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EXPLORING PHRONESIS IN DIGITAL INNOVATION

Research paper

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Abstract

Prior literature has emphasized the challenges of appropriating digital innovation in terms of combining digital and physical components to produce novel goods and services. However, there is a lack of more detailed understanding of how actors draw on experience, careful judgment and learning to drive digital innovation processes towards a projected future vision. In this paper, we explore how actors at a large incumbent car-manufacturing firm engage with digital innovation as they grapple with complex user expectations through the lens of phronesis. On the basis of engaged scholarship and interviews with members of two research and development (R&D) teams, we pay attention to the particular capacities, here termed phronetic principles, that guide user centric development work. Based on this, we propose five principles of importance for understanding digital innovation process: 1) projecting visions, 2) value-based judgment, 3) attuning to particulars, 4) open-mindedness, and 5) perpetual learning.

Keywords: Phronesis, Digital Innovation, Digitalization, Value-based rationality

Introduction

“Aristotle couldn’t have imagined the world we live in. Our world is much more complex and contradictory than his was, and the need for practical wisdom is even greater” (Schwartz & Sharpe, 2010 p. 49).

The extant literature on digital innovation, reflects a view on innovation processes based on instrumental rationality and utilitarian calculus. Specifically, it emphasizes concepts such as teleology and control readily associated with traditional structures and management (Svahn and Henfridsson 2012). This model of thinking rests on the idea that scientific knowledge is appropriate and a precondition for ideal decision-making (Flyvbjerg 2001). As organizations adopt digital innovation where both technical and organizational processes need to be aligned a more hybrid business logic is called for (Hylving and Schultze 2013; Svahn et al. 2017; Yoo et al. 2010); one that addresses the complex blend of technological, social and cultural challenges more effectively. The missing piece, then, in the digital innovation literature is a more nuanced understanding of how actors engage in development work as they grapple with reorganising for digital innovation.

In this paper, we analyse how actors accomplish digital innovation in a car-manufacturing firm through the lens of phronesis; in common parlance practical wisdom. Although phronesis is gaining currency in the management and organizational literature to study human judgment (e.g., Shotter and Tsoukas 2014) and ethical action (Mingers and Walsham 2010), it is relatively unexplored in the relation to digital innovation. A phronetic approach conceptualizes ‘wisdom’ as attuning to the particular situation and assessing what seems the best way forward. In other words, it foregrounds the capacity to synthesize, general universal knowledge (‘what can be done’) with the particular knowledge of a certain situation (‘what should be done?’) (Schwartz and Sharpe 2010), which is important to an organization's propensity to find a way to create value or, putting it differently to evolve into a more user-centric rather than

product focused organization. In recent years, scholars have called for renewed attention to Aristotle's concept of phronesis to explore the role and formation of practical wisdom across different practice contexts such as education (Birmingham 2004; Noel 1999), social research (Flyvbjerg 2004; Flyvbjerg et al. 2012; Ngwenyama and Klein 2018; Roos 2017), nursing (Flaming 2001), management (Kase et al. 2014; Nonaka and Toyama 2007) and policy-making (Linke and Jentoft 2014). In addition, Shotter and Tsoukas (2014) suggest that the capacity to making judgments underlies much of leaders' action since it allows them to operate more fully in circumstances they face.

There are several reasons why it is worth exploring phronesis in digital innovation processes. First, it can be argued that phronesis has become prominent in innovation settings with the coming of new digital technologies and associated changes in social and cultural ways of 'doing things' (Löwgren and Stolterman 2004; Zackariasson et al. 2006). Second, there is a need to clarify the concepts of phronesis and to identify it empirically if it is to be 'recognized' in a digital innovation context. Third, limited recognition of the need to innovate value-based systems and artefacts, in the digital and experiential economy (Yoo 2010) has been expressed. Fourth, calls continue for research, which addresses the development of theory that contributes to improve IT-usage and acceptance from a humane perspective (Spiekermann 2015). More so, little recognition of the particular set of abilities and patterns, which underpin digital innovation process work, remains relatively unexplored. Beyond these reasons, an important motivation for carrying out this research is a general interest to generate insights that can inspire practitioners in the digital age to learn to become better managers (Shotter and Tsoukas 2014) and thereby contribute to creating a better future (Aanestad 2016; Schultze 2017).

In light of this the guiding research question has been: *How can we understand digital innovation process through the lens of phronesis?* This study contributes to the existing digital innovation literature by offering findings with important implications for contexts where experiential computing and a user focus is imperative (Weisbach 2017). More specifically, the study shows that applying the notion of phronesis offers a useful framework for understanding how practitioners constantly balance instrumental rationality (rules-following) with nuanced practice demands (values-following). It highlights how phronesis can serve as a subsidiary resource in implementing appropriate innovation practices in an increasingly digitalized context.

The paper proceeds as follows: it begins by outlining relevant digital innovation literature and how it relates to digitalization of organizations and society in general. Then it describes the use of phronesis as a lens to better understand innovation process related to user-centred design. The research method is outlined, followed by the presentation of the findings. The paper concludes with a discussion and conclusion that highlights the key insights.

Digital Innovation

Innovation is about something new as is revealed by the Latin roots of the term, *nova*. While there are different definitions of the concept of innovation, they all include newness in some aspect. Further, it entails the process of producing new products or services reflecting a 'demanding journey towards practical application of an idea' (Svahn 2012, p. 19). With the increasing digitalization over the past few decades, a new stream of research has made its way into the information systems literature, namely digital innovation. Digital innovation has triggered a range of different phenomena, from new business models to crowdsourcing and online networks or communities formed around specific interests (Selander and Jarvenpaa 2016; Svahn et al. 2017). It has been defined as "the carrying out of new combinations of digital and physical components to produce novel products" (Yoo et al. 2010, p.2). Indeed, digitalization and digital innovation has changed entire industry sectors and much of these changes stem from characteristics of digital materials, such as generativity (Zittrain 2006), and homogenization of data (Yoo et al. 2012). Yoo (2010) brings up seven different capabilities of digital materiality that enable us to do new things in new ways (Leonardi and Barley 2008) and thereby triggering new opportunities

(Sambamurthy et al. 2003). Thus, digital materiality affords action possibility for a specific person, or group of people, in a specific context (Gibson 1977).

While considerable research has focused on diverse aspects on digital innovation, little attention has been paid to the underpinning rationalities connected to digital innovation research. Most studies, to our knowledge, are based on instrumental rationality; *what* has been done or *how* has it been done. For example, applying digital innovations require craftsmanship of how to assemble and re-arrange different components in the best way, and what components to include in what order (Baldwin and Clark, 2000; Svahn and Henfridsson, 2012). What is overlooked is the knowledge perspective that is based on ‘value-rationality’, which emphasises what goals ought to be pursued in relation to human values and interests (Kase et al., 2016). For example, how an organization should act in order to encourage a common good practice in development work (Crosby and Bryson, 2005). Digitalization forces actors to balance these two approaches. While it is possible for organizations to change well-trodden innovation paths by employing appropriate management processes (Eisenhardt and Tabrizi 1995; Henfridsson and Yoo 2014) it is difficult for these organizations to adapt to the digital realm (Selander et al. 2013) or to fully embrace digitalization (Hylving et al. 2012). New skills and types of knowledge are required in order for organizations to prosper in their attempts to conquer the challenges of digital innovation (Holmström 2018; Leonardi et al. 2012). This paper argues that one of the knowledge types required to engage in digital innovation processes is *phronesis*.

Phronesis

In the Nicomachean Ethics, Aristotle distinguishes between three types of knowledge or virtues of the human mind: *episteme*, *techne* and *phronesis*. Episteme is related to scientific knowledge (‘this is true and cannot be otherwise’). Epistemic knowledge includes for example the knowledge of how to calculate the speed of a car during an hour (km/h). Techne is translated as craft or craftsmanship, and refers to embodied knowledge involved in, for example, assembling a car or working with metal. Phronesis is mostly described as practical wisdom (Kase et al. 2014). It reflects those aspects that people in practice situations would refer to as being ‘the reasonable thing to do’, in relation to the particulars of the situation (Shotter and Tsoukas 2014). The goal of phronesis is to reach Eudaimonia, or genuine happiness - ‘human flourishing’. For example, infusing innovation practice with phronesis, means that practitioners involved in such knowledge based work would be guided by a desire for users’ happiness and prosperity (Ngwenyama and Klein 2018).

Although all three knowledge types are brought to bear in most types of activities, be it innovation, manufacturing or design, phronetic knowledge is at stake when situations are ambiguous and where multiple paths of responses are available (Schotter and Tsoukas, 2014). While episteme is the type of knowledge that is transferable from one person to another, both techne and phronesis are experience based (Flyvbjerg, 2004 B). It means that in order to become an expert, one has to develop many lived experiences. A baker improves by baking many breads; however, the baker cannot transfer the specific details of making the “perfect loaf”. Thus, the lessons learned through baking many breads represents techne knowledge. In this context phronetic knowledge is at stake when an apprentice is unable to read a bread recipe, and the baker subsequently responds to the situation in a manner that promotes confidence rather than shame.

Either way, being wise is presented as a way of acting when circumstances are uncertain and ambiguous during which agents strive for ‘the common good’ (Roos 2017). This type of knowledge boils down to what one knows to ‘make things happen’ (Zackariasson et al. 2006), which renders it useful for understanding the idiosyncratic process of (innovation) work. Phronesis is a form of knowledge that is personal and cannot be taught, and hence, is learned in practice (Shotter and Tsoukas 2014). There is no modern translation of the word phronesis and this type of knowledge is therefore often perceived as elusive and difficult to grasp (Linke and Jentoft 2014). Nonaka and Toyama (2007) use the metaphor of manufacturing a car to define phronesis; it is “the knowledge of what a good car is (value judgment),

and how to endeavour to build such a car (realize the value judgment)” (2007, p. 378). Following this claim, the attainment of phronesis relies on multiple and repeated experiences in similar contexts. Since each experience is unique, quantity matters, i.e. opportunities to learn from experience forms the basis for developing phronetic knowledge. This elevates the importance of constant learning and reflection to cultivate practical knowledge (Birmingham 2004) and to carry it forward into situations where there is a demand for finding the most appropriate option (means) to reach a desired end-goal (or eudaimonia).

Reflection is another important quality and intellectual state connected to phronesis (Birmingham 2004). It is a cognitive engagement that takes a person further in the progress of work activities, which at the same time enables new learning (Rodgers 2002). Reflections can be described as a cycle of thinking and acting (Korthagen and Kessels 1999) to understand the particulars of current context (e.g. interests, technical constraints/opportunities, personalities). (Shotter and Tsoukas 2014, p. 224) observe phronesis in leadership in terms of a ‘refined capacity to intuitively grasp salient features of ambiguous situations. They suggest that while phronetic judgement does not necessarily eliminate problems, it can provide cues as to how problems might ‘best’ be handled in a given situation.

In this context, practitioners’ actions are also guided by value-based judgments, rather than rational-bound decisions. Judgment making is a dynamic process based on visions, values and acquired (experienced-based) knowledge (Flyvbjerg 2001), and is geared towards a possible future. In other words, judgment regarding the ‘best/right’ way forward is informed by values, ideals, the past and an urge for outcome(s) for the common good. As values are subjective and constantly mutable, open-mindedness is an important aspect of making judgments. The virtue of open-mindedness is an element intertwined with phronesis (Zackariasson et al. 2006) in that it allows for creativity and new ways of seeing and understanding situations (Rodgers 2002). Hence, the characteristic of being open-minded emphasizes that no one knows everything, and that curiosity and exploration paves the way for staying open.

Imagination, a future vision, or what Aristotle refers to as phantasia, demands open-mindedness, and active involvement within a specific context, reinforcing the ability to staying open to new ideas. Visions assist the process of producing and comparing future possibilities towards a desired solution or end-goal. It is a mental tool for sustaining an open mind as well as attuning to the particulars of future scenarios (Birmingham 2004). In this regard, visions can be used as a feedback mechanism in the design process to anchor the problems in a projected future use situation (Bødker 2000). The phronetic principles derived in this research, shed light on the role of phronesis in digital innovation process.

Method

Research setting

AutoInc is a global car manufacturing company with a long tradition of producing a range of passenger vehicles, including sedans, SUV’s and hatchbacks. The organization employed approximately 40 000 in 2019 and sells cars worldwide with a strong focus on Europe and Asia. Similar to many other car manufacturers, the company consists of different core departments including design, human resources, finance, marketing and research & development (R&D). The R&D department is in turn divided in different divisions, much mirroring the car as a hierarchical modular product (Colfer and Baldwin 2016). For example, Electrical and Electronic Systems (EESE), is responsible for components and functions such as body electronics and infotainment. One of the groups within EESE, named *Driver Interaction and Infotainment*, is doing research and development connected to everything that is used, knowingly or unknowingly, by people in the car to be informed or entertained, such as navigation system, music player and car focused features. This group, in particular, has had a big growth due to the increase of consumer electronics and digitalization in general.

Just like the rest of AutoInc is the Driver Interaction and Infotainment group organized according to the car components. The increased level of digitalization since the early 2000, has challenged institutionalized ways of working at AutoInc. At the same time, the emergence of digitalized components in the car

such as sensors, voice recognition and digital displays, has allowed the company to leverage on digital innovation as a source for competitive differentiation.

To learn about the implications of digitalization on current innovation processes, we chose to focus in particular on two different groups within a subgroup of Driver Interaction and Infotainment, named DUX (Digital User Experience) and another we call ILC (Information Load Control), and how they conducted digital innovation. This decision was motivated not only by AutoInc's increasing appreciation for the need to transform their operations using digital technologies, but also by the fact that in some parts of the business the organisation was undertaking their own digital transformation by attuning to user needs as a matter of practice. The research was carried out as a qualitative case study of AutoInc in general and the two groups in particular, since the investigation was focused on unearthing not immediately apparent aspects of conducting digital innovation. Specifically, we analysed how these two groups managed development work related to in-car user experience.

Data collection

The first author had been engaged in research (Van de Ven 2007) at AutoInc since 2010, and had also worked for one of AutoInc's suppliers in the early 2000. The entry to AutoInc as researchers for this specific study came in October 2013 and continued with intermittent visits until April 2015. The time spent at AutoInc provided us with a useful initial understanding of what it means to accomplish digital innovation within the context of a research and development organization within a car manufacturer. We tried to stay as context-sensitive as possible when interpreting particular situations and practices referred to by our interviewees (Flyvbjerg 2001), thus allowing us to avoid superficial explanations and interpretations.

The study relied on 15 in-depth interviews, carried out by the first author between September 2013 and March 2015. The interviewees were UX designers, Usability specialists, Interaction designers, group managers and a site manager. The interview guide was designed to tap into each interviewee's experience of development work, practical challenges of performing digital innovation, and processes they rely on (formal/informal) to progress development work. Thus, interview questions were designed to probe deeper into the guiding principles of digital innovation work. This made it possible to capture the 'phronetic principles' that guided innovation work in pursuit of digital innovation. It also rendered visible activities, processes and artefacts that were instrumental to this type of knowledge intensive work.

To avoid biases from a single data source, a range of other methods were used to triangulate findings (Flick 2004), including a range of informal meetings at the canteen as well as other meeting spaces such as conversations by the coffee machine, but also archival documents and a workshop.

We used archival documents to aid understanding of context, development work and company strategy. This included project documentation such as PowerPoint presentations depicting completed sprint cycles, description of user journeys, requirement specifications, and organizational charts. Additional sources comprised pictures covering walls where they put up, post-it notes, information boards and workstations.

Finally, we ran a workshop to examine the perceived ability to innovate at AutoInc. In total, 17 people from different units participated to discuss a range of topics including quality, purchasing, project management, user experience and interaction design. Extensive notes were taken throughout the workshop and written up soon afterwards to ensure accuracy. Analysis of this data aided understanding of the context of the organisation and perceived challenges related to AutoInc's capability to respond to digital transformation and concerns relating to automotive industry as a whole.

In sum, the first research phase focused on understanding institutionalized structures guiding innovation work, and work in general within the organization, whereas the second phase, was shorter and more intense, and based on capturing data about the company's digitalization and efforts to adapt to digital transformation.

Data analysis

We used an abductive approach to analyse our data which involved a constant movement between theory and empirical data (Mingers 2004; Wynn and Williams. 2012). Following this analytical mode, we combined the insights from the case study with the theoretical ideas that form the basis of digital innovation as well as the notion of phronesis. It enabled us to pay attention to the phronetic aspects of engaging in development work that accords with a value-based and user centred focus. This involved an initial ‘broad-brush’ coding of our materials to identify portions that offered potential insights into the enactment of practical wisdom.

The data were analysed in two stages. The first stage consisted of identifying instances of phronesis or ‘expressions’ of practical wisdom referred to by our interviewees in their discussions of development work during the interviews. In doing this, we read the transcripts several times and scrutinized initial codes and categories carefully to avoid ‘forcing’ the data (Glaser 1978). Examples of codes emerging included ‘*pictures as goals*’, ‘*emotional expression*’, ‘*discerning details*’, ‘*sensing possibilities*’. The next step of the analysis involved collapsing codes into first order categories as presented as phronetic principles in Table 1. We then set out to capture the innovation approaches that coexist within AutoInc. As part of the careful analysis and interpretation of the empirical and secondary data, we also developed rich case descriptions (Rousseau and Fried 2001) to illustrate the different innovation approaches that coexist within AutoInc. We differentiate between a production logic that rests on following rules and procedures (instrumental rationality); i.e. ‘how to make a car well’ and one that foregrounds what a ‘good’ car is... and how to build such a car’ (Kase et al. 2014, p. 54), representing a value-based rationality. The essence of these descriptions has helped to elucidate how these two different rationalities pave the way for different ways of creating user value. Another key development which informed our analytical reasoning is the increasing adjustment among product-focused companies towards a service-oriented logic where people and human needs are centre stage.

Continuously cycling between the conceptual and empirical (Van Maanen et al. 2007), we moved from initial descriptions of main themes of describing ‘practical experience’ to phronetic principles that shape digital innovation process. It was evident that actors aimed for value-based outcomes; highlighting the importance of ‘acting wisely’ (e.g. deliberating choices, taking into account what practice demands etc.) to fulfil expectations of digital innovation work. The final step of the analysis involved going back to the data and once again examine the instances of phronetic principles and their enabling implications for digital innovation as well as doing ‘validity checks’ with key interviewees to ensure that our interpretive scheme based on a phronesis lens made sense within the two groups.

Empirical findings

This section provides a nuanced understanding of the process through which actors accomplish digital innovation. We observed that the innovation approach employed in the two groups diverged from the institutionalized innovation process in AutoInc as a whole. While the two working groups under study, ILC and DUX, were described in terms of ‘*user-centred*’, ‘*value oriented*’ and ‘*communicative*’, the terms used to depict the general processes within AutoInc centred round ‘*predictability*’ and ‘*measurement*’. Thus, the general image held by the interviewees regarding the organization focused on the technical and architectural aspects of the car.

The institutionalized innovation processes

At AutoInc, most work was carried out following the waterfall approach whereby requirements are clearly specified in terms of scheduling, testing and verification of an implemented solution. ‘What gets measured gets done’ was an often-heard axiom. As explained by an interaction designer: “*When specifying requirements, we always have to consider how we can test it according to set norms. If there is no number [a measurement number assigned to a requirement], it can’t be implemented*”. For example, a requirement for setting a destination in the navigation menu was described as five (5) clicks/interactions.

That is, a user should be able to set the destination of where she intends to go with five clicks after having started the navigation system. If this was completed, it was considered a ‘good and usable’ navigation system. In all, this way of specifying requirements followed a linear, waterfall process of 11 steps; starting with ‘product definition’ and finishing with ‘verifying product’. As each product development cycle usually lasted for five years, it took long time to get a new car out on the market.

In this context, getting permission to proceed in a particular direction was a salient part of maintaining control and this routine tended to rely on persistent explaining and cajoling. One of the engineers explained his frustration with having to handle this kind of work issue, saying: *We specify the requirements in such a detail so that we might as well implement the damn thing ourselves.*” (Referring to the requirement specification sent to suppliers). Within this culture of instrumental orientation, practitioners were expected to develop adequate documentation, which can be readily accessed to track changes. They prioritised carrying out documentation properly: that is, keeping track of what is going on in the projects as well as ensuring that actions accord with what has been documented.

Not surprisingly, ‘technical knowledge’ and ‘well-articulated specifications’ combined provided a realistic image of the task structure ideology. If changes are required, the specification is updated and sent back to the chain of stakeholders to be revised. The interaction designers felt frustrated and demoralised with this control-driven development process. *“I think we have eight levels in the organization where some decisions have to go through. It takes forever. And with this whispering game, who knows how the idea might look like when it finally reaches top management, it probably looks completely different from its original version.”* It often took months, even years, to implement changes. Since making changes depends on whether there is a “window for change”, the engineers are continuously faced with the risk of delays in their work, which in turn creates a domino-effect throughout the project.

Within the R&D department, the institutionalised way of developing solutions was based on incremental innovation. In other words, cars were constantly being produced at AutoInc but the difference between them reflected improvements in features and functionality, rather than ‘new’ functionality. For example, the user interface design for the navigation system developed in the early years of 2000 is nearly the same as the one produced 10 years later. One manager explains: *“It was very cumbersome to make changes. When the 2.1 project [a name of an infotainment project] went into production, they upgraded or adjusted the UID [User interface design]. It had taken two years and the changes were minimal. Some things [graphical elements] were moved around a little. Only very small details, but it took two years.”*

However, as AutoInc felt the pressure to embrace the opportunities offered by digitalization, innovation groups within the organisation begun to pursue digital innovation in new ways as the following section will describe.

Phronesis in digital innovation processes

As digitalization has progressed in the organization with an increased focus on software in the car, the pressure to change existing innovation approach has encouraged a movement towards agile way of working as the optimal way to better respond to user needs and values. For example, the groups within the Driver Interaction and Infotainment group started to focus more on user-centred design and user experience (UX). More specifically, a group of approximately 8 people based within the headquarters and an additional 8 people from other sections of the organization were officially established in the organization. This group was supposed to focus solely on UX connected to the car. It was named DUX - Digital User Experience. Another small grouping of three people, belonging to a subgroup of Driver Interaction and Infotainment, worked with a R&D project with a focus on how to help drivers to handle all the information that is available when using the car. This group was called ILC (Information Load Control).

The two development groups, ILC (Information Load Control) and DUX (Digital User Experience), based their innovation process on human values, visions, and openness to new ideas and options, which was at odds with the traditional way of innovating at AutoInc. The immediate focus was the process,

not the outcome, although a vision of an outcome helped them take the next step in the process. There were clear signs that innovation work in both groups was geared towards delivering solutions that accords with user needs and expectations. In this context, these expectations were referred to as ‘user values’.

Phronetic principle 1: Projecting visions

To amplify the orientation towards ‘user values’ storyboards and personas were used to visualize the values guiding the innovation practices, and especially so in terms of ensuring a shared understanding during the innovation process. From this perspective, storyboards were a useful means to influence design solutions as well as ensuring outcome quality more effectively. The personas included rich information about what kind of ideals and values the person would have. With information regarding, for example, organic food or the appreciation of quiet time, included in the vision it was possible to get a feeling of what direction to go in the development process. It allowed designers to visualize as well as producing a variety of user journeys of potential customers and ask for feedback. This facilitated and triggered meaningful conversations around issues concerning what features to include/exclude, modifications, and how the decided features should work and interact with the user. As expressed by one of the interaction engineers who developed a typical user journey for a busy professional called Susan: *“We developed a fictitious successful person leading a stressful life called Susan because we needed a base to hold on to when innovating. With this [fictitious person as a base] the development work was prioritized around Susan’s values and what she thought was important.”*

The creation of user stories constituted a way of ‘acting wisely’ in terms of getting to anchored decisions in a dynamic setting. The engineers in the two groups applied due care and diligence to advance their innovation work through the use of storyboards. For instance, one group used the ‘healthy ride’ value image in order to direct attention and effort. The process entailed the construction of a story that focused on illuminating the user’s emotions, feelings, and wellbeing. The ‘healthy ride’ was first presented on a big board where different aspects of it was described, including specific technology that could enable or disable a good outcome, such as how a phone app must be connected to a specific server or how climate and weather information must be communicated. It also allowed the engineers to think about what external sources, such as companies selling healthy products (i.e. farmers market and organic food store) or organizations promoting healthy activities (i.e. gym), that could be used in order to improve the healthy ride from other aspects than driving, or going in, the car. Similar to the persona Susan this development tool served as a reminder to embed the emotions and values represented in the healthy ride into the actual design. For example, the storyboard included phrases like “authentic and genuine”, “informed and calm”, “peace of mind in the moment” and “fits into my life”.

To ensure a broader participation of stakeholder within the organization in the innovation process the healthy ride storyboard was transformed into an animated movie. Adding movies provided possibilities to discuss the overall perception of the desired solution as well as pertinent issues and specific details that would improve the ‘healthy ride’. An advantage with animated movies, or a first simulation of a solution to the Susan persona, was that it could be distributed to non-traditional stakeholders, such as top-management and different types of end-users, to solicit their opinions and input to see if the development was heading in the right direction. Discussing with more people also provided new insights regarding challenges and possibilities they might have overlooked. For example, an issue that was raised as a result of showing the movie was the importance of developing new business models that were able to cope with “over-the-air” software updates. In this regard, the movie not only afforded a vision of what could be developed, but also presented a use when discussing other opportunities that were not yet considered. It helped the engineers to identify important aspects through free-flowing open dialogue which where an essential ingredient to help the group to improve its innovation process further.

Phronetic principle 2: Value-based judgment

Central to the storyboards and personas was to capture, for example, the persona Susan’s habits and preferences; from the moment she wakes up in the morning and drinks her coffee; getting into the car,

the commute to work, and the various activities that she is preoccupied with while driving, but also information about her daily life in terms of keeping track of birthdays and getting notifications regarding which store sells the tennis shoes she wants. The continuous weighing of choices and priorities was carried out in tandem with reflecting on how best use information for the purpose of improving the solution under construction. As one interaction designer said: *“We use GPS, internet connection, the cloud, data from the CAN bus [inside the car] , google maps...and personal data from the telephone list, mail - both regular and work, Facebook, Twitter, Insta, YouTube, calendars. So it is a nightmare from an integrity perspective, there is no integrity at all. You know exactly where you have been and what time and everything. So using Susan is important in order to make a judgment on what and how to use the data.”*

Thus, the use of storyboards and personas served to trigger reflection as well as to leverage knowledge on how to create a solution in accordance with both the persona AutoInc’s value vision: ‘a pleasurable and outstanding user experience’. To enable this a great deal of research was done and knowledge of the “history” was acquired. The site manager explains: *“To work from a user centric perspective, which is our foundation, you really need to backtrack a lot.”* As values often are connected to history, this story-telling was emphasized. The made-up history of a persona or the storyboard in conjunction with AutoInc’s own history helped when judging which direction to continue. Additionally, it was clear that working with personas assisted the designers to include emotional aspects such as moods and personality traits in innovation work, and thereby lessening the focus on driving innovation through measurements and numbers. Phrases the healthy ride worked with was for example *“standing out, but not too much”* and *“reflection of who I am”*. These assisted in choosing one alternative over another in the development process - would option ‘A’ take the solution closer to “standing out, but not too much” compared to option ‘B’, ‘C’ or ‘D’? By appropriating the storyboard, the engineers found an efficient way to communicate user values while at the same time remain open to and continuously explore new ideas and possibilities. It presented a way to institutionalize the process of actually talking about what cannot be fully measured; emotions did not emerge as readily accessible as a requirement specification with detailed description connected to a number.

Consequently, innovation work was primarily guided by values, rather than measurable dimensions to come as close as possible to a user-oriented solution. Ultimately, the engineers used the vision as a balance board to arrive at an end-solution that resonated with the stated project values. Instead of asking ‘what to do’ and ‘how to do it’, they asked ‘why do it’. As explained by one of the interaction engineers; *“We always asked “Why”, we tried to be holistic and asked “why and how is this benefiting the user?” and then get it done”*.

Phronetic principle 3: Attuning to particulars

An important part of the user centred innovation work was a constant balancing of various requirement needs and individual team member demands across the innovation process. Attuning to specified and unspecified project requirements and multiple, sometime conflicting demands represented the necessity for handling emerging issues sensibly. The ability to attune to contextual demands was observed as a vital aspect of handling on-going ‘checks’ and not the least for carefully managing involved expectations; ‘keeping people happy’. It also formed an important basis for making ‘good’ judgments.

Using the visions also assisted in identifying particulars that made a difference and sometimes made them change direction in the innovation process. For example, once they noticed that an existing technical solution was insufficient in terms of handling details, they decided to develop a bespoke solution: *“We first thought about implementing IFTTT, but we wanted a solution that was context aware, and we used more parameters than what IFTTT could handle. We needed time, position, direction, and tons of other data, [such as] frequency, how often you are at one position. And IFTTT can’t handle that. So IFTTT is only one part of a third-party program in the solution.”* In order to identify important details that mattered, they involved users constantly and concurrently: *“If you really want to deliver value to the user, you need to take the user into the loop and find out what they value. It is not enough to take the user into the loop and then wait three years and then ask “is this what you wanted?” . No, you should*

do it every week, or every day.” He continues: “It is a matter of trust. Every two weeks we got together and asked so what is up now. [...] Having the mindset that the world is changing we might as well incorporate changes into the process. It will change [the world in general, requirements and what the user values, wants and needs], the scope will change.”

The two groups were seeking to arrive at a solution whereby the context was more important than following procedure. For example, instead of trying to look into the future, they developed a solution that mirrored the past and used history to adjust to current the circumstances, they reflected continuously on what they had and in which direction they wanted to head. An engineer explained: *“This context awareness has only to do with memorability, it is about patterns and identifying important details. For example, when the user leaves home, the time is used, the coordinates are used etc. It [the solution] remembers this and can use it to adjust. Also, when you leave work at a specific time that matches something in your calendar.”* Using all different kinds of data, in particular specific data that would bring the solution closer to the value-based Persona or Storyboard, assisted in making it unique and user centred.

Phronetic principle 4: Open-mindedness

Favouring a mindset of not pre-defining the outcome or end-goal in implementing a solution was radical because it constituted a new way of doing things. A manager explains: *“AutoInc is not trust-based. It is “Explicitly tell what you want to do and then you get the money” So, define the black box in detail, tell us what it cost and then you get the money. That is how you develop a car, but it is not how you do, for example, customer clinics. You don’t even know what direction your project is heading.”*

In light of this, the majority of the engineers at AutoInc were now faced with the consequence of digitalization, which caused concern in some corners of the organisation. In an informal conversation one engineer expressed his view on the matter: *“How are we supposed to know if it is not specified what to do, there is no control and we don’t know where we are heading”.*

However, the two groups’ open-ended approach to progress innovation offered ample opportunities for them to be ‘effective performers’ during the whole innovation process. It meant that they could provide useful input at any point during the innovation process. Specifically, the interaction designers were given the opportunity to use their domain-specific expertise to promote creativity and innovation. Instead of following a rules-based approach and tick boxes as they completed each step; they took small steps to accommodate changes and, when the circumstances demanded also diverted from projected visions (as needed) as long as they made sure that they got closer to the value words and value-based concepts. Subsequently, if it was recognized that the previous step took them into the wrong direction, in terms of losing a key aspect of the solution or value perspective, for example “connectedness”, “transitional space“, or “high expectations for service”, it was relatively easy to revise the design or prototype.

Phronetic principle 5: Perpetual learning

Apart from using personas and storyboards, practitioners also relied on many iterations to leverage team knowledge and creativity. An important principle heeded by the working groups was therefore to implement frequent and short cycles of innovation work in order to integrate experience and knowledge from previous loops and continuously learn. For example, on the ILC group constantly evaluated and compared the status of the prototype with the storyboard related to the persona Susan in order to learn from the past and use that newly acquired knowledge in the present. Each meeting became a space where new things were learnt and items were deleted, added or adjusted to create a closer fit with the desired values as represented by the user story. Overall, this way of working allowed decisions to be made and changed across the innovation trajectory in an open minded, yet grounded way. In a sense, nothing was set in stone and it was always possible to adjust and improvise to get to a ‘good’ (eudaimonian) solution.

The two groups worked with an array of different tools in the development process. Simulations and movies helped them with presenting a vision, other development tools assisted in a perpetual learning process where they at the same time could make a judgment and reflect upon where they were heading. One of the more appreciated tools was a wall filled with organized post-it notes of what had/should be

implemented. The post-it notes were changed, deleted, modified and added along the way. This gave them possibilities to openly and fast get an overview and glimpse of what they had done and was planning to do. One of the interaction designers said: “*It hangs there on the wall and you can take a look at it all the time.*” The board supported the developers’ concern with making the right judgments regarding what actually matters. Thus, it became a tool to ensure that the team made the best possible judgments throughout the innovation process. Above all, it kept the group engaged and up to date with what was going on in relation to the stated values and projected vision.

Both innovation groups applied innovation practices that meant a continuous learning process where new and old knowledge were used in the next step. Indeed, it was necessary and almost natural for the respective groups to include practice routines that promoted iterations, discussions and continuous reflection. Additionally, during and between each iteration there were possibilities to change or redefine technical features in keeping with applying a value-based approach.

	Phronetic principles	Explanation
# 1	<i>Projecting visions</i>	Collective future orientation is crucial in accomplishing digital innovation. To this end, visioning together serves to support the realization of a user centric (eudaimonian) solutions.
# 2	<i>Value-based judgment</i>	Practitioners draw on experience-based knowledge to arrive at solutions that accord with the projected vision (e.g. ‘quiet time’, ‘authentic and genuine’). Prudent judgement involves weighing up pros and cons against professional and personal values.
# 3	<i>Attuning to particulars</i>	Knowing what to do in relation to other people demands awareness of situational details. Acting wisely in a particular moment is a matter of interpreting and discerning what alternative is most ‘appropriate’.
# 4	<i>Open-mindedness</i>	Keeping an open mind to new options and possibilities as well as ambiguity paves the way for learning and innovation.
# 5	<i>Perpetual learning</i>	Embracing the challenge of engaging in digital innovation involves acting on new knowledge and technologies boils down to cultivating continuous learning.

Table 1. Summary of phronetic principles guiding digital innovation process.

Discussion

The study conveys that practitioners draw on five overlapping phronetic principles to operate more fully as a group in complex development settings. It elevates the importance of practical in-situ knowledge and attention to what the practice demands rather what is specified and rules-based. In this regard, phronesis emerged as an important professional capacity to make appropriate judgments and determine the best way forward (Schwartz and Sharpe 2010). The discussion that follows illustrates the implications of phronetic principles in innovation work.

First, the five practical wisdom principles can be viewed as enablers in creating an open-ended learning innovation process which is essential in digital innovation. The first principle of *projecting visions* serves to support the collective development of a user centric solution throughout the innovation process. The vision also serves to remind the project team members to stay open to change. Using the vision as a guiding light, enables *perpetual learning* (principle #5) from practice and the refinement of ideas and possible ways of resolving contradictory requirements. In this way, perpetual learning unveils the core of digital innovation work as marked by iterative and frequent loops of testing and re-doing as well as

an ability to ‘adventure’ into new directions. Our research shows that digital innovation work is a matter of being able to draw on personal and *value-based judgment* (principle #2). For example, deciding whether to follow the specified rules (e.g. implementing measurable requirements) or to fulfill the user values and needs (e.g. ‘authentic and genuine’). Additionally, different digital information sources (Facebook, News, Calendar, in-car information such as fuel level or car position) demands a much more sophisticated capacity to process and discern what information is needed. The capacity to identify important details while also *attuning to the particulars* (principle #3) are crucial in order to reach a “common good” solution. Lastly, being engaged in digital innovation work requires openmindedness (principle #4) to new options and possibilities as well as ambiguity to promote continuous learning and innovation.

In sum, we have argued here that phronetic principles renders possibilities to balance different rationalities (instrumental vs value-based) with care in the pursuit of a good ‘end’. Against this background, for organizations to take on digital innovation, the managerial challenge is to create the right circumstances for phronetic knowledge to flourish. In contrast to instrumental rationality where control and predictability is driving decision-making, phronesis emphasizes practical reasoning that is based on ‘what is worth pursuing’; which is relevant in the digital era where everything is in constant flux. Given the importance of digital innovation in contemporary organizations, this study generates insights relating to how to enable more meaningful digital innovation contexts. Moreover, it aims to encourage more studies, and hence theorizing in areas that are important to make the world a better place (Aanestad 2016; Schultze 2017). In this regard, the study makes several contributions to the literature on digital innovation management. First, it highlights that applying a practical wisdom lens to understand digital innovation in complex tradition bound organizations unveil the importance of ‘phronetic’ characteristics such as perpetual learning, open-mindedness, projecting visions, value-based judgement and attuning to particulars. Secondly, it shows how applying phronetic knowledge and value-based rationality when innovating can be mirrored in the outcome of the process. That is, if you work with values, values will be encapsulated in the solution.

Conclusion

Prior research has pointed out the importance of embracing digitalization to build sustained competitive advantage. To this end, the present study explored digital innovation with a particular aim to explore the process that undergirds this type of development work. The study gives insight into the role of phronesis to progress digital innovation toward a projected vision representing user values and expectations. The value of the paper lays not only in presenting phronesis as a useful lens to understand the dynamic process of digital innovation, it also invites scholars in the field of information systems, to further explore the human capacities that enables a ‘good’ innovation process as well as solution.

Given its exploratory character, the study has at least three limitations. Even though the concept of phronesis offers a useful lens to understand some of the key ‘wisdom’ principles guiding innovation work, their impact requires additional research. Also, the granularity of the principles is at a relatively high level. It would therefore be worthwhile to pursue additional research that more carefully scrutinize the nature of these principles and thereby specify them further. We also imply that if applying phronesis in the process, it is mirrored in the solution. This follows Baldwin and Clark’s (2000) claim regarding fundamental isomorphism. It seems as if the fundamental isomorphism is applicable not only between design and task, but also to the logic you apply to the task and the design. That is, if you use value-based rationalities in your tasks, the design will end up encapsulating values. However, this needs to be further studied, and we highly encourage researchers to take on this call.

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