

Design artefacts as flexible and persuasive tools for customer-centric innovation

Organisations are increasingly adopting customer-centric innovations to increase business value; however, very little is known about the factors driving customer-centric innovation or the conditions under which customer-centric innovation succeeds. Similarly, very little is known about the role of design artefacts as inputs in customer-centric innovation processes or as instruments that support the organisational change required for innovation. A practice-led case study was conducted to examine the role of design artefacts and demonstrate how design artefacts are flexible and persuasive tools that mediate the social and intertwined demands of customer-centric innovation strategies. Five distinct roles of design artefacts are proposed and their value in contributing to innovation and organisational change are considered.

Keywords: Design Artefacts, Customer-centricity, Design Practice, Organisational Change

Introduction

As a key strategic resource, the capacity to innovate has become increasingly important to commercial, non-commercial and government organisations globally. This valuable approach can improve people's wellbeing, their relationship with the environment, organisational efficacy and profitability. Much can be achieved by adopting a customer-centric approach to innovation; however, many challenges still remain (Bucolo, Wrigley and Matthews, 2012). Recent research has shown that this approach involves many aspects and relationships; for example, it can involve design processes (Dorst, 2011) and design mindsets (Schweitzer, Groeger and Sobel, 2016). Little is known about the role of design artefacts in supporting an organisation to be customer focused or the changes that need to be implemented when such a strategy is adopted.

Adding to the complexity of these issues, to date, definitions of artefacts have mostly been vague. Researchers widely agree that artefacts are essential to 'getting things done' in organisations (Knorr Cetina, 1997; Orlikowski, 2002); however, very little is known about how managers successfully use and produce design artefacts (both at the organisational and individual levels) when pursuing innovation and implementing any associated change processes. We define design artefacts as visual artefacts used within innovation and design processes and any visual objects towards which and with which individuals act. This includes only artefacts that have been made during the design process such as prototypes, customer journey maps and wire-frames and it does not include artefacts that constitute a final product or service.



We conducted a single instrumental case study (Stake, 1995) that sought to improve the ordering and activation services related to complex information technology and telecommunications products. We adopted ethnographic and practice-led design research approaches to undertake an investigation of situated design practices in a complex practice context (Mafe and Brown, 2006). Our case study considered the role of design artefacts in relation to their social contexts. By doing so, we clarified the mediatory roles of design artefacts within customer-centric innovation processes and highlighted the potential of design artefacts to support organisational change.

Theoretical background

Customer-centricity and organisational change

Human-centred innovation is based upon 'customer insights' or the knowledge gained by interacting directly with consumers to understand their values and meaning-based needs (Beckman and Barry, 2007). In business practice, human-centred innovation' is also referred to as 'customer-centred innovation' or 'customer-centricity'. Design professionals have long used ethnographic research approaches within design practice; however, more recently, innovation and management writers have also advocated for the adoption of ethnographic approaches in relation to customer-centricity (Beckman and Barry, 2007; Liedtka and Ogilvie, 2011). Previous research has shown that design processes and artefacts are commonly applied within the business context and that design practices and tools add value to businesses (Leung et al., 2016). Numerous studies focusing on customer-centricity have shown that the application of design tools and methods (e.g., 'personas', 'prototyping', 'scenarios' and 'customer journey maps') are endemic in design practice. These valuable methods provide deep insights into customer needs and inform human-centred innovation processes (Manning, Bodine and Bernoff, 2012; Schrage, 2006). Further, customer-centricity is critical to gaining a competitive advantage in business (Galbraith, 2005; Manning Bodine and Bernoff, 2012).

However, in both the design and business literature (and in practice), understandings of how customer-centricity is enabled within organisations are limited (Johnston and Kong, 2011). Adopting a customer-centric perspective, requires epistemological and attitudinal shifts (Dunne, 2011). Thus, if customer-centred innovation is to be achieved, organisational transformation is also required. This could include changes to culture, processes and structure that are both challenging and time consuming. Recent studies identified some of the relationships between design (thinking) practices and organisational change and culture (Buchanan, 2015; Elsbach and Stigliani, 2018). However, understandings of the role of design artefacts in facilitating changes towards customer-centricity remain limited.

Design artefacts as boundary objects

Design artefacts help to get things done. Previous research has shown that material artefacts play important mediatory and enabling roles in organisational and inter-organisational innovation processes (Rafaeli and Vinai-Yavetz, 2004a, 2006). The effects of different artefacts (e.g., Gantt charts, texts and documents, visual representations and drawings) have been analysed. Such artefacts can be used in organisational learning, knowledge and management (Hutchins, 1995; Wenger, 1998, 2000) or as collaboration enablers (Star and Griesemer, 1989), coordination devices (Henderson, 1991) and as socio-

material objects that mediate the social and material nature of work practices (Orlikowski, 2002, 2006, 2007). However, previous studies have largely focused on how materiality and artefacts support product development processes.

Among people, artefacts facilitate knowledge sharing and transformation and play practical, political and persuasive roles (Kimble, Grenier and Goglio-Primard., 2010). The idea of an 'artefact as a boundary object' explains the different roles of artefacts and the implicit functions of an artefact in social mediation. Boundary objects refer to the brokering and boundary spanning capabilities of artefacts across functional domains within collaborative work (Star and Griesemer, 1989). Boundary objects create a shared language for individuals and allows individuals to represent their knowledge. Boundary objects also provide individuals with a concrete means for specifying and learning about any differences, dependencies and what is new across a given (knowledge) boundary. Additionally, boundary objects facilitate the process by which individuals transform the knowledge being used and apply what they know to transform existing problem-related knowledge (Carlile, 2006). Carlile (2002) outlined the two key tenets of boundary object artefacts: i) boundary objects are practical, as they enable a shared means of representation and a specification of any differences at the boundary; and ii) boundary objects are political, as they facilitate knowledge transformation. Thus, if innovation requires boundary spanning, the act of deciding which artefacts to share and with whom and when could be both a practical and political decision. Wenger (2000) conceptualised these decisions as brokering or processes of translation, coordination and alignment between perspectives. Brokers move knowledge from one place to another and bring back news from the forefront (Wenger, 2000).

Designers as knowledge brokers

Designers who create and employ artefacts can be considered 'knowledge brokers' (Hargadon and Sutton, 2000), who use boundary objects to broker customer-centric knowledge. Designers use artefacts as conscription devices (Henderson, 1999) to enlist participation in organisational settings. Wagner (2000) discussed the significant and persuasive roles of artefacts in collaborative work. Similarly, artefacts are also critical to customer-centric innovation contexts in which they function to mediate social and political processes and collective actions.

Understandings of the enabling roles of artefacts in organisational contexts is well established; however, understandings of the enabling roles of artefacts in organisations attempting to move towards customer-centricity remains limited and vague. Thus, this case study sought to determine if and how design artefacts could be used to support the organisational change required to design and deliver customer-centric products and services. To answer these questions, we adopted a theoretic perspective of design artefacts as boundary objects and acted from the understanding that the designer is the knowledge broker in the context of organisational change towards customer-centricity. We also examined the role of design artefacts as flexible tools that mediate the social and interlinked demands of innovation initiatives in a specific organisation.

Studying how designers (and non-designers) consider and use design artefacts will increase knowledge of the enabling and mediatory roles of both design practices and artefacts in complex social innovation contexts (the very situation that countless organisations are

presently facing). The central objective of our research was to gain a better understanding of how design artefacts function to facilitate and motivate collective action and enable communication and transformation.

Methodology

A single in-depth case study was conducted to examine the role of design artefacts and understand whether and how they support customer-centric innovation. The organisation selected for the case study had a confident strategic intention to pursue customer-centricity. This allowed us to undertake a deep analysis of the contextual factors affecting the roles of a range of artefacts.

We also adopted a researcher-as-instrument (Robson, 1995) approach. Under this approach, the researcher was the lead designer of the case project and the researcher's relationships with those being investigated were examined (MacDonald, 1994). Multiple data collection methods and sources were employed, including participant observation, qualitative interviews, document collection and the use of thick descriptions (Geertz, 1973). Additional data sources included intranet and public website content, emails, field notes, physical artefacts, memorandums and artefacts produced by other designers for other projects.

Sampling was opportunistic (Miles and Huberman, 1994). This was not ideal; however, due to the covert nature of the study, it was the only approach available. In the early phase, we had limited access to conduct interviews with diverse organisational members, most notably members of the senior leadership team. These interviews provided insights based on a restricted representation of perspectives. To gain further valuable insights, we also obtained additional perspectives from stakeholders at different levels of seniority. At the end of the project we assumed an overt role. This allowed us to conduct further interviews with the participants of the final project presentation, who had been invited to participate in the study.

Semi-structured interview guides and a detailed research protocol (Yin, 2003) were used to conduct a total of 13 interviews over two years. The majority of interviews occurred within three months of the final delivery of the project results. Follow-up interviews were also conducted with three participants some five to six months after the project had been delivered.

The activities and contextual factors associated with the defined activity systems (i.e., the individual, team, project and organisational activities and contextual factors) were considered during data collection and analysis. Participants were asked to describe any challenges they experienced when undertaking their work activities. This question enabled participants to explicate any contradictions located within the different activity systems (Engeström, 1999). Data were collected and iteratively analysed over an 18-month period that comprised three distinct phases, each of which used different approaches.

For the data analysis, a constructivist grounded theory approach was adopted (Mills, Bonner and Francis, 2006), as the study relied on predefined theoretical concepts. Different

analytical procedures were applied to each phase of the research, including concurrent collection and the coding and double coding of data (Krefting, 1991).

The case: Redesigning online order and activation processes

This case study was conducted at an Australian ASX-listed company with over 40,000 employees. The company offers a broad range of technology products and services. Two years before the project commenced, the company had appointed a chief executive officer who was committed to building a customer-centric organisation. The organisation were commonly employing human-centred design approaches for product and service development and had several dedicated design teams. While this context created favorable conditions for design experimentation, it also creates a limitation for replicability of the fi The business strategy motivating this project was to improve the online ordering capability of a specific group of business-to-business customers, who were responsible for on selling products. The project team adopted a customer-centric approach to design new online ordering and activation services. The researcher was hired as a ‘customer-centred design lead’ to work with the internal user experience group for five months.

The objective of the project was to deliver a conceptual design, including wire-frames (i.e., blueprints or visual specifications for online services) to improve online ordering. The project deliverable would support the development of a business case study so that a project team could be established, and the solution brought to market.

The key sponsor of the project was the design director; however, there was an implied and strategic obligation to also connect with other stakeholders who would potentially fund and build the suggested solution. Given that the lead designer’s tenure at the company was short, it was also important that the knowledge related to this project was codified and transferred in an accessible way.

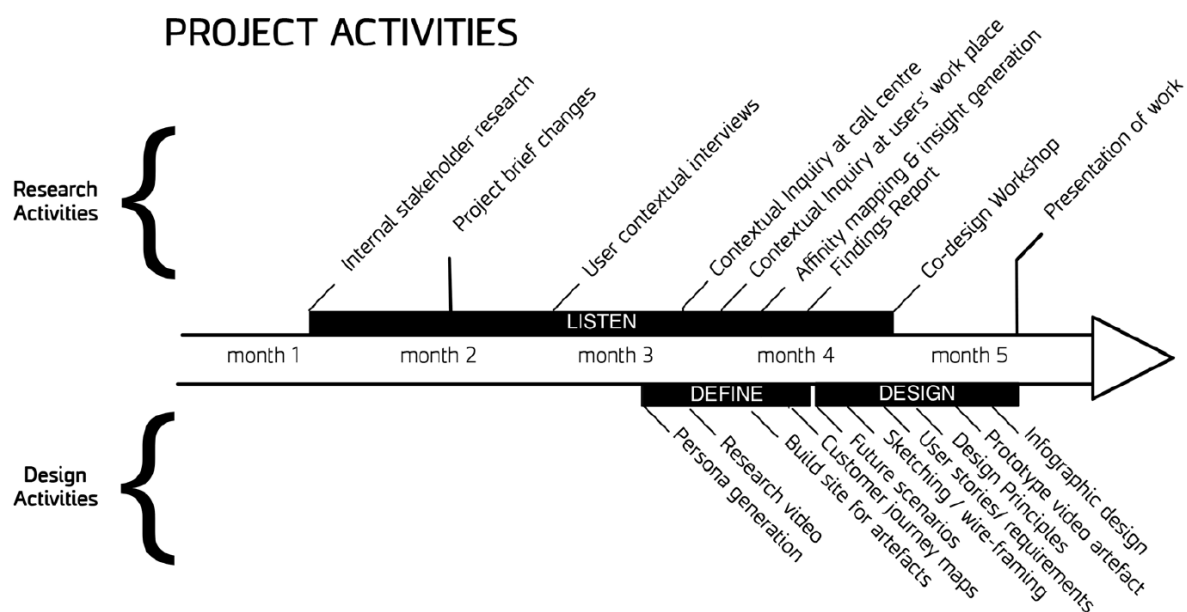


Figure 1. Research and design activities during the Listening, Defining and Designing Phases of the project.

Figure 1 shows the project’s design and research activities. Table 1 provides an overview of each phase of the project, summarises the activities completed in the project and describes the artefacts that were produced. The project had three phases:

- **The Listening Phase.** During this phase, the team set out to i) understand the current processes for ordering and activating products as experienced by internal staff and customers; ii) consider existing challenges with internal systems that may be common to both staff and customer groups; iii) understand customer work contexts and their dependent organisational processes; and iv) understand customer challenges and needs. The team used ‘affinity diagramming’ to gain insights and show that the current ordering systems and processes required improvement.
- **The Defining Phase.** During this phase, the lead designer created artefacts for ‘design synthesis’ and ‘reflection-in-action’. Specifically, the designer considered the information needs of different stakeholders and created distinct artefacts to satisfy specific information needs and preferences. During this phase, team members engaged in iterative sketching and conducted a workshop with 10 business customers, where participants reviewed and refined preliminary sketches for a web portal. The team then transformed the designs into more detailed wire-frames.
- **The Delivery Phase.** During this phase, the project outcomes were shared in a meeting with 40 internal stakeholders via video and telephone conferences. The project deliverables were hosted on a website that could be accessed online during the meeting.

Table 1 summarises the different activities and artefacts associated with the different phases of the project and Table 2 lists the project artefacts as they were shared.

Table 1. Activities and artefacts delivered in different project phases.

<i>PHASE</i>	<i>ACTIVITY</i>	<i>ARTEFACTS</i>
Listening Phase	Stakeholder qualitative research	Research report
Defining Phase	Data synthesis and artefact creation	Opportunity maps Personas Customer journey maps Research videos Infographic
Designing Phase	Iterative sketching (wire-frames) Codesign workshop	Function overview Wire-frames User stories Video prototype Future storyboard Quick Wins

Delivery Phase	Communication of findings and deliverables via email and a presentation	PowerPoint presentation HTML deliverables site
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Table 2. Overview of project artefacts.

ARTEFACT	DESCRIPTION
Research report	The research report communicated the key insights about the user group mapped to the associated findings and recommendations. Insights comprised broad generalisations. The findings provided evidence of the insights. Additional information was provided and recommendations (e.g., suggestions of things to change or do) were made to address the insights and findings. The artefacts functioned to document the findings and substantiate the design recommendations. The recommendations were presented in a format common to the organisation.
Opportunity map	Visual maps were constructed to understand customer work activities. The initial freehand sketches were later translated into designed artefacts. One illustrates the activities of the customers and the other identifies high-level capabilities to support these activities, including a summary of the benefits to the organisation. Initially created as conceptual tools to consider and synthesis customer needs, these maps were used to document and communicate the work activities of customers and identify opportunities for service improvement.
Persona	Three personas were created to reflect three different customer types based on the type (and complexity) of the products sold. Data from customer interviews were used to guide recruitment for the codesign workshop. Personas were intended to inform future design work relating to both this initiative and these customers.
Customer journey maps	Data from the internal workshop and qualitative interviews were translated into customer journey maps, including maps of the tasks, artefacts, systems and tools used. Customers' needs, pain-points and opportunities were then mapped to the different stages of the customer journey. Three maps representing the ordering and activation processes for three distinct products communicated the complexity of the existing processes. The maps provided a framework for the organisation to reconsider associated processes and systems.
Infographic	The infographic translated complex quantitative data to a broad audience group in an accessible way. It presented the number of support calls made to the customer call centre, information about the associated revenue derived by the organisation in relation to each product and the number of customers per state. It illustrated statistics by showing that i) the customer group contributed a significant amount of revenue to the organisation; and ii) if the organisation improved their ordering services, the call centres would become more efficient and the organisation's net revenue would consequently increase. This artefact was a persuasive artefact, as it illustrated the potential value of investing in a revised online ordering service.
Research video	Two 1.5-minute research videos were created on the qualitative research that was undertaken. Each video displayed 8–10 verbatim quotes from various staff and customer research participants. These videos sought to create empathy for customers and simply and persuasively communicate the issues consumers encountered when ordering products. The videos revealed issues with the current ordering processes and which tools were onerous.
Function overview	The function overview provided a brief summary of the functions for the recommended portal. It mapped opportunities identified in the opportunity maps. It sought to provide an easily digestible overview of the proposed organisation's service capabilities.

<i>ARTEFACT</i>	<i>DESCRIPTION</i>
Wire-frames	A series of annotated wire-frames were delivered as a PDF file to visually communicate the features of the portal rather than specific patterns and interactions.
Video prototype	In the video prototype, a user called 'Janine' talked the audience through an animation of wire-frames, describing a proposed system in terms of its benefits. These benefits addressed many of the pain-points expressed by other artefacts (e.g., the journey maps and personas). The lead designer was of the view that wire-frames were not easily accessible to non-technical audiences. Thus, the video prototype was created to present the designs in an accessible way that was appropriate to a broad range of stakeholders.
User stories	Agile user stories (e.g., 'As a customer I can check the status of an order, so that I can arrange access for technicians installing network infrastructure') were set out in an Excel spread sheet to correspond with the features in the wire-frames. The user stories sought to communicate the scope of the design and required technical integration to enable the development of the project management staff.
Quick wins	In an Excel spread sheet, the quick wins (i.e., the actions that the organisation could implement immediately to improve the existing service for a group) were listed. All of these quick wins could be executed immediately and without funding.
Future storyboard	Two future storyboards (depicting the scenarios in use) showed a tracking feature and a mobile ordering process using a tablet. These artefacts communicate service concepts in relation to their use context.

Data Analysis and Propositions

We found that the use of design artefacts in customer-centric innovation activities leads to organisational change. Design artefacts play an important role in organisational change, support social mediation and are critical in enabling and mediating change. We contend that design artefacts have five significant and distinct socio-political and sociocultural roles. Specifically, we argue that design artefacts: i) act as customer empathy enablers; ii) act as collaboration facilitators and activators; iii) provide reflective sense-making frameworks; iv) are persuasive tools; and v) are design and customer-centric knowledge communicators. We explore each of these five roles and discuss their relationships with customer-centric innovation and organisational change in relation to the case study, making five propositions.

Proposition 1: Design artefacts function as customer empathy enablers

Participants in this study agreed that adopting a customer-centric perspective was vital to company processes; however, like participants in previous studies (e.g., Galbraith, 2005, Shah et al., 2006, Meyer and Schwager, 2007), the participants in the present study did perceive the shift towards customer-centricity as challenging. Participants also reported that creating project artefacts (e.g., personas), rather than writing bullet point lists for Power Point presentations, gave the customer research a human voice and face and communicated customers' frustrations and needs in an accessible and engaging way. Personas were considered particularly instructive in communicating information about customers' behaviours and qualitative and behavioural information from customers' perspectives.

When reviewing the videos created from customer interviews, another key artefact in the study, participants noted that they felt more directly engaged with the artefacts and unlike documents, which have to be read, it was impossible to scan videos. Videos evoked much more direct exposure to customer pain-points. Notably, the use of first person verbatim quotes facilitated customer empathy while the visual artefacts motivated sharing between formal and informal social networks. Thus, evidence was found for the effectiveness of design artefacts and their value in understanding customers and creating empathy. Additionally, participants noted that the engaging visual formats would be useful in aiding cultural change within the organisation.

Other authors have considered how design artefacts can evoke feelings of empathy (e.g. Van Rijn et al., 2011). However, in this case study, we found that organisational outcomes required the collective participation of many people and that empathy was not only valuable within the design team, but also affected people involved in other projects. Due to their aesthetic dimensions, design artefacts link with subjective emotions, empathy, intuition and judgement (Fulton Suri, 2008; Rafaeli and Vilnai-Yavetz, 2004b). Participants in the current study noted how the novel visual formats of the artefacts motivated them to share information with their colleagues. The rich visual design of the artefacts addressed a number of issues related to less engaging formats and encouraged feelings of customer empathy across broad organisational audiences.

Customer empathy encourages customer-centric judgements, behaviours and the advocacy required to implement innovative changes, such as changes to processes and organisational structures (Manning, Bodine and Bernoff, 2012). As a connectedness organising mechanism, empathy can assist staff members to recognise the interconnectedness and inter-relationships between collective actions (Pavlovich and Krahnke, 2012). Empathy also facilitates shared meanings that can create, sustain or change organisational cultures (Cook and Yarrow, 1996).

It is contended that design artefacts can motivate customer-centric collective actions by facilitating far-reaching empathy for customers and enabling customer-centric judgements and behaviours. Design artefacts can shift thinking from matters of sheer usability towards a deeper understanding of human dignity and thus positively affect the thoughts and actions of individuals (Buchanan, 2015) in support of customer-centric collective outcomes.

Proposition 2: Design artefacts facilitate and activate collaboration

Participants in this study reported that collaborations among cross-functional business groups were critical to innovation processes. In this case study, participation in the project activities was mostly voluntary; however, the design artefacts also activated the involvement of non-designers in the company. Many participants noted that encouraging other colleagues to contribute and their overall engagement with and advocacy for the innovation initiatives was both critical and challenging.

Artefacts, such as videos and presentations, were shared with managers from other areas to communicate issues related to poor customer experiences and gain their support. After the project was completed, some artefacts stimulated the interest of several other stakeholders

in the project and its outcomes. This ultimately led to the development of more ideas and associated change processes.

Using the artefacts to activate collaboration and participation in the innovation context of the project was critical. Motivated by human agency (Maidique, 1980; Rogers, 1995), team members became change agents who enacted change by interacting and networking within and across the organisation. Thus, it appears that by creating empathy, the artefacts motivated and activated collaborations.

Thus, the artefacts mediated the dialogue between designers and other members of the organisation by codifying and communicating knowledge. Visual artefacts (e.g., customer journey maps) provided the bases for discussions about customer-centric changes beyond the project context. For example, one process improvement specialist stated that she would use artefacts within workshops as a 'springboard' for conversations about improvements related to other associated processes.

Artefacts transform understandings and actions by enabling people to identify contradictions and uncertainties related to organisational processes (Engeström, 2001). Artefacts are not merely static knowledge repositories (Carlile, 2002); rather, artefacts are dynamic and active tools. Individuals use 'artefacts of knowing' (Ewenstein and Whyte, 2007) to exemplify, translate and contribute to their understandings. When mediated by artefacts, knowledge and activity and communicative actions (Orlikowski, 2002) transform and facilitate innovation (Dasgupta and Gupta, 2009; du Plessis, 2007). Proposition 2 describes the mediatory and enabling role of artefacts.

Proposition 3: Design artefacts provide reflective sense-making frameworks

We observed that members of the project team used artefacts as reflective sense-making tools to understand, frame problems and communicate. Sense-making refers to the process by which individuals or groups make sense of information. The artefacts (e.g., the opportunity maps or journey maps) created for this project assisted non-design staff members to understand and appreciate new models for thinking about customers and the difficulties that customers face using the current products and services.

For example, the lead designer created opportunity maps and personas to help demonstrate the work practices of customers and conceptualise how the organisation could add value to these practises for customers. These artefacts were initially used to understand the context and needs of customers; however, they evolved throughout various consultations until they ultimately served as a framework for reflection and a synthesis of key customer tasks, needs and improvement opportunities. Thus, the artefacts became structures through which the design team could reflect and refine their understandings of the project. Similarly, the journey maps were used to combine different data into one visual artefact over time. This enabled the team to synthesise, consider and talk and gain insights into the data and allowed non-design staff members to understand current user experiences and related systems.

The value of visual practices in sense-making and synthesis is well established (Kolko, 2010; Krippendorff, 1989). Such practices enhance sense-making processes by making the abstract

more concrete, improving communication, building knowledge and enabling complex and non-tangible concepts to be understood (Michela and Floricel, 2012; Oster, 2009).

The visual artefacts in this study aided sense-making, shifted mental models and supported organisational change processes (Senge et al., 2005). Further, sharing within and between organisational networks led to collective sense-making (Orlikowski, 2002). The design artefacts provided cognitive frameworks to various actors, supported problem-framing processes (Beckman and Barry, 2007; Dorst, 2011) and enabled the organisation to identify and solve customer problems and innovate. Thus, as suggested by Proposition 3, artefacts are valuable 'things-to-think-with' (Brandt, 2007).

Proposition 4: Design artefacts play persuasive roles

In the case study, artefacts assumed an implicit persuasive role. From executives to the frontline staff delivering the products or services, from the staff involved with implementation to customers—every stakeholder needs to be engaged, informed or convinced in some way at some point. Team members employed artefacts as persuasive tools. For example, some team members used the artefacts to encourage senior executives to fund the project while others used the artefacts to support their recommendations.

Additionally, team members found that the artefacts were very effective in communicating key issues and complex financial information. For example, the infographic clearly showed the financial benefits related to funding the proposed platform while the videos provided evidence as to why the ordering service needed to be improved. Wagner (2000) suggests 'persuasive artefact', however, her observation is based on collaborative architectural work within a single community of practice. Conversely, in the present study, we observed that artefacts enable social mediations between communities of practice across long-term innovation initiatives.

This study also revealed how artefacts play political roles. One participant emphasised the importance of gaining support from the 'right' stakeholders to progress a project and noted that the videos had been very helpful in increasing the interests of stakeholders. Thus, brokering artefacts to stakeholders at different times represents a political activity (Carlile, 2002; Kimble, Grenier and Goglio-Primard, 2010). It has been suggested that politics only play out during the final phases of a project (Carlile, 2004); however, we found that politics and the management of social relations were significant throughout the project. Thus, artefacts play important, persuasive roles in the innovation, design and implementation phases of projects. Artefacts also affect project advocacy, project continuation, consensus building, knowledge sharing and organisational change processes.

Proposition 5: Design artefacts effectively communicate customer-centric and design knowledge

In this case study, the project participants used artefacts to effectively communicate a customer-centric perspective. For example, the participants showed videos of customer interviews to executives, national sales staff and call centre representatives to demonstrate customers' perspectives. Both videos and personas were used to educate new staff about customer characteristics and needs. Further, even after the project had finished, members of the organisation continued to use the same artefacts to describe key customer attributes.

Management theory supports the role of artefacts in organisational learning. Indeed, organisational learning often rests upon social processes that are mediated by artefacts (Boreham and Morgan, 2004; Weick and Roberts, 1996).

The artefacts were also used tactically (to explain the 'how') and strategically (to help individuals to envision 'what could be'). For example, a conceptual video prototype, which had been created to explain the design concept to staff members with no or limited technical knowledge, was later used to share a customer-centric vision to the organisation. Thus, artefacts can function to motivate action, enable strategy (Spee and Jarzabkowski, 2009) and bridge current and future states. Artefacts are often used to share a future vision, activate participation, collaboration, advocacy and internal alignment because of their engaging visual form. In the case study, the artefacts linked specific actions or outcomes to a broader strategic narrative.

When artefacts are shared voluntarily and talked about widely, they can become mechanisms to express culture and enact change (Carlile, 2006). For example, in this case study, participants recalled how they learnt about the project 'road show' via formal and informal networks. This illustrates the social character of knowledge sharing and the value of social networks in distributing knowledge within organisations (Dasgupta and Gupta, 2009; 1995; Lave and Wenger, 1991). Artefacts can become symbols of a new customer-centric culture (Boreham and Morgan, 2004) merely by being discussed. Thus, design artefacts appear to strengthen informal work relationships, organisational learning and cultural transformations towards customer-centricity.

Overall, we found that customer-centric knowledge, expressed via engaging and accessible design artefacts, provided the organisation with new and effective boundary objects, which allowed people to engage with, talk through and discuss customer-centricity. Thus, artefacts played enabling roles, acted as change agents and supported innovation and transformation.

Conclusion

This study sought to explore the value of design artefacts in creating customer-centric organisations. In this paper, five distinct roles of artefacts were considered. By virtue of their rich, visual, novel and engaging formats, artefacts are likely to be shared more easily in informal organisational arrangements (e.g., among cross-functional teams). Artefacts provide an accessible and applicable way to communicate tacit needs and other customer-centric insights. Artefacts inspire customer-centric behaviours and stimulate cultural shifts in organisations. Thus, our findings generally showed the value of design artefacts in customer-centric organisational change. However, further empirical research is required to validate the propositions developed in this paper and to determine the conditions under which design artefacts enable customer-centric organisational change.

Our research raises a number of questions about the factors and capabilities needed to transition to customer-centricity using design artefacts. Factors such as knowledge management capabilities, organisational culture and absorptive capacity (Cohen and Levinthal, 1990) could affect the ability of design artefacts to impact organisational transformations. Additionally, artefacts need to be recognised and promoted by leadership

(Aftab 2012). Executive support for the use of design artefacts shows their widespread use and effects (Bailey, 2012).

Organisations need to develop the necessary capabilities to use design artefacts as mediatory and enabling tools. Training and participation in design processes can facilitate familiarity with customer-centric design artefacts (Junginger, 2005). For example, this case study informed the creation of a pedagogical framework that was designed to support the development of design artefacts (Wechsler, 2017).

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