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SERVICE DESIGN THINKING

– **Design as strategy.**

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TURUN AMMATTIKORKEAKOULU THESIS

Both services and design have been studied extensively but the method of service design thinking (SDT) has not been covered as thoroughly. The SDT approach is relatively new and brought about by changes within the value creation process.

The objective of this research is to study the field of SDT and the theories at work within the approach. Co-creation, prototyping and the evolution of the method became the central themes extensively examined and from which research questions developed.

Because of the unfamiliarity of the general subject matter extensive time is taken to lay the groundwork for understanding why and how this approach is being considered as so important for innovation of new and existing services.

In this thesis a qualitative research approach is used to glean insider information from those practicing SDT. The collected data is used to answer research questions which were formed during the literature review and the process of locating a case study subject.

The findings of the research act to confirm elements of the theory and also fill in some missing knowledge related to co-creation and prototyping of digital services. The use of only one case study limits the legitimacy of the findings and this is considered in the final conclusions.

The thesis writing process is effectively a first attempt at research for most .It is a difficult learning process and cannot be done alone without help and guidance. I would like to thank my thesis supervisor Alberto Gonzalez for his efforts to support and guide me on the thesis writing journey. His insights and assistance have had a real positive influence on the work presented here.

OPINNÄYTETYÖ (AMK) | TIIVISTELMÄ
TURUN AMMATTIKORKEAKOULU

Koulutusohjelman nimi | Suuntautumisvaihtoehdon nimi

Opinnäytetyön valmistumisajankohta | Sivumäärä

Ohjaaja(t)

Tekijä(t)

OPINNÄYTETYÖN NIMI

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ASIASANAT:

.

CONTENT

APPENDICES

Appendix 1. Interview Transcript

FIGURES

TABLES

LIST OF ABBREVIATIONS (OR) SYMBOLS

SDT	Service Design Thinking
SD	Service Design
UX	User experience
NSD	New Service Development
M2M	Machine to machine
P2M	Person to machine
P2P	Person to person
SDL	Service Dominant Logic
B2B	Business to Business
H2H	Human to Human
RRS	Rapid Research Sprint

1 INTRODUCTION

1.1.1 The thesis research

The thesis will examine an approach to service innovation and new service creation called Service Design Thinking (SDT). A coalition of principals, processes and tools directly drawn from the world of design and designers, applied to new service development and service innovation. The approach is motivated by a recognised shift in the value creation nucleus, from the control of the firm to a co-created effort between firm and customer, which is now extensively written about in service literature (Prahalad & Ramaswamy 2004; Mager et al. 2005; Pine II & Gilmore 2011; Osterwalder & Pigneur 2010; Edvardsson et al. 2011).

To understand how value is now derived through service interactions, Edvardsson et al. suggest that management needs to analyze how value is co-produced through configurations of people, technology, information and service systems (Edvardsson, et al., 2011). This refers to the point where the service is simultaneously produced and consumed.

Interaction is a key moment of the users experience when consuming a service. Service interactions are delivered machine to machine (m2m), person to machine (p2m) and person to person (p2p) (Miettinen & Koivisto, 2009). Prahalad & Ramaswamy cite this interaction as the new locus of value creation between the firm and the consumer (2004), the place the interaction occurs is called the service interface. It is valuable to note here that a service is produced and consumed at the same time during the interaction, a defining characteristic of service production when compared with the production and consumption of products.

SDT is promoted as a methodology for management to apply to the service development process which Mager says positively influences the *interactivity dimension of services* (Mager, et al., 2005). True to design philosophy the

contribution of users in the co-creation of value is fully recognised and incorporated into the way of service design thinking. Companies already recognise the importance of design in the innovation process (Mager & Sung, 2011) and fully recognise the importance of the user experience. The scope of this review is not only on innovation of services but how SDT aims to enhance the users experience during interaction. Prahalad & Ramaswamy confirm the need to develop this area suggesting that managers need to focus on the experiences that customers seek to co-create and facilitate this working relationship (2004).

SDT entails a merger of the principals and approaches of the design world with the necessary industrialization of the service delivery process as staged by marketing and management (Miettinen & Koivisto, 2009; Mager, et al. 2005). Thus initially the research begins with an examination of services and the relocation of the source of value creation, this is followed by a look at the elements from the design world which are being used to assist the innovation process. SDT is an approach to service creation and innovation of existing service offerings which focuses on enhancing the experienced interaction between user and service offering.

When using a service customers consciously and sub-consciously record or rate the experience based on the interaction. Emotions, feelings and opinions are all stimulated after a service has been used. Was the experience good, enjoyable, helpful, efficient, beneficial, confusing, uncomfortable, or even painful? The list is endless and the recorded experiences are certainly never unanimous amongst users. An area completely beyond the control of the service provider, the user, is said to play a pivotal role in the production and consumption of the service and therefore joins with the firm as a co-creator of value. The user, susceptible to all of life's ups and downs, daily fluctuating emotions and moods, unfathomable mix of experiences, personality traits and unique characteristics has now become the firms "business" partner in value creation.

It is this shift in the value creation nucleus that motivates the author to research the area of SDT. SDT will be presented as a way to influence the areas of new

service creation and existing service innovation. I feel this is a valuable development and is worth researching. Saunders et al. believe the decision to study a particular subject is a direct reflection of a persons "values" (Saunders, et al., 2012). The choice of research shows you think this is an important topic over others. The same can be said for the choice of data collection techniques also. The choice here is to conduct an interview for data collection. Saunders et al. believe, those choosing this method for data collection demonstrate they value personal interaction with respondents more highly than views expressed through anonymous questionnaires (2012).

This paper devotes some time to further expand the approach of SDT and bring some familiarity or foundational knowledge to the reader before focusing on a particular method within the process known as prototyping. Prototyping within SDT will form the basis for the selection of a study of its application within the high tech sector. A local company "Infinity" will become the case study subject and findings from an interview with CEO Mikko Kämäräinen will be presented in chapter 7. The case study will be used to answer the research questions which have been developed during the review of the literature. The research questions are as follows:

1. How does the Rapid Research Sprint (RRS) work in service development?

    o GOAL= to find out if and how Infinity co-creates with users during the design process, a fundamental aspect of SDT.

2. How does prototyping in digital service development differ from general service development?

    o GOAL= Understand the way prototyping works in reality and compare with theory.

3. How do SDT methods influence the business model?

    o GOAL= Understand why design is being used in the early service development process.

During the following analyses and for the remainder of the paper the two phrases service design and Service design thinking are used seemingly interchangeably. However it is not the case and each represents a different facet of designing services, a comparison and analyse of the major differences is made later and for now it's good to think of SD as the general area of designing services while SDT is an approach used within SD.

2 SERVICES

PRODUCT	SERVICE
→ Produced	→ Performed
→ Material	→ Immaterial
→ Tangible	→ Intangible
→ Can be stored	→ Can't be stored
→ Usually without client	→ Interaction with client
→ Consumption after production	→ Consumption = production
→ Defects in manufacturing	→ Mistakes in behaviour
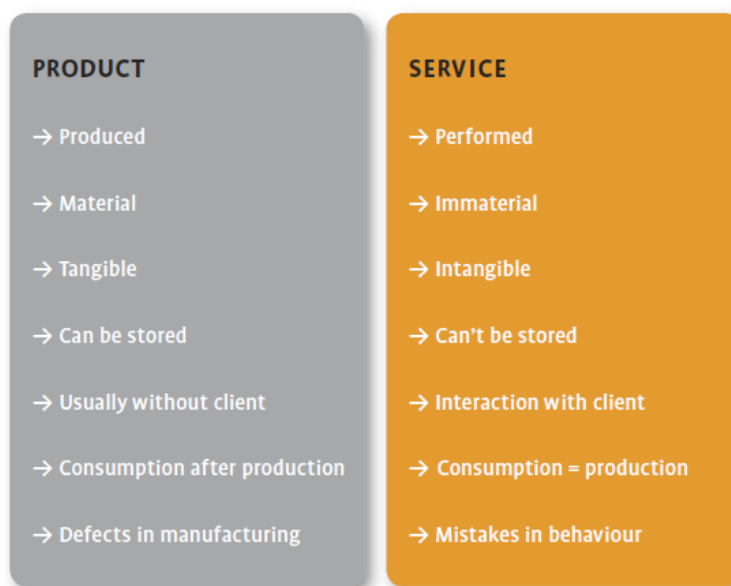
Figure 1 Differences between products and services (Design Council .UK, 2005)

Figure 1 shows the differences between products and services and is widely used in service literature. The diagram can also be interpreted to show what is unique about services, SDT addresses the implications of these unique aspects (Moritz, 2005).

Antti Ainamo develops these differences further adding; a service involves a greater amount of customers within the production process; it is also harder to maintain consistent quality control production standards and there is an absence of inventory. Antti Ainamo says that while its useful to agree on the product

service differences in Figure 1 it should serve as only a platform to then consider how services differ amongst themselves not just in relation to goods (Ainamo, 2007).

Just like there are many kinds of goods there are also many kinds of services, Ainamo uses the comparison of a restaurant meal and a medical diagnosis to highlight just how extreme and varied the difference can be (2007). Blomkvist challenges research to focus less on services as a whole but to develop and understand service categories' better (Blomkvist, 2010). King & Mager highlight another defining characteristic of a service, the "unique selling point", services cannot be duplicated and cannot be produced anywhere else in the world. They add that services are relational, involve special knowledge and contain a shared experience between a company and a customer (Mager & King, 2009).

The following is an examination of 5 other key factors influencing the way services are valued and understood.

- The size and relevance of the service sector.

- Satisfaction of consumers

- The nature of services

- Technology and the connectivity of consumers

- Shifting of the value creation nucleus and the experience aspect

A 2006 survey of 362 companies reveals there is a divide between service suppliers' perceived ability to satisfy (80%) and customers' who actually agree (8%), (Allen, et al., 2005). Moritz confirms that not enough companies regularly innovate their services and that improvement is essential for not only companies but economies also (2005).

The accepted distinctive characteristics of services, (IHIP) intangibility, heterogeneity, interactivity and perishability describe the specific nature of

services and support the need for distinct innovation strategies and models (Edvardsson, et al. 2005; Mager & King, 2005). It is this lack of distinct innovation strategies that some researchers believe is responsible for such low customer satisfaction with current service offerings. (Prahalad & Ramaswamy, 2004; Miettinen & Koivisto, 2009).

New technologies are enabling new service opportunities, the internet, telecommunications, computers and wireless devices continually open up new possibilities (Moritz, 2005). The tools of connectivity are facilitating communication between consumers, consumer-to-consumer analysis and dialogue flows over the internet. Once isolated and passive, consumers now have alternative sources of information and perspective, empowered consumers are now questioning industry's value creation process. Historically companies organized their activities to produce value and controlled the strategies to achieve it (Ramaswamy & Ozcan, 2013). Now these active consumers are increasingly co-creating value with the firm through high quality interactions which include an experience element.

Firm and consumer interaction is becoming key to value creation as the process shifts from a firm-centric view to personalized customer experiences (Prahalad & Ramaswamy, 2004). Miettinen reasons that fluctuating markets and rapid changes within markets means that improvement and innovation of skills are crucial for service providers for retaining customer's and finding new ones (2009). As value shifts from services to experiences, innovation of services must also evolve to creating meaningful, satisfying experiences (Prahalad & Ramaswamy, 2004).

In support of this shift in the value creation nucleus academic literature and research has been calling for a different approach to value creation known as the customer centred view or the concept of co-creation (Prahalad & Ramaswamy, 2004) (Edvardsson, et al., 2005). This view acknowledges a customer's role in defining and creating value and therefore the importance of their involvement in the design and creation process.

Services have always been consciously organised but not necessarily designed from a user's perspective to create more efficient, enjoyable and useful experiences (Stickdorn & Schneider, 2010). Service innovation occurs differently than within manufacturing firms (Mager, et al., 2005). Innovation in manufacturing firms usually occurs within the R&D or Design departments. Innovative solutions for services are often developed within the service development process and management, outside of typical R&D (Mager, et al., 2005) .

The preceding paragraphs have highlighted 5 factors which are forcing service firms to reconsider their approach to service development. Firstly the size and relevance of the service sector highlights the importance. Secondly the historical satisfaction with current service offerings reveals the need to improve and also highlights the experience aspect as key to understanding how and where the focus for improvement should be. Thirdly noted is off course the general technological environment which has an influence on how service innovation occurs. Finally noted is evidence of a shift in the way value is created and the role consumers now play in co-creating value.

Acceptance of these five factors leads to some assumptions regarding value creation, service development and customer satisfaction.

- In order to influence what a consumer experiences, the interaction of the customer with the service must be taken into consideration during the creation process of that service?
- If value creation now results from the interaction of consumers with services how do providers take advantage of this?
- How can service providers keep up with emerging needs created by technological changes, forecast them and remain relevant?

2.1.1 The service interface

Service creation and service innovation are both manageable processes, currently research is incomplete but models and processes do exist. The method of service design thinking is promoted here as one which is highly suited to the

successful development of services. Moritz believes key factors that have emerged in regards to New Service Development (NSD) are the involvement of customers (2005). "Ad hoc", has been used to describe new service development, failure rates remain high for new services and research in understanding key influential strategic factors for success is ongoing (Edvardsson, et al., 2013). Edvardsson et al. name 2 principals of SDT, integrated development teams and customer co creation as having been shown to be important factors in NSD (2013).
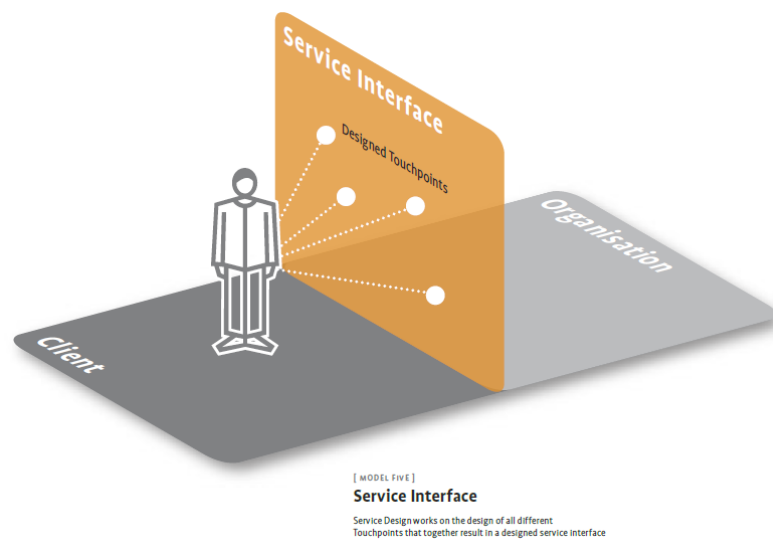
Figure 2 The service interface (Design Council .UK, 2005)

Figure 2 illustrates how the client and organization meet at a certain moment, this is where the service is produced and consumed simultaneously and is known as the interaction. Interfaces have many forms and they are generally categorized as those between humans and between humans and machines. The physical features a user will engage with to use the service are known in service literature as touchpoints. They could be in the form of a keyboard or occur across a counter in a face to face service experience such as a hotel receptionist would deliver.

This section has tried to reveal some important elements of services which will contribute to understanding better the development of the SDT approach. What emerged was a "point" known as the interaction where production and

consumption occurs and the resulting user experience happens. Chapter 3 now continues with the breakdown of the major themes of SDT, design.

3 DESIGN

"Business people don't just need to understand designers better; they need to become designers"

Roger Martin, Dean, Rotman school of management (Osterwalder & Pigneur, 2010)

"It is within the service design process that designers can demonstrate unique skills perfectly suited to service design"

Oliver King, co-founder and director of engineservicedesign.UK in an interview with Birgit Mager for online magazine Touchpoint, 2005. Birgit Mager is a specialist in service design and professor at Köln International School of design.

In the 2 quotes a type of war is being played out, on one side Roger Martin represents the business management view and makes a claim which insinuates that business people can become designers. Whereas Oliver King on the other hand standing firmly on the side of designers makes a statement which leaves no doubt about the specific talent and skills required to be a designer, these opposing views are interesting to note.

Over the last 10 years approaches and methods from the field of design have been successfully used to create solutions in the development of services. Early on the concept and practice of service design was received amidst confusion due to a rather common misunderstanding of "design" by the wider public, media and industry (Miettinen & Koivisto, 2009).

Design was thought to be about making things more beautiful and more expensive, (Mager cited in Designing services with innovative methods, Miettinen and Koivisto, 2009) Moritz thinks the misunderstanding surrounding the

meanings of design stemmed from the historical understanding of design as being a tool for the production and styling of artefacts (2005). Moritz describes designs historic role as concerned with the look and feel of the features of artefacts. Which of course it was and it still assumes this role, however design is now being used in so many more different ways.

Currently there are many fields of design and emerging fields such as SDT which should not be confused with service design or interaction design or experience design, they are described:

1. Service design refers to the use of design methods from product design and interaction design for designing the experience of and the interface to services (Cottong, 2009). Baty says service design is the intentional and thoughtful design of internal and customer-facing activities needed to deliver a service (Baty, 2012). He also highlights the importance of the design process to affect all people involved, those behind the scenes in the firm and the users themselves. Blomkvist, "service design aims to improve complete service experiences, across touchpoints and service moments, across physical spaces, virtual places, graphical objects and social interactions"(2010).

2. Interaction design is historically linked with the design of digital control interfaces for products. A complex product example is the computer, the control interfaces are the software and operating systems within (Baty, 2012). Modern interaction design can include services and also focuses on how to humanize technology.

3. SDT is an emerging field, a way to solve all kinds of problems using design tools and methodologies (Cottong, 2009). Baty describes SDT as occurring early on in a project and involves developing empathy for the customer, developing design ideas and using visual techniques and prototypes to trail those ideas (2012).

4. Experience design. It's also possible to add experience design (UX) here, which Baty says is focused on only the customer facing aspects.

Cottong says it is a human centred design process which focuses on the quality of an experience a user has when using a good or service.

Another approach involving design that deserves an explanation is, design driven innovation. It is fundamentally different in that it is an approach which aims to change the historical meanings of existing products or services. The example of the Nintendo Wii is often used to explain it. The Wii changed the way people thought of the gaming console, from a sit down static experience into a full physical activity with positive health benefits. Roberto Verganti has written a book titled "*Design driven innovation*" published by Harvard Press. He delicately describes the fundamental differences between "user centred" design methods of SDT and "design driven" innovation which leverages design in a totally different way and takes no notice of what people want (Verganti, 2011).

The UK council for design highlights gaps between the role of design within manufacturing and service firms, tables 1& 2.

	Manufacturers	Finance & business services	Consumer services
It is integral to the firm's operation	41%	15%	6%
It has a significant role to play	35%	18%	15%
It has a limited role to play	15%	39%	42%
It has no role to play at all	9%	28%	37%

(Design Council survey of 1,500 firms, 2005)

Table 1 the role of design in manufacturing and service firms (Kimbell & Seidel, 2008)

Tables 1 & 2 show that design is underutilized in service creation and service innovation. It can be interpreted that manufacturers value design a whole lot more and often have designers leading their new projects.

	Manufacturers	Finance & business services	Consumer services
Design Manager/ design team leads and guides whole process	63%	3%	13%
Designers are used in all stages	41%	12%	5%
Designers are used in some specific stages	19%	2%	28%
Designers are not included in the process	13%	84%	55%

(Design Council survey of 1,500 firms, 2005)

Table 2 how design is used in firms' new product and service development (Kimbell & Seidel, 2008)

In an Oxford University report on design methods Robert Young exposes many dilemmas surrounding the merger of design with business (Young, 2008). Young drawing from a work by Manzini points out that the increase in the popularity of SDT comes from a shift in thinking where design was a tool for consumption, to design now being a tool for the development of relationships between people and technology.

The field of design has always studied users and the way they interact with artefacts (Miettinen & Koivisto, 2009). Designers are by nature responsive to their environments and changes within those environments, it is part of the design process to understand users, empathise with them and know the value objects create for their users in everyday life (Mager & King, 2009). King even adds that understanding user-centeredness is a unique designer skill. Mager and Sung have found that over the past few decades' designers' roles have evolved to now include a focus on the interaction between technology and people (2011).

Mager and Sung show an evolution has occurred where designers who once designed products are now using design as a strategy for creating services (2011). Design moves from being a styling tool for products to being a process or strategy for services. Moritz confirms this evolution explaining that designers used to influence the end look of a product but with disciplines melting into each other design has become a business strategy in itself (2005). They declare that companies are already aware of the need to incorporate design processes within organisational thinking, not merely as a tool to be used once in a while, but as a way to approach each project and each project phase. Miettinen & Koivisto, confirm this need to integrate design thinking deep down into organisations and Miettinen herself describes good design as being connected with good strategy(2009).

[MODEL THREE]
Levels of design
1 Design of features (product, service or space)
2 Design of client experience
3 Design of processes and systems
4 Design of strategy, philosophy, policy or ideology
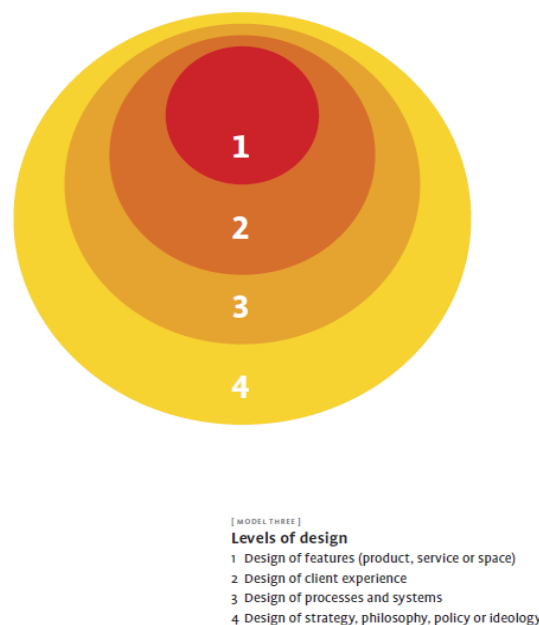
Figure 3 Levels of Design (Design Council .UK, 2005)

Figure 3 illustrates designs expanding areas of influence, from the historical application of design, the styling of products, to the more recent development where design is now being used to influence business strategy. It shows design is no longer just concerned with how things look and is no longer only applied at the end of the product development process (Moritz, 2005). Design is now being

used to influence the experience people have and the processes and systems behind those experiences.

What makes approaches of the design world good for use in service innovation? Tim Brown, CEO of IDEO, says "designers use a human centred creation process, understanding how designers think during the creation process can help service providers to incorporate co-creation within their service development process" (Brown, 2009).

Designers approach from a different perspective than engineering based companies (Brown, 2009). The design approach, the process and the human centred view all differ from standard product development. Tim Brown shares with his readers several concepts which he believes aids innovation "Firstly problems within design are seen as projects, and projects are seen as non-linear or iterative" (2008). It is in the character and nature of the designer to empathise with the people experiencing the problem, thus empathy is an essential design principal (Moritz, 2005) (Mager & Sung, 2011).

Inspiration, ideation and implementation are three words Brown uses to show how a designer thinks when tasked with taking a problem to market.   He describes these as overlapping, non-linear and iterative so to facilitate a key concept of the design process; its exploratory nature. If done right he explains there should be multiple discoveries along the way which are either integrated or allow the team to return to revisit its basic presuppositions. Thus highlighting the need for an iterative process unlike the typical milestone-based process of traditional business practice.

The idea to include design within the business approach should not be a surprise, business people have been acting as designers already. When they create a new business, or business idea, strategies, business models, processes and projects they are practicing design anyway (Osterwalder & Pigneur, 2010). Unfortunately they may lack what designers themselves are equipped with, a wide variety of design tools and training.

Today design has evolved to not only shape and style products but to also influence and shape the experience customers have with products, services, spaces or some mix of these (Moritz, 2005). Furthermore design is now being used to develop the processes and systems that are behind these experiences. Lastly design is now also influencing the development of strategies and even philosophies which contribute to policy making. With these types of contributions design is being recognised as an element to be included up front in the project (Moritz, 2005).
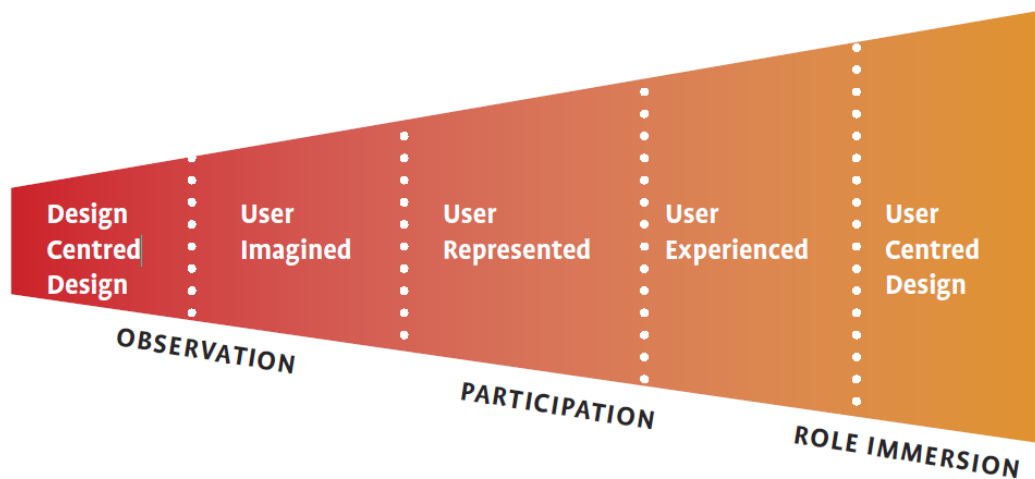
Figure 4 Co-design (Design Council .UK, 2005)

Figure 4 illustrates the various levels of influence design can have on a project. From left to right it can be seen that each level becomes more intrusive within the users world. Design centred design being narrow in terms of approach, the use of users input is limited or passive and therefore without the users' viewpoint it cannot be described as human centred. The broader right hand side of the diagram represents a wider approach described as role immersion. This is the holistic approach where all stakeholders are considered by a variety of experts to arrive at a unique solution through a unique approach, something the SDT approach claims to do.

4 SDT

Service design thinking has emerged as an approach to apply early on in the service development process and facilitate innovation. Yet it is still relatively misunderstood by management, many companies have not evolved to integrate any type of service innovation specific methods (Miettinen & Koivisto, 2009; Moritz, 2005). According to Moritz, there is a long way to go to before firms acknowledge that a lack of good service design remains a barrier to success (2005). Holmlid in a similar vein reports that while product design and interaction design are established practices service design remains largely misunderstood (by management) (Holmlid, 2007).

Antti Ainamo has found that research literature follows a similar trend, he notes that while research in innovations and operations is abundant specifically there is a research gap in the area of service innovation (Ainamo, 2007). In a 2005 conference in Helsinki, leading researchers in the service innovation field Birgit Mager et al. presented a paper titled "Innovation through Service design" in which described the emergence of SDT. The paper then also exposed the lack of an innovation model and asked for further evolution of the discipline and a concrete merger within service development practice.

Researchers Segelström & Holmlid, have found that many fundamental aspects of service design are still unexplored academically (Segelström & Holmlid, 2009). Their reasoning; that historically service design research had been focused on how the discipline of design related with other disciplines and the arguing of service design in its own right.

Currently there is no official definition of SDT instead a variety of descriptions can be found. Table 3 is a collection of SDT descriptions;

Reference	Definition	Keywords
(Stickdorn & Schneider, 2010)	Service design thinking creates interfaces which are useful, useable and desirable from the clients' point of view, distinct from the suppliers' point of view.	Create Interface Client/Supplier
(Mager, et al., 2005)	Described as a human centred approach it is design-driven innovation of new service ideas and new or better modes of experiencing the service offering.	Human centred Innovation Experience
(Prahalad & Ramaswamy, 2004)	It is concerned with the supplier-user interface; or the "service relationship" or "delivery" innovation which effects self-service, e-commerce, on-line services and more importantly, interactions which have an "experience" characteristic. As previously introduced it is this experience interaction between firm and consumer which is now seen as the locus of value creation.	Interface Experience Interaction Value creation
(Moritz, 2005)	Service design acts as an interface and connects organisations and clients in a new way.	Interface Org/client Connects
(Miettinen & Koivisto, 2009)	Service design addresses the functionality and form of services from the perspective of the user.	Function & Form User

Table 3 SDT definitions and descriptions

Nearly all descriptions of SDT that can be found originate from service researchers, service design consultants and service design practitioners. When reading through these descriptions it seems each is slightly different than the rest. However some commonalities from the previous descriptions are;

- The interface and its central role as the place value is created.
- The importance of a user's "experience".
- The human centred approach in creation or innovation of services.

The description from Mager appeals to the author of this thesis for a variety of reasons. Firstly the phrase "human centred approach" seems very appropriate to be included within a description of SDT. Mikko Kämäräinen, in the case study interview indicated this specifically when he addressed the issue of who his clients were, when asked if he had only B2B customers he replied, "no, right now we work with humans, therefore we think of our business as human to human" (H2H). He explained; "it is humans who create solutions, people working together, not companies, companies never create solutions" (2014). Mikko Kämäräinen is the CEO of award winning Finnish design company INFINITY which is the case study subject for this research.

Despite the fact this is contradictory to the user centred approach the reference to design driven innovation is the next appealing part of Magers description in Table 3. SDT has the approach to change perceptions about problems. Within SDT it is of utmost importance to discover what the real problem is before suggesting any quick fix. If design driven innovation is capable of changing the associated meanings of an offering by altering features, SDT can also do this using design methods to alter the understanding of the problem in a holistic context.

Finally the inclusion of the experience aspect cements this as why this description is chosen over others. While the research phase seeks to understand the context of the "need/s" in a holistic manner. The following parts of the SDT process work on best developing the service to create useful, useable and meaningful experiences. The process of SDT recognises the importance to develop the

solution into a satisfying experience and this is captured within Magers description.

4.1.1 The Process

SDT is used to search for solutions to people's problems by affecting the process of how those people and their problems are understood. Tim Brown says about innovation; "innovation is powered by a thorough understanding, through direct observation of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold and supported" (2008). King writes that SD is a process much the same as the design process the main differences lie within the techniques and methods used by the team (Mager & King, 2009).

SDT leads the development process and begins with a research phase. Stickdorn et al. refer to this as exploration and say its purpose is in finding out what are the real problems at work (Stickdorn & Schneider, 2010). Table 4 is a collection of process models found in service innovation literature.

Reference	Process			
UK design council (Stickdorn & Schneider, 2010)	Exploration	Creation	Reflection	Implementation
(Brown, 2009)	Inspiration	Ideation		Implementation
Miettinen & Koivisto 2009; Stickdorn & Schneider 2010.	Discover	Define	Develop	Deliver
(Moritz, 2005)	SD understanding Explaining	Thinking	Generating Realising	Filtering

Table 4 Process of SD

Most importantly to note says Stickdorn, the SDT process structure is iterative in its approach (Stickdorn & Schneider, 2010) this is a well-known theme also

confirmed by Brown et al. and is expanded here in section 4.1.1. This is the reason the words in the process diagram are not separated by arrows. The individual steps (exploration, creation, reflection and implementation) of the first process in Table 4 are now examined further.

4.1.2 Exploration

Stickdorn & Schneider say the idea of phase one, exploration, is to become fully aware of the situation from the perspective of the current and potential customers of a particular service (2010). Miettinen & Koivisto put it another way "it is about understanding the service context, the users and the business environment" (2009). Moritz proposes another process which has a first phase titled, Service design understanding, this refers to an education process which precedes any other work (2005).

At the end of this first phase problems should be identified and in-depth insights generated. The development team should now have identified the customers' needs, motivations and expectations, the service providers' processes and constraints. The customer journey map should be generated and this should contain the identification of all touchpoints in sequence.

SDT tools in the exploration phase are used to understand and create empathy with the user, understand and experience the current service and its place within a broader picture, (the holistic aspect of the approach). Miettinen agrees with the empathy focus stating, "designers' tools and the service design process emphasize empathy for the users, creativity, visual thinking and co-design" (2012). SDT tools used for the exploration phase are by nature user centred and consist of interviews, observational exercises and participatory design sessions, sometimes these tools are known as "the need tools".

Stickdorn and Schneider write that the main questions the "needs tools" address are:

- Whose needs the organisation should focus upon,
- How well does the organisation understand its customers' needs and

- To what extent are you as an organisation satisfying them.

Stickdorn & Schneider recommend involving customers at this stage as one of the best ways to ensure the downstream success of the service (2010). Mager & King say service design requires textual, emphatic research which differs from a quantitative approach which attempts to know the user via facts and figures (2009).

Kämäräinen referred to this when he spoke about the thinking behind the old linear process to market; "it was a process developed to reveal "what" should be produced, the company then just needed to figure out "How" to do it". Kämäräinen explains that this is no longer the case, instead now the big question is "What" should we be doing? (2014).

As a way to answer this question Infinity has developed a process known as the "Rapid Research Sprint". The first few days of the RRS are spent with a customer analysing the "what" aspect from a holistic viewpoint. With companies having the capability to reproduce almost anything the most important consideration becomes "what" should we produce.

4.1.3 Create and reflect

What follows the research phase is the idea generation and idea testing process, or creation and reflection stages. Stickdorn & Schneider highlight the importance of using interdisciplinary teams in this idea creation phase to achieve holistic and sustainable ideas. They says it's crucial to include all stakeholders and that, facilitating co-creativity amongst the team is a key goal of a good service designer (2010).

It's here, mistakes should be made as this is a cost effective way of testing ideas and abandoning them for other ideas, more iterations should be done here than in following phases. Stickdorn & Schneider regard this as one of the main features of SDT and say this approach is not about avoiding mistakes, but rather to explore as many mistakes as possible (2010).

During the reflection phase idea testing is done through the use of service prototypes, there is a detailed section specifically dealing with service prototypes in 4.1.6. There is a focus here on ideas testing and failing, or put another way; create, prototype, iterate. There should be many iterations between here and the previous phase. Each cycle adds information, what works, what's missing, what doesn't work, this new information is added to the next round. Each round uses quick, agile and cheap methods to facilitate communication and analyses (Stickdorn & Schneider, 2010)

Stickdorn & Schneider say the intangibility aspect of services makes this a difficult stage to prototype in. SDT has developed a wide range of tools to help the research phase and the prototyping process. SDT tools and techniques are used to visualise concepts and facilitate the communication of concepts.

4.1.4 Implementation

The final stage in the process is called implementation and involves the same demands as found within any change process. Normal change management principals can be applied to aid the process. All changes made to services must be consistent with the other parts of the service, consistency within the service concepts must be shared throughout the entire services network of actors, touch points and systems. SDT tools can be used to illustrate these processes and evidence at an organisational level (Stickdorn & Schneider, 2010).

Implementation involves the task of conveying the chosen concept to others beyond the development team. Clear communication is needed not only for new processes and physical changes but also to convey emotional aspects of the newly innovated service. To achieve a smooth transfer of the newly designed concept its best to involve as many employees as possible earlier on in the design process. Similar communication tools used within the development team to convey ideas during idea generation can also be used to up-date employees during the development process. This helps to engage those not directly involved with the development team and should also allow for any input they have. Stickdorn adds that certain employees must contribute to the prototyping of

certain service moments so they can have a clear vision of the concept. Implementing change relies on management's commitment and understanding of the chosen concept and its ability to instigate change and handle the usual problems which arise with any change process.

5 PRINCIPALS OF SDT

5.1.1 Iteration

Stickdorn & Schneider say that while a design process is non-linear, it still consists of a works within a structure of exploration, creation, reflection and implementation (2010). Stickdorn & Schneider describe the iterative nature of the SDT method as a development process which is continually able to move backwards, take account of itself and be capable of reconfiguration. The structure is cyclical throughout the project, returning to previous parts of the framework essential in the iterative nature of the whole journey. Miettinen & Koivisto describe the iterative aspect as one which is a cyclic process of prototyping, testing, analysing and refining work in progress (2009). Tim Brown also supports this approach and says it is an essential part of the innovation process (2008).
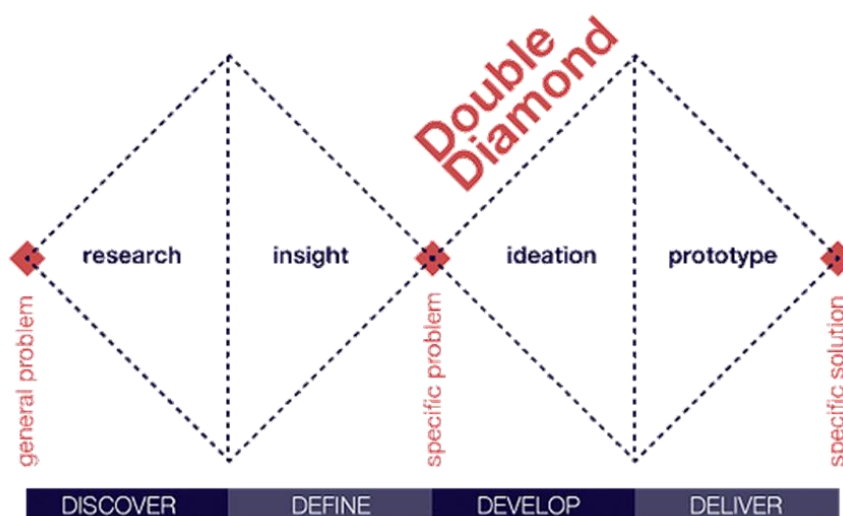
Figure 5. The Double Diamond (Stickdorn & Schneider, 2010)

The double diamond is used to give the design process a structure and gives the project a framework to move forward. Iteration means that when new idea creation occurs and new useable information becomes available the project can move backwards to a point to allow for the new discoveries. Cycles of iteration allow for any new discoveries which occur from testing as mistakes in the concept are exposed. Stickdorn & Schneider say that being able to move backwards is only progress if you can learn from the previous mistakes (2010). The double diamond framework is also used by Mager and King in their interview article "Methods and processes of service design" (2009).

Tim Brown writes about iteration when referring to the trail and era process of the famous innovator Tomas Edison. Edison whose quote "99% perspiration" regarding genius seemed to accept the trial and error path as the only road to innovation (2008). Brown also claims Edison was an early adopter of a teams based approach shifting away from the lone inventor mentality, this is a foreshadow of the multidisciplinary approach as used in SDT where a great emphasis is placed on using a development team which is filled with a variety of expertise and backgrounds. The second component which is coupled to the team are the intended users themselves however the relationship is not always straight forward or obvious. Different researchers and authors have alternative views regarding the co-creation aspect in service development as occurring between users and services.

5.1.2 Co-creation

Currently literature and research show that the traditional firm centric path to value creation has been usurped. Instead now the user or consumer has a role

to play within the value creation process and co-creation is the path to exploiting this. Here now is a collection of the various descriptions found of co-creation during this study.

Reference	Description	Keywords
Prahalad, 2004; Prahalad & Ramaswamy, 2004; Miettinen & Koivisto, 2009; Stickdorn & Schneider, 2010.	A relatively new concept in the service world, co-creation refers to the involvement of the customer with the firm in the creation process	Customer& firm Creation process
Stephan Moritz, 2005	Participation of clients with designers during project development is known as collaborative design and user centred design	Participating together. User centred
Miettinen & Koivisto , 2009	Co-creation is the way in which a customer is allowed to co-construct the service experience to suit his/her context	Customer Experience
(Ind & Coates, 2013)	Co creation sees people and organizations participating together in approaches to insight and the processes of new product and service development and marketing.	Participating together.

Table 5 Co-creation descriptions

Companies in the past have often enjoyed working closely with their customers but that relationship has still been firm-centric. Self-service, pumping gas, cleaning up, self-checking, have all been some of the strategies used to involve

customers, yet in all of these the firm has remained the overall architect of the activity (Ramaswamy & Ozcan, 2013) (Prahalad & Ramaswamy, 2004).

Miettinen & Koivisto say that through the service offering client and customer will become thoroughly integrated thus by definition most services are co-produced, design thinking then integrates customers as active parts of the service delivery process seeing them not as passive consumers but active partners and "co-creators" of value (2009).

Stickdorn et al. describe services as being by nature irrelevant without the involvement of the customer, so all the more reason to involve them in the creative process (2010). Miettinen & Koivisto see co-creation as the way in which a customer is allowed to co-construct the service experience to suit his/her context (2009). Mager & King believe enjoying this co-creation process with users is one of the most important qualities of a service designer (2009).

Moritz uses the phrase *user centred design* to describe the participation of clients with designers during project development and this then is also referred to as collaborative design (Moritz, 2005). Ind & Coates say co-creation is a method where researchers bring together users and clients to examine a proposed concept together (Ind & Coates, 2013). Miettinen & Koivisto include the customer in co-creation before, during and after the construction of the service experience with methods from the design world facilitating communication between the user and the service provider.

Looking back at the literature available regarding co-creation there seems to be a mix of ideas among researchers as to the meanings of co-creation. Blomkvist confirms this is known and includes this quote from Sanders "(t) he meaning of co-creation is still not clear and there is some confusion about how it is actually done" (Sanders cited in Blomkvist, 2010).

Due to the various angles or ways co-creation can be viewed it is surmisable to suggest that all of the above do occur. Some researchers suggest co-creation occurs at the moment of interaction when a customer uses a service, this is a reference to the co-creation of value as proposed by Mager, Prahalad et al. This

is a different concept to the co-creation concept as proposed by Ind & Coates, Miettinen & Koivisto which occurs in user/developer relationships during the service development phase.

5.1.3 Multidisciplinary approach

Services are by nature complex and have specific implications, Moritz says because of this designing them requires input and expertise from different disciplines, the process requires a multidisciplinary approach (2005). According to Moritz top design company IDEO hires professionals from a wide variety of fields to be involved in the service design process. Psychology, human factors, zoology and ethnography are just some of the examples he gives (2010). Such a mixture of expertise provides designers with a wide experience base, input is diversified and expertise is specific.

In order to develop a sound understanding of what customers need groups such as Nokia, Intel, and Telenor employ teams of anthropologists and sociologists to work with customers to develop new and better services (Osterwalder & Pigneur, 2010). Tim Brown from IDEO also believes in having a diversified team to work on new creations (2009). Miettinen & Koivisto suggests the work of designing new services is often interdisciplinary by necessity and that anthropological and psychological expertise enriches the project (2009).

Miettinen describes a variety of client specialists which could be involved such as marketing, business strategy, organisational department, human resource department, IT department in naming just a few of the likely contributors from the client side. There could also be the need for external experts to bring their own unique knowledge and professional view into the design project (Miettinen & Koivisto, 2009).

The advantages of using multiple disciplines include, an ability to view the problem holistically. The inclusion of a variety of disciplines all adding to the design process allows for input to emerge from all angles. Many times experts from different fields view problems differently due to their specific training,

experiences and viewpoints. Moritz explains how the combination of disciplines allows and generates a holistic approach which interprets the true needs of the project differently resulting in radical solutions as opposed to obvious ones (Moritz, 2005).

5.1.4 Holistic

> "Services are not seen as one thing, rather a lot of different things that all need to be considered in a holistic manner" (Blomkvist, 2010).

Part of the service design process is that it is a holistic approach (Miettinen & Koivisto, 2009). Miettinen & Koivisto say the holistic approach involves viewing the project by looking at all systems and subsystems of relationships and interactions. Stickdorn and Schneider consider the holistic approach as a way to consider everything the user experiences when using the service. Firstly there is the physical aspects, the physical environment, the use of physical artefacts and maybe a physical outcome if there is one. Mager has a different view on the holistic aspect which broadens its scope even further, she says what the customer needs and experiences "does not begin or end at the borders of organisational structures" (Mager & King, 2009).

The environment is a place subconsciously perceived by customers (Stickdorn & Schneider, 2010) therefore every aspect of it, which can be perceived by the 5 senses must be considered relevant. Stickdorn and Schneider continue to add to this saying, all touch points and service moments occur in an environment which is consciously perceived by the customer and therefore should be considered. Regarding perceived consciousness Darey & Jerry said "Embracing the goddess energy within yourselves will bring all of you to a new understanding and value of life, a vision that inspires you to live and love on planet earth. Like a priceless jewel buried in dark layers of soil and stone earth radiates her brilliant beauty into the caverns of space and time" (Darey & Jerry, 1987). The environment around us will always resonant and connect with us, even if we are asleep.

The service sequence must be considered with a focus being on alternative customer journeys, mapping can be used to consider the moods and feelings of

the customer and stakeholders and ensure a great customer experience. The service provider must also be considered, they are responsible for the backstage systems and elements which allow the service to function (Stickdorn & Schneider, 2010).

Stickdorn & Schneider continue to expand the holistic concept and explain how the service provider must be considered and its role in the production of the service. There are the values, norms and culture of the organisation which should not clash with the service offering and there is also technical aspects such as the technological processes used and the design and structure of the organisation to consider (2010). Kimbell also speaks about the importance of maintaining a holistic view, she studied SD companies in action and concludes; designers view the service as a combination of stakeholders, technologies, practices and their interconnected relations with each other. These companies viewed their services as dynamic or emergent experiences not as a stable or fixed entity (Kimbell, 2009).

Also in Miettinens book "Designing services with innovative methods" guest writer Birgit Mager describes the holistic approach as a having a very broad sense or place within society as a whole. The holistic approach is as an alternative to a purely technical pursuit where all skills in the project team are focused on technical excellence. Rather, by using analytical, conceptual and social competencies other aspects such as ecological responsibility, urgent social issues and even gender issues can be addressed. This is again a hint that expectations are rising regarding the impact of a service on society and the environment and that a big picture approach is the way forward. Others also hint at this concept believing service design has a part to play in creating more sustainable societies and providing more ecological solutions for systems at work in society (Brown, 2009; Miettinen & Koivisto, 2009; Bruce, 2002).

5.1.5 Prototyping

"The goal of a prototype is not to complete the design. It is to learn about the strengths and weaknesses of the idea and to identify new directions" (Brown, 2008).

Prototyping services as done using SDT methods is very different than product prototyping and a whole new way of thinking is needed. The characteristics of services once again calls for new approaches. At Tim Browns company there is a saying "the IDEO way" this refers to in-house approaches such as; "quick and Dirty" prototyping and phrases "failing often and early", "thinking with hands" and "serious play" (Miettinen, et al., 2012). Miettinen et al. believe it is characteristics of the service business landscape such as, the competitive situation of the business, time-to-market demands, the unpredictability of customer needs and the business future which demand a certain pace of "speed and agility" within the design process (2012).

Holmlid notes, the practice of prototyping services results in a higher quality service experience and better service engineering process (Blomkvist & Holmlid, 2010) thus affecting both the users experience and the back stage elements of the service provider. In an earlier paper Holmlid & Evenson say that, exact methods of how prototyping services is done is a bit of a mystery for researchers and all the experience lies with the practitioners. It can be that each case is unique, uses different methods and the nature of it requires a case by case approach (Evenson & Holmlid, 2007).

This difficulty for researchers to describe prototyping methods interests the author and provides an opportunity to formulate the second research question. This would become integrated into the strategy for the interview, which can be viewed in section 6.1.3 in Table 6. Prototyping became an extensive theme throughout the case study interview. It was in the interview that two categories of prototyping emerge, one for general services and one for digital services this would form a proportion of the primary data used for analysing the findings. Regarding digital services Kämäräinen also suggested that each client usually needs a customised solution and prebuilt digital prototypes were for the most part not possible or very rare (Kämäräinen, 2014).

Evenson & Holmlid use this description, "[service prototyping is a tool] for testing the service by observing the interaction of the user with a prototype of the service put in the place, situation and condition where the service will actually exist."

(2007). But they do also provide this alongside another excerpt which has a different take on what is important about prototyping. Jeannette Rae writes, "Good service prototypes appeal to the emotions and avoid drawing attention to features, costs and applications that can clutter the conversation and derail the excitement factor" (Rae, 2007). Rae says that service prototypes should be cheap, quick and simple, she believes it's important to gain feedback relating to how the customer feels using the service and what additional improvements the customer thinks should follow. Continuing she adds that early concept prototypes should be unfinished and malleable, inviting improvement, there should be "white space" so the user can imagine the concept evolving into the service offering with which they would like to interact.

Service prototyping is done by either focusing on a particular moment or by a complete walkthrough of the service. (Arvola, et al., 2012) Stickdorn & Schneider describe when prototyping occurs; "after cycles of the phase's exploration and creation, the development team has settled on advanced concepts worth testing". They describe the intangibility characteristic of services as a challenge when prototyping services and the question of how to give the future user a vision of the future service? They note it is very important to prototype service concepts in reality or circumstances close to reality and SDT uses staging and role-play approaches to achieve this.

Blomkvist & Holmlid studied a group of SDT practitioners and specifically asked them about prototyping. They found that when asking designers what their work consisted off, prototyping was left out. Yet when asking specifically about prototyping over half said it was one of the most important things they did (Blomkvist & Holmlid, 2010). They described prototyping as the physical manifestations of ideas and concepts, another example of how important visualization techniques are in the SDT process. Stickdorn & Schneider say prototyping is a way to *concretise* an idea. They found there was no structure or defined process to the prototyping phase and there was also some variance in what prototyping meant amongst those interviewed (2010). Some of those interviewed described prototyping as merely communicating an idea to the client

and this was a way to make the idea more real. Conversely others believed that whatever helped them to learn and communicate could be seen as a prototype, even a conversation as one put it.

Miettinen & Koivisto considers services like this "Services are processes that happen over time, and this process includes several service moments. When all service moments are connected the customer journey is formed" (2009). Blomkvist begins his PhD thesis on service prototyping by addressing some of the obvious dilemmas involved. He points out that services occur as relationships between providers and users, how can that be prototyped? He asks, how can you prototype a relationship which develops over encounters and time, a service can be seen as a journey, some have many stops and occur over an extended period of time, air travel for example. Maybe the question should be asked, why not include more studies of relationships if they play such an important role in services.

6 METHODOLOGY

6.1.1 Research Methodology

The field of those practising SDT is in reality relatively small. Researchers are often using case studies to reveal what SDT looks like in practice. Candidates are most likely sourced from those practising SDT. The chosen method to answer the questions developed during the study of the literature review is in the form of a company case study. Saunders et al. describe case studies as a way to develop in depth understanding of the concepts and processes being enacted (Saunders, et al., 2012) Saunders also states that a case study can be a very good way to exploring existing theory and provide a source of new research questions (2012).

Some basic criteria was established as a guide to select an appropriate subject.

- The company needed to be practicing the methods of SDT not merely acting as a consultant for SDT.

- There must be a high tech element present in the subjects' portfolio.
- Evidence of a reasonable history of working practice, at least 5 years in the business.

A local company Infinity was chosen as the target. Infinity is an award winning Scandinavian design firm currently operating in China, Europe and The United States. They have offices in Helsinki and Turku. They have a global customer base including Nokia, Kone, Suunto, Teleste, Orion and BMW and according to their web site they have created over 60 patents since their establishment in 2003.

The company was initially contacted through the Infinity Facebook page and a request was made for assistance with the thesis research. After a brief exchange of information regarding the research subject matter, CEO Mikko Kämäräinen indicated his willingness to help. A meeting was organised to take place, in person, at Infinity's Turku offices which are located in the LOGOMO complex. A 1 hour time slot was allocated for the meeting in which Mr Kämäräinen said he would show me some of their projects and speak about the business. The meeting was scheduled for the 24th of March which allowed 1 month to analyse the findings.

During the organising of the meeting I never asked if I could do an interview. As it was the CEO who had responded I felt it was in my interest to "follow" his seniority. Maybe he choose to personally attend the interview to control what was shared about the company and this also influenced my position and attitude on the upcoming meeting. I accepted this would be an informal setting where for the most part I was being given a "tour" of sorts.

The meeting developed as an unstructured interview, which according to Saunders et al. is in effect an informal conversation (Saunders, et al., 2012). During an unstructured interview the respondent has free roam to reveal, discuss, share opinions and speak freely. Saunders et al. say unstructured interviews are good for discussing topics in-depth and allows the interviewer to "find out what's

really happening" (2012). For this case the author prefers the term unstructured interview over semi-structured interview because of the respondents invitation to "come over and I will show you what we do, show you some of our projects" (Kämäräinen, 2014). There was no mention of an interview format, Table 6 is labelled "Interview strategy" merely as a label to provide structure.

This notion of "what's really happening" is a driving force behind the choice of method, a case study, to answer the research questions. A part of the motivation for the case study is to examine how the research phase of service development works and compare prototyping of digital and general service concepts. According to service innovation literature, prototyping can be hard for researchers to grasp as it occurs spontaneously almost on a case by case basis and more questions arise once you add high tech or digital elements. Saunders recommends exploratory studies for such situations where a researcher wants to discover what's happening (2012). Saunders says "exploratory studies can help to clarify your understanding of a problem when you're unsure of the precise nature of the problem" (2012).

According to Saunders another benefit of exploratory studies is the ability to discover new relevant data which leads to new insights (2012). This was certainly the case during the unstructured interview. The meeting produced insights regarding the evolution of requirements, the development from linear to agile processes, understanding of digital service prototyping and how the company seeks out opportunities. All these insights became part of the primary data and were incorporated into the research findings found here in chapter 8.

Knowing the meeting would effectively unfold as an unstructured interview presented some challenges and uncertainties.

- How would the meeting play out?
- What information would come out of it in relation to the research questions?
- How to guide the respondent to benefit the research?
- How would I cope with the situation?

At the beginning of the meeting the respondent gave permission to record the conversation. This was beneficial in that I could focus on what he was saying and formulate responses and questions which would hopefully allow me to execute pre-planned lead questions to cover my research material. It is to be noted that in a recorded interview there is a chance the behaviour of the respondent will be different as he will now be "on record". On the other hand having the recording allows for a very detailed analyses at a later date and the ability to quote the respondent. The transcribing of the 60 plus minutes of dialogue however, would prove to be a time consuming task. Saunders warns of the immense task of transcribing interview recordings, 1 hour of audio can take 6-10 hours to transcribe for a professional typist (2012). Saunders says one way to reduce the time needed is to transcribe only those sections pertinent to your research (2012). The interview conducted for this research was 80% transcribed with some irrelevant material excluded. Saunders also recommends adding little descriptions into the transcribed text which capture the "tone" of the respondent, without he says the text will lack contextual information (2012). In the transcribed interview text found here as appendix 1, contextual information is recorded in blue type.

6.1.2 Research Design

During the literature review the early research phase and the prototyping phase of the SDT approach became a source of interest and started to provide some inspiration for the formulation of the research questions. Once Infinity was confirmed as the case study the research questions were again reformulated according to the information I could gather on the company. The company website provided a key piece of the puzzle which allowed for the customisation of some aspects of the research questions. Early on the idea that the research questions should be such that they couldn't be answered by theory became a major part of the formulation criteria, other criteria was:

- Cannot be answered by literature review
- Shape to compare with existing theory

- Must draw from practical experience
- Find out "what's really Happening"

The research questions have been "customised" to merge the theory with the case study subject. The adding of "Goals" is to de-customise the research question and link it back to the literature review. Research method theory says the process of qualitative research is not linear in its path to findings. (Eriksson & Kovalainen, 2008) Instead Eriksson & Kovalainen describe it as having a circularity characteristic. They write "the circularity of the research process can be related to the so-called *hermeneutic circle*. The hermeneutic circle refers to the methodological process of understanding, constructing and deepening a meaning in the interpretative process during research activities" (2009). This affects the research in that as new information is interpreted it naturally allows the researcher to reflect on his previous work. During this reflexivity much of the research process is critically inspected (Saunders, et al., 2012). The reflection process influences the narrative tone that emerges throughout the methodology sections.

Research questions are:

1. How does the Rapid Research Sprint (RRS) work in service development?

   o GOAL= to find out if and how Infinity co-creates with users during the design process, a fundamental aspect of SDT.

2. How does prototyping in digital service development differ from general service development?

   o GOAL= Understand the way prototyping works in reality and compare with theory.

3. How do SDT methods influence the business model?

   o GOAL= Understand why design is being used in the early service development process.

6.1.3 Data collection

In order for the unstructured interview to produce material to cover the research questions there was a need to direct the conversation to certain topics. To achieve this a number of pre-planned lead questions were formulated before the meeting, these were:

Research question	Goal	Probing questions
How does the Rapid Research Sprint (RRS) work in service development?	To find out how Infinity co-creates with users during the design process using SDT methods.	What types of user data gathering techniques do you employ? How long is the research phase? Can you give an example of the typical research phase?
How does prototyping in digital service development differ from general service development?	Understand the way prototyping works in reality and compare with theory.	Do you have semi built digital prototypes? The "lean UX" seems interesting can you explain? When do you begin to develop prototypes?
SDT methods and the business model.	Understand the client/firm relationship and discover how Infinity finds its clients.	How do you find opportunities? How has the business process changed? Can you speak a bit about the reference to IoT on your website?

Table 6 Interview strategy.

Table 6 illustrates that some semi-structured interview techniques were used in the pre-planning.

6.1.4 Limitations of the data collection

Saunders et al. consider the choice of a single case study adequate when investigating a critical case or to observe and analyze a particular phenomenon (2012). In this case the "phenomena" became the digital element of the subject, Infinity. Infinity develops digital services and general services. During the literature review a lot of the theory covered general services. To now include the digital element comes about because of the opportunity to work with Infinity.

Obviously the findings of a single case study are not able to be compared with other cases findings. Saunders et al. say multiple cases when chosen carefully can produce similar results or enable literal replication. That would be more appropriate to prove a theory or back up certain deductions. The ability to get inside a company and see what's happening can produce unexpected results. Secondly the single case study becomes much more manageable for a student.

7 ANALYSIS OF THE RESEARCH DATA

7.1.1 Organising the qualitative data

The transcribed interview content revealed a series of examples which the respondent had used to make his points. Mr. Kämäräinen has previously given presentations on SDT related topics and therefore he has well formulated practical examples to illustrate his points. The examples have been labelled and displayed in table 6 alongside the emerging themes and corresponding research questions.

Interview Example	Themes	Research question	Usability Rating 1-5
Car stereo example	Co-creation Research Methods Prototyping Old vs new	1 and 2	5
School example	Co-creation Research Prototyping	1 and 2	5
Building contractor example.	Co-creation Research methods Prototyping	1 and 2	4
Skype example	Co-creation Prototyping	1 and 2	4
Digital services	Research Prototyping	1 and 2	2
Caribean tourist example	Opportunites	3	5
Internet of Things	Business opportunites NSD	3	2
Big Data	Business Opportunites NSD	3	2
DVDs and CDs	Old process Requirements	3	2
Mobile phone	Old process Requirements	3	3

Table 7 Classification of interview data

Previously in the research design section 6.1.2 I expressed some of the challenges with the upcoming interview, having done the interview I can reveal something of the experience and how those challenges played out.

Mr Kämäräinen understood the general field of my research, SDT and did not need much prompting. He spoke easily about the central themes of the SDT research phase and had a lot of concrete examples to share. He covered several times the business model and went over the evolution from the linear to agile process. I failed to get him off that topic several times .Personally I found I was a passenger to a lot of "the direction" of the meeting. Luckily I found that most of what he choose to talk about was interesting for my research. This would have been a good experience to build on and carry into other interviews.

In hindsight I should have pressed harder for more information on specifics of the co-creation process and prototyping. This would have bolstered the research findings and resulted in good insider information. Mr Kämäräinen has experience presenting this topic and leading workshops so he is able to articulate very good examples to illustrate certain aspects. So when he covered something he did it in quite a lot of detail which took up quite a lot of time. Saunders cites this as a disadvantage when interviewing ""specialists" who can go into great detail on their topic of expertise (2012). If the subject is outside the research parameters it's not useful and takes up valuable time. Saunders recommends, without causing offence; attempt to impose direction. Maybe take them back to an earlier point or request a pause so you can write down what they said (2012).

It wasn't until later that I realised during the interview he was switching between general service development examples and digital service development examples. I felt I wasn't as prepared as I needed to be to handle the information regarding digital services. As a result the information became part of the research findings without a strong link back to the theory.

7.1.2 Co-creation

This is a collection of all examples from which emerged themes surrounding the research phase of service development and the principal of SDT, co-creation. The examples chosen from the interview were selected to provide information to answer this research question:

1. How does the Rapid Research Sprint (RRS) work in service development?

   o GOAL= to find out if and how Infinity co-creates with users during the design process, a fundamental aspect of SDT.

In the field interview Mr Kämäräinen spoke about the development of business practices in terms of the evolution of methods for working with users/customers. Mr Kämäräinen revealed, how companies understand "what to do" has evolved over time and how design now has a role to play in this. Mr Kämäräinen used the scenario of improving a car stereo to highlight the difference in approaches to the research phase:

- Economic method:

  o Find out what competitors are doing, upgrade features to be better or unique (feature vs feature).

- Marketing method:

  o Ask drivers what they wanted from a new car stereo. The key being "ask" marketers ask and then respond from the resulting data (focus groups).

- Design:

  o Got into the car and observed and recorded what the participant did, then returned to the office to develop solutions with co-workers based on observational data.

- NOW

- o Designer spends time with driver in car and questions the need for the stereo. Why does he use the stereo? He observes what he does with it and what he really uses it for, is it to drown out kids or to hear traffic reports or…… Based on this information the designer begins to formulate solutions right there and then with the driver. Basic prototypes are explored and iterations are happening live if possible.

(Kämäräinen, 2014)

The interesting development between points "design" and "now" is that generation and testing of ideas using prototypes now occurs in the field with the user. This is consistent with the process of SDT labelled exploration, create and reflect in sections 4.1.2 and 4.1.3 of the literature review.

The fact that the user is involved confirms that co-creation is valued as part of the SDT method, the co-creation method was introduced in section 5.1.2. In table 5 Co-creation descriptions, it was revealed there are several theories as to its meaning and where it occurs. In the examples here it is occurring in early service development in line with the views of Prahalad, Ramaswamy, Miettinen, Koivisto, Stickdorn, Schneider and Moritz.

Mr. Kämäräinen used the Building contractor and Schools example to show how the research phase and prototyping worked for general service development.

- Research phase
  - o Observational (spent time at work with employees)
  - o In the field (why) questions
  - o Co-creation of ideas with users
  - o Mapping
  - o Empathizing

- Prototyping
  - Immediately in the field during research phase
  - Basic form on paper with users
  - Co-creation of early prototypes

In these examples he described the use of SDT techniques of observation, empathizing and stakeholder mapping, as ways to gather data and generate ideas with users. He also believed that the researcher's task is to try and understand why things are happening or not happening during the observation period. This qualitative approach to the research phase is supported by Mager & King, Stickdorn & Schneider and Miettinen and Koivisto in section 4.1.1 as an answer to developing services which are a true indication of what people want. This is a response to the shift in the place of value creation from services to experiences as discussed in the chapters Introduction and services.

These examples revealed Infinity is working together with users to co-create the service concepts. This was cited by Stickdorn & Schneider, Miettinen & Koivisto as part of the SDT way. This is a strong theme in SDT literature and also covered in the co-creation section 5.1.2 and again is in response to the theory that value is now created between firm and customer.

What did not emerge from these examples was confirmation of the SDT principal of using a multidisciplinary approach. In a separate example regarding the education of clients Mr Kämäräinen said the reason for the use of SDT tools and techniques was to help clients "step back" from the company and look with fresh eyes and understanding at how they are creating value with their customers. This can be linked with the holistic approach of SDT from section 5.1.4.

It emerged from the digital services example that the RRS was an approach for digital elements. Some differences occur regarding co-creation with users. It's more likely users are distant and co-creation works with a supplier of a service. However Mr. Kämäräinen did say that the end users' needs are still considered the motivation for innovation.

7.1.3 Prototyping

This is a collection of all examples from which emerged themes surrounding the prototyping method within SDT and how it occurs in reality. The examples are selected to provide data to answer the research question:

2. How does prototyping in digital service development differ from general service development?

   o GOAL= Understand the way prototyping works in reality and compare with theory.

In the 2 examples "Skype and digital services" it was revealed that prototyping begin as users tested beta versions of the product which are already launched live. This is typical for digital services but had not been covered in the section prototyping 5.1.6.

Mr Kämäräinen said that this is also how the RRS worked at Infinity. Infinity employs a very specific model for the beginning of a digital project known as the "Rapid research Sprint" (RRS). The goal for digital services is to get a working prototype in 3 weeks. Miettinen believed the need for speed was due to the characteristics of the service business landscape as discussed in chapter 5.1.5.

Within the Skype example he revealed how testing digital services live with users is considered a form of prototyping. "There is no need to finalize a digital service product" he comments, "you just need to communicate with the users, that this is a beta version. Keeping the version in development so to speak means that the developer is remaining humble and open to make changes". There is more on Skype and digital prototyping in 7.1.4 and its link to the lean process model.

In regards to general service prototyping Mr Kämäräinen says that he has personally lead SDT workshops in which they rapidly prototype service concepts using visualizing techniques such as diagrams and drawings followed up by walk-throughs and acting scenarios to further test the concepts. Theory confirming

this as a SDT approach and reasons for prototyping can be found in Section 5.1.6. And also the confusion surrounding the various descriptions as to what prototyping actually is.

In examples "schools, car stereo and building contractor" prototyping occurred in the research phase with users. Concepts are communicated using basic visualizing techniques. Occasionally prototypes are able to be developed further using other SDT techniques such as acting, walkthroughs and role playing.

In the "Caribbean tourist" example the end user is so far away. Prototyping is done with the client. The end user in this case will not likely participate in the prototype development until the service goes live.

7.1.4 Old vs new

This is a collection of all examples from which emerged themes surrounding the historical development of the process to market, the evolution of requirements and the way the business model works. This data is grouped to provide an answer for the research question:

3. How do SDT methods influence the business model?

    o GOAL= Understand why design is being used in the early service development process.

Within various examples Mr Kämäräinen raised the issue of "how do companies know what the right thing is to do now". In the past companies new what to do but just had to figure out how. Now it's the other way around "what should we do" is more important he said. Data from the interview has been categorised here in Table 9 to highlight the factors which have contributed to the evolution of business practices.

Data categories	Old	New
Requirements	Set at beginning	Kept open
Opportunities	Quote, compete on price	Test pilots, approach Develop together.
Products/service	Released in versions	Upgraded live
Research method	Economic, marketing	Design, SDT
Process to market	Linear	Agile
Manufacturing model	Mass	Lean

Table 8 Old vs New

Table 8 shows how companies answer the question "what should we do". Requirements set at beginning meant companies new what to do. Now they are kept open because "what to do" is developed with users. Users have become so important to the value creation process. This is the view of Prahalad, Ramaswamy et al. as mentioned earlier in regards to co-creation in 7.1.2.

This fundamental shift in value creation has affected the approach to "opportunities" seen in Table 9. If a company doesn't know what to do on their own there is nothing to send out to tender or tender for. This then continues to affect research methods which shift from economic and marketing methods to human centred methods of design. Discovering the needs of the user become the starting point for project development. As discussed in the services chapter the rapid pace of technology and changing living environment mean these needs must be continually reassessed.

Taking the design approach affects the path to market in general service development and digital service development. The approach becomes deeply collaborative between firm, client and user. Agile reflects the iterative nature of development compared to the "fixed specs" mentality of old. Lean describes the need for delivering only what the customer wants.

Mr Kämäräinen gave a comparison of how product/service requirements used to be developed in order to begin a project. "In products, services and digital

interfaces it used to be that requirements were developed and finalised before anything else. Once you had the requirements the process to market was very linear. Now when people don't know what to produce there are no set requirements". This is particularly relevant in digital services he said and he used the Skype example to illustrate how this works.

"When people at Skype have an idea, they implement it immediately, it could be a new feature. Immediately they test it with a small group of users live. Based on the reaction they either scrap it, alter it or improve it. Then within a week they test the new version. The process continues until they are happy and launch it for everyone. In this example the prototype is immediately tested live with users, the digital nature of the service allows for fast cycles of iteration to develop the product". Requirements have no influence on deadline to market or what the feature will be like. There is no requirements, requirements are left open for a period and effectively they are developed with the users.

Requirements or specifications used to be set by engineers like Mr Kämäräinen, now designers in the field aim to develop requirements on the spot with users. Engineering and technology is so advanced that the "how it's going to work" part is not considered. Mr Kämäräinen revealed that sometimes it's quite scary for a client to go from having 100 pages of requirements to having open requirements and no set deadline. He then describes how they go about introducing this way of working with potential clients.

Many of our clients use these old linear models he said. What we do is identify clients who have products or processes which are out-of-date. We show them what new start-ups are doing and how we can help them also do this. We target specific people in the company who we think we can connect with. People who may already see these things. We work with them to develop some ideas and show them what we could do for them. We structure a deal based on what we can produce for them and if they like it they can use it. They can outsource the project to us to develop it and they remain managers of it. We learn from them and they learn from us, sometimes they like what we do and want to learn how we do it so they can begin doing it for themselves.

He compares this approach to how it used to be done. A company needs IT services, they make the requirements and put the offer out to tender. Companies quote and compete on price. This worked when companies knew what they wanted and had fixed requirements. This cannot work now when the client and firm must work together to develop the requirements, to find out together what they should be doing.

Mr Kämäräinen then used the example of a tourist in the Caribbean to show the chain of businesses which are behind the experience of a cruise in the Caribbean. Using this model he shows me how Infinity fits into the picture. Infinity will learn how the chain works, what each business is providing and contributing to the end user experience. The should also research the end users and become totally familiar with why users are consuming the service. Now before any of the businesses in the chain needs something, they will approach one and describe what they have to offer to the end user through a collaboration. Infinity doesn't work with the tourist directly but their research and concepts generated have a direct influence on the experience the tourist has.

8 CONCLUSIONS OF THE STUDY

Example	Research Q1 Co-creation	Research Q2 Prototyping	Research Q3 Old vs New
Car stereo	SDT approach. Co-create in research phase. "Why stereo"	Prototype concepts during research, iterate.	Requirements developed with user. Result= New product
Building contractor	SDT Approach Co-create in research phase "What to do"	Prototype concepts during research, iterate.	Requirements developed with users. Develop Result= New service
Schools	SDT Approach Co create in research phase "what to do"	Prototype concepts during research, iterate.	Requirements developed with users. Develop Result= New service
Skype (upgrades)	RRS Concepts developed in house	Users test prototype live. Prototype is product/service	Requirements are open. Product/service never officially finished.
Caribbean tourist	SDT researching clients' users. RRS approach with client.	Prototype with clients Client decides when its ready.	Requirements developed with clients. Develop Result= New service
Digital services	SDT researching clients' users. RRS approach with client.	Users test prototype live. Prototype is product/service	Requirements are open and developed with clients.

Mobile phone	SDT and RRS Co-create in research phase	Prototype with clients Client decides when it's ready.	Requirements developed with user. Result= New product

8.1.1 The research findings

1. How does the Rapid Research Sprint (RRS) work in service development?

   - GOAL= to find out if and how Infinity co-creates with users during the design process, a fundamental aspect of SDT.

The first research question about the RRS and whether or not services were co-created together with users was answered by Mr Kämäräinen in several of the examples. However regarding the RRS it was unclear to what extent co-creation occurred and if a typical SDT methodology was also implemented alongside the technical approach of the RRS.

It emerged that the RRS is a method for digital services development and has its own unique process. It varies from the research process for a general service offering. The RRS is about implementing an idea in the digital world as fast as possible using rapid iterative loops (design, prototype, and test with users). There is some similarities here with an approach called Lean IT. Some of the terminology that he used to describe the RRS was unfamiliar, waterfalls, scram modes and lean UX.

In the examples "car stereo, building contractor and schools the SDT approach was used in co-creating service concepts together with users. It occurred very much as was described in SDT theory. In these 3 specific examples the SDT approach to research, spending time with a customer, empathising, observing, understanding and building a holistic picture were described by the respondent as occurring within their own research phase. Co-creation was central to the development of ideas and concepts for service development.

2. How does prototyping in digital service development differ from general service development?

- o GOAL= Understand the way prototyping works in reality and compare with theory.

Two major differences regarding prototyping emerged. In general service development the SDT approach is to immediately visualize ideas using basic prototypes. However in digital services the users become testers of the prototype developed between the client and customer. Users remain testers until the prototype has been developed into a version good enough to launch. Even then iterations can continue with users as testers.

General service offerings receive more hands on user and stakeholder involvement in concept creation and development of basic prototypes. However as we saw in the digital service example for Skype, users became actual test subjects for working prototypes but this did not mean they were involved with the initial concept development. That is a major difference then compared with the use of users early on in general service development.

In regards to prototyping several scenarios emerged in which prototyping had a different meaning, happened at a different point in development and involved users in different ways. This is also what was found in the literature review section where researchers had various ways to explain prototyping and what it was. Even within general service development what prototyping consists of is varied and bears no resemblance to the method for prototyping of digital services. But the concept, testing with users is the common element.

3. How do SDT methods influence the business model?

- o GOAL= Understand why design is being used in the early service development process.

Research question 3 had the most open parameters of all. Its focus on SDT and the general business model however ended up revealing some of the most profound insights. Theoretical factors behind the use of design thinking in the early service development process were covered by the theories of value creation, co-creation and the recognition of the importance of the user experience. It was the views of Prahalad, Ramaswamy, Moritz, King and Mager that recognised the shift of the value creation nucleus and the importance of co-creation and the user experience.

The third research question was meant to address this aspect of SDT but the framing of the question was to imprecise to yield any direct answers. I believe this occurred because I did not have practical experience to understand how processes have developed over time. However when Mr Kämäräinen spoke about the evolution of requirements and the shift from a linear process to an agile process he provided the answers to a question I was unable to form.

The sharing of this knowledge provides missing links as to "how" the need for SDT has emerged. The need for companies to be quick in digital service development and the need for general service innovation to focus on the end user experience are both addressed in the literature review.

Kämäräinens description of business practices confirms the views of Prahalad, Ramaswamy, Mager, King and Moritz who cite the user experience as the new location of value creation. Unexpectedly Kämäräinen shows that it is not always through direct contact with the end user that co-creation is achieved. His model demonstrates that companies can be actively contributing to the end user experience from a distance.

The revelation of the evolution of "how requirements" affect production was not considered in the literature review. Had the review contained information from manufacturing concepts such as lean production or Lean IT then it would have been possible to link the theory to those.

Table 9 in 7.1.4 is derived from the content generated by the interview and best links the factors behind the emergence of the SDT approach. The development of requirements, research methods and process to market have all evolved to take into account the shift in the value creation nucleus. The end user experience is best addressed through human centred ways of developing services.

8.1.2 Suggestions for further research

The use of an interview with a SDT practitioner and developer of digital services provided excellent practical knowledge and experience which could not have come from a survey directed towards SDT researchers and teachers.

Most of the theory studied in the literature review did not tackle the issue of how the research phase is implemented for digital services. Instead the literature speaks about services in general. There is a research opportunity here if

In the future the research could have been reinforced by the continuation of the interview process with more respondents from other design companies. This would generate a vast amount of material but also provide the ability to perform a comparative analyses which this research has been unable to do.

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Interview transcript

Respondent= Mikko Kämäräinen CEO at Infinity digital services.

Interviewer= James Applegate

Mikko begins with an example of the old linear process to market.

Company questions, "We should have new products". It should be something like this but we don't know exactly:

- then you have to develop the requirements
- Develop the design
- Make it manufactuerable, so that's the documentation part

This is how it used to work, in the old days when everything was quite investment heavy, there had to be these gates (stages) which you lock (upon completion) and everyone knows what each department is going to design.

I   Requirements I   Design   I   Implementation   I

Mikko emphasizes that this process, the gates and stages, the method of investment does not exist anymore.

Now the requirement is to be created as you are getting the design and you are already creating the implementation, and you're learning from the implementation, which actually affects the requirements and the design.

It used to be so that at this point it used to be public (final product) now (in the new process) the users can see what's happening (from earliest prototypes). Previously the process was quite secretive and then IPR was created to protect from others and then you push it, market it and sell it launch it.

This process has changed, (draws the diagram below)
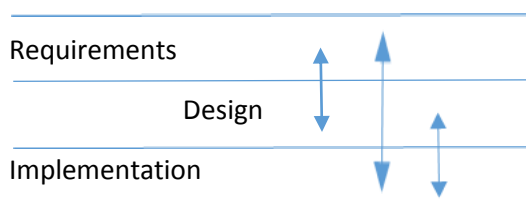
These stages can be totally interlacing and almost from day one its public, you are actually working with the users, there is guaranteed feedback, and everything is affecting everything.

This forces us to continually question "are we doing the right thing" that's a real question now days!

In a very linear world it's very easy because you know what you're supposed to do. Let's say that you're going to create the next mobile phone, you already know what it is and when it's a mature business. You take what you have done before and what the competition is doing and you create a slightly better requirements. Make it slightly faster, bigger, small incremental changes. At that point the company knows what it is doing and who it is doing it for.

Since 2008 this process has stopped, no-one knows what they should be doing! (Last 5 or 6 years)

This process still exists in manufacturing, services and digital design, this process was fine when you know what you're doing. (dvds or cds for example) They still work towards the launch date.

The big question then was how are we going to do it, NOT what are we going to do!

The big question now is what should we be doing? NOT how should we do it.

It's something that's created as a by-product, what should we be doing.

There is now no issue with a deadline date to answer the investment, especially with digital products there is no cost for altering the products, and you can do it live. You can actually push updates every day.

 It totally changes the paradigm so that you can actually shift something, if it doesn't work, change it, iterate, test it with your users and change it totally if it doesn't work.

SKYPE EXAMPLE:

This is how SKYPE works, if you look at their business process, how they do business, they have an idea so they immediately implement it, let's say they add a new function or interface to the software, they launch it for a restricted audience, let's say 200 or 300 people randomly selected, average SKYPE users, then they test or measure how well people are doing with the new function or interface, how well its accepted. If it's a flop they dump it and say it doesn't work. If it's something that seems people are interested in but don't know how to use or don't like to use for a long time then they can iterate it, make a new version, then one week later they are back testing the new version with the users. If it's a hit then they at some point launch it for everyone.

This is live testing of a working prototype?

Yes!

This is the process that startups have started to use, minimal viable products, when you have something that is minimal and viable as a product you start shipping it and testing it?

This process doesn't apply to the end stage but also to the front stage, when you have an idea you prototype something immediately, without completely understanding it, (is it a good thing or not) then test it with a limited set of users.

Research used to be such that you have an authority, the researcher, he's a bit more intelligent than the average guy, and this person is then like looking at how people are behaving. Then there are different methods gathering data.

- Economics: using focus groups studies
  - Researcher decides what to ask and the focus group answers.
  - And they collect the data which can be quantitative quite often
  - This is how business people, marketers did it.
- Then there is the designers way
  - They go to see how the users behave in their everyday life.

SCHOOLS EXAMPLE

He gives example of trying to find a solution or product for schools,

What do you do?

The marketing guy probably collects a lot of data about schools and then you have a bunch of spreadsheets of information saying things like. 22.5% of this age group behaves like this.

Designer will go to the school and look at all involved people and processes.

Teachers, parents, budget, costs, facility management, everything going on at the school.

The designer would spend at least a day, preferably a week trying to be one of them trying to understand;

- What are they actually doing?
- Not just what they are saying. (problem with focus groups, quite superficial if I'm not asking you why are you using a certain service or would you like to use a certain service we are about to launch. Focus group only provides an answer not what the users are actually doing.
- Try to understand what

He likens the process to anthropology, the study of different societies and the behavior of human beings in the societies.

 The idea is that the designer will then have some ideas as an outsider and as an expert, hey they are now doing it like this but if they were using iPads they would do this totally differently, then he goes and creates a prototype of the idea. (Preceding method, prototyping occurs "back at office")

The new method is then that they prototype there on site already with the people immediately. You have an idea, you toss around ideas with these people and then you develop something on the spot, quite rapidly and quite roughly. This way prototyping is also part of the research. There is no process like, first do research and then do prototype, no instead it can all happen simultaneously. Instead there is a split research prototype, research prototype, research prototype.

Question: When you go to a customer, with knowledge of their business and an idea of what you do, do you already take a semi built digital prototype that can be used on-site?

Answer" Quite rarely, they are all-ways so different, but we have learned to be quite rapid, it shouldn't take more than a week to take a digital prototype that can be run on any device"

Mikko now shows a presentation slide:
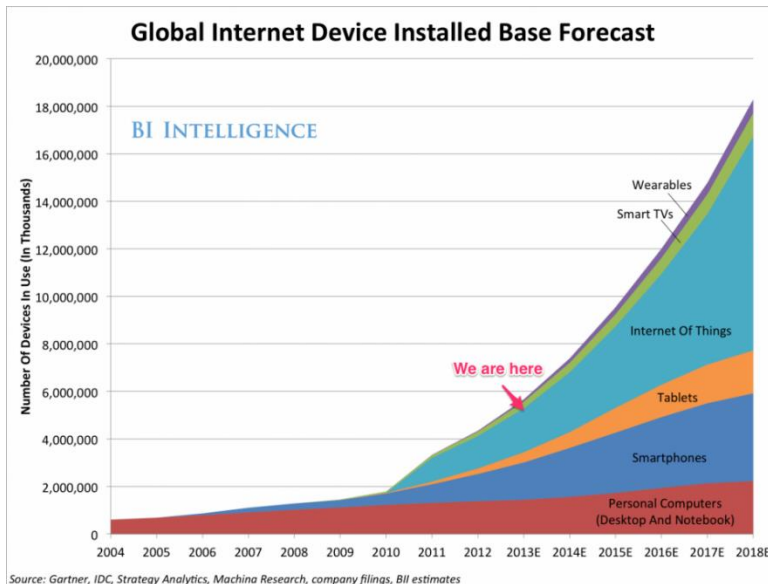
Smartphones not growing as fast as people thought.

Wearables are very marginal…..

Smart TV's never going to explode, people don't use all features for internet.

IoT is the new one, not to high tech, connected devices, what to do with the data, new business model. By 2020 any device costing more than 1$ will be internet connected. The price to connect electronically to the internet is so low that everything can be connected.

This enables new businesses for everyone who wants to use it.

He uses examples: lights, locks, rfid tags can be connected to internet, Security Company can see who is using the tags and block or monitor users. This will go rapidly from small scale things, it's about user interface for the locks, and the business will be in the interface for this. Everyone is talking about big data but big data requires this IoT data.

But if you can connect that data to something else, our phones or computers, other services can be built, we can create smart conclusions based on the available data. Big data requires IoT , there is global data , sensors, certain systems collecting data about your behavior, personally we are pushing data online about ourselves, then there are hidden actuators, (mechanical switches without interfaces) , then there are user interfaces, ….

Then he shows the Sony bracelet which collects movement data.

Collect and mash up the data and create new and unique things, you could create a box which acts on all this data.

Or you could create heating systems for houses or cities which responds to weather, forecasts, users' presence, it can take into account if the users alone or not, collect data and smartly control the temperature of the house without programming weekly routines, simply react to users routines, save money on heating bill, cut costs. The measure of impact is 20% for heating bill if you automate it.

Finland has made promises to cut co2 these technologies become a key part of achieving these goals of cutting co2. If you look at how they are going to do this, these technologies are key to it because people are not going to change.

Business model allows company to control home owner's environments and provide comfortable environments and save them money.

Complementary solution to alternative power choices, replace old sources and

Question: So your business model can work with this data which is produced by IoT?

Answer: Our task is to be able to help our clients create these kinds of solutions.

Question: I am interested to know what happens inside the RRS, when you get together with your customers; Are these B2B clients?

Answer: There is no more B2B or B2C there's only human to human, when you are working with people they are working with people and they are trying to create solutions for people. It is never about the companies, the companies do not think or create new solutions and innovations it's the people who create solutions.

Now when we are creating something for somebody…..

He now shows a business model diagram.

Infinity	Company A	Company B		End users
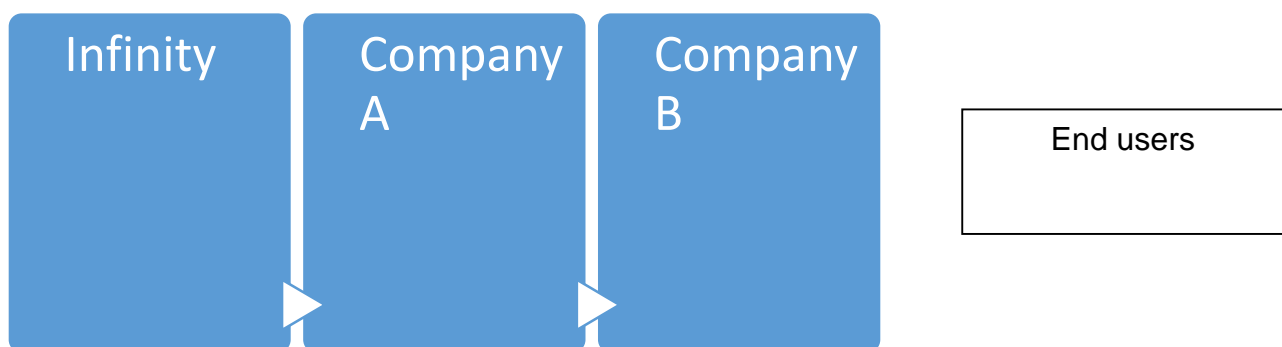
Here is the company (A), they are creating something for this company (B) who is then selling the final product to the end users and now infinity is the sub-contractor for this company (A) . It often happens that they aren't the consumer brand,

So if you go the traditional method, then you should supply the services Company B wants to buy, then you end up in a competition with a lot of suppliers over cost, IT for example, .Requirements are set and people quote the price.

If you're able to see the chain (as in diagram) then before they say they need something then you try to learn what this company is doing for the next company. Then you come back and you understand they are actually selling this end stuff for some people and these people are buying it because?

Can we help you (Company A) we know your active here (Company B and final product) we can help you in your business because we also understand your clients business.

Uses the tourist in Caribbean example.

The research part…

BUILDING MAINTENANCE EXAMPLE

Now we are doing one service for a building Maintenance Company, for them we are spending some days with the contractors, in the vans circulating around the city. Trying to understand what they do …it's not about asking them "what would you like, how would you like the new service to be for you," because they don't know, if you don't have any synthesis to show them! But they immediately understand if you say "hey here's an idea" now you work like this they make notes and give input, what if we make a new service for your client which solves these problems. Then we go immediately back to the computers and create prototypes.

Mikko show another slide regarding the research phase.

The first day or 2 is observational, which originates from user centred design. Now this is being taken further by the idea that….. (Goes into next example)

Car stereo example;

- Engineer makes a feature list, feature vs feature style: incremental changes
- Marketing process asks users what do you want, what would you like
  - Marketers themselves are not innovators they don't usually the ideas
    - Subjects also don't have the ideas they are not engineers.
  - Goes to engineers with new requirements and product is developed.
- 90s Designers process gets in the car with the user
  - Observe what, where, how and why is he doing it. Gain insights.
  - They record what they say they are doing!
    - Drown out the kids
  - Returns to office to develop prototype.
- Now since 2010 designer makes onsite prototype (on paper) and toss around ideas with users.
  - Use paper, diagrams, conversations, sharing ideas with users.

- o The big difference is the designer remains onsite to develop the idea, instead of returning to the office.
- o Understand why ….maybe the solution is something non-related to audio.
- o Discover the real need and create new solutions for that need.

In my research there is a variety of ideas around what prototyping means, some say even the communicating of an idea is a prototype, others suggest a basic 3dmock up or basic software solution.

Mikko= When we talk about prototypes it depends on the stage of the project, in the research phase the prototypes are on paper. A lot of the time when you work with engineers, the hardware and software engineers tend to refer to prototypes which are actually almost fully formed products which are close to completion. If you wait that long to show users, what happens if they don't like it?

In parts of the literature there are researchers who suggest SDT methods are a way to discover "blue ocean" type solutions, completely changing the way the "need" is understood and reformulating it to arrive at new solutions. For example in the car stereo situation the solution might be not to have a stereo at all….

Mikko= or maybe even something that totally replaces audio, the idea is to understand why!? This should stop during the process, because he has trouble changing the radio station, the solution is not to make it easier to change the station but rather to analyze why is he changing the station?, why is he sitting in the car? And work from there.

(Going back to development of design process from 2010 onwards)

New process is intriguing for many companies. Quite new. It has been used now for 15 years in design since 90s but not used by many companies.

Then you went into this actual designing the solution and then you add many iterations, design test design test and then implementation and then a lot of agile products/projects there where you create software in scram modes and so. It's not a waterfall you don't create the requirement specs for the software. And then create a certain implementation, but still this is a big waterfall with iterative loops between stages.

The process evolved to become design test design test

Now the process becomes design test implement, design test implement, this is referred to as a waterfall process which has iterative loops within stages.

This is fine if you know what you're doing, but what if you're creating a solution to "how can people have a more/better productive time in the car"?

Business model has also changed, value used to be in products and maintenance, but a startup ….

Usually this is a company who already has a business model, we have these products, these distributers and these people who maintain everything.

But what if the company is a start up with no idea of what they should be doing?

I ask about the risk of using this process, Mikko says it's more common for the new process doesn't have a requirement deadline, the requirement can change over a period of a time given.

One of the theorists suggest educating the client to SDT methods beforehand.

Mikko- There is no familiar milestones, three weeks from now we have the requirements frozen, then we develop for 2 years…. then someone says let's not use 2 years let's use 1 year and let's keep the requirement open all the way to the end, because we can learn something down the track which will affect the requirement, then it's quite scary for clients.

I have seen in the theory the openness to integrate new information back into the requirements.

Mikko says he has a presentation about designing new user experiences.

I saw on your web site a reference to Lean UX can you explain this a little?

It's quite simple, if you doing it in agile UX it means it's in agile processes like scram this it means sprints, iterations, iterations, iterations, but if you add lean to it means that the user experience can be iterated live as well so you're testing it with real users after launch.

Like the Skype example?

They had a conference in NY last year the first one where they started discussing" let's not just use this iterative learning processes within the development phase, let's face it everything is moving to be digital and in the cloud there is no launch date, you can actually launch the prototype, just put a text somewhere, this is beta or please give feedback or btw we are already collecting feedback. Then at some point you can say it's ready, public relations people can yell about it, we can write a fb story ab out it now its launched but this doesn't mean its frozen if something is not working or misguiding users we can change it, next week it's a bit different, so lean UX means we can actually be humble and honest about the truth, it's not finalized and it doesn't have to be.

 Still in services people are talking about Lets freeze the service and then if we need to make change we can make version 2. But this is based on the digital world where you must ship physical hardware like dvds, you have to have release 1 or release 2. But now its digital it's possible to iterate and change things live.

How is the business model organized around Lean UX? Do you remain in the business relationship forever as the developer, do you own the product?

The clients own the product, when we are working with clients in projects which have digital service. First we create rough prototypes on paper, then we create more final prototypes and then iterate together with the clients and users until they say it's ready to be coded. Quite often it's not something that's a web based user interface, like it can be a device which has to be coded in hard code which has to be implemented on the device it has a touch display it's going to be included so at that then point our project goes like this, then there is some software house that takes over and they are recording the actual stuff that's going into the device like mobile phone.

Is that the final interface…?

It's acting as requirement specs instead of creating Microsoft word 100 pages of requirement specs and specifications, when you have a view like this then you have a button like this and it behaves like this instead you have a working prototype on the phone and you say replicate this.

So the prototypes are very much more interested in how not the look and feel of the device, the look you hand to someone else?

Yes and the look should be easily changed rapidly also, iterate able,

It's a good business model because you remain in a relationship with those clients and your service continues on.

And usually its split so that, typically our client has these linear models , they take a long time, quite often it's not a hit it's a miss, it's not quite successful or it's a total flop and then they repeat the process and its quite expensive and it's not creating success we are aiming for. How do you educate the client regarding the lean agile way? Our model is that we go and contact these clients were we identify they are in need of this kind of thing, usually there products have been around quite some time and you can see that the new startups are creating something more valid to the users, something with a better business model, something with a better user experience, and there much more rapid, so you can easily link to the burden of the old company, our processes are a bit off, someone on the inside must have noticed that, so it's easy when you go in and say that we have the model that the startups are using and if you have some case which is very urgent right now, let's say you have a fair in 6 months and you need something to show, we can help. You can outsource it to us, you can be the manager of the project and we will run it for you. This will be a test project, proof of concept that it works .In 6 months you will have something that you wouldn't have without us. As a by-product then we get to do this more and its good for our business we get to create the continuation of these kind of projects where we create new things in sequence for them and they also begin to understand how it works maybe we can use it ourselves as well. When educating clients I don't believe we can come in and say we will change your processes. It's not going to happen but any big change actually in my opinion is easier to implement when you have these kinds of successful pilots. Pilot that shows yes it can be done differently, the results are better the costs are lower and btw it was more fun. Then people get interested, can I also work like this, is it allowed in this company. Instead if you go in like a consultant and try to change a company from the outside, People will probably be like this, oh yet another consultant trying to tell us how we should work, trying to implement the models he learned from a book.

During the study I felt at times that much of the ST area was being taught by consultants.

It's quite apparent that within bigger companies there are several sub cultures within the house, you can usually spot certain individuals who are rebels and they will be running things their own way inside the company. As a consultant you try to link with these people because you can boost their way of working and easily change the way they work. You learn from it and they learn from it and then it's possible it starts something new from inside the company.

Evan though what we are speaking about is modern and new, lean UX at the heart of it is still traditional business opportunities, even though there is all the digital elements there still needs to be good old business instincts for opportunities.

And there I somehow have always trusted in this theory that you should just get one pilot, one successful project going, if you can sell that then it's easy to upscale that afterwards. One of our clients told me later on after he was ordering the 3 or 4th projects, told me that, In the beginning when you first came and told me you could deliver an android app within 5 months, we didn't know what we wanted, we need an app, we need certain functions, but we don't know how to make it, who could make it, what should be in it, we have just been given the task by management to make an android app. We said it's possible in 5 months internally it wasn't possible they couldn't even create the specs in 5 months. So we did it, afterwards when you were saying that we can do it in 5 months, he didn't believe, Many salesman have come and promised the same but not delivered.

So now the big plus for us is that we can do what we say. There's a lot of sales guys saying they can do it, and it leads to a lot of disappointments in the field.

Going back to the presentation slide.

So we started from the persona, from the persona we created humans who are the targets of our projects. We modelled based on their observations of the customers, their lives, what they did on holiday, this was about holidays, when is the holiday, what they do on holiday, then they made the customer journey and flow expectations, before and after, so we prototyped on paper and with acting, new ideas we had for new services, This was 2days and this is typical when prototyping intangible services, not digital or interface.

Human to human services are difficult to sell when you have the digital part it's easier to show people.

This is exactly the methods as described in SDT theory, which is probably unable to speak about the digital elements and instead focuses on the general service development.

You can prototype the user interface for the service.

In the theory the SDT practitioner becomes a host to enable the insiders to come to new solutions.

The big pic about SDT is that you use the tools, is that they learn something new. The reason for the tool is to take them away from the daily perspective, who they are as a company, the tools force them to look at things differently. These are our customers and these are there needs how can we do something differently.

Let's make something new, so start looking at the comp, at what we can improve, how we can cut costs or improve, they really look at re configuring the value or maximizing the value.

A lot of companies don't understand this and they will suffer when companies develop better solutions. It will be like Nokia, not responding rapidly enough.

The meeting ends