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Human-Centred Design for Digital Transformation

Abstract

Organizations in the Digital era are facing unprecedented challenges to leverage emerging technologies and reshape their industries in response to contemporary challenges. Human-Centred Design (HCD) represents a way that organizations can rethink and restructure themselves to ensure they are optimized to adapt to the emerging Digital challenges.

This white paper defines Human-Centred Design (HCD) and provides some historical context for how we define technology and how this has affected the design process to date. This is followed by a more detailed description of HCD concepts and processes. Finally, this paper describes other areas in which HCD can be used to support Digital transformation.

KEYWORDS: Human-Centred Design, HCD, Design thinking, User Experience, UX, UED, User Innovation, Digital Design

Introduction

Multiple studies show that *Digital* and *Digitalization* are key priorities for today's organizations and that the pace of change, as well as identifying the right skills and capabilities to cope with it, is a key concern for CIOs (EY, 2014; Gartner, 2014; Westerman, Bonnet, & McAfee, 2014). Additionally, there is plenty of confusion and concern with regard to exactly what *Digital* means and what organizations need to do to respond to it.

One way of understanding Digital is to consider it as IT from the user's perspective. Digital is about how people design, use and connect through technology and how, in an organizational context, they are enabled to react to, adapt and leverage technology to increase performance, innovation and value. Digital disruptions have fundamentally changed how we do business today, in ways that reach even beyond technology to strategy formulation, relationship building, and process implementation. Digital companies such as Google, Facebook and Apple have established entirely new business models around creating useful, innovative and often beautiful technologies for people and, in the process, changed the business landscape in the Digital era. All of these considerations need to be taken into account as part of a Digital transformation.

Therefore, in the Digital-era enterprise, it is necessary to understand technology not merely as an independent entity, but also how it is embedded in the wider social context: in this case the organization and its wider ecosystem. Noted sociologist Saskia Sassen points out that there is no organization that is completely virtual and no economy that is entirely Digital; instead that *Digital space* is embedded within a varied complex of social, cultural, economic, subjective, and imaginary constructs (Sassen, 2002). This is also acknowledged in the professional ICT literature: "*Technology systems exist to help people work together to get things done*" (Gartner, 2013).

This white paper outlines an approach to including social and contextual considerations in the design and development process that can support an organization in its Digital transformation initiative. This approach is called Human-Centred Design (HCD); similar approaches include User Experience, Design Thinking, and User Innovation. By acting as a complementary perspective to a technology-centric, engineering approach, HCD can help to reinvent IT and its relationship with the business. It can also be integrated into the wider organization to ensure optimal design and use, not just of technology, but also of organizational-wide strategy and culture,

as well as processes, structures and services, to enhance performance and value throughout the organization. By expanding our capabilities now to incorporate a human-centred viewpoint, the goal of Digital transformation may prove to be less complex or distant.

Historical Perspective

But before we do that, let's take a step back and look at how technologies have been defined and developed to date in order to understand how this has affected the design process.

There are two totally distinct and seemingly irreconcilable perspectives on what technology is. The first, which dominates traditional scientific and engineering fields, is that technology is "the application of scientific knowledge for practical purposes, especially in industry".¹ The other, is that technology is simply a tool for use.²

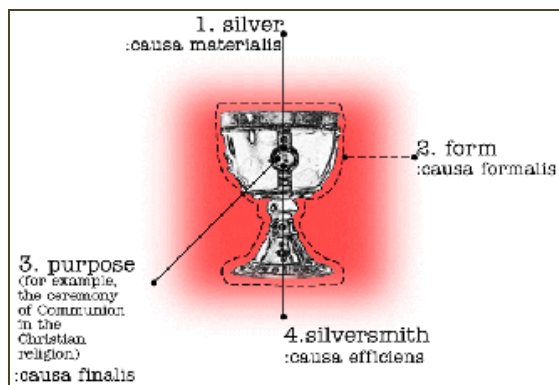


Figure 1: An illustration of Aristotle's four causes using the example of a silver chalice – Heidegger (UH, 2014)

The German philosopher, Martin Heidegger, discusses alternative ways of understanding technology. Giving the example of a silver chalice, he uses Aristotle's four causes to articulate the many different origins and ways of understanding a single object. For example, an object may be understood either in terms of the material out of which it is made or its structural arrangement, or form. Alternatively, it might be understood in terms of its ultimate purpose or even in terms of who is needed to bring the object into being, in this case the silversmith (Heidegger, 1996).

Thus, depending on a person's relationship with the object, it may be understood variously as a thing in itself, or a thing to be taken apart, studied, and fixed. It may also be understood as a tool that is imbued with meaning only when put to use, without the need to understand its inner working or to theorize about it. Conceding that there are distinct and equally valid ways of perceiving technology allows us to accommodate a

number of different perspectives. Failure to understand this can result in a breakdown in communication and understanding between the various stakeholders involved; for example, in the characterisation by IT and designers of the user as stupid.³

At first glance, the conception of technology as applied science seems a reasonable one. Science is the pursuit of knowledge, and technology is the application of that knowledge; all for the betterment and furthering of humanity. However, this way of conceiving of technology means that everything that gets in the way of applying the pure science becomes a constraint, including, for example, whether people can actually use it.

The reality of technology development is often very different. Of course scientific principles and discoveries are used in technology development, whether consciously or unconsciously, but there are many other explicit and implicit inputs, most of them, for better or for worse, thoroughly unscientific. Despite this, the traditional process of technology development has tended to be considered in a linear way. Technology requirements were often defined by the developer, or with minimal input from the sponsor. The technology development process was often considered a mysterious and impenetrable one and, on completion, the technical product was released to an often resistant user group.

"Technology is generally 'black-boxed' in that the... work that goes into its production is obscured by technological determinism which separates out technological 'development' from the 'social' sphere and produces technologies (and their 'effects') as 'inevitable' and usually desirable (as 'progress'). (Moore, Griffiths, & Richardson, 2005)

In this way, science and engineering are often considered disciplines that affect society, rather than disciplines that are affected by society. By conflating technology and science, there are a number of misconceptions about technology that persist. We mistake technology as something that is objective and rational, and independent of interpretation, politics or opinion. By imposing this rational narrative onto a thoroughly complex and messy reality, we have chosen to ignore the obvious human factors.

Louis Bucciarelli, Professor of Engineering and Technology Studies at MIT, uses the term *object world* work to describe the traditional concept of technology design

¹ Oxford English Dictionary Definition

² See, for example, Bill Gates <http://www.ucl.ac.uk/teaching-learning/news/is-technology-just-a-tool>

³ See, for example, <http://infodesign.com.au/usabilityresources/articles/themythofthestupiduser/>

and development as the art of applied science pursued independently by an individual. While he acknowledges that it is a necessary pursuit as part of the development process, he does not consider it sufficient if design is to succeed. Design is, instead, a collaborative pursuit, involving discussion, deliberation and negotiation (Bucciarelli, 2002). In other words, it is a thoroughly political exercise, which must be recognised and accounted for in how organizations manage collaboration, assign responsibilities, and empower individuals.

The viability of a product is not determined in a laboratory; instead it is determined by its future adoption. In the words of Susan Dray, "if the user can't use it, it doesn't work" (Andersen, 2007). Brilliant theories do not always make great technologies, and sometimes truly simple ideas that emanate outside of the laboratory can lead to the greatest inventions and innovations. In the Digital era, the focus is shifting toward interactions and outcomes that relate to people working with each other and with technology in new, unstructured and experience-driven ways (Gartner, 2013).

Humans are not artifacts or components; instead they are highly complex, unpredictable and creative, and this needs to be addressed both in the organizational strategy and in the design and development process. The need to better understand how people act and include user perspectives into the development process is not merely an extension of the traditional engineering process. Rather, the design and innovation process requires complementary disciplines, capabilities and competences.

HCD for Digital Transformation

Transforming to Digital is a concern for the whole organization – from organizational culture and strategy, through to operations. IT, in the new Digital enterprise, will be required to "ideate, or dream the Digital dream, and execute in close partnership with colleagues, in an exploratory way, with understanding of the potential of new trends" (Gartner, 2014). One way to do this is to put HCD at the centre of what your organization does, from strategy development to innovation and other capabilities (Vollmer, Egol, & Sayani, 2014).

There can be a certain amount of trepidation at the prospect of opening the flood gates and letting people or users in to the design process. However, just as there are systematic and rigorous engineering processes, there are equally systematic and rigorous ways of including social aspects in the design process that are currently successfully carried out in organizations and in scientific research.

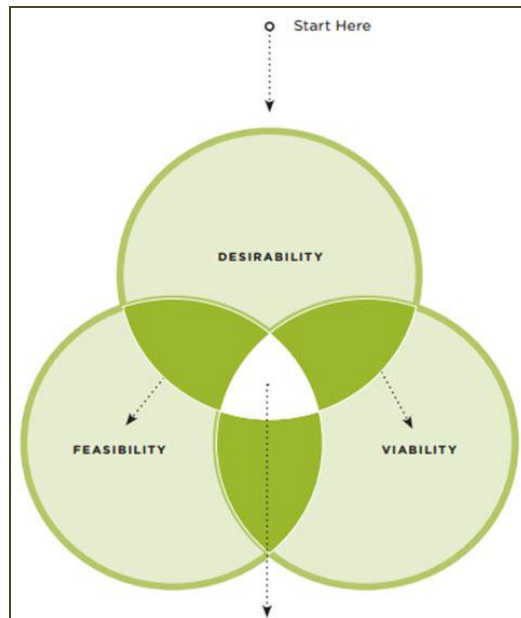


Figure 2: IDEO's Three Lenses

Tim Brown, President and CEO of design and innovation consulting firm IDEO, has pioneered the concept of *Design Thinking* which he describes as "a methodology that imbues the full spectrum of innovation activities with a human-centered design ethos" (Brown, 2008). This approach to innovation is driven by developing a complete understanding, through direct observation, of people's needs and experience of interacting with particular products and services. The solutions that emerge at the end of the HCD process should correspond with the overlap of the lenses as outlined in Figure 2: they should be desirable, feasible, and viable (IDEO.org, 2009). Many organizations already have some of these design and social science research capabilities embedded in the form of User Experience or User Interaction teams.

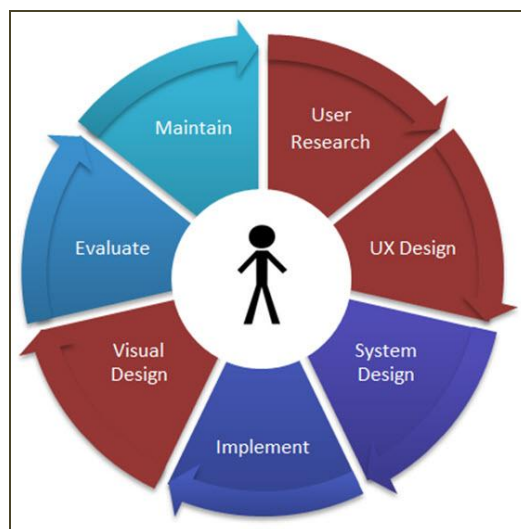


Figure 3: The HCD Process

Traditionally, the role of design has been treated as a downstream step in the development process. However, rather than making "an already developed idea more attractive to consumers" (Brown, 2008), HCD can be used to generate ideas that better meet consumers' needs and desires. This means that HCD becomes an important strategic tool, resulting in "dramatic new forms of value" (Brown, 2008). HCD should therefore be an integral part of product strategy and incorporated into the full development cycle. Crucially, the human-centred process should start before the requirements gathering phase and should always include direct observation with the intended users of the product or service. By the time the product goes into development, the initial research and design phase will already be complete.

The first step in the HCD process is the use of social science research methods – such as direct observation, interviews, and surveys – to fully understand and empathise with user perspectives and to maximize idea generation. Ideally, this type of research is sustained throughout the design process in an agile and iterative manner, meaning the product concepts have been thoroughly refined, articulated and tested with real users and project sponsors before going into development. An empathetic focus is "an essential driver to creating simple yet disruptive solutions that are operationally feasible, economically viable, and, most importantly, desired by users." (Vollmer et al., 2014)

The second step is the design phase. Here ideas may be refined collaboratively using participatory design techniques. Final user journeys and interfaces are described using information architecture and interaction design techniques, taking into consideration the three lenses of user desirability, business viability, and technological feasibility. Post-development and post-deployment, user research and design continues to evaluate and capture learnings from the product in use. These may take the form of formal user testing, informal observations and/or behavioural or usage analytics.

Microsoft and SAP have both adopted Design Thinking methods into their capability suites. Sam Yen, Chief Design Officer at SAP, believes that Design Thinking represents the best way to identify opportunities for game-changing innovation (Yen, 2014).

A HCD process must be both agile and iterative – in order to maximize opportunities for interaction and feedback throughout the design cycle, as well as to build sufficient flexibility into the process to adapt to changes and new ideas.

"[Thomas Edison's] approach was intended not to validate preconceived hypotheses but to help experimenters learn something new from each iterative stab. Innovation is hard work; Edison made it a profession that blended art, craft, science, business savvy, and an astute understanding of customers and markets... Put simply, it is a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity... Leaders now look to innovation as a principal source of differentiation and competitive advantage; they would do well to incorporate design thinking into all phases of the process."(Brown, 2008)

HCD across the Enterprise

So far we have looked at specific conceptions of technology and Digital innovation, but we also need to look at how this relates to the wider social sphere in which it is embedded; in this case, the organization and its wider ecosystem. How Digital technologies are conceived, created, assimilated, and used within an organization affects and is affected by multiple levels of interacting elements, including the organizational structure and culture, organizational processes, organizational networks and capabilities, and – from the perspective of this white paper – how organizations understand and conceptualise "people".

Introducing HCD approaches, capabilities and competences into the design process will ensure that:

- *Adoption increases exponentially.*
- *Innovative ideas and new applications are captured.*
- *The product or service being designed is optimised for use.*
- *Time is not wasted on developing unnecessary functionality.*
- *Development work does not stray from specification.*

Up until now, human-centred design and the inclusion of social and behavioural disciplines have mostly been engaged alongside technology in the form of User Experience Design and User Research. In the future, these disciplines are likely to be applied to a much wider range of problems and in much more strategic contexts (Gartner, 2013). Human-centred design and user innovation can create new opportunities for organizations to "explore and exploit simultaneously, as multiple users can be a source of continuous and simultaneous exploration of business ideas (that the firm may not be able to recognize itself) and their exploitation." (Keinz, Hienerth, & Lettl, 2012)

Human-centred perspectives and methods can be brought to bear on how an organization views and connects with its people, customers, suppliers and partners; how it conceptualizes and designs its

organizational structure and culture; the structure of its business and operating models, and of course, its processes, products and services. By embedding a HCD capability into your organization, there are also other applications where it is likely to have a significant impact; for example, in the area of information management.

"This, then, is a call-to-action for business leaders all around the globe: recognize this new era in design, and transform every product and service into something more rewarding, memorable, and valuable. Evaluate each element of a product, service or process and improve it, simplify it, step by step. Understand that design is not just a marketing tool, but a genuine source of competitive advantage, customer and employee satisfaction and, finally, higher profits." (Yen, 2014)

The digital era of vastly increased user and consumer data represents radical changes to how organizations use and protect data. A "growing tension is emerging between the desire to use information for competitive advantage and the risk of reputational damage through misuse or inappropriate use" (Gartner, 2013). Data needs to be mined, interpreted and used, and ultimately fed back into the design process, continually remaining sensitive to the responsibilities of handling personal data and legislative demands. Once again, this will be done most effectively by incorporating a number of different perspectives and competences into the process.

Tips to incorporate HCD in your Digital transformation:

- *Embed human-centeredness in your organizational culture.*
- *Leverage your existing UX and UI resources.*
- *Make friends with marketing!*
- *Establish multi-disciplinary teams representing technical, social, and agile perspectives.*
- *Introduce an exploratory discovery phase prior to requirements gathering.*
- *Include all members of the design and development teams in user interaction exercises.*

To date, understanding of social data is typically driven by experts in database management, such as computer scientists and IT technicians. They understand how to get Digital information, but they don't always understand how to get from information to meaning (Fournier & Rietveld, 2014). Adding human-centred perspectives and methods to data analysis competences will ensure a richer and deeper understanding of how technology can best be optimized. Additionally, experts trained in understanding human perspectives can formulate probing and relevant questions to ask of the data, are sensitive to culturally and socially sensitive data, and can help to mitigate risks associated with it.

Conclusion

Scientific and techno-centric viewpoints make assumptions based on theories that may prove to be incorrect; for example, that new technologies will necessarily replace old ones, that people will use technologies the way they were intended, or that complete automation is the goal of Digital transformation. An expanded conception of what technology is and new approaches to designing products, processes and services in Digital era enterprises coupled with a human-centred approach to culture, strategy, governance and data can be used to reinvent the organization in the Digital era.

The key to human-centred design is that it offers a complementary, systematic, structured and proven holistic approach to including complex and perhaps daunting human consideration in your organizational and product strategy, the result of which will be increased motivation, creativity, adoption, and employee productivity, as well as improved customer retention and lower risk. It is worth a shot.

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