



# TAXONOMY OF BUSINESS MODELS RELEVANT TO IOT APPLICATIONS

## WP 4

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Identifying Key Components that Facilitate Learning from Others to Find a Suitable Business Model





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## PROJECT SUMMARY

The internet of things (IoT) has a revolutionary potential. A smart web of sensors, actuators, cameras, robots, drones and other connected devices allows for an unprecedented level of control and automated decision-making. The project Internet of Food & Farm 2020 (IoF2020) explores the potential of IoT-technologies for the European food and farming industry.

The goal is ambitious: to make precision farming a reality and to take a vital step towards a more sustainable food value chain. With the help of IoT technologies higher yields and better-quality produce are within reach. Pesticide and fertilizer use will drop and overall efficiency is optimized. IoT technologies also enable better traceability of food, leading to increased food safety.

Nineteen use-cases organised around five trials (arable, dairy, fruits, meat and vegetables) develop, test and demonstrate IoT technologies in an operational farm environment all over Europe, with the first results expected in the first quarter of 2018.

IoF2020 uses a lean multi-actor approach focusing on user acceptability, stakeholder engagement and the development of sustainable business models. IoF2020 aims to increase the economic viability and market share of developed technologies, while bringing end-users' and farmers' adoption of these technological solutions to the next stage. The aim of IoF2020 is to build a lasting innovation ecosystem that fosters the uptake of IoT technologies. Therefore, key stakeholders along the food value chain are involved in IoF2020, together with technology service providers, software companies and academic research institutions.

Led by the Wageningen University and Research (WUR), the 70+ members consortium includes partners from agriculture and ICT sectors, and uses open source technology provided by other initiatives (e.g. FIWARE). IoF2020 is part of Horizon2020 Industrial Leadership and is supported by the European Commission with a budget of €30 million.

## EXECUTIVE SUMMARY

In order to make successful use of the Internet of Things, organisations need to figure out the way they create, deliver and capture value and the role data plays in this. This value creation is unique for each organisation. Finding a suitable business model is therefore a creative process in which it is crucial to understand the business in its specific context and see matching opportunities.

Learning from others makes it easier to see and evaluate opportunities. However, as business models are unique for each business, an endless amount of business models exist. In order to see the patterns in these models, many business model taxonomies have been created in the past. Such classification schemes typically try to give a structured overview of business models used by businesses.

Many business model taxonomies especially assist with *understanding what exists*, instead of *identifying what is suitable*. Existing taxonomies generally take successful business models as starting point and use pattern theory to create business model clusters based on similarities. This works for business innovators who master business modelling concepts and logic and who search for possible business models. However most people involved in the IoF2020 use cases have a different background than business modelling, and instead of search for possible business models, they look for solutions to practical business challenges. While the business models included in the taxonomies might provide valuable insights and inspiration to solve these problems, the existing taxonomies do not suffice for two reasons: 1) the difference in starting point between taxonomies and innovator (business model similarities versus business model challenges) hinders the discovery of the relevant business models and 2) innovators are especially interested in what is needed to solve a specific problem and to make a business model work in practice. This requires information beyond the existing taxonomies as they typically stop after a short description of a specific business model.

This deliverable is a first step in creating a taxonomy that is aimed at bridging these two gaps. To reach that goal, Work Package 4 will take the existing business model challenges as a starting point, and develop the taxonomy to provide meaningful inspiration to answer these challenges. Just like a car dealer who will guide you in the process of choosing the right car out of the countless number of options, this taxonomy aims at assisting the businesses around IoT to find their way in the myriad of possible business models to effectively and efficiently learn from these models. The existing taxonomies will be used as valuable input to this approach. A new tool will be presented in D4.5 'Overall lessons learned regarding business model'. The status of the business models will be presented in the deliverables D4.8 Use Case Business Plans (M12), D4.9 Use Case Business Plans (M24), D4.10 Use Case Business Plans (M35) and D4.11 Use Case Business Plans (M46).



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# 1. INTRODUCTION

In order to make successful use of the Internet of Things, organisations need to figure out the way they create, deliver and capture value. This search for value creation and appropriation is central in the search of a viable business model. In this process, nine interconnected building blocks play a role (Osterwalder and Pigneur 2010):

- Value Proposition
- Customer Segments
- Key Partners
- Key Activities
- Key Resources
- Customer Relationship
- Channels
- Revenue Streams
- Cost Structure

The way these nine building blocks are structured together form the business model. With so many elements to tweak, finding a suitable business model is a creative process crucial to understand the business in its specific context. Which one of the nine elements is especially challenging depends among others on the competences and network of the actors involved, of the ambitions and goals of the business and of the alternatives that the prospected customers have available.

Work Package 4 provides assistance to each of the use cases in the five trials to find a suitable business model. This deliverable forms part of the provided assistance. It characterises the key components of business models relevant to the use cases and to IoT applications in general. It furthermore sets out principles for finding inspiration in existing business models and business model components both inside and outside the sector.

This deliverable depicts a first step in designing a taxonomy tool and offering inspirational insights for the design of a suitable business model. As will be explained in this deliverable it has been decided to create a taxonomy based on the business model challenges of the IoF2020 use case partners to make this taxonomy as valuable to them as possible. As a result, the taxonomy will need more time to develop during an iterative process in which the business model support to use cases will feed into the taxonomy development and vice versa.

This deliverable looks at existing business model taxonomies from literature and identifies the gaps between the existing taxonomies and the business model challenges faced by IoF2020 use cases. It



identifies important inputs and starting points for future activities of the Work Package, including the development and refinement of individual use case business models and the definition of the market entry strategy.

As the IOF2020 project develops, this taxonomy will be updated to include the newest insights. In the end, we want to come up with a decision-tree-like diagram that helps businesses in the agro-food domain in their search for an adequate IoT business model. Through a short selection process they are directed to a list of business models and business examples that could provide valuable inspiration to them. This outcome/taxonomy will be presented in D4.5 'Overall lessons learned regarding business model'. The status of the business models will be presented in the deliverables D4.8 Use Case Business Plans (M12), D4.9 Use Case Business Plans (M24), D4.10 Use Case Business Plans (M35) and D4.11 Use Case Business Plans (M46).

In the remainder of this deliverable, first the methodology will be discussed. Then existing taxonomies are discussed, followed by the core business model challenges as experienced by the use cases. Based on these two aspects, the deliverable concludes with the crucial elements of facilitating learning from existing business models and identifies the next steps in the related business modelling support.

## 2. METHODOLOGY

This deliverable looks into existing business model taxonomies and business model challenges as expressed by IoF2020 Use Cases. Therefore, it combines literature study of existing taxonomies and semi-structured interviews with use case representatives.

The literature study focusses on identifying relevant existing taxonomies and understanding the aims with which they were created and the process used to develop the taxonomy. Literature explaining business model taxonomies known to the Work Package 4 team was taken as a starting point. From there, references were studied to identify additional taxonomies. Furthermore an Internet search was done using key words including business model taxonomy, sustainable business models and Internet business models. This literature study is used to identify the characteristics of assistance to business model development.

A total of six semi-structured interviews were held with use case representatives, identifying the business model challenges they face. Appendix 1 shows an overview of the topics covered during these interviews. It was chosen to have interviews only with those case study representatives that themselves signalled to be working for some time on business model development or have a specific interest in developing the business model for the use case. These representatives were seen as having the best view of the current status of business model development and therefore can function as an adequate entry point for discussing the topic within the use cases.

The use cases are quite diverse in terms of development phase and distance to market. As a result some use cases have already started working on business model development, while others are currently focused on other challenges. It was decided to start with those use cases with the highest need regarding business model support. All use cases will be included in the next stages of the project.

### 3. EXISTING BUSINESS MODEL TAXONOMIES

Over the years, various authors have analysed existing business models and looked for patterns. Such patterns are suggested by these scholars as a way of enabling the process of learning from previous business model experiences and allow for selecting, refining and applying different business models. To identify those patterns, existing business models are identified and clustered. (e.g. Osterwalder & Pigneur, 2009; Gassmann et al., 2014; Remane et al., 2017, Lüdeke-Freud et al., 2017). These taxonomies provide overviews of currently existing business models, each with a specific chosen categorisation. The book *'The Business Model Navigator. 55 business models that will revolutionise your business'* by Gassman et. al. (2015) is one of the examples of the overviews provided by taxonomies.

This chapter looks into existing taxonomies relevant to the IoF2020 use cases and identifies the most important lessons learned from these taxonomies.

#### 3.1 AN OVERVIEW OF EXISTING TAXONOMIES

To identify the relevant taxonomies the following characteristics of the IoF use cases were taken into account:

- 1) All use cases are focused on developing IoT and data products and services. Therefore taxonomies that specifically focus on internet business models, IoT models and data business models are relevant. Many taxonomies have been created around these topics. The taxonomies included in this study are: Bambury (1998), Timmers (1999), Rappa (2001), Eisenmann (2002), Van T Spijker (2014), Fleisch et al. (2014)
- 2) One of the aims of the IoF2020 project is to have a positive societal effect in terms of people, planet and profit (PPP). Therefore taxonomies focussing on sustainability, PPP business models are relevant. Related taxonomies included in this study are: Joyce (2015), Lüdeke-Freud et al. (2017)
- 3) All use cases strive to create a successful business from the innovation. Therefore the taxonomy created by Gassman et al. (2014), focussing on business success, has been included in this study.
- 4) All use cases consist of cooperation between various companies that jointly investigate an innovation. As a result, apart from the development of a business model for the innovation itself, the use cases should also develop business models focussing on the role of the

innovation for their existing business. While much literature is available on these collaborative innovations, no taxonomies as such have been found on this topic.

Table 1 shows an overview of these existing taxonomies relevant to IoF2020 use cases.

Table 1.: Overview of Existing Taxonomies Relevant to IoF2020 Use Cases

Author	Taxonomy Focus	Number of Models in the Taxonomy	Classification Scheme
<b>Paul Bambury (1998)</b>	E-Business Models: Timing of internet involvement i.r.t. other business	14	Transplanted Real-World Business Models (8): Mail-Order, Advertising Based, Subscription, Free Trial, the Direct Marketing Model, the Real Estate Model, Incentive Scheme, Business to Business  Native Internet Business Models (6): Freeware Model, Library Model, Information Barter, Access Provision, Web Site Hosting & Other Internet Services, Digital Products & The Digital Delivery Model
<b>Paul Timmers (1998)</b>	E-business Models: Value proposition, Role in the Value Chain	11	e-shop, e-auction, e-mall, Third Party Marketplace, e-procurement, Virtual Communities, Value Chain Integrators, Collaboration Platforms, Value Chain Service Provider, Information Brokerage, Trust Services
<b>Michael Rappa (2001)</b>	Internet business Models: Value Proposition,	9	Brokerage, Advertising, Infomediary, Merchant, Manufacturer (direct), Affiliate, Community, Subscription, Utility

		Revenue Model		
<b>Thomas Eisenmann (2002)</b>	E-business Models : Types of services provided	8	Online Retailers, Online Portals, Internet Access Providers, Online Content Providers, Application Service Providers, Online Brokers, Online Market Makers, Networked Utility Providers	
<b>Arent Van T Spijker (2014)</b>	Data Driven Business Models: Business Value created by data	5	Basic Data Sales, Product Innovation, The Commodity Swap, Value Chain Integration, Value Net Creation	
<b>Fleisch et al. (2014)</b>	Internet of Things Business Models: Product Types	7	Digitally Charged Products (6): Physical Freemium, Digital Add-on, Digital Lock-in, Product as Point of Sales, Object Self Service, Remote Usage and Condition Monitoring Sensor as service (1)	
<b>Gassman et al. (2014)</b>	Business Success: Value Proposition, Value chain, Revenue model	55	Labels: What (45), Value (45), How (38), Who (8): Add-On, Affiliation, Aikido, Auction, Barter, Cash Machine, Cross Selling, Crowd-Funding, Crowd-Sourcing, Customer Loyalty, Digitalization, Direct Selling, E-Commerce, Experience Selling, Flat Rate, Fractional Ownership, Franchising, Freemium, From Push-To-Pull, Guaranteed Availability, Hidden Revenue, Ingredient Branding, Integrator, Layer Player, Leverage Customer Data, Licence, Lock-In, Long Tail, Make More	

Of It, Mass Customization, No Frills, Open Business Model, Open Source, Orchestrator, Pay-Per-Use, Pay What You Want, Peer-To-Peer, Performance Based Contracting, Razor and Blade, Rent Instead of Buy, Revenue Sharing, Reverse Engineering, Reverse Innovation, Robin Hood, Self-Service, Shop-In-Shop, Solution Provider, Subscription, Supermarket, Target The Poor, Trash-To-Cash, Two-Sided Market, Ultimate Luxury, User Designed, White Label

<b>Alexander Joyce (2015)</b>	Sustainable Business Models:  Economic, Environmental, Social	24	<p>Economic Business Model Patterns (8):</p> <p>Provide on Demand, Hidden Revenue, Freemium, Razor and Blade, Pay for Success, Subscription, Franchise, Product Financing</p> <p>Environmental Life Cycle Business Model Patterns (8):</p> <p>Industrial Symbiosis, Resource Stewardship, Functionality not ownership, Encourage sufficiency, physical to virtual, optimization, circularity, substitution for renewables</p> <p>Social Stakeholder Business Model Patterns (8):</p>
<b>Florian Lüdeke-Freud et al. (2017)</b>	Sustainable Business Models:  Financial, Eco, Social, Collaboration	45	<p>Financial Patterns (7):</p> <p>Pricing and Revenue (4), eg 'Subscription Model', Financial (3), eg 'crowdfunding'</p> <p>Eco Patterns (23):</p> <p>Ecodesign (4), e.g. 'Product Design' Closing-The-Loop (9), e.g. 'Industrial</p>

Symbiosis' Supply Chain patterns (6), e.g. Green Supply Chain management', Service and Performance (4), e.g. Result-Oriented Services'

Social Patterns (13):

Giving (2), e.g. 'Buy one, Give One', Access Provision Patterns (6), e.g. Building a Marketplace', Social Mission (5), e.g. 'Market-Oriented Social Missoin'

Collaboration Patterns (2):

Cooperative Patterns (1) 'Cooperative Ownership, Community Platform (1) 'Sharing Business'

### 3.2 EACH TAXONOMY DESCRIBES EXISTING MODELS FOR A SPECIFIC ELEMENT OF THE BUSINESS MODEL

Most of the taxonomies above start with the existing business models in a specific area and look at the patterns that are typical for these models as a whole. Joyce (2015) and Lüdeke-Freud et al. (2017) take the business models of existing sustainable businesses as a starting point and identify the business model epicentres: the core elements of the model. Gassman et al. (2014) take a similar approach when identifying the business model epicentres of economically successful businesses. Fleisch et al. (2014), Eisenmann (2002) and Rappa (2001) in turn each look at what business models exist in specific areas of the digital economy. Van 't Spijker (2014), narrows down his focus in order to get a more detailed insight in the role of data in existing businesses.

In some cases the taxonomies show overlap in business models. Joyce (2015), Gassman et al. (2014) and Fleisch et al. (2014) for example all identify freemium business models. Showing that this type of models can be successful in economic perspective, and has been used amongst Internet businesses and sustainable businesses. The taxonomies typically list a number of companies and products that uses a specific business model.

#### 3.2.1 Taxonomy business models are not complete business models

It is important to realise that the business models mentioned in taxonomies are not complete business models: they specifically describe how a company could organise a specific business model building block. Figure 1 shows an example of this using the Razor and Blade business model. As the figure

shows, the Razor and Blade business model refers to a specific organisation of the value proposition (2 correlated products) and the income structure (the product people are looking for is inexpensive, however a consumable related product is needed to make it work. This consumable product is sold with high margins).

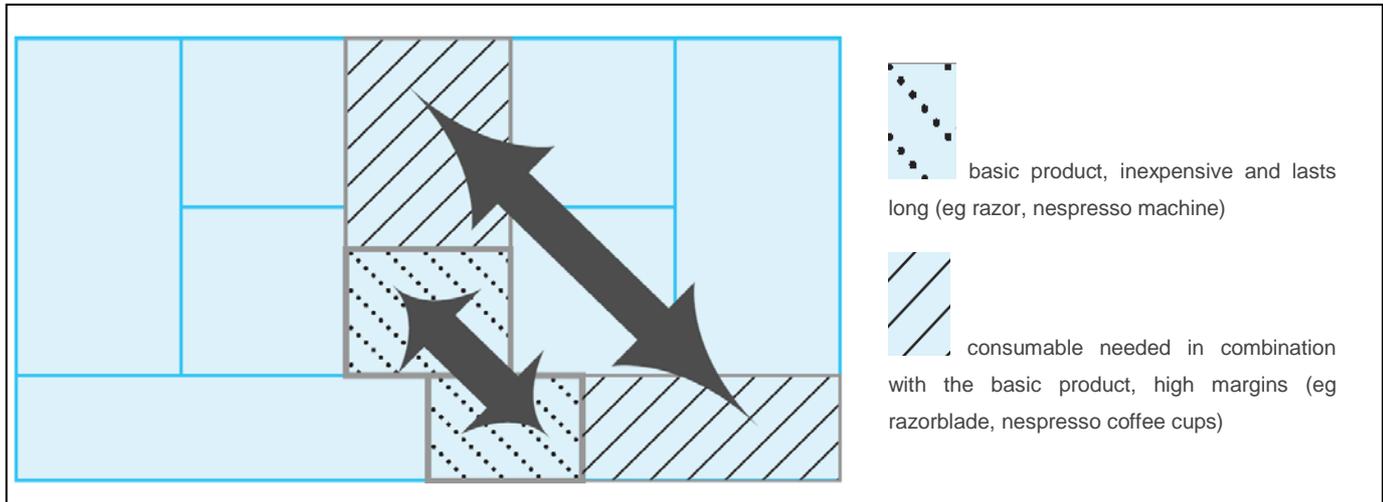


Figure 1. Razor and Blade Business Model

source: Joyce 2014

### 3.2.2 Taxonomy business models often do not pay attention to the combination of models

Companies in practice use a combination of various business models. For example Nespresso uses a combination of various business models. Nespresso uses the Razor and Blade business model to guarantee a regular income flow. The product that the customer needs (the razor) is sold for a low price, after which regular purchase of relatively expensive blades is needed. They also use an 'Ultimate Luxury' business model, creating an exclusive feel for their Nespresso through making it available only through specialty shops, at the same time allowing for direct sales. It is the combination of these models that makes Nespresso unique and successful.

The existing taxonomies typically look for a mutual exclusive patterning. Business models in the taxonomy of Lüdeke-Freud et al. (2017) for example are either included in the social pattern subcategory, or in the cooperation pattern subcategory. The same is true for the business case examples used in the taxonomies: specific business examples are typically either freemium, or collaboration. Only the taxonomy as developed by Gassman et al. (2015) uses labels to classify business model patterns relevant to value proposition, revenue models or the organisation of the value chain. This use of labels allows for identifying the interdependence of various business model building blocks.

### 3.3 EXISTING TAXONOMIES ARE LIMITED TO A SHORT DESCRIPTION OF EXISTING MODELS

Existing taxonomies typically stop at a description of the model augmented by one or more example businesses. Figure 2 shows an example of such a description.

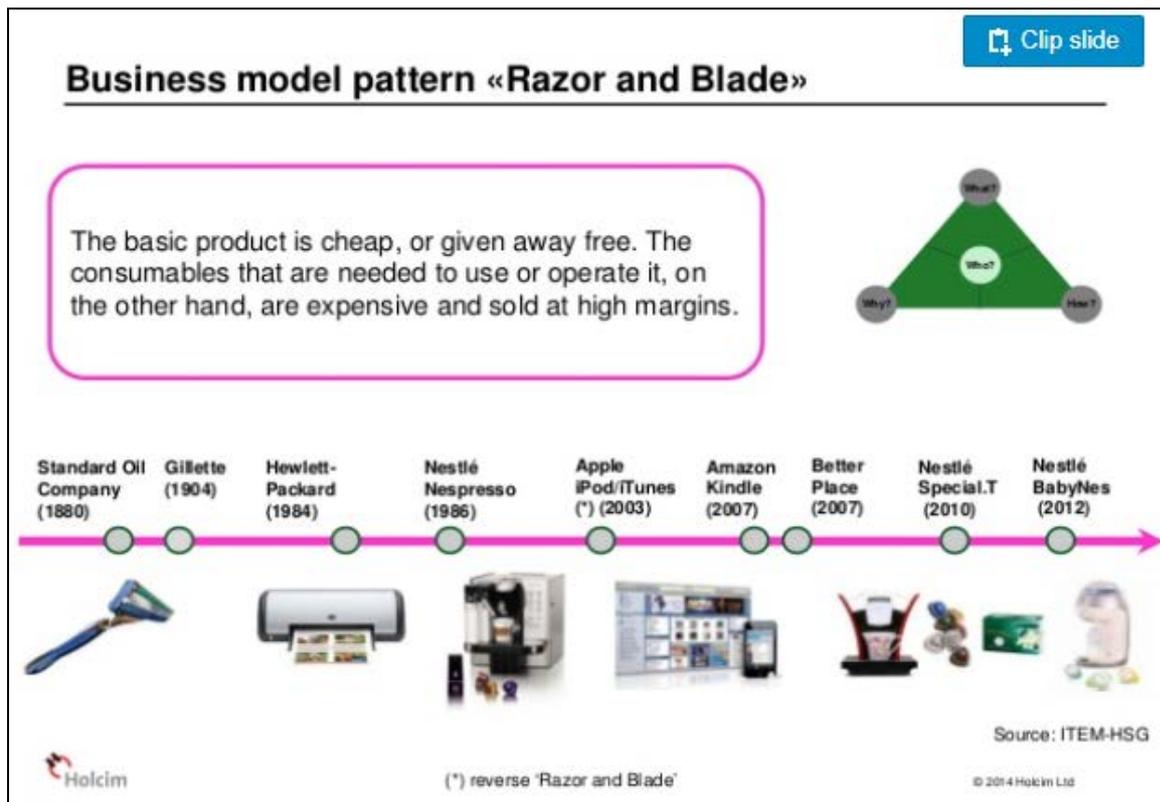


Figure 2. Business Model Description as used by Gassman et al. (2014)

The existing taxonomies typically provide no guidance into the specific instances that make a Razor and Blade model especially interesting, nor do they look into the aspects that would stimulate a successful adoption of such a model.

#### 3.3.1 Taxonomies help in general exploration of business models, not in problem solving

As a result the taxonomies are often very useful as inspiration when exploring possible business models. Gassman et al. (2015) aims at facilitating this exploration through a conversation tool that introduces various business model patterns. The tool tries to influence existing discussions on business model options to also include conversation on how specific business model patterns might influence a business. As such it represents the only taxonomy that has been created with the explicit ambition to assist in the process of business model innovation. While the tool will be useful for business developers that invest in such an exploration, it is however less helpful when looking for suitable solutions to a specific business model challenge.

## 4. EXISTING BUSINESS MODEL CHALLENGES

To understand to what extent the existing taxonomies assist the IoF2020 use cases with appropriate business model inspiration, this chapter presents the analysis of the interviews.

### 4.1 BUSINESS MODEL QUESTIONS OF IOF2020 USE CASES RELATE TO SPECIFIC BUSINESS MODEL BUILDING BLOCKS

Table 2 shows an overview of questions related to the business challenges that are expressed by the interviewed use case partners. The overview shows that the questions relate to specific building blocks of business models. While many questions are related to solutions specifically IoT- or data-driven companies, various questions are more general business development questions.

Table 2: Use Case Business Model Questions

Business Model Building Blocks	Questions
<b>Value Proposition</b> (what value do we bring to the customer? what problem do we help our customers to solve?)	<i>How to convincingly communicate the added value of data sharing?</i> <i>How to deal with a situation in which prospected customers do not (yet) see the added value of an add-on IoT service?</i> <i>What types of additional value creation is feasible for a specific IoT service?</i> <i>How to proof and calibrate our systems for other, similar sectors?</i>
<b>Customer Segments</b> (for whom are we creating value? Who are our most important customers?)	<i>How to identify additional customer segments for our service?</i>
<b>Customer Relationship</b> (what type of relationship does each of our customer segments expect to build and maintain with us?)	-
<b>Channels</b> (through which channels do our customer segments want to be reached? How do we raise awareness of our products and services? How do we help our customers evaluate our value proposition? How do we allow the purchase of our products and services? How do we deliver our products and services to our customers and how do	<i>How to stimulate user acceptance of specific data services?</i> <i>How to communicate about data collection?</i> <i>How to communicate about data safety, so that people trust the data collection?</i> <i>Can different customer segments be served by the same platform?</i>  <i>What marketing strategy can best be used to reach our customers?</i>

we provide after sales assistance?

<b>Key Partners</b> (who are our key partners and what activities or resources do they deliver? How do we arrange our partnership?)	<i>What partners should be thought of to make the business successful?          What kind of agreements related to data ownership and data use should be made with partners to facilitate a fruitful cooperation also in the future? What examples exist?          What could value chain integration look like? What are important partners and why?          What could be the added value of cooperation with other initiatives?</i>
<b>Key Activities</b> (what activities do we have to do to create value for our customers and run our business?)	<i>How to stimulate a specific quality standard throughout the value chain? What examples exist from other sectors?          How to organise safe data storage?</i>
<b>Key Resources</b> (what are the key resources required for our value propositions and how do we organise these?)	<i>How to organise data ownership, –use and – access?          What legal aspects should be considered regarding data gathering, ownership, -use and -access?          What examples exist of agreements on data-ownership and non-disclosure?          What is key information to take into account and manage if we bring products to market?</i>
<b>Revenue Streams</b> (what value are our customers willing to pay? How would they prefer to pay?)	<i>What do data revenue models look like for different players in the value chain?          What are pros and cons of various payment systems for platforms?          What are examples from other businesses?          What are possible payment structures (including lease options)?</i>
<b>Cost Structure</b> (what are the most important costs inherent to our business model? What are the most expensive elements of our business model?)	-
<b>Other topics:</b>	
<b>Business Innovation</b>	<i>What are extra business opportunities for working with a specific quality standard for machines with an ICT solution?</i>
<b>Process go to market</b>	<i>What are the main steps to go to market?          What would a roadmap look like when you are developing an ICT initiative?</i>
<b>Competitive analysis</b>	<i>What does the ICT landscape currently look like in agriculture?</i>

## 4.2 A GAP EXISTS BETWEEN QUESTIONS AND EXISTING TAXONOMIES

As Table 2 shows, the questions use case members express are generally specific questions related to an element of the business model and within a specific context. For example, some of the use cases wonder how to successfully raise awareness of their prospected customer regarding the added value of their product. Other use cases are looking for additional customer segments that can be

interested in their product or service. While finding answers to these questions is crucial for the business success, the existing taxonomies do not provide answers to these questions. The topics of these questions are out of scope of the existing taxonomies. Many use cases for example are looking for input and case examples of regarding agreements, organisations and communication regarding data collection, -use, -access and –storage. This is a topic that is not included in the existing taxonomies. These questions related to organizing data collection, -use, -access and –storage are closely linked to the IoF2020 activities in task 4.6.

For some other questions the existing taxonomies do provide valuable insights, but lack detail to fully answer the question: a use case for example looks for pros and cons of various payment structures. While the existing taxonomies do provide an overview of payment structures used, they do not include the positive or negative aspects of these payment structures, nor do they discuss the success factors that would make specific payment structures successful.

### **4.3 CASE EXAMPLES CAN PROVIDE VALUABLE INSPIRATION**

In some instances, use case partners explicitly ask for other company examples:

*What are pros and cons of various payment systems for platforms? What are examples from other businesses?*

*What examples exist of agreements on data-ownership and non-disclosure?*

*What kind of agreements related to data ownership and data use should be made with partners to facilitate a fruitful cooperation also in the future? What examples exist?*

Apart from these questions also for other questions examples of how other initiatives answered these challenges can provide valuable inspiration to use cases. For questions like ‘*What could be the added value of cooperation with other initiatives?*’ or ‘*What partners should be thought of to make the business successful?*’ case studies of existing collaborations can provide valuable lessons learned that help the use cases to formulate their own answer to these questions. Similarly, for a question like ‘*Can different customer segments be served by the same platform?*’ examples showing when different customer segments are and are not served by the same platform, included the reasons why, can help the use case to find an answer.

## 5. CONCLUSIONS AND NEXT STEPS

This deliverable looked which existing business model taxonomies can be used to answer the business model challenges faced by IoF2020 use case partners. The overview of existing taxonomies from literature showed that they provide interesting insights in types of business models in use. However, to make these insights valuable for the IoF2020 use case partners, a translation needs to be made to bridge the gaps. The characteristics of this translation are the following:

- 1) Take the business challenge as a starting point (as opposed to taking existing business models as a starting point)
- 2) Focus on specific Business Model Building Blocks (as opposed to complete business models)
- 3) Identify and create Case Studies from related fields (IoT / Data Driven / Agriculture) for specific business model challenges
- 4) Move beyond describing the Business Model, include success factors and points of attention

These steps are important because existing taxonomies in general do not assist in the process of selecting which business models might be successful for a specific business. Furthermore, existing taxonomies typically take business model patterns as a starting point. For business developers that master the business model language, these taxonomies most likely provide sufficient inspiration for them to identify relevant models and examples. However, the set-up used by these taxonomies is less suited to people who do not master this business model language, as is the case for many of the use case partners.

The questions of IoF2020 use case partners are especially directed towards how to solve specific challenges related to one or more business model building blocks. Often these questions require answers that are specific for IoT- or data-driven companies. In some of these cases the business models as described by the taxonomies of Timmers (1998), Rappa (2001), Thomas Eisenmann (2002), Van 'T Spijker (2014) and Fleisch et al. (2014) can be used as a starting point. Other questions are related to more general business development. In these instances then business models as identified by Gassman et al. (2014) can be used as input.

During 2018 Work Package 4 will further develop these ideas to inspire the use cases. This includes the development of a logic to come from the business model challenges to meaningful inspiration for the use cases and related initiatives. Furthermore, Work Package 4 will identify and develop case studies providing practical examples of how other initiatives have answered the challenges faced by the use cases. These case studies will be the basis of the business model descriptions that will be developed. Appendix 2 shows a draft outline of such a business model description.

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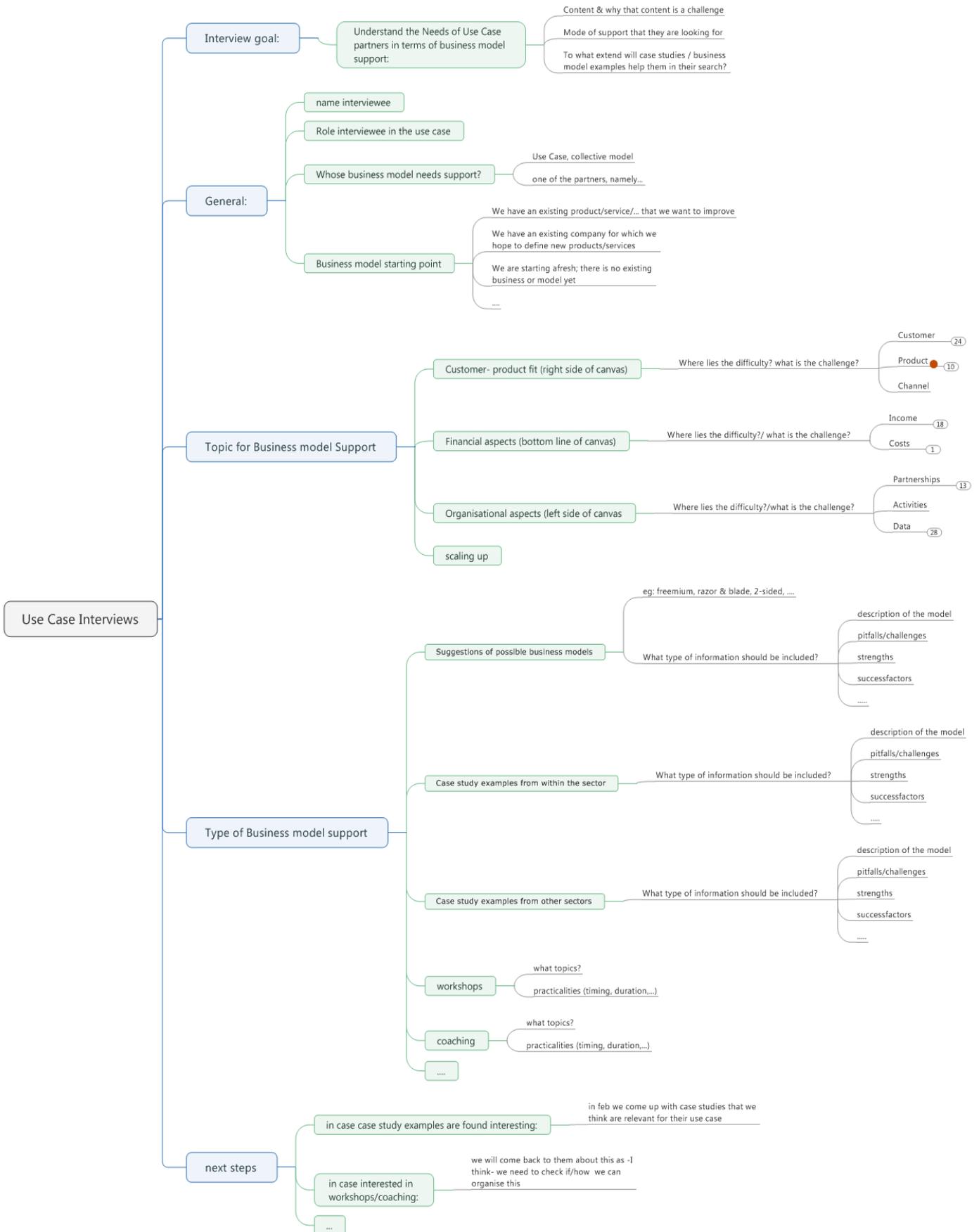
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## APPENDIX 1 INTERVIEW TOPICS

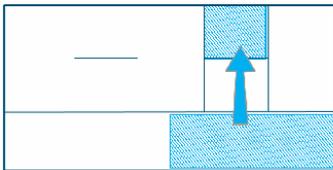
The following six use cases were interviewed using a semi-structured interview approach: use case 1.4 Farm machine Interoperability, 2.4 Remote Milk Quality, 3.3 Automated Olive Chain, 3.4 Intelligent Fruit Logistics, 4.3 Added Value Weeding Data, and use case 5.1 Pig Farm Management. On the IoF2020 website (<https://www.iof2020.eu/trials>) a description of these and other use cases can be found.

The topics addressed during the interview are depicted in the mind map on the next page:



# APPENDIX 2 DRAFT OUTLINE OF BUSINESS MODEL DESCRIPTION

## Freemium



Include hyperlinks to relevant case descriptions.

Basic service is free of charge, premium service is paid for.

The model is often used in data driven companies. Customer data is automatically collected and owned by the company. A Premium account can also include privacy options.



### Advantages

- Lowers the entry barrier for customers and therefore stimulates a quick market penetration / large user base



### Pitfalls

- It often is difficult to motivate users to switch to a premium account
- Offering your product/service for free means you do not generate revenue: you will need another source of income to cover the necessary costs



### Successfactors for this model



#### Related to the product/service:

- Your product/ service is truly distinctive from existing alternatives in terms of:
  - geographical focus
  - value proposition
  - customer segment
- Your product/service significantly gains in value when you have a large user base.



#### Related to the company:

- You have another source of revenue
- You are experienced with communication and network building



#### Related to the wider context:

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These aspects are the key to answering business model