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Ricardo Guerrero

Jacobs University Bremen gGmbH, Germany, r.guerrero@jacobs-university.de

Christoph Lattemann

Jacobs University Bremen gGmbH, Germany, c.lattemann@jacobs-university.de

Simon Michalke

Jacobs University Bremen gGmbH, Germany, s.michalke@jacobs-university.de

Dominik Siemon

LUT University of Finland, Finland, dominik.siemon@lut.fi

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A Human-Centeredness Maturity Model for the Design of Services in the Digital Age

Ricardo Guerrero ¹, Christoph Lattemann ¹, Simon Michalke ¹, and Dominik Siemon ²

¹Jacobs University Bremen gGmbH, Business and Economics, Germany.
(r.guerrero@jacobs-university.de, c.lattemann@jacobs-university.de, s.michalke@jacobs-university.de)

²LUT University, Information Systems, Finland.
(Dominik.Siemon@lut.fi)

Abstract. *A lack of measurement tools as well as a strategic and systematic approach for companies to achieve a high degree of human-centeredness is unknown in business and research discussions. This becomes an obstacle for companies when designing services, which are geared to improve humans' lives. Based on the guidelines of Design Science Research (DSR), we address this gap by developing a human-centeredness Maturity Model (MM). The design of the MM is grounded in extant literature, semi-structured interviews as well as a focus group involving company representatives from the field of services, service design, and human-centered design. Results reveal a series of dimensions, capabilities, and stages indicating an evolutionary path towards maturity for companies to become truly human-centered. Becoming truly human-centered will allow firms to develop specific and targeted improvements initiatives, which could optimize resources deployment and thus, resulting in designing better services for the customers.*

Keywords: Human-Centeredness, User-Centeredness, Maturity Models, Design Science Research, Services.

1 Introduction

Digitalization is changing the way we work, live, consume, and interact with each other. This on-going change poses not only major opportunities for companies but also challenges [1]. One of the major challenges risen due to the proliferation of information and communication technology (ICT) in our daily lives is reflected in the change of customers' habits and expectations towards services and products [2]. Today, customers do not simply buy products anymore. Instead, products are also considered as services and therefore, customers' purchase decisions revolve around buying into an experience [3–5]. In this context, firms can no longer rely on a 'user-centered' approach – characterized more by the premise of designing *for* the user (also considered throughout the paper as *customer*). Rather, companies must adopt a more holistic 'human-centered' approach – characterized more by the premise of designing *with* and *by* the user (i.e. co-creation) [6–8]. Despite the broad range of theoretical contributions

[9–11] as well as consultancy groups reports (e.g. McKinsey) [12], showing how having a greater customer focus could lead firms to new advantages in terms of increased sales, customer retention rates, business performance, and higher return on investments [12]; firms in practice still struggle with many deficiencies when it comes to design and develop services. For instance, [11] argue that 60 percent of service innovations fail due to a lack of an appropriate human-centered strategy towards innovation. Similarly, authors such as [5, 13] argue that services are generally under-designed and inefficiently developed because companies limit themselves to simply identify and meet customers' needs rather than on design services *with* and *by* the customers. Nevertheless, moving away from being user-centered towards becoming human-centered requires a radical change in the company's mindset and the development of capabilities as well as aligned step-by-step processes allowing firms not only to meet the uninterrupted cycle of human-centeredness improvement but also to design and develop better services for customers [14]. Therefore, companies are in need to find ways that allow them to become more human-centered in a strategic and systematic way [15].

One instrument to develop and improve human-centeredness when designing services is a maturity model (MM) [14]. Through essential elements describing adequate processes and an evolutionary path for improvement, a MM serves the purpose for developing human-centered capabilities by providing guidance on how to achieve a higher degree of human-centeredness, which might result on firms designing better services for the customers [14, 16]. In this context, due to the fact that there is little robust evidence on how companies become human-centered in a systematic and structured way, this research aims at developing a MM that enables companies to (i) identify the underlying capabilities that characterize human-centeredness, (ii) describe step-by-step processes for companies to become more human-centered, and (iii) support companies in assessing their current human-centeredness degree. Consequently, we answer the following research questions: 1) What are the key underlying capabilities that characterize human-centeredness? and 2) What are maturity stages of human-centeredness in an organization and how are they described? In order to address these questions, we follow a Design Science Research (DSR) approach [17] and develop a MM as resulting artifact.

2 Theoretical Background

2.1 Human-Centeredness as a Service Concept

The conceptualization of human-centeredness in the literature generally endorse the idea of the 'Service-Dominant Logic' (SDL) as the opposite of the 'Goods-Dominant Logic' (GDL) [7, 18]. The underlying assumption of the GDL sees the producer and the customer strictly separated from each other and the value of the tangible asset or product is defined by the market price or what the client is willing to pay (value-in-exchange) [18]. Instead, under the perspective of the SDL, companies cannot create value by themselves but rather focus on the cooperation of different actors (e.g. customers) with the aim of applying collective knowledge to develop and design better

services (co-creation) [5]. The idea of human-centeredness has also been associated with the idea of designing customers' experiences towards the satisfaction of customer requirements, including his/her emotional, social, and ethical-self [19–22]. Consequently, according to authors such as [23, 24], human-centeredness is inherently interaction and relationship-based. Human-centeredness aims at establishing more intimate customer relationships aimed at favoring a real integration in the firm. In order to get an intimate relationship with the customer, the establishment of firm-customer trust is required [19] and it may be achieved through improving the interaction between the customer and service provider in the entire service design and development process [21, 24]. Consequently, according to authors such as [22, 25], human-centeredness contradicts the philosophy of mass customization, since this is essentially product-centric [18]. In this context, a human-centered approach is reflected by personalization, whereby the aim is to design and develop customized services based on different customers' needs. Additionally, [20, 22], highlight that the success of human-centeredness lies in the ability of leaders to drive the change. They emphasize the need of a common goal and a shared cultural view towards implementing human-centered processes. Finally, authors such as [10, 19, 22], argue that being human-centered, built around a dialogue and interactions with the customers and that both of them should be nurtured by intimacy and empathy. Thus, they emerge as prerequisites for becoming human-centered.

2.2 The importance of Human-Centeredness for Services in the Digital Age

In the last decade, human-centeredness has started being considered as a prerequisite for designing services in the digital age [26]. While it is true that ICT is driving digital transformation, it is also true that adopting a human-centered mindset is the 'secret sauce' to digital transformation success [2, 22, 27]. According to [28], "no matter how technological a service is, it is still created for humans" [28]. They argue that services, even if they are digital, go beyond just technological components. In this context, they claim that although services might be nowadays supported by new digital technologies, the design and development of such services should always keep the humans' needs at the core [28]. This view has been extended by [22, 24], who argue that not only the humans' needs should be in the focus of interest but also their challenges, problems, wishes, values, and attitudes in a professional and everyday life. In this context, services – either analogue or digital, are considered to be successful if they contain a relevant future-oriented customer benefit and if they succeed in improving the human's life [4, 19, 21]. Consequently, authors such as [2, 21] claim that that digital services are all about 'interactions'. In this context, as companies are now looking for more and more ways to interact with their customers through the use of the different digital channels (e.g. social media, digital platforms, virtual assistants, video-streaming, etc.), putting the customer at the centre of gravity of every interaction is an opportunity to build trust and loyalty. This, results in an advantage for companies to design more enriching service experiences [2].

Nowadays, businesses need to exploit their services by providing a rich experience to their customers. Organizations need to create more and more tailored solutions to be

able to improve humans' life. Achieving a high human-centeredness maturity degree can help employees in an organization to think like designers, which means supporting their capacity to use creativity, transform tacit knowledge into explicit ideas, and brace oneself in listening to customers and co-create with them [19]. Here, unlike from an user-centeredness perspective, which is characterized by designing services *for* users and collecting data through observations and/or by conducting interviews with customers to simply meet customers' needs, the design of the service is characterized by designing services *with* and *by* the user and includes concepts such as co-design and co-creation. [5, 7, 8]. In this context, customers are actively involved as partners/-participants in the service development process and thus, are also considered as resources for value creation [5].

2.3 Maturity Models

MMs are assessment tools consisting of essential elements and criteria, which describe the areas of action and maturity stages that indicate the evolution path towards maturity for a given object, process, or capability area [29]. An essential component of any MM are predefined development stages, which are referred to as 'maturity levels' [29]. Here, the lowest level stands for an initial state that can be characterized by an organization having little capabilities in the domain under consideration. In contrast, the highest level represents a conception of high maturity [29]. Finally, depending on which requirements are fulfilled concerning the different maturity levels, a certain degree of maturity is awarded [30]. In the MM literature, there is not – to our knowledge – any MM that evaluates the aspect of "human-centeredness" as a capability per se. Nonetheless, we were able to identify some MMs in the field of service design and innovation that assessed "customer-centeredness" as a capability. Here, only few authors such as [31–36] analyzed customer-centeredness but only limited its scope to the concept of 'user/customer involvement'. In this context, while it is true that 'user/customer involvement' is a key characteristic of human-centeredness [5]; it is also true that studies focusing on the concept of human-centeredness have also acknowledged the importance of other characteristics such as 'co-creation', 'customer satisfaction', 'customer interaction', 'customer trust', 'service personalization', 'leadership', 'customers empathy', and 'customers well-being' [19–21, 24, 25, 27]. Nonetheless, none of these dimensions have been considered nor addressed in any of the service design nor innovation MMs developed. Thus, we believe that in refining service design and development practices, all these different capabilities need to be taken into consideration when assessing "human-centeredness".

3 Methodological Approach

Our study follows the DSR paradigm proposed by [17]. This form of research is widely accepted among IS scholars for addressing real-world problems [37]. DSR strives to build and evaluate "artifacts" that are to be understood as constructs, models, guidelines, methods, or instantiations with the aim of solving organizational problems

[37]. In the context of DSR, MMs can serve as reference models and hence, artifacts that show “an anticipated, desired, or typical evolution path” [29]. Consequently, we decided to follow the approach established by [29] to develop our MM, since this provides a stringent as well as a consistent development process that is subject to the DSR guidelines [17]. This process is based on eight phases (see. Figure 1). Phases 1 to 4 are crucial to develop the design specification of a MM, whereas phases 5 to 8 concern its application and evaluation. In this paper, we address phases 1 to 4 (highlighted in *grey*), including a first pre-evaluation based on the conduction of interviews with industry experts as well as a focus group. Phases 5 to 8 are subject to further research.

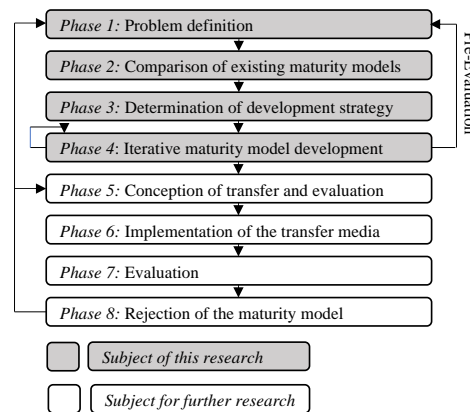


Figure 1. Procedure model based on (cf. [29])

Our approach starts with *problem definition* (phase 1). This phase was disclosed within the introduction section. Our MM addresses the complexity for companies to become human-centered in a structured and systematic way, and allows them to measure their current degree and means of human-centeredness. For phase 2 (*comparison of existing MMs*), we conducted an extensive literature review in accordance with [38]. Initially, we focused on identifying relevant MMs related to service innovation, service-design, and customer-centeredness, as human-centeredness is strictly related to such concepts. We predefined the search terms/keywords to “((maturity AND model) OR (capability AND model) OR (process improvement AND model) OR (maturity AND grid)) AND "service innovation") AND “service design”) AND “customer-centeredness”)” and used Web of Science as our database, as it showed more results than other databases. On a first attempt, 243 results were found in total. Inclusion and exclusion criteria were defined to identify the most relevant articles. The search was limited to scientifically ranked journals, book chapters, and conference proceedings. The research focus of the literature was set on the following areas: management, business, economics, engineering, and IS, as the number of publications and interest from diverse research disciplines on the topic of MMs has increased over the years. This reduced the number of relevant publications to 192 articles. Articles that did not include at least one of the search terms in the abstract or title were excluded, resulting in 92 articles. Furthermore, only articles that provided a MM for service design, service innovation, and customer-centeredness were selected for analysis

purposes. MMs from other domains were not taken into consideration. This led us to a review sample of 15 articles, which were then fully analyzed [31–36, 39–47]. Once analyzed the content of the 15 articles, it became apparent that ‘human-centeredness’ as a capability is underrepresented in such MMs and that there are no MMs for human-centeredness itself. For phase 3 (*determination of development strategy*), decisions regarding strategy and architecture of the MM are made at this point. We decided to build a dual function model. In this case, it works as a descriptive but also prescriptive model [48]. From a descriptive point of view, our model will serve the purpose of assessing the here-and-now (i.e. actual degree of maturity) towards “human-centeredness”. Similarly, from a prescriptive point of view, our model will allow firms to identify gaps for improvements and at the same time, it will show trajectories to guide the transition for firms to become more human-centered. For phase 4 (*iterative maturity model development*), an initial design and development of the MM must be done. In view of the unsatisfactory coverage of human-centeredness as a capability in service design, service innovation, and customer-centeredness MMs as well as the absence of MMs in human-centeredness itself, we decided to extend our literature review and further investigated the topic of human-centeredness as a whole in a later stage [38]. This was done with the intention of identifying the underlying capabilities that characterize human-centeredness as well as stages of human-centeredness maturity. Once more, Web of Science was selected as our database, as it showed more results than other databases. To secure an extensive cover of studies, we searched for a set of variations related to the concepts of user-/human-centeredness. We interchanged the following search terms by using AND/OR as search operators. On a first attempt, 78 results were found. Here, the same analysis approach was followed just as in the previous review. After an extensive analysis incorporating studies focusing on areas such as human-centered design, user-centered design, marketing, and design, 16 articles were selected for further analysis purposes [6–8, 10, 16, 19–23, 25, 49–52]. In this context, a total of 31 articles were analyzed in-depth for the development of the initial MM architecture. Here, an initial set of capabilities that characterize human-centeredness were identified. Likewise, we were not able to find any maturity stages for ‘human-centeredness’ per se but rather for ‘customer-centeredness’ [49]. These were taken as the basis for our initial model (see. Table 1). Finally, based on the identified literature, we developed a precise definition of every development stage for every capability.

Table 1. Initial Architecture of the Model

Stage	Capability
Stage 1 – <i>Infancy</i>	(1) <i>Customer Engagement</i> [10, 16, 51]
	(2) <i>Co-creation</i> [6–8]
Stage 2 – <i>Developing</i>	(3) <i>Customer Satisfaction</i> [19–22]
	(4) <i>Customer Interaction</i> [26, 27, 39]
Stage 3 – <i>Transforming</i>	(5) <i>Customer Relationship</i> [23, 53]
	(6) <i>Customer Trust</i> [19, 21, 53]
Stage 4 – <i>Truly Customer-Centric</i> [49]	(7) <i>Service Personalization</i> [22, 25]
	(8) <i>Leadership</i> [20, 22]
	(9) <i>Customer Empathy</i> [10, 19, 22]
	(10) <i>Customer Well-Being</i> [52]

After the initial architecture of the MM was set up, a pre-evaluation strategy was defined by the authors as suggested by [29]. We pre-evaluated our model following a dual approach. Firstly, from May 2020 until March 2021, we conducted interviews with thirteen company representatives in the field of services, service design, and human-centered design, to refine the initial architecture of our model. Secondly, once refined the model, in April 2021, we designed a focus group to evaluate the consistency, comprehensiveness, and problem adequacy of our model, as suggested by [29]. For the development of our expert interviews, we laid the focus on interviewing founders (CEOs), company's managers, service managers, designers such as service designers from service companies all over the globe. A semi-structured interview guideline was conceptualized and a total of thirteen semi-structured interviews of approximately 60 – 120 minutes were conducted. Each interview started with a short, target-oriented introduction into the topic of “human-centeredness” with especial emphasis on other similar terms used in the literature (e.g. customer-centeredness, user-centeredness). In this context, the participant was also questioned on his/her own understanding of the term “human-centeredness” and a brief discussion was held. A second round of questions was asked about what could be underlying components/elements/capabilities that might characterize human-centeredness. Subsequently, a third round of questions was asked about when they would consider a stage of being “fully” human-centered achieved. Finally, once asked all the questions, the initial MM derived from the literature was introduced and we offered them the opportunity to provide feedback, in ways that they could add, modify, or remove any of the previously identified capabilities and stages. As a result of our discussion with the interview experts, as mentioned before, we refined the initial architecture of the MM. All interviews were audio-recorded and later on, transcribed. Interviews were also coded using MAXQDA as a computer-based qualitative analysis tool. The transcribed data was independently analyzed by three researchers, using codes as an efficient data-labeling and data-retrieval method [54]. Finally, after developing the model, it needs to be tested in a real-world context and evaluated for relevance and rigor, including validity and reliability [29, 48]. Also, for guaranteeing broad applicability, the model should be built upon quantitative methods (phase 5). Next, further evaluation and improvements on wider acceptance should be conducted (phase 6 and 7), and later, a decision on the acceptance or rejection of the model is going to be made (phase 8). These phases (5, 6, 7, and 8) are not the object of this paper and thus, are subject for further research.

4 Results - Development of the Maturity Model

4.1 Conceptual Architecture

Maturity stages and their characteristics. As a result of our literature review, a great variety of models with regards to service design, service innovation, and customer-centeredness were identified. In view of the unsatisfactory coverage of human-centeredness as a capability in these MMs as well as the absence of a MM for human-centeredness itself, we decided to develop a new MM. In order to describe the maturity stages and their characteristics, we performed two iterations. In the first

iteration, we defined the maturity stages based on our findings from the literature review. In this regards, drawing on the four maturity stages towards true customer centricity adopted by [49], we initially conceptualized four stages: (1) infancy, (2) developing, (3) transforming, and (4) truly customer-centric. However, we considered the characteristics of such stages to be too narrow, as they implied a more “user-centered” perspective rather than a “human-centered” perspective. Therefore, we aimed at extending the understanding of these stages throughout the findings of our interviews as well as based on our view towards “human-centeredness” per se. In the second iteration, confronted with the lack of coverage of the initial stages, we proceeded to discuss our initial findings with our interview experts. The discussion revealed that although [49] stages built on the concept of customer-centricity, the characteristics of such stages adopted a more user-centered perspective, since the capacity for customers to act as co-creators and co-designers was not even mentioned neither in the 3rd (transformative) nor the 4th (truly customer-centric) stage of maturity. Interviewee 3 commented: “...*Co-creation must be present in at least the higher stages of human-centeredness. I could understand that this is not the case for an infancy stage. Nonetheless, human-centeredness to its fullest is about co-creating with your customers and involving them at all phases of the design and development service process...*”. Similarly, the discussion also revealed that at no time, the ability to see the customer as a “human” itself, was also not reflected at any of those stages of maturity. Interviewee 9 commented: “...*Aren't companies supposed to put humans first when developing solutions? Human-centeredness goes beyond looking at the customer as a mere customer or consumer. These are people who have desires, problems, needs, and we are supposed to improve their lives with whatever we create for them...*”. Additionally, they criticized that in the stages proposed by [49], there was no stage of ‘assimilation’. In this context, they argue that [49] jumps from one stage of ‘transformation’ to one ‘fully customer-centric’ without an assimilation stage in between. According to some of the interviewees, this seemed to be quite unrealistic because to become fully human-centered, a firm must go first through an assimilation process to ingest the changes achieved so far. Then, it can find ways for improvement to become fully human-centered. Based on the aforementioned, major adaptations had to be made to reflect the evolution path towards truly human-centeredness. As a result, we suggest a fit between the characteristics provided by [49], our view on human-centeredness, and our findings gathered from our interviews. In the following, the maturity stages and their descriptions are described.

Stage 1 – Infancy. Customers are seen as mere consumers of services. Service provider and customer are strictly separated from each other. Value of a service is defined purely by the market price. The organization lacks comprehension of the effects of involving customers in the design and developing of services. **Stage 2 – Developing.** Customer engagement is inconsistent but the firm begins to recognize that focusing on the customers might lead to innovative service outputs. Customers are still perceived as consumers but their needs begin to be in the focus when designing services. **Stage 3 – Transforming.** Co-creation is understood as a necessity. The company has defined plans and priorities on engaging their customers in the design and development of services. Management is more sophisticated, open, and engaged towards co-creation.

Firm understands the capacity of designing experiences instead of purely services. **Stage 4 – Assimilating.** Co-creation and co-design practices are reflected in the firm's strategy. Customers are considered, foremost, as humans, and firm's biggest source of value contribution. Concrete strategy to improve service experience through full understanding of customers. Innovative outputs are visible and acknowledged due to co-creation and co-design practices. **Stage 5 – Truly Human-Centered.** Customers represent the biggest source of value contribution when designing services. Firm's decisions are always based around the customers and their well-being is of utmost importance. Services are built on experiences and the firm improves customers' lives with such experiences. Customers are seen as humans and the motto: *"putting humans first in solving problems"* is embedded in the company's mindset and culture. Co-creation and co-design practices are conducted at all instances. Firm is characterized for its innovative outputs due to its co-creation and co-design practices.

Underlying capabilities of human-centeredness. In order to identify the underlying capabilities that characterize human-centeredness, we once again performed two iterations. In the first iteration, we identified ten capabilities based on our findings from the literature review (see. table 1). Consequently, in the second iteration, confronted to achieve a more holistic and comprehensive view of human-centeredness, we further discussed our initial findings with our interview experts, in such a way that we could revise and refine our initial MM. All interviewees recognized the identified capabilities to be suitable to characterize and measure human-centeredness. However, nearly all interviewees emphasized that in some cases there was no difference between one capability and the other. Interviewee 4 commented: *"...What is the difference between customer relationship and customer engagement? To me, both have to do with the ability to involve the customer at all instances when designing services..."* Interview 11 commented: *"Doesn't co-creation involve both aspects of customer relationship and customer involvement? In the end, everything revolves around co-creating with the customer and providing a proper customer' experience..."*. Consequently, interviewee 2 commented: *"...Isn't it true that an empathic bond is developed when an interaction takes place? The more a company interacts with the customer, the higher the sense of empathy that the customer will feel towards the firm and, vice-versa..."*. Additionally, some interviewees also expressed the absence of "data" as a capability itself, which is extremely important when becoming human-centered. In this context, interviewee 1 commented: *"...How do you expect to be human-centered if you don't think of data? Data is everything today for companies, especially when it relates to knowing your customers' behaviors and attitudes..."*. Here, the interviewee emphasized the role of ICT towards achieving a truly human-centered maturity degree. Finally, some of the interviewees mentioned the necessity to depict some capabilities as meta-dimensions, instead of characterizing them as capabilities. They claimed that by doing so, the result would be a more holistic and structured model, which could be more applicable in real-life practice. For instance, interviewee 4 commented: *"...I see co-creation as a dimension and customer engagement the capability of such dimension. Both are related to each other; however, co-creation is kind of the meta-level of engagement..."* In the same lines, interviewee 9 commented: *"...Empathy, satisfaction, well-being, and trust. All these things will*

always be a result of the user experience and thus, they depend on the service providers' capacity to design such experience...". Taking into consideration the findings derived from the interviewees, we re-defined the underlying capabilities of human-centeredness. We followed the approach established by [55], who recommend to separate MM capabilities in a multi-dimensional manner and discard those capabilities that do not directly have an impact in the domain into consideration. In the following, the human-centeredness dimensions and capabilities are described.

(1) **Co-Creation** – measures the extent to which customers are active and involved when designing services. It is analyzed by the means of the following capability: *customer engagement*. (2) **Customer Experience** – measures the overall cognitive and emotional assessment of the company's offer from the customer's point of view. It is analyzed by the means of the following: *customers' satisfaction, customers' empathy, customers' well-being, and customers' trust*. (3) **Service Personalization** – measures the company's ability to design customized services, whereby not only the needs should be in the focus of interest but also their challenges, problems, wishes, values, and attitudes in a professional and everyday life. It is measured by the means of the following: *service personalization*. (4) **Strategy and Leadership** – measures the company's ability to develop a human-centered mindset and culture and effectively implement it across all levels of the organization. It is measured by the means of the following: *leadership*. (5) **Technology** – measures the company's ability to understand which technologies are becoming important when collecting data about their customers. It is analyzed by the means of the following: *data collection*.

4.2 Consistency, Comprehensiveness, and Problem Adequacy of the Model

Finally, as suggested by [29], to evaluate the consistency, comprehensiveness, and problem adequacy of the model, we designed a focus group with four company representatives. Here, the final architecture of the model was in-depth discussed. Regarding comprehensiveness, all participants considered the MM's general design to be suitable and comprehensive, as it clearly depicts capabilities as reference points for firms to establish human-centered improvement initiatives. Considering the problem adequacy, there was an overall consensus that the MM not only help firms to measure their current human-centeredness maturity degree but also is of great help when transforming the organization towards becoming more human-centered. Additionally, they all emphasize the importance of becoming more human-centered in today's digital era and thus, it is of extreme relevance having such a strategic and systematic measurement instrument. The consistency of the MM was generally agreed and led to no significant changes in the model (see. Appendix A). However, the discussion revealed that just because a firm does not possess a stage of "truly human-centeredness" in all capability areas, it does not mean that the company is not sufficiently human-centered. In these lines, they claimed that reaching a stage of "truly human-centeredness" highly depends on the size as well as resource availability and capacity of the firm. However, being human-centered was considered when the company has reached certain business- and customer focus alignment, which led the company to have fruitful and notable improvements and outputs.

5 Conclusions and Outlook

In today's digital age, companies are forced to achieve a mindset shift from having a user-centered perspective towards a human-centered one. By developing a human-centeredness MM under the guidelines of DSR [17], we contribute to current literature and practice in several ways. From a theoretical perspective, we are the first to provide an MM for human-centeredness by indicating series of capabilities such as stages that describe an evolution path towards human-centeredness maturity. Consequently, we respond to research calls for further investigation on how firms could become more human-centered in a strategic and systematic way [15]. Additionally, we add value to the understanding of the service design field – in general, in such a way that we have extended the concept of 'human-centeredness', which has been not only a subject of research but also of confusion for so long with other terms such as "user-centeredness" and "customer-centeredness". By doing this, we allow researchers to finally understand the difference between the one and the others. Finally, our MM can be used as a reference for other studies focusing on studying the influence of ICT in service encounters as the majority of these studies only consider variables such as customers' satisfaction and customers' loyalty and thus, neglecting the presence of other important variables (e.g. customers' empathy, customers' trust, customers' well-being), when designing service-customers' interactions [56]. From a practical perspective, having a measurement tool that is able to determine the extent of human-centeredness in firms will not only be useful on determining the firm's maturity degree of human-centeredness (i.e. how human-centered the firm is), but more importantly, this tool can also help to develop specific and targeted improvement initiatives, which could optimize resources deployment and will result on designing better services for the customers. This research has also limitations. First, a possible limitation regarding qualitative research is that it engages interviews as a data-collective source and such could be susceptible to backwards reconstructions and false findings. However, to overcome this problem, we focused on targeting company representatives based on their expertise and firsthand experience in human-centeredness. Second, we are aware that our MM is the result of a pre-evaluation phase and thus, issues concerning to its validity and reliability cannot, at this point, be assessed as they belong to the evaluation phase (phase 7). Although two qualitative approaches were conducted for the elaboration of our results, we still consider our model to be "pre-evaluated" and not "fully" evaluated, as it is only based on qualitative analysis (i.e. expert interviews and focus groups). Authors such as [48] argue that a fully MM evaluation is only considered when qualitative analysis are also supported with quantitative methods. Nonetheless, this was not the case for this research paper. Thus, it is our goal to conduct further research with more company representatives and perform a more elaborated study on the basis of case studies and quantitative analysis to further refine our MM and thus, address such reliability and validity issues. Finally, to support our evaluation process, we plan on instantiating our constructed MM into a digital design tool, which companies can use as support to address and improve their maturity concerning human-centeredness. This expository instantiation will be used by companies on long-term basis to finally decide on the acceptance or rejection of our model (phase 8).

References

1. Viswanathan, M., Sreekumar, A.: Consumers and technology in a changing world: the perspective from subsistence marketplaces. *European Journal of Marketing*. 53, 1254–1274 (2019).
2. Goodwin, K.: *Designing for the digital age: how to create human-centered products and services*. Wiley Pub, Indianapolis, IN (2009).
3. Ramaswamy, V.: Co-creating value through customers' experiences: the Nike case. *Strategy & Leadership*. 36, 9–14 (2008).
4. Robra-Bissantz, S., Lattemann, C.: 7 Rules of Attraction. *HMD*. 54, 639–658 (2017).
5. Vargo, S.L., Lusch, R.F.: Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*. 36, 1–10 (2008).
6. Akama, Y., Prendiville, A.: Embodying, enacting and entangling design: a phenomenological view to co-designing services. *Swedish Design Research Journal*. 1, 29–41 (2013).
7. Morelli, N.: Service as value co-production: reframing the service design process. *Journal of Manufacturing Technology Management*. 20, 568–590 (2009).
8. Sanders, E.B.-N., Stappers, P.J.: Co-creation and the new landscapes of design. *CoDesign*. 4, 5–18 (2008).
9. Bannon, L.: Reimagining HCI: toward a more human-centered perspective. *Interactions*. 18, 50–57 (2011).
10. Kronqvist, J., Salmi, A.: Co-designing (with) organizations: human-centeredness, participation and embodiment in organizational development. In: *Proceedings of the Conference on Designing Pleasurable Products and Interfaces* (2011).
11. van der Panne, G., van Beers, C., Kleinknecht, A.: Success and Failure of Innovation: A Literature Review. *International Journal of Innovation Management*. 07, 309–338 (2003).
12. McKinsey: *The Business Value of Design*, (2018).
13. Grönroos, C.: Value co-creation in service logic: A critical analysis. *Marketing Theory*. 11, 279–301 (2011).
14. Viikki, K., Palviainen, J.: Integrating Human-Centered Design into Software Development: An Action Research Study in the Automation Industry. In: *Proceedings of the 37th Conference on Software Engineering and Advanced Applications* (2011).
15. Chew, E.: Service Innovation for the Digital World. *Enterprise Modelling and Information Systems Architectures*. 9, 70–89 (2014).
16. Majid, R.A., Noor, N.L.Md., Adnan, W.A.W.: An Assessment Tool for Measuring Human Centered Design Adoption in Software Development Process. In: Rocha, Á., Adeli, H., Reis, L.P., and Costanzo, S. (eds.) *Trends and Advances in Information Systems and Technologies*. pp. 1046–1055. Springer International Publishing, Cham (2018).
17. Peffers, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S.: A Design Science Research Methodology for Information Systems Research. *Journal of Management Information Systems*. 24, 45–77 (2008).

18. Jallat, F.: Reframing Business: When the Map Changes the Landscape. *International Journal of Service Industry Management*. 15, 122–125 (2004).
19. Foglieni, F., Villari, B., Maffei, S.: *Designing Better Services: A Strategic Approach from Design to Evaluation*. Springer International Publishing (2018).
20. Korper, A.K., Patrício, L., Holmlid, S., Witell, L.: Service design as an innovation approach in technology startups: a longitudinal multiple case study. *Creativity and Innovation Management*. 29, 303–323 (2020).
21. Lattemann, C., Robra-Bissantz, S., Ziegler, C.: *Die Komposition personennaher Dienstleistungen von morgen*. HMD. (2020).
22. Riedmann-Streitz, C.: Redefining the Customer Centricity Approach in the Digital Age. In: Marcus, A. and Wang, W. (eds.) *Design, User Experience, and Usability: Theory and Practice*. pp. 203–222. Springer International Publishing, Cham (2018).
23. Kvelland, L.M.L., Høiseth, M.: Is the ‘User’ Term adequate? A Design Anthropology Perspective on Design for Social Welfare Services. In: *Proceedings of NordDesign* (2016).
24. Patrício, L., Gustafsson, A., Fisk, R.: Upframing Service Design and Innovation for Research Impact. *Journal of Service Research*. 21, 3–16 (2018).
25. Blomberg, J., Darrah, C.: An Anthropology of Services: Toward a Practice Approach to Designing Services | Synthesis Lectures on Human-Centered Informatics. *Synthesis Lectures on Human-Centered Informatics*. 8, 1–115 (2015).
26. Human, S., Neumann, G., Alt, R.: Human-centricity in a Sustainable Digital Economy. In: *Proceedings of the HICSS* (2021).
27. Riedmann-Streitz, C.: *Gibt es noch Marken in der Zukunft?: Hybrid Brands - eine Zukunftsvision für starke Marken*. Gabler Verlag (2017).
28. Augsten, A., Geuy, B., Hollowgrass, R., Jylkäs, T., Klippi, M.: Humanizing organizations - The pathway to growth. In: *Proceedings of the ServDes* (2018).
29. Becker, J., Knackstedt, R., Pöppelbuß, J.: Developing Maturity Models for IT Management. *Bus. Inf. Syst. Eng.* 1, 213–222 (2009).
30. Pöppelbuß, J., Röglinger, M.: What Makes a Useful Maturity Model? A Framework of General Design Principles for Maturity Models and Its Demonstration in Business Process Management. In: *Proceedings of the ECIS* (2011).
31. Rapaccini, M., Saccani, N.: Service Development in Product-Service Systems: A Maturity Model. *The Service Industries Journal*. 33, 300–319 (2013).
32. Blommerde, T., Lynch, P.: A Maturity Matrix for Assessing Service Innovation Capability. In: *Proceedings of the Irish Academy of Management Conference* (2016).
33. Burger, T., Ganz, W., Pezzotta, G., Rapaccini, M., Saccani, N.: Service Development for Product Services: A Maturity Model and a Field Research. In: *Proceedings of the European Association for Research on Services* (2011).
34. Wang, K.J., Widagdo, J., Lin, Y.S., Yang, H.L., Hsiao, S.L.: A service innovation framework for start-up firms by integrating service experience engineering approach and capability maturity model. *Service Business*. 10, 867–916 (2016).

35. Adrodegari, F., Saccani, N.: A Maturity Model for the Servitization of product-centric companies. *Journal of Manufacturing Technology Management*. 31, 775–797 (2020).
36. Jin, D., Chai, K.-H., Tan, K.-C.: New service development maturity model. *Managing Service Quality: An International Journal*. 24, 86–116 (2014).
37. Baskerville, R.L., Myers, M.D.: Fashion Waves in Information Systems Research and Practice. *MIS Quarterly*. 33, 647–662 (2009).
38. Webster, J., Watson, R.T.: Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*. 26, 13–23 (2002).
39. Mattei, G., Canetta, L., Sorlini, M., Alberton, S., Tito, F.: Innovation Maturity Model for New Product and Services Development: a proposal. In: *Proceedings of the IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)* (2019).
40. Adrodegari, F., Saccani, N.: Assessing the Service Transformation: A Maturity Model. In: *Proceedings of the Spring Servitization Conference* (2017).
41. Blatz, F., Bulander, R., Dietel, M.: Maturity Model of Digitization for SMEs. In: *Proceedings of the 2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)* (2018).
42. Btoush, M.H., Siddiqi, J.I.A., Grimsley, M., Akhgar, B., Alqatawna, J.: Comparative Review of e-service Maturity Models: 6I Model. In: *Proceedings of the E-Learning, E-Business, Enterprise Information Systems, and E-Government Conference (CSREA EEE)* (2008).
43. Carroll, N., Helfert, M.: Service capabilities within open innovation: Revisiting the applicability of capability maturity models. *Journal of Enterprise Information Management*. 28, 275–303 (2015).
44. Freitag, M., Ganz, W.: InnoScore; Service: Evaluating Innovation for Product-Related Services. In: *Proceedings of the Annual SRII Global Conference* (2011).
45. Li, E.Y., Chen, L.-W., Shen, C.-L.: A framework for Service Innovation Capability Maturity Model. *Proceedings of the International Conference on Operations and Supply Management* (2010).
46. Lynch, D.P., Blommerde, T.: Towards a Conceptualization of a Service Innovation Maturity Model. In: *Proceedings of the Irish Academy of Management Conference* (2013).
47. Valdez-de-Leon, O.: A Digital Maturity Model for Telecommunications Service Providers. *Technology Innovation Management Review*. 6, 19–32 (2016).
48. Bruin, T. de, Rosemann, M., Freeze, R., Kulkarni, U.: Understanding the main phases of developing a maturity assessment model. In: *Proceedings of the 16th Australasian Conference on Information Systems* (2005).
49. LeBlanc, J.: Customer Centricity Changes Over Time. *Customer Strategist*. 8, 1–6 (2016).
50. LeBlanc, J.: What is Your Customer Centric DNA?. *Customer Strategist*. 1, 1–6 (2019).
51. Prestes Joly, M., Teixeira, J.G., Patrício, L., Sangiorgi, D.: Leveraging service design as a multidisciplinary approach to service innovation. *Journal of Service Management*. 30, 681–715 (2019).

52. Thackara, J.: *In the bubble: Designing in a complex world*. MIT Press, Cambridge, Mass (2005).
53. Patrício, L., Gustafsson, A., Fisk, R.: Upframing Service Design and Innovation for Research Impact. *Journal of Service Research*. 21, 3–16 (2018).
54. Mack, N., Woodson, C., Macqueen, K., Guest, G., Namey, E.: *Qualitative Research Methods: A Data Collector's Field Guide*. Family Health International (2005).
55. Fraser, P., Moultrie, J., Gregory, M.: The use of maturity models/grids as a tool in assessing product development capability. In: *Proceedings of the IEEE International Engineering Management Conference* (2002).
56. Xu, X., Thong, J.Y.L., Venkatesh, V.: Effects of ICT Service Innovation and Complementary Strategies on Brand Equity and Customer Loyalty in a Consumer Technology Market. *Information Systems Research*. 25, 710–729 (2014).

Appendix A: Human-Centeredness Maturity Model

Capability		1. Infancy	2. Developing	3. Transforming	4. Assimilating	5. Truly Human-Centered
Co-Creation	Customer Engagement	Customers play little or no role and are considered as mere consumers. Firm assumes to know what customers want.	Customers are involved through study and observation but there is little to almost no direct contact. Firm ideas purely come through internal channels such as sales reports, feedback, and complaints.	Customers are, from time to time, asked about their needs and desires at various stages of the service design and development process. Customers are considered as information sources and are, from time to time, surveyed for market analysis and service definition requirements.	Customers start to co-create and have an active, on-going role and influence on service design and development process. Customers are integrated both into the early stages of ideation and service development as well as in the verification and testing stages. Firm always searches for customers' opinions before any service launch.	Customers play an intrinsic role when designing and developing services. Customers are involved as co-designers and assist with the creation of solutions at all instances. Firm view customers as partners and foremost, as their biggest value-contribution source. Firm achieves long-lasting relationships with their customers and they are considered to be 'loyals'.
Customer Experience	Customers' Empathy	Customer problems are only faced from the company's perspective instead of the customer perspective.	Firm starts to interact with the customer and their curiosity for them start to raise. Firm is willing to explore and discover the customer private and professional life situation.	Firm takes an active role and starts to wonder how to improve customers' lives with their services. Firm expands their knowledge about the customer and is surprised by aspects that could highly influence the service experience.	Firm connects with the customer by recalling explicitly upon his/her own ideas, needs, challenges, and values in their professional and private life. Firm has a philanthropic view towards their customers and does not see them as 'customers' per se but as 'humans'. Firm overall goal is to develop solutions that are able to improve a human life situation.	Firm employees create an emotional connection with the customers and makes sense, at all instances, use of a customer- and philanthropic perspective.
	Customers' Well-Being	Firm strictly separates themselves from the customer. Firm's value is considered based on 'massive selling' and 'service price' instead of providing a benefit for the customer.	Firm starts to raise the question whether to consider themselves and their customers as an 'union'. Services are only built upon market trends and firms' perceptions instead of having the customer in focus.	Firm considers themselves and their customers as a 'union'. Market trends and firms' perceptions are left aside when developing services and the customers' needs are put in the focus.	Firm goes beyond putting the customers' needs in the focus but also their challenges, problems, wishes, values, and attitudes in a professional and private life. Firm has philanthropic view towards their customers and does not see them as 'customers' per se but as 'humans'. Services are co-created and built aiming a customer benefit towards improving his/her life situation.	Customers feel happy and have developed an emotional bond towards the firm due to extensive co-creation practices. Firm puts the customer above everything else and is only willing to design experiences, whose main purpose is to improve people's lives.
	Customers' Trust	The very need to intentionally earn customers' trust has not been realized by the firm. Company has little to no willingness to interact with the customer and therefore, a feeling of trust is not achieved.	There is general necessity of trust building. Few interactions with the customer start to appear due to heroic practices from some employees. Nonetheless, these interactions are spontaneous and incomplete and thus, a feeling of trust is not achieved.	Inter-personal trustful relationships are established between several customers and several employees due to the fact that the customer is involved, from time to time, in the service design and development process. Internal policies and business rules concerning trust building (e.g. data privacy) are started to be implemented in the company.	Internal policies and business rules concerning trust building (e.g. data privacy) are implemented all over the company and followed by all firms' employees. Trustful relationships are established due to the fact that the firm relies on co-creation practices and thus, always have the customer in focus.	Customers firmly believe and trust the company at all instances due to the inter-personal relationship generated by allowing the customer to act as co-creator/co-designer. Customers identify themselves with the firm's culture and brand and thus, it is very unlikely for them to switch to another firm.
	Customers' Satisfaction	Customer satisfaction is not a priority for the company and management has little to no interest in finding ways to achieve it.	Customer satisfaction is becoming important for the firm. Customer satisfaction highly depends on heroic practices of certain employees in direct contact with the customer and not on proven processes or best practices.	Customer satisfaction is recognized as important. Customer satisfaction increases because of speed and accuracy levels of the company on responding to customers' needs and desires.	Customer satisfaction is part of the company's culture and vision. Firm is constantly finding ways to co-create with their customers to convert them into loyal customers.	Customers are always satisfied because of company's ability on involving them as co-designers and thus, allowing them to create the best customer' experience. Customer satisfaction has become a part of company's daily work. Customers are considered loyal and fans of the company.
Service	Service Personalization	Firm considers service personalization to not be beneficial. Firms seeks no ways to achieve service personalization. Services are purely designed based on market trends and employees' perceptions.	Firm recognizes the importance of designing services based on customers' needs. Small initiatives towards designing personalized services start to appear. In this context, the firm inspects aspects related to customer buying records and conduct surveys to determine customer behavior and needs.	Services are built and designed around customers' needs. Groups of personalized services become more visible due to high efforts on checking out customers' buying records and conducting surveys to determine customer behavior and needs.	Services are built and designed beyond mere customers' needs but also their challenges, problems, wishes, values in their professional and private life. Firm starts to make use of customer-relationship management (CRM) tools (e.g. GoogleTrends, Google Analytics) to better track their customers' behavior and habits.	Services are seeing as 'experiences' and they are designed beyond mere customers' needs but also their challenges, problems, wishes, values in their professional and private life. Firm is an expert on designing and developing personalized services due to employee's expertise on handling CRM tools (e.g. GoogleTrends, Google Analytics).
Strategy & Leadership	Leadership	Firm does not recognize the customer to be a fundamental element of the firms' vision and mission. Human-centeredness is not recognized as a relevant corporate value.	The importance of human-centeredness is partly recognized by managers but there is little conviction that such perspective could have positive effects. Firm shows no guidance to company's employees on how to interact with customers.	The importance of human-centeredness is aware by managers and they are convinced that customers represent an important source of value. Company's managers and employees lack on skills on sufficiently encouraging customers to open up and engage in the service design and development process.	Human-centeredness is considered to be a fundamental element of the firm's vision and mission. Company's managers and employees are fully certain that their customers are their biggest source of value. Firm promotes and relies on co-creation practices, whereby the customer is engaged at all instances during the service design and development process.	Human-centeredness is fully recognized, accepted and lived at all levels of the company. Firm is aware that having a human-centered mindset and culture is indispensable to ensure long-term business success. Co-creation practices are tangible all over the service design and development process, even if it could lead to service failures.
Technology	Data Collection	The very need to intentionally collect data from their customers has not been realized by the firm.	Firm starts to recognize the importance of collecting data about their customers. Data collection is conducted purely through analog manners such as surveys and demographic studies to determine customer behavior and needs.	Firm considers data as a very important resource when designing and developing services. Data collection occurs not only in analog manners but also through the combination of customer relationship (CRM) tools (e.g. GoogleTrends, Google Analytics) to better track their customers' behavior and habits.	Data is considered to be a fundamental resource of the of the firm's human-centered strategy. Firm's first initiatives on collecting data through new digital technologies (e.g. big data, machine learning, artificial intelligence) take place.	Firm's services are only as good as the data collected to develop such services. Firm becomes an expert on collecting data by making use of new technologies (e.g. Big Data, Machine Learning, Artificial Intelligence).