An interview protocol facilitated that similar procedures were followed in all interviews (Yin, 2017). The semi-structured nature ensured that relevant topics were covered, yet still allowed for flexibility. In all interviews at least two researchers acted as interviewers, and each interview took 1.5-2 hours. Interview transcriptions and field notes were produced. To ensure validity of data, face-to-face interviews and secondary data were compared. This process reduced data misunderstanding, increased the validity of the findings and validated the information received from various sources. In Table 1 an overview of the interviews is visualized.

For data analysis, patterns, similarities and differences were identified. All three researchers undertook individual analysis before comparing findings and reflections.

Company Position	Danfoss Division	Month, Year	City, Country
President	Cooling	Dec, 2018	Nordborg (HQ), Denmark
Director Digital Business & IoT	Heating	Dec, 2018	Hamburg, Germany
Director Digital Business & IoT	Cooling	Dec, 2018	Hamburg, Germany
Director Business Development	Heating	Dec, 2018	Hamburg, Denmark
Vice President, Product & Segments	Heating	May, 2019	Silkeborg, Denmark
Head of IoT	Drives	Aug, 2019	Vaasa, Finland
Marketing Director	Heating	Sep, 2019	Sonderborg, Denmark

Table 1: Interviews 2018-19

Within-case and cross-case analyses (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) were conducted.

Findings

In the following sub-sections, we offer findings from within-case and cross-case analyses of the two IoT platforms sub-cases.

Within-Case Analysis: The Danfoss-Leanheat IoT Platform

In 2016, Danfoss acquired a 23 percent stake in the Finnish company Leanheat Oy, which was started up in 2011. In 2018, Danfoss' shareholding increased to 46 percent. In May 2019, Danfoss took over the full owner-ship of Leanheat. Leanheat has continued operations as a separate business unit headed by its present CEO, Jukka Aho. From 2016 to 2019, Leanheat increased its number of employees from 12 to 50 (Leanheat, n.d.).

Leanheat uses AI (Artificial Intelligence) and machine learning to generate thermodynamic models of build-ings on a closed platform. Leanheat software is installed to monitor and control energy consumption and improve the indoor climate for the residents. The company offers a digital user-interface, where the local real estate service providers can see the real-time tem-perature and relative humidity. In addition to indoor sensor data, Leanheat's system relates to weather data and district heat data. The interface gives the building administrators a very good overview of the apartments and is an easy way to control the heating. This has helped them to manage the temperature imbalances in each apartment and react much faster than before.

After installing the Leanheat system, the customers, i.e. Finnish building owners, reduced energy consumption by 20 percent during peak hours, and their overall energy costs dropped by 10 percent (interview, May 2019).

The Leanheat solution has been installed in more than 100,000 apartments, primarily in Finland, with pilots ongoing in Denmark, Sweden, Germany, Poland and Norway. But there is also potential outside Europe as is currently being demonstrated in a number of pilots with district heating companies in China. Leanheat software presently controls fifteen heating circuits at eight sites in the city Tianjin (Leanheat, n.d.).

When it comes to platform approach, Leanheat posi-tions itself as a domain specialist (within heating) and a platform orchestrator that works independently from other domain specialists serving the customers, like e.g. manufacturers of light control products. A com-mon IoT platform across the various domains, however, may come. It is impossible to say when though (inter-view, May 2019).

The Danfoss-Leanheat platform influences the compa-ny's interactions with its customers, and the company welcomes these new opportunities. Whereas Danfoss used to be a component supplier for which the interac-tion with the customers was finalized when the buying transaction was carried out, the digitalization and the platform allow for an ongoing dialogue with the cus-tomers. When customers buy a platform-related prod-uct they pay for the installation, and hereafter they pay a running service fee. The basis for the continuous dialogue and the service fee is that Leanheat, based on information from the system, now can debate how the

heating system works and how to optimize it. Instead of only dealing with the customer's procurement department, more stakeholder groups have become relevant, e.g. facility managers in buildings and district heating representatives. The information provided by the system as well as the ongoing dialogue with more stakeholder groups form the basis for an effective orchestration of value co-creation with existing and new customers, i.e. a high platform stickiness (interview, May 2019).

When it comes to suppliers, e.g. installers, Danfoss-Leanheat is still working with the same ones as before implementing the IoT platform. As stated by one of Danfoss' IoT-managers:

"Trust and respect are crucial and elementary values when selecting and working with suppliers."
(interview, Aug. 2019)

Danfoss has a developed network of specialists - and no plans for letting other stakeholders take over this task (interview, May 2019). We interpret this as an aim for high platform stickiness with the supplier-partners, see Figure 3.

In sum, Danfoss is aware that the way of doing business is changing, i.e. going from pure product-selling to a product-service focus, and communicates that

suppliers that do not manage to develop themselves in this direction will be replaced. As stated by a Danfoss manager:

"Our suppliers need to understand: If they want to be an important partner in the future, then they must develop their business" (interview, Sep. 2019).

Within-Case Analysis: The Danfoss-Schneider-Somfy IoT Alliance Platform

In 2018, Danfoss entered into a partnership with the French companies Schneider Electric and Somfy, aimed at accelerating the adoption of connectivity in the residential, mid-size building and hotel markets on a closed, leading platform. The purpose of the alliance was to develop a 'connectivity ecosystem', primarily for smart hotel rooms and secondly for general smart homes and buildings.

Lars Tveen, president of Danfoss' heating segment, commented:

"Controlling lighting, heating, and shutters together in one system is a real expertise that we can now jointly offer by combining more than 300 years of industry leadership, all backed by our extensive professional installer networks." (Danfoss, n.d.).
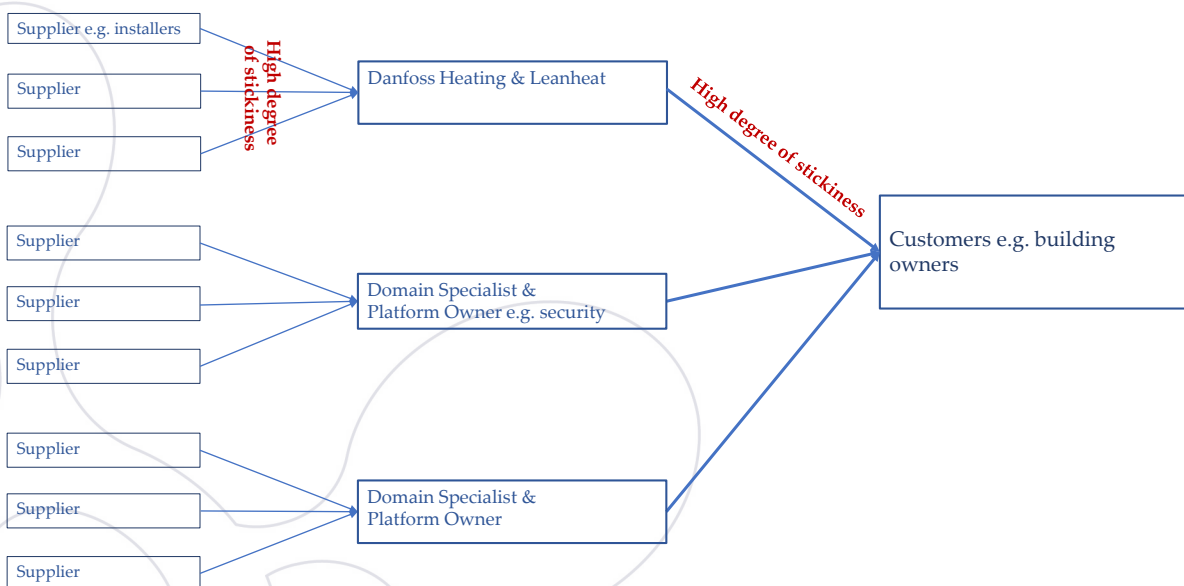

Figure 3: Danfoss-Leanheat's Relationships with Various Stakeholders

In developing a 'smart building' IoT platform solution, each of the three partners can supplement and integrate their core competences into one smart solution:

Danfoss: Danish company, leading position within Residential Heating and Indoor Climate, #1 position in District Energy Solutions, Strong installer network spanning across Europe, Russia and China.

Schneider: French company, Schneider Electric is among the global leaders in the Digital Transformation of Energy Management and Automation in Homes, Buildings, Data Centers, Infrastructure and Industries. Global presence in over 100 countries.

Somfy: French company, world leader in the automatic control of openings and closures (shutters) in homes and buildings. Present in 60 countries with 125 subsidiaries.

As one of the first customer priorities, the alliance wants to approach hotel chains around the world. The integration of systems provides a guest experience, while saving energy without impacting customer comfort and health. The solution also allows hotel facility managers to control everything through a single integrated system and at the same time save energy (Schneider, n.d.).

The three companies use Schneider's platform. The thought behind the alliance is that the three companies should stay independent and not interfere with the development of each other's products and services. The offerings will still be sold individually through Schneider's electricians, Danfoss' plumbers and Somfy's specialist installers - and they are not supposed to install each other's products even though they all can be connected to the common platform and operated by a single user-interface device. Instead the idea is - as a first step - that each company should introduce their customers to the other companies' products and services if the customers have needs in more domains, e.g. for optimization of heating and openings and closures of blinds. The attractiveness for the customers of the alliance should then be that they are ensured that the two partners of the one, they are in contact with, also are global market leaders, meaning that quality products and services (instead of competing on price) can

be offered and seamlessly connected at the platform, also at a later point of time. This is supposed to give a high platform stickiness on the customer side. Danfoss is very aware of the role they have in the partnership, their main focus is to develop their competences within heating, and not to be a developer of the platform. As an IOT-expert at Danfoss phrased it:

"We are very good at meeting the customers' requirements and needs [within heating] … but to develop a platform I never think we will" (interview, Sep. 2019).

As many companies can offer platforms, e.g. Microsoft and Google, the idea is - as a second step – to undertake innovations together so that the three companies can get a competitive advantage by providing offerings that are even more value-adding than 'just' information of each other's products and services as well as seamless connection to the common platform. A Danfoss manager expressed it this way:

"Where the real value creation comes is where you start to think [the product] together to a higher extent… [and] also get the optimization advantage, because we actually have aligned the thought about energy savings" (interview, May 2019).

The aim for both the first and the second step, as described above, makes the platform stickiness between the three alliance partners high. As an IoT-manager said:

"If we manage to develop our services and be attractive enough, then we will continue to be interesting to the platform and as a partner. If not, you will be replaced. It is important to always to be in front in your domain" (interview, Sep 2019).

When it comes to other suppliers, firms offering products and services from complementary domains like door locks and installations, the three alliance partners are not ready now to invite them to take part of the alliance or have high stickiness. It builds too much complexity when it comes to coordination, as well as it gives lower flexibility for setting the optimal value constellation i.e. choice of stakeholders, see Figure 4.

But when the alliance has become more mature it will be natural to expand the collaboration with more platform partners (i.e. domain specialists). As stated in two of the interviews:

"With this new project approach we have stopped thinking about our own Danfoss products - we need to take a customer solution approach, which requires that we also include products and services from non-Danfoss suppliers" (interview, Dec 2019)

"In the future we will be more focused on teaming up with more partners" (interview, Sep 2019).

One of the key drivers for the formation of future alliances is 'time-to-market' - one of the interviewees emphasized this:

"Today's focus is on 'time-to-market'. For this you need to cooperate. We look to others and reach out instead of developing solutions ourselves" (interview, Dec 2019)

Cross-Case Analysis of the Two Sub-Cases
The empirical studies of the Danfoss Leanheat IoT platform and the Danfoss-Schneider-Somfy IoT Alliance Platform suggest that different strategies can be sought when it comes to building up relationships with core stakeholders on IoT platforms.

For both cases, high platform stickiness was sought in the relationship with the customers. This is illustrated by this quotation from an interview with a Danfoss representative:

"In [specific] segments we believe that we have a position where we can play a role [in an IoT-context] - and where we said we would deliver more than products. We [do] deliver products. Our strategy is that we stand on advanced products. This is where we come from. This is our legacy. This is where we are strong. However, new ways to optimize exist. .... Buildings will be 'smart'. Less than two percent of the current buildings are 'smart'... In 2015, we decided for a strategy to create more stickiness through a discussion with our current customers. Today, the problem .. is that when we leave [after having sold the product to a procurement department] we are kind of done. It is difficult to get an ongoing dialogue with them... we would like to have that". (interview, May 2019)

Danfoss has the latest years also experienced changes in some of the bigger customers' preferences, they are getting more and more interested in integrated service solutions. The possibilities within IoT provides new opportunities for the manufactures to offer the customers integrated service solutions in cooperation with new or existing alliance partners, and *"we are just in the beginning of that development process"*. (interview, Sep. 2019)

In the two cases, it can be seen that the manufacturers aim for building up long term relationships with customers on IoT platforms in B2B markets. *"Setting up an IoT solution is anyway an effort, and as customers see the benefits, they want to benefit more. This means that we learn about things that are valuable to this customer, and it is easier for us to fulfil the requirements of this customer"*. (interview, Aug. 2019)
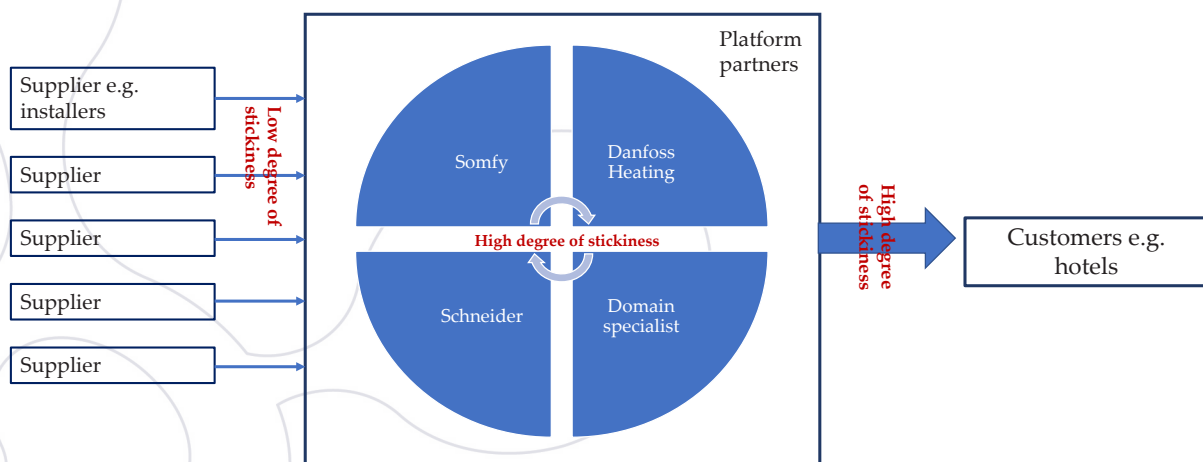

Figure 4: Danfoss-Schneider-Somfy IoT Alliance's Relationships with Various Stakeholders

When we compare the Danfoss-Leanheat case with the Danfoss-Schneider-Sompfy case it can be noticed that the manufacturer in the first case is aiming for building up long term relationships with a few core partners (i.e. high platform stickiness) in contrast to the latter case where the focus is to build up close relationship to the other domain partners on the platform and then applying, what we could call, a 'pick-and-choose' approach to the suppliers.

This low level of stickiness towards suppliers was underlined by one of the interviewees: *"Our official software partner is Microsoft, but we may also choose Google as partner - it all depends on the project requirements and the customer solution"* (interview, Dec. 2018).

The examples of both high and low platform stickiness towards the suppliers will be discussed further in the next section.

Discussion, Conclusion and Future Perspectives

Discussion and Propositions

The empirical study illustrated that an IoT platform gives opportunities for creating stickiness on the customer side and for co-creating added value due to e.g. the information of system performance. The frequency of interaction - on both the supplier and the customer side - is increasingly seen as a means to measure loyalty (Rong, Xiao, Zhang & Wang, 2019).

As a platform owner gains more knowledge about customers' preferences and behavior, it can personalize its offer to specific customers. This will create incentives to stick with the platform because abandoning the platform in favor of a rival platform would also mean leaving the value that the platform is able to deliver to the customer though learning effects over time.

One way for the platform owner to increase switching costs and create lock-in effects on both the supplier and customer side is to make the platform incompatible with rival platforms. The level of compatibility with rival platforms is a strategic choice, sometimes desirable and sometimes undesirable from the platform owner's perspective (Tiwana, 2014). More attractive customers make it more attractive for suppliers (e.g. software

or app developers) to enter the platform and offer their digital services to the customers through the platform.

Prior research in the B2B industrial buying process identifies risk and complexity as two of the key determinants of how much time and effort that are involved in the upstream buying process. Higher risk and complexity motivates buying centers to let more managers and resources be involved in the buying process (Johnston & Lewin, 1996). However, Osmonbekov & Johnson (2018) find that use of IoT can decrease the Human-to-Human (H2H) communication and let the platform software make very fast side-be-side comparisons of performance information from different suppliers. In this way, the IoT platform software can more or less automatically choose the first and best supplier that would fulfill pre-determined criteria. At least this could be the case for products and services that are well-known to the platform owner. For 'New Task' situations, the buying process would require more H2H communication (Osmonbekov & Johnston, 2018).

Referring to the 'ladder of stakeholder loyalty' framework, it seemed clear that the IoT platform enabled a strategy for developing an allied relationship, i.e. the highest level on the ladder, with the customers. For a manufacturer like Danfoss which previous had challenges on keeping a dialogue with the customers after the sales transaction (as the customer didn't need it) this was welcomed - and makes us propose:

P1: To sustain and grow the business, manufacturers in B2B markets desire high IoT platform stickiness with customers.

When it concerns the suppliers the picture was more complex. In the Danfoss-Leanheat case, the company aimed at co-creating value with their existing suppliers, i.e. the plumbers, whereas they did not intend (in the short run) to co-create value with other domain experts. We call this 'the classical way' of relation building, as it seems to continue the patterns of doing business that existed before the application of IoT technology, intending for a high platform stickiness with their 'usual' partners but not with new ones in terms of someone from other domains as they did not want to expand their business in this direction.

In the Danfoss-Schneider-Somfy alliance, it was clear that the three companies intended to develop into allied partners in order to ensure long term innovation and optimization of the value co-creation. However, they preferred to have other suppliers on the IoT platform as cooperative or neutral partners in the terminology of the stakeholder loyalty ladder, as it gave more sense to select a supplier in light of the specific situation, we call this a "pick-and-choose" strategy, than to build up allied relationships. This is a result of the fact that an IoT platform potentially is dynamic, meaning that the constellation of stakeholders easily can be changed, which can be utilized to maximize the value constellation. We call this 'the new way' of relation building. This makes us propose:

P2: To ensure continuous innovation, manufacturers in B2B markets desire high IoT platform stickiness with a few partners.

P3: To ensure optimization in a high complexity context through a dynamic stakeholder constellation, manufacturers in B2B markets desire low IoT platform stickiness with the majority of suppliers.

When it comes to degree of aimed-for stickiness, two fundamentally different business models were identified, coined the Classic Relationship IoT platform model (characterized by low complexity) and the New Relationship IoT platform model (characterized by high complexity). In both business models, the manufacturer desires high stickiness with customers. In the New Relationship model, however, low stickiness with suppliers is preferred in order to enable the manufacturer to orchestrate the stakeholder constellation dynamically, see Scheme 1.

The low stickiness towards suppliers is in line with Broekhuizen *et al.* (2020) showing that in new turbulent markets, which is the case with use of IoT in hotels (Eskerod, Hollensen, Morales-Contreras & Arteaga-Ortiz, 2019) as in the Danfoss-Schneider-Somfy alliance, platforms often choose to open up ('low stickiness' towards suppliers) and stimulate supplier-led innovation, thereby shifting the risk to invest to suppliers. When shifting from the market growth to the maturity phase (as with the case of Danfoss Leanheat), knowledge becomes more readily available and platform differentiation becomes more difficult to achieve. In such a situation, platform owners may compensate for lack of platform differentiation by increasing the supplier stickiness and give them greater authority and more benefits, or by acquiring them, as we also saw in the case with Danfoss Leanheat.

Managerial Implications

Generally, IoT has far-reaching managerial implications beyond what has been presented here. In most companies, the current state of IoT is a collection of fragmented networks of things, using the Internet and other technologies to transfer data to and from each sector's cloud service. Consequently, the full potential of the

	Stickiness 'Upstream' (towards suppliers)	Stickiness 'Downstream' (towards customers)
Classic Relationship IoT platform model (Case: Danfoss Leanheat) *'Low Complexity'*	High	High
New Relationship IoT platform model (Case: Danfoss-Schneider-Somfy) *'High Complexity'*	Low	High

Scheme 1: Platform Stickiness in B2B IoT Platform Models

IoT-era has not yet materialized, so the future opportunities in internet-related industries are unlimited.

Specifically, when it comes to customers, the implications seem straightforward, where companies try to build up relationships, and stickiness, to their key customers through Key Account Management (KAM) and other relationship tools (Scheme 1). However, the implications in relationships and stickiness to supplier-partners seem more complex, as described in the following:

As shown in Scheme 1, 'complexity' is a key indicator for the degree of stickiness with supplier-partners. If several alliance partners are involved on the platform (as with the Danfoss-Schneider-Somfy platform), more coordination is needed and 'complexity' increases. Consequently, higher level of 'Orchestration capability' is needed for coordination of the different stakeholders' contribution to value creation. As an alternative, the company and its alliance partners can try to simplify operations and compensate for high complexity by setting up specific requirements for a supplier's product and service contribution to the IoT platform. The first supplier that will fulfill the specific requirements for the solution will be chosen - a kind of 'pick-and-choose' selection strategy with relatively low transaction costs, as the answer to the increasing complexity on IoT platforms. Following the notion of Ng & Wakenshaw (2017, p. 9): "Physical products can now be designed to be changeable, for example through an application interface that allows customizability upon use to respond to emergent contextual situation", it means that products and services from suppliers can learn adaptation to the IoT platform and customer solution very fast. Consequently, platform owners will increasingly require that suppliers are offering potential digital 'plug-and-play' solutions, which will then be coupled together with other suppliers' solutions to a total customer solution.

Research Contributions

The research contributes to the existing literature in three ways. First of all, the research provides an empirical example of two orchestration strategies by referring from the two embedded sub-cases within the Danish leading manufacturer, Danfoss. Secondly, the empirical study identified two ways of dealing with stakeholder relationships in an IoT context, coined by us as the Classic Relationship IoT platform model and the New Relationship IoT platform model. Fundamental for both models is the aim for high platform stickiness (long-lasting bonds) with the customers. Novel in this research is that in the New Relationship IoT platform model, low stickiness with suppliers is preferred in order to enable the manufacturer to orchestrate the stakeholder constellation dynamically to enhance value creation. Hereby (and our third contribution) our research shows that IoT platform orchestration can be seen as an important aspect of platform capabilities, where the orchestrator must take advantage of the external resources and not only focus on own resource ownership.

Limitations and Future Perspectives

This study involves one company (Danfoss) studied regarding handling of two-sided platforms in the heating of buildings. A more systematic comparison of several companies' IoT platform strategies could reveal more insight into how different industry and firm contexts would influence the level of intended platform stickiness and the capabilities needed. Several different company cases could represent different levels of complexity, which according to our research is one of the decisive factors for explaining 'intended stickiness' level. It is also likely that different industries would differ in terms of their competitive intensity and technological turbulence and this would probably also have an effect on the 'intended stickiness'.

Further research might take the next steps be exploring the necessary actions in order to fulfill the 'intended

stickiness' on IoT platforms. A future research framework could guide platform owners on when to apply certain stickiness activities rather than others. These activities could also be differentiated between upstream (towards suppliers) and downstream (towards customers) activities.

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About the Authors

Dr. Svend Hollensen (svend@sam.sdu.dk) is Ph.D. and Associate Professor of International Marketing at the University of Southern Denmark (Sønderborg). His research interests are within Global/International Marketing, Globalization, Internationalization of companies, Relationship Marketing and Social Media Marketing. He has published articles in well-recognized international journals like California Management Review. Furthermore, he is the author of globally published textbooks, e.g. 'Global Marketing' (8th edition, Pearson Education), 'Marketing Management' (4th edition, Pearson Education), and Social Media Marketing (4th edition, together with Philip Kotler and Marc Opresnik). Through his company, Hollensen ApS, Svend has also worked as a business consultant for several multinational companies, as well as global organizations like World Bank.

Dr. Pernille Eskerod is Ph.D. and Professor of Management and Organizational Behavior at Webster Vienna Private University. Her research interests are within Stakeholder Engagement, Project Management, Change Management, Sustainability and Strategic Management. She has published several articles within the leading journals of her main field, i.e. International Journal of Project Management and Project Management Journal. Pernille has acted as journal guest editor, published more books, journal articles and book chapters on Project Stakeholder Management. Furthermore, she has attracted funding from competitive applications for international research projects. In 2020, she conducts research on Engagement of Community Stakeholders in Infrastructure Projects, Stakeholder Engagement in Rural Tourism in Austria and Serbia, Internet-of-Things (IoT) and Sustainability within the Hotel Industry, and Managerial Implications of IoT.

About the Authors

Dr. Anna Marie Dyhr Ulrich is Ph.D. and Associate Professor of B2B Marketing at the Department of Entrepreneurship and Relationship Management at the University of Southern Denmark (Sønderborg). Her research interests are within B2B Marketing, International Marketing, Globalization, IOT and Relationship Marketing. Anna Marie has published articles within these topics in well-recognized international journals and books. She has a long national and international teaching and research experience. She has practical experience from jobs as project manager, owner of her own consultancy business and as senior consultant in the international department of the Confederation of the Danish Industry, Copenhagen.