Digital innovation in context
Exploring serendipitous and unbounded digital innovation at the church of Sweden

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Abstract

Purpose – The purpose of this paper is to investigate how digital innovation processes emerge and evolve in organizational settings, and how serendipitous and unbounded digital innovations affect organizations' overall digital directions.

Design/methodology/approach – The authors draw on an interpretive case study of the Church of Sweden, tracing in detail the design, deployment and governance of an interactive website for digital prayer, the Prayer Web (PW).

Findings – The findings show how the site came about in a serendipitous manner, created by an advertising agency as part of a marketing campaign. In turn, the unbounded nature of digital innovation was revealed as the wide and rapid adoption of the PW raised issues concerning the church's overall digital direction linked to centralized control, as well as the nature and role of pastors, prayer and communities, as the site allowed people to post prayers and spread their messages (initially with no moderation).

Originality/value – The authors explore the serendipitous and unbounded ways in which digital innovation emerged and evolved in a traditional organization with a long legacy as an important societal institution. The paper contributes by generating rich insights on the role of the distinct aspects of digital technology in serendipitous and unbounded digital innovation. It particularly highlights how the editability and reprogrammability of digital artifacts triggered unexpected new behaviors and governance requirements in the organization under study. The authors encourage further research into the interrelationship between multiple unbounded and serendipitous digital innovations in an organization over time.

Keywords Case study, IT artifact, IT innovation, Interpretivist research

Paper type Research paper

1. Introduction

As shown by various authors (e.g. Boland *et al.*, 2007; Yoo, Henfridsson and Lyytinen, 2010), digital innovation has become an increasingly distributed and heterogeneous phenomenon. While digital technology has historically been leveraged to streamline production and administrative processes (Davenport, 1993; Scott Morton, 1991), it has recently come to play an increasingly central role in most organizational functions (Nambisan *et al.*, 2017). This is particularly evident in the firm's outbound dimensions (e.g. distribution, marketing and sales) (Porter, 1985), which are increasingly digitized. Moreover, current products and services often contain digital components that connect them to broader digital infrastructures (Henfridsson and Bygstad, 2013; Tilson *et al.*, 2010) characterized by dynamic distribution of digital technology control points where a wide range of actors co-create value and contents (Fader and Winer, 2012; Pagani, 2013; Yoo, Henfridsson and Lyytinen, 2010).

Following these developments, IS scholars have increasingly examined the specific implications of digital technology for organizational product and service innovation (e.g. Fichman *et al.*, 2014; Huang *et al.*, 2017). Yoo, Henfridsson and Lyytinen (2010) have noted the expanded locus of control in digital artifacts (*vis-á-vis* analog artifacts), and Austin *et al.* (2012)

show how this has enabled digital innovation processes to ignite in more serendipitous ways. Moreover, some distinct aspects of digital artifacts also affect the evolution of digital innovation processes and their outcomes. For example, according to Kallinikos *et al.* (2013) and Yoo, Henfridsson and Lyytinen (2010), digital artifacts have far greater editability and reprogrammability than analog artifacts, making them more malleable. Hence, Yoo and others (Yoo, 2012; Yoo, Lyytinen, Thummadi and Weiss, 2010) have pointed to the unbounded ways in which digital innovation processes and their outcomes tend to evolve. Nevertheless, little is known about how serendipitous and unbounded digital innovations are enacted in organizational practice, and how they can be managed. This study addresses this gap, and specifically the following research question:

RQ1. How do digital innovation processes emerge and evolve in organizational settings, and how may serendipitous and unbounded digital innovations affect organizations' overall digital directions?

Drawing on an emergent perspective, as outlined by Markus and Robey (1988), our exploration of this research question departs from the premise that new knowledge can be generated about the nature of digital innovation by studying how it emerges in practice through complex and unpredictable interactions between users and digital artifacts. Further, we draw on Leonardi (2012)'s argument that although some distinct aspects of digital artifacts persist over time, a key concern is to generate rich insight into how users enact these aspects through temporary fixations at specific points in time, in specific social contexts.

Informed by this perspective, the paper draws on a case study of a specific digital innovation effort by the Church of Sweden to address our research question. This church has battled a steady decline in membership during the last 20 years. As a response to this decline, the church implemented a new communications strategy in 2004, articulating a new trajectory in terms of relating to their members and the public. Here we study in detail the design, deployment and governance of the Prayer Web (PW). This is an interactive website for digital prayer that was designed and launched as part of a marketing campaign to promote the upcoming Church election in 2009. It received both domestic and international advertising awards[1].

Our findings show how the PW concept emerged in a serendipitous manner. The Church of Sweden initially envisioned a print-based campaign centered around historical church buildings, but the contracted agency suggested a digitally focused concept based on the act of prayer. The unbounded nature of digital innovation was revealed as the ensuing distributed innovation process unfolded, particularly as the marketing campaign came to an end. Due to the rapid and wide adoption of the PW, it became increasingly clear to the church that users found the site to be a meaningful digital service, and thus expected it to persist. While the church's Communications Department eventually realized that it had successfully digitized the act of prayer, one of the organization's core practices, this raised a number of challenges regarding the daily operations, long-term governance and further development of the PW. Based on these findings, the paper contributes to the literature on digital innovation by generating rich insights concerning the process and outcomes of serendipitous and unbounded digital innovation.

The remainder of the paper is structured as follows. The next section presents the literature that the paper draws on, and seeks to add to, highlighting a set of key theoretical constructs that inform the study. This is followed by a description of the research design. We then report and discuss our findings and their implications. Finally, we address the limitations of our study and suggest directions for future research.

2. Digital innovation
In this section, we first discuss how the distinct aspects of digital technology are conceptualized in IS research. Then we present a brief overview of relevant research that has explored implications of these distinct aspects for organizational innovation.

2.1 The distinct aspects of digital technology

From the late 1970s onwards, scholars (e.g. Barley, 1986; Bostrom and Heinen, 1977; Lee and Berente, 2012) have investigated how the introduction of novel digital artifacts affects resource allocation and the division of labor in organizations. Digital technology was initially procured by senior management and governed by technology experts (Weill, 2004). However, as digital technology evolved and organizational information processing needs increased, staff with an array of roles were delegated responsibility for developing, implementing, maintaining and controlling the digital artifacts owned by and used in organizations (Agarwal and Sambamurthy, 2002; Willcocks and Sykes, 2000). Still, it is well documented, e.g. by Robey *et al* (e.g. Boudreau and Robey, 2005; Markus and Robey, 2004), that digital technology has a strong propensity to generate unintended consequences.

Recent scholarship has suggested that unintended consequences may be particularly pervasive when moving beyond improvements of an organization's internal workings, toward digital product and service innovation (Nylén and Holmström, 2015). For example, Tumbas *et al.* (2018) found that rapid digitization confounds any straightforward organizational matching of roles, functions, units and staff. This is not surprising because, as noted by Yoo, Henfridsson and Lyytinen (2010), digital technologies have become easier to use and cheaper, enabling digital innovation to occur through local experimentation at various levels and units within an organization. Nevertheless, to understand when, how and why digital innovation processes emerge and evolve in organizational settings, there is a need to examine the distinct aspects of digital technology.

Yoo, Henfridsson and Lyytinen (2010) propose that understanding of the distinct aspects of digital technology can be improved by considering the layered modular architecture on which, they argue, all digital artifacts are based. This architecture comprises four loosely coupled layers. First, data homogenization enables the encoding of contents into bits. Standardized file formats allow such contents to be loosely coupled to the other layers. Second, the service layer comprises application functionality such as web-based services that allow users to create, edit and display digital contents. Third, in the network layer, data networks such as Wi-Fi and cellular networks enable the distribution of digital contents. Finally, following Yoo, Henfridsson and Lyytinen (2010), there are numerous kinds of devices through which users can consume digital contents.

A distinct aspect of digital artifacts highlighted in the digital innovation literature is their high level of malleability (Tiwana *et al.*, 2010; Yoo *et al.*, 2012), which is enabled by their editability and reprogrammability. Editability refers to the ease with which digital contents can be reorganized, added to, and deleted (Kallinikos *et al.*, 2013), while reprogrammability refers to the ability of services, networks and devices to "accept new sets of logic (instructions) to modify [their] behaviors and functions" (Yoo, 2010, p. 231). A further, paramount, distinction between digital and analog artifacts proposed by Yoo, Henfridsson and Lyytinen (2010) is that whereas analog artifacts are tightly coupled across the four layers, the user decides when and how to enact a particular combination of layers of a digital artifact. Inevitably, this has major implications for both processes and outcomes of digital innovation in organizational settings, as illustrated empirically by Nylén *et al.* (2014), for example, in a study of digital product innovation in an incumbent media firm.

2.2 Serendipitous and unbounded digital innovation

The increasingly distributed locus of control in digital technologies bestowed by the loosely coupled layered modular architecture described above has had profound effects. *Inter alia*, as noted by Garud *et al.* (2008), since the internet's inception, it has been almost impossible for digital service designers to predict how a specific digital artifact will be interpreted and enacted in practice by users. This raises obvious difficulties, but according to

Austin *et al.* (2012), the diffusion of control also greatly increases levels of *serendipity*, defined as "the art of making an unsought finding" (Van Andel, 1994, p. 631), in the ignition of digital innovation processes.

The importance of serendipity in scientific discovery is often highlighted, for example, by Shapiro (1986), and its roles have been studied in contexts of diverse disciplines, such as information science (Foster and Ford, 2003), marketing (Brown, 2005) and entrepreneurship (Dew, 2009; Engel *et al.*, 2017). In an entrepreneurship context, Dew (2009, p. 735) defines serendipity as "search leading to unintended discovery." In practical terms, Bonney *et al.* (2007) argue that organizations can increase the likelihood of generating serendipitous innovations through promoting flexibility and openness in their strategic innovation management efforts. However, Bouncken (2011, p. 596) argues that "empirical studies so far neglected to differentiate between planned and serendipitous innovation," defining the latter as unplanned, but appreciated, innovations related to technical, design or service elements.

According to Harty (2005, p. 512), in innovation research, it is generally assumed that innovations are bounded, i.e. "restricted within a single, coherent sphere of influence." Drawing on the distinction between bounded and unbounded innovation as "innovations that can be contained within an implementer's control and those that spill beyond this into potentially more contested domains" (p. 515), the cited author suggests that positioning innovations as unbounded allows innovation scholars to attend to their effects and consequences across multiple contexts and discourses as a wide range of actors and artifacts interact.

The notion and characteristics of unboundedness have also been addressed by IS scholars, particularly the specific nature of digital technology in the processes and outcomes of entrepreneurship (Nambisan, 2017) and innovation (Yoo, Lyytinen, Thummadi and Weiss, 2010). In terms of digital innovation processes and outcomes, rather than a matter of perspective taking, Yoo, Lyytinen, Thummadi and Weiss (2010) and Yoo *et al.* (2012) have argued that digital innovation is inherently more unbounded than non-digital innovation due to the higher levels of inherent malleability in digital artifacts.

Regarding the process of innovation, the unboundedness of digital innovation is effectively illustrated in a study by Boland *et al.* (2007) of a project in the architecture, engineering and construction industries where digital artifacts allowed rapid, heterogeneous and expansive innovation processes. Such processes increasingly span multiple organizational functions that operate under radically different logics (Henfridsson *et al.*, 2014; Lee and Berente, 2012), or stretch across multiple organizations (Argyres, 1999; Dougherty and Dunne, 2012), involving diverse actors across industry-level value chains (e.g. Malhotra *et al.*, 2001; Zhu *et al.*, 2006), or complementary actors in emerging digital business ecosystems (Pagani, 2013; Parker *et al.*, 2017).

In terms of innovation outcomes, the unbounded nature of digital innovation can be explained by the fluid boundaries of digital products that are enabled by temporary bindings across the four loosely coupled layers described by Yoo, Henfridsson and Lyytinen (2010): content, service, network and device. In order to deal with complexity resulting from unbounded innovation outcomes, as noted by Leonardi (2012), scholars theorizing digital artifacts tend to assume that while digital product boundaries are fluid, they can be temporarily fixed. For example, Skog *et al.* (2018) applied this approach in a study of how the Spotify platform scaled by strategically adjusting specific architectural configurations.

As outlined above, extant research has generated valuable insights into the nature of digital technology and its implications for organizational innovation. However, less is known about how serendipitous and unbounded digital innovations emerge and evolve as the layered modular architecture is enacted in practice, potentially affecting established modes of IT governance and organizations' overall digital directions.

3. Method

We conducted an interpretive case study to investigate the Church of Sweden's digital innovation efforts. We chose this approach for its suitability for collecting and analyzing rich and detailed context-sensitive data on organizational phenomena (Jones, 2014; Walsham, 1995), and its capacity to support the combination of multiple data sources (Creswell and Creswell, 2018).

3.1 Research design

We came into contact with the Church of Sweden through a collaborative project involving a university and several organizations (private and public) engaged in multiple industries. The project allowed us to collaborate actively with the church and gain access to collect the data analyzed in this study. At the project's launch, the church was revising and expanding its communications policy, making strenuous efforts to standardize its internal IT systems, and discussing the best approach for establishing a more interactive presence on the internet and social media services. We perceived this as an excellent opportunity to explore dynamics associated with digital innovation at an organizational level. In particular, we decided to trace in detail the design, deployment and governance of the PW, an interactive website for digital prayer launched in 2009.

3.2 Research context

The Church of Sweden was founded in 1536 and has around 6m members, making it one of the largest evangelical Lutheran church bodies in the world[2]. Swedish law stipulates that it must cover the entire country. All Swedish citizens and anyone living in Sweden (regardless of citizenship) is allowed to join as a member. The Church of Sweden divides the country into 1,355 parishes (statistics from 2017) in 13 dioceses. Church of Sweden's national headquarters are located in the city of Uppsala, and the church has around 24,000 employees in total, working at local (parish), regional (diocese) or national level.

Parish members and the general public's first point of contact is traditionally their local parish. Each parish is served by at least one pastor who is responsible for providing counseling to the members residing in his or her district. According to the Church of Sweden, many of its ceremonies (e.g. divine service, baptism, marriage and funerals) contain an aspect of pastoral counseling. However, counseling is also done through individual conversations between a member and a pastor or deacon, and can sometimes involve spiritual guidance. In the Church of Sweden, pastoral duties such as providing counseling to members should only be carried out at the parish and diocese levels. According to our respondents, if the act of praying is part of pastoral counseling, the prayer should be received by a pastor at a parish or by a bishop in a diocese. Consequently, staff at the headquarters in Uppsala traditionally do not engage in such duties[3].

A key mission for the Church of Sweden's parishes is to offer divine services, which are usually led by the pastor and open for the public to attend. They are held every Sunday, but also to various extents during other days of the week. In the Church of Sweden, key components of divine service include bible reading, prayer, a sermon usually held by the pastor, reading of a confession of faith, and singing of liturgy and hymns.

While the act of praying is an important component of divine services, the Church of Sweden members have many ways of praying in various contexts. Prayer is seen as a way of expressing one's needs for help and guidance, giving thanks and praise, and/or seeking forgiveness, by conversing with God aloud or through thoughts alone, in any context and time. Members often pray for someone who is sick or needs some kind of support, and they can also ask their pastor or deacon to pray for them, either in an individual meeting or as part of divine service. In many of Church of Sweden's churches, there is a so-called prayer-box (see Plate 1). Churchgoers write a prayer on a piece of paper and put it in the box. Subsequent practices vary, but generally the pastor, deacon or bishop empties the contents of the box into

Plate 1.
A prayer box on the
wall inside one of
Church of Sweden's
churches

a basket a few times a week, and then carries the basket to the altar during divine service. He or she then typically reads all prayers in silence, either during service, or in isolation.

Annual membership fees, collectively one of the church's main sources of income, are deducted as a levy based on each member's annual income. The Church of Sweden holds elections every four years, in which anyone who is at least 16 years old and a Church of Sweden member can vote for representatives of so-called nomination groups that are roughly equivalent to political parties. These representatives stand for election at the parish and diocese levels as well as national level (the general synod).

Historically, all newborns of parents who were members of the Church of Sweden were automatically affiliated. However, following changes in regulations in 1996, individuals are only affiliated if and when they are baptized in the Church of Sweden. Further regulatory changes occurred in 2000 when the Church of Sweden was formally separated from the Swedish state. As a consequence, the Church of Sweden became fully responsible for organizing its own elections. Both of these regulatory changes were associated with public debate concerning the scope of the church's role in society, and its overall relevance. Increasing numbers of Swedes started to terminate their memberships around the turn of the millenium.

Following these developments, the church sensed a need to revise the communication of its brand. In 2002, its centralized Communications Department at the headquarters in

Uppsala initiated creation of a new organization-wide communications strategy. In contrast to the resulting planned strategic changes emerging from that effort, we noted that the PW had come about in an apparently more serendipitous, perhaps even accidental manner (cf. Austin *et al.*, 2012), and it had far greater impact than the planned changes. Seeking to understand this impact, and how the PW came to be, this paper analyzes in detail the design, deployment and governance of the PW.

3.3 Data collection
We collected both primary and secondary data (see Table I). Our primary data sources are semi-structured interviews and meetings, most conducted at Church of Sweden's head offices. In 2011, the first author interviewed 12 respondents (10 Church of Sweden employees and two representatives of external consulting firms), all of whom were involved in digital innovation, but in three different ways (see Table I). Eight were engaged through increasing involvement in both internal and external digital communication efforts as part of their roles in the church's Communications Department. Two had a lengthy experience in developing and governing Church of Sweden's back-end IT systems. The other two were external consultants who had evaluated a number of Church of Sweden's digital efforts (the PW, most recently at the time). Before starting to collect data, we constructed an interview guide, which was continuously revised throughout the data collection process as interesting new issues emerged. The interviews varied between 45 and 90 min in duration. All respondents' names were anonymized to respect and protect privacy and integrity.

In addition to data from the primary data sources outlined above, we also collected three main forms of secondary data: policy documents (formal documents describing communications strategies, visual strategies, brand evolution, etc.), presentations (presentation slides), and reports by external consultants. In addition, we utilized publicly available information about the organization and, of course, the form and content of the PW itself. With regards to the latter, it is important to stress that the analysis presented in the paper is based on the first version of the PW that was launched in 2009. At the time of writing, the PW persists. However, its graphical appearance has evolved over the years and new features have been added.

3.4 Data analysis
Having discovered the PW as a particularly interesting project in the church's digitalization efforts, we wanted to understand how it came about and what associated organizational consequences it triggered. Applying a process-based approach (Pentland, 1999), we sought to unpack the temporal dynamics of the PW's emergence and evolution as a digital innovation. Given our adoption of an emergent perspective (Markus and Robey, 1988), unpacking these

Respondent/role	Organization/department
Department head 1	Communications department
Department head 2	Communications department
Deputy department head	Communications department
Communications officer 1	Communications department
Communications officer 2	Communications department
Communications officer 3	Communications department
Communications officer 4	Communications department
Communications officer 5	Communications department
Department head	Administrative IT
Department coordinator	Administrative IT
Communications consultant 1	External consultant
Communications consultant 2	External consultant

Table I.
Overview of respondents

dynamics involved identifying how actors within and outside of the Church of Sweden, as well as the organizational context in itself shaped the PW's evolution over time. Our data analysis efforts involved hermeneutic circles of interpretative reading of the data (Jones, 2014; Klein and Myers, 1999) and allowing the data to be reflected against theory (Weick, 1996). Though an iterative process, in what follows, we describe and discuss its key stages.

To begin tracing the design, deployment and governance of the PW, we first identified key design and managerial decisions and recorded the time point(s) that each respondent's account referred to, the respondent's role in the focal events and the digital artifact(s) that the respondent discussed. We next traced outcomes of these decisions, paying attention to the directionality of change (e.g. top-down, bottom-up, outside-in), and how changes and outcomes were related over time. Here, triangulation with our secondary data sources served as an important means to gain deeper insight into the temporal dynamics of the PW project. Following procedures and aims of process-based analysis of organizational phenomena (Langley, 1999; Pentland, 1999), we in this way gained insight into the antecedent conditions for digital innovation at the Church of Sweden, and were able to delineate design, deployment and governance as three distinct but interrelated stages of the PW as a digital innovation. Our exploration of the role and significance of decisions and their outcomes in each of these stages form the basis for the findings and discussion presented in the paper.

4. Findings
In this section, we present the findings from our case study of the Church of Sweden and the process of designing, deploying and governing the PW.

4.1 Background: the Church of Sweden and the internet
The internet was the first outward-facing digital technology that the Church of Sweden started experimenting with. Recalling how he explored the internet during the mid-1990s, the church's Head of Administrative IT describes how he considered the opportunities that the internet presented to the Church of Sweden, while researching its use by other churches in Sweden. Looking back, he reflects on how Church of Sweden's particular organizational form may have impaired its efforts to establish a web presence:

> Our geographical thinking is a major limitation. I realized that we were already lagging behind. The Catholic Church and the larger independent churches in Sweden offered, for example, online counseling early on. I think their more centralized organizational forms facilitated this. (Administrative IT Department Head)

He further attributes the Church of Sweden's fragmented web presence at the time to the traditional prohibition of staff at the central organizational level from conducting pastoral work. As the church gradually established a presence on the internet, it was in an organic and dispersed manner, as lead users in different parishes across the country designed and launched various forms of websites. While most parish websites had their own domain names, the Church of Sweden had a centrally governed domain linking to them. Communications Officer 2 reflects on this stage as follows:

> I think that our web development efforts have been quite poor, partly due to our motley and difficult way of organizing work: the relationship between the central level and parishes has been unclear when it comes to web development. (Communications Officer 2)

This tallies well with the description by the Deputy Head of the Communications Department of the church's initial approach to the web that prevailed throughout the early 2000s:

> We actually said, "Let a thousand flowers bloom". It was like, sure, someone has to look after our domain name, but let creativity flourish, and use the starting page more like a phonebook that

provides links to different websites created in the parishes in order to show the diversity we can offer. (Deputy Department Head, Communications Department)

In 2006, following the implementation of the new communications strategy, this approach changed. The Church of Sweden had two key aims for the new communications strategy: to articulate the organization's core values clearly and provide guidelines for the organization's communication with the public. After two years of internal negotiations, the new strategy was implemented in 2004. It was soon followed by a new visual identity, the Church of Sweden's first intranet and an internal communications policy, while the website was redesigned and repurposed.

As a consequence of the new strategy, in the Communications Department, more resources were allocated to managing the content on the central domain, and a fundamentally redesigned version of the central website was launched in the following year. A central web editorial team, placed in the Communications Department, proactively encouraged the parishes to redesign their websites according to new guidelines. However, the increased resources allocated to managing the main Church of Sweden website were primarily used to ensure the quality of editorial contents rather than facilitate new forms of interaction:

When we started the web editorial team in 2006, it was very much based on a news publishing mindset. We had a vibrant meeting each morning: "What's in the pipeline? What are we doing today?" And then we set about producing news and feature articles. The starting page had loads of editorial content. It was fun, but you have to realize that the Church of Sweden is not a news agency. (Communications Officer 4)

Despite the number of strategic communications efforts launched, the long tradition preventing central organizational level pastoral work (which showed little sign of imminent change) remained a major obstacle. However, the lack of digital interactions between the church and its members was about to be addressed, but it would not be driven by either the IT Department or the Communications Department.

4.2 Designing a campaign concept

The Church of Sweden's two previous church election campaigns (in 2001 and 2005) had been managed by leading Swedish advertising agencies. In early 2008, a project team comprising members of the Communications Department started planning a marketing campaign intended to raise awareness about the following year's church election. The team had a budget ten million Swedish kronor to spend on the campaign. Based on their experience of the two previous elections, the Communications Department knew in advance the types of resources they would need for such a campaign, and roughly how it would play out. As a first project milestone, the team was expected to deliver a suggestion for a conceptual basis for the campaign. Communications Officer 1 recalls how they finally decided that historic church buildings would be a focal concept:

A survey showed that the Swedish public, regardless of whether they are Christian or not, members or non-members, tend to value historic church buildings. So, we thought, "Let's leverage this as a way of catching public attention: sort of, Here, look at what we manage!" (Communications Officer 1)

The project team agreed that the campaign should highlight the roles and values associated with these buildings. Based on their previous experience, they knew that secular Swedish citizens are likely to be provoked by biblical themes, but a recent survey had shown that a large proportion of Swedish citizens appreciated historic church buildings, and thought that preserving them was important. Having considered the survey results, the project team argued that centering the concept on historic church buildings would focus on a "neutral" dimension of their operations, which could help

maximize the campaign's effects. The project team's main focus at this point lay in planning the campaign's deployment and deciding how to allocate the budget to advertising space in different media channels. However, they also discussed the possibility of exploiting the concept in digital channels by providing interactive maps of some kind, guiding users to the historic church buildings:

> Maybe it's just me, I'm a bit of a cultural heritage nerd. But I'd like to have a kind of digital church-map of Sweden […]. What churches are there in my current area? It would be great to be able to find these buildings on a map, and be able to click and get some basic information: "Oh, it was built in 1842 and can accommodate 300 people", and then it should be possible to click again to get to the website of the particular parish. I think that would be really great. (Communications Officer 1)

After a period of negotiations, a leading Swedish advertising agency was contracted to handle the campaign. However, the agency reacted skeptically to the project team's ideas about centering the campaign around historical church buildings, arguing that rather than seeking a neutral ground, the Church of Sweden should stand up for and highlight the values of its central practices. Therefore, they suggested using prayer as a focal concept instead. The Deputy Head of the Communications Department recalls:

> I think we were all caught a bit off guard by the advertising agency's suggestion. We were thinking: historic church buildings, backlit; print ads. Instead the agency started showing us photos of prayer boxes, saying, "We went to a bunch of churches, and we found these boxes". We were like, "Sure, they've been around for hundreds of years", and then they said "Yeah, we want to move them to the web." (Deputy Department Head, Communications Department)

More specifically, the agency presented a prototype for an interactive campaign website that they called the PW. Figure 1 shows a screenshot of the version of the website that was launched when the campaign started.
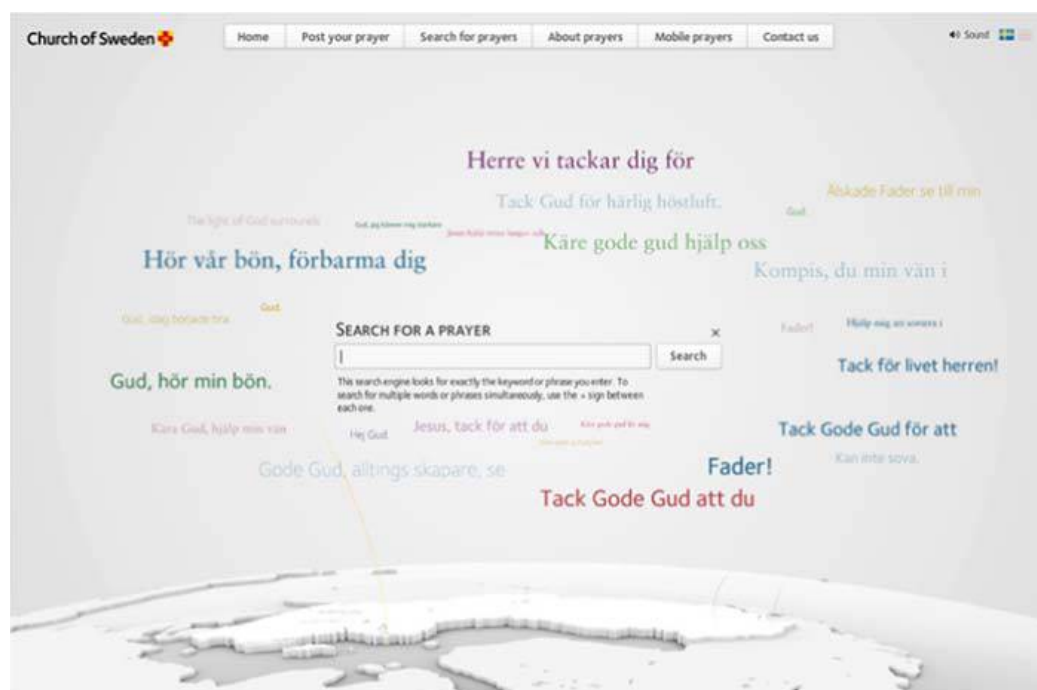
Figure 1.
The Prayer Web:
screenshot of the
version of the website
that was launched
when the campaign
started

Note: Examples of prayers (translated from Swedish) include: "Lord, in your mercy, hear our prayer," "Dear God, help us" and "Thank you Lord for the gift of life"

The version of the PW submitted by the agency would allow users to type a prayer in a free-text web-form. After clicking a submit-button, the prayer would be immediately displayed in an animation together with other recently posted prayers. All these prayers recently posted would continuously move from the bottom of the page, where an illustration of the globe would be placed, upwards to the top of the page, which was meant to represent heaven.

In their pitch, the agency also explained how additional functionalities would allow prayers to be shared on various social media services. The project team quickly took a liking to the concept, particularly its co-creative dimension. The Deputy Head of the Communications Department recalls how this way of leveraging user-generated contents gave her a feeling of relief, for two main reasons. First, the project team did not have to formulate a text describing the organization's core, for which the Church of Sweden would be the official sender. This was gratifying because such processes, most recently when creating the new communications strategy, had always involved delicate consultation within the organization to reach agreement on the exact wording. Second, the team perceived the concept as resonating well with one of the church's key functions: hosting ceremonies such as baptisms, weddings and funerals that are co-created by its members.

However, the team also identified potential risks associated with the concept, related to internal Church of Sweden politics. They argued that parish representatives could interpret the concept as a device to support central organizational level pastoral work, and thus feel sidelined. The project team expressed these concerns as they presented the concept to their CIO. However, the CIO not only embraced the concept, but also surprised the team by arguing that their concerns were non-issues:

> In terms of us actually getting a go-ahead for the Prayer Web concept, the guy that was CIO at the time played a key role. He had started out his career as a priest and had no issues with linking the digital concept to the physical boxes in the churches, arguing, "This is just another way of praying". The CIO said that as long as the prayers are submitted to and received at a cathedral, which in fact is a pastoral level, it's fine. (Deputy Head, Communications Department)

To enable this, the CIO first asked the project team to go back to the agency and ask them to add a feature that would allow users to select the diocese that would receive their prayer, and back-end functionality for the automatic distribution of the prayer to the selected diocese. The CIO argued that with this modification any pastoral work related to the PW would in fact be carried out at a pastoral level. As a next step, he leveraged his internal ties as he set out to obtain approval for the concept from senior management:

> The CIO had a lot of strong ties in the organization, established through a long career of senior roles […]. Not only did he endorse the concept, he wrote personal letters to the chaplains at all the cathedrals, and had the ability to present the concept to the church board in a balanced manner. (Deputy Head, Communications Department)

Final approval and go-ahead for implementing the concept were obtained after the CIO had presented it to the archbishop and the church council.

4.3 Deploying and governing the PW

When the PW was launched in August 2009, the Communications Department held a press conference to present the campaign. Media interest heavily exceeded the department's expectations, and its Head gave more than 100 interviews during the following weeks. Traffic to the PW also greatly exceeded the department's expectations, but this surge was accompanied by new challenges:

> The Prayer Web was supposed to be self-sanitizing, a bit like Wikipedia. If someone posted something objectionable, it was supposed to be removed by other visitors using the "report-function". But, of course, that didn't work, as we quickly realized. (Communications Officer 1)

The site was subjected to severe spamming attacks. For example, a spambot entered lots of sexually explicit terms, at a pace that no self-sanitizing mechanisms could reasonably match. To deal with this problem, two communications officers were assigned to read all new prayers posted and manually approve those they deemed suitable for publication. However, the Communications Department soon realized that this solution was unfeasible, and decided to consult the agency. To resolve the problem, the agency brought in a number of temporary workers who moderated the site, in shifts, 24/7.

Overall, the PW, as such, was well received internally. However, according to Communications Consultant 1, the ways in which the project was managed became subject to significant criticism:

> The Prayer Web was not very well anchored in the organization. Particularly not with people in the parishes, the ones who actually meet the voters. In fact, the Communications Department was very secretive about the campaign. When local communications officers asked for information and materials, the answer was basically "It will be something really exciting, a surprise!" While the Communications Department did not want any leaked information to ruin their well-orchestrated launch, a consequence was that only a limited number of parishes linked to The Prayer Web from their own websites. Also, I would argue that if the Communications Department had involved members throughout the organization earlier on, there would have been lots of cheaper resources to utilize instead of bringing people in on temporary contracts to deal with the spamming attacks and the enormous workload they caused. (Communications Consultant 1)

In contrast, other respondents argued that the Communications Department's approach to managing the project was essential for launching such a novel concept. For example, the Administrative IT Department Coordinator commented that:

> I can see why some organizational members were upset and argued that the Communications Department and the Head Office bulldozed the rest of the organization when implementing the Prayer Web. Then again, we really need to ask ourselves if this type of concept could have the same massive impact if local adaptations and multiple parallel ideas were allowed […] I think the Prayer Web reflects our current member base, as increasing numbers primarily view themselves as members of the Church of Sweden as a focal unit rather than a local parish. (Department Coordinator, Administrative IT)

The Administrative IT Department Head also expressed concern regarding the Church of Sweden's geographical organizational form in relation to its digital efforts:

> I think it is a question of this geographical concept becoming increasingly difficult to retain. Consequently, it will become increasingly accepted that we take initiatives at the central level. (Department Head, Administrative IT)

Communications Officer 2, who was not part of the project team, reflected on the conflicting views of the PW as follows:

> It's the form that's different, but it's unexpected and nontraditional enough for everyone to react to it, not all of them positively, but a majority. But […] and I want to emphasize this point, this is the kind of stuff that we need, and we have to accept that if we get a lot of praise for these types of efforts we will also get a lot of crap. But we have to take it. (Communications Officer 2)

As the Church of Sweden's project team was wrapping up the church election campaign project, and the agency's work was done, new prayers were constantly posted. The project team started realizing that rather than simply designing and implementing another church election campaign, they had effectively digitalized the act of prayer. However, the additional resources allocated to moderating the site were only granted for the remainder of the campaign period. Overall, there were no clear answers to questions regarding how the PW should be governed and further developed.

Further verification of the innovative, and welcomed, aspects of the PW was provided by Lutheran churches from around the world getting in touch and giving positive feedback about the site. More specifically, the Church of Finland wanted to collaborate on creating a Finnish version of the PW. The Head of Communications handled these negotiations, which involved sharing knowledge as the Church of Sweden was interested in adapting the Church of Finland's successful confirmation site. However, when she asked the advertising agency for the source code, a major obstacle was encountered. The Deputy Head of the Communications Department explains:

> Regrettably, we neither own the copyright, nor control the source code. In fact, we are billed for consulting hours whenever we want to do anything with the Prayer Web, even just revising some text-based content. This is an absurd situation and utterly regrettable. We simply cannot repeat this sort of mistake in future projects. (Deputy Department Head, Communications Department)

To keep the site up and running, it was decided to assign responsibility for moderation permanently to the Communications Department. Over time, daily routines developed for this work:

> There's no denying that the editors in the Communications Department have a new task. It affects my workload as well, particularly when journalists or other actors ask for reports or outputs from the Prayer Web. Since I was the one who got a walkthrough of this intricate admin system, it usually lands on my desk. But due to the broad adoption of the Prayer Web, we cannot go back. More likely it is only the first part of [activities] in that area. I think we'll expand in the digital realm, with additional interactive services going forward. (Communications Officer 1)

Many of our respondents expressed various ideas about additional key practices in the Church of Sweden that could be digitalized, and how this could be done. However, the department (and organizational level) that should champion digital innovation efforts and the roles of external actors in that process were still unclear.

5. Discussion
In the following sections, we discuss our findings in relation to the theoretical foundations of our study, while articulating a number of contributions to research and practice.

5.1 Malleable digital artifacts and unbounded innovation
Designing, deploying and governing the PW took the Church of Sweden into a type of innovation process that fundamentally departed from the logic that had characterized its previous church election marketing campaigns. These were ran in collaboration with various advertising agencies, mainly involving print-based materials and broadcast media advertising. Conceptual writings (e.g. Kallinikos *et al.*, 2013; Tiwana *et al.*, 2010; Yoo *et al.*, 2012; Yoo, Henfridsson and Lyytinen, 2010) have suggested that increased levels malleability is a distinct aspect of digital artifacts and highlighted it as a key issue to address in digital innovation research. Our findings confirm this claim and reveal some important practical consequences. Designing and deploying the PW involved effectively digitizing prayers as textual content that could be created and edited by users with relative ease. However, as illustrated by our findings, the possibility for users to create, edit, store, distribute and display a prayer in novel ways initiated unintended new behaviors and governance requirements. The church's previous, non-digital, church election campaigns had involved managing temporally bounded projects. In contrast, our findings show that the malleability of digital contents and services blurred any definable beginnings and ends for the PW, empirically illustrating how unbounded digital innovation evolved in practice. Leveraging reprogrammability by asking for the addition of features allowing prayers to be

submitted to the various dioceses enabled the CIO to shape the malleable PW so that it did not involve pastoral work at a central level.

Past research on the unintended consequences of digital technology (e.g. Boudreau and Robey, 2005; Robey and Holmström, 2001) has mainly focused on organizational use of internal IT systems. Our study expands the discourse on unintended consequences of digital technology by highlighting those that emerge as end-users and consumers of an organization's digital services enact them in practice, *inter alia*, by exploiting the unbounded nature of digital innovation. For example, our findings show that before the campaign ended, the rapid and wide appropriation of the PW generated additional tasks for the Communications Department, which required adjustments to resource allocation. They also illuminate effects on governance, an understudied aspect of the relationship between novel digital artifacts and resource allocation in organizations. More specifically, to achieve sustainable governance of the PW, the Church of Sweden changed the division of labor by assigning daily moderation of the site to the Communication Department's editors.

The changed division of labor in the Communication Department represented a significant shift for the Church of Sweden. The Communications Department's previous web-based efforts had mainly involved production of traditional editorial content for one-way communications. In stark contrast, members and the general public were producing their own contents, and communicating with each other, with and through their prayers. Meanwhile, the editors' main task became administration of the user-generated contents. Over time, the version of the PW that was launched came to be seen as what Leonardi (2012) calls a temporary fixation as the service layer could be reprogrammed relatively easily to accommodate additional ways of distributing and consuming prayer. In turn, the loose coupling of the service and contents layers, highlighted by Yoo, Henfridsson and Lyytinen (2010) as a distinct feature of digital artifacts, opened possibilities for prayers being represented not only by pure text but also other types of content in the near future.

5.2 Balancing control, serendipity and co-creation

The initial PW concept emerged in a highly serendipitous manner. The project team did not think it was engaging in a digital innovation effort when it started collaborating with the advertising agency. Rather, the team's focus lay in commissioning the creation of a print-based marketing campaign. Furthermore, as illustrated by our findings, the Communications Department's previous digital efforts could be classified as traditional editorial work, involving one-way communications with a broad audience. Therefore, it is not surprising that the project teams' initial idea concerning historical church buildings was geared toward informing the public about a topic. Unexpectedly, the advertising agency instead initiated and drove a digital innovation effort that involved digitalization of one of the Church of Sweden's core practices, the act of prayer and the church relinquished enough control for them to do so. In this manner, the PW became an unsought, but appreciated and thus serendipitous discovery, as defined by scholars such as Van Andel (1994), Dew (2009), and Bouncken (2011) of serendipity in innovation, entrepreneurship and science.

In accordance with contemporary writings on digital service design and innovation (e.g. Diller *et al.*, 2005; Hassenzahl and Tractinsky, 2006), rather than exclusively seeking to satisfy users' information needs, the PW concept suggested by the advertising agency sought to induce engagement through a meaningful user experience. In this respect, our findings show that the project team was attracted to the co-creative aspects of the PW concept, which resonated well with the team's perception of the Church of Sweden as a platform for co-creation. Following this line of reasoning, the communications team also wanted the PW to be self-sanitizing in a crowd-based manner. However, the study reveals how the Communications Department clearly adopted a closed approach to sharing

information internally during the PW's design and launch. One respondent stated that one reason for this approach was the risk of the concept being leaked to the media in advance. With the benefit of hindsight, it seems that the central Communications Department wanted to exercise control of the PW by promoting co-creation externally, but not internally.

Implementation of the new communications strategy required an attempt to move beyond the church's *ad hoc*, "let a thousand flowers bloom," approach described by our respondents. Tensions between distributed and centralized organizational units during such a shift are not surprising, but a notable feature of this case is that the initiative to standardize the Church of Sweden's web-based external communications coincided with significantly loosened couplings in the layered modular architecture by the emergence of smartphones and social media. While scholars such as Pagani (2013) and Yoo, Henfridsson and Lyytinen (2010) have highlighted the increasingly distributed locus of control in digital artifacts it is notable that the church's attempted shift from "no control" to "all control" happened at such a point in time. In this respect, the paper contributes by revealing some of the organizational implications of the layered modular architecture. It enables co-creation by "external" users, which is an increasingly attractive feature for organizations to exploit, while at the same time increasing the difficulty for particular units or people with particular roles to justify any lack of internal transparency and co-creation in an organizational digital innovation process. At least, any deliberate attempts to shroud digital innovation projects become more obvious.

5.3 Practical implications

In addition to the theoretical implications, the insights generated in this study may provide practical foundations for guidelines that we believe could support organizations' digital innovation efforts. Specifically, our study shows how the layered modular architecture of digital artifacts can enable traditional suppliers, such as advertising agencies, to drive digital innovation in a focal organization in ways that can disrupt its established ways of doing business. Notably, the administrative IT unit, which had historically championed IT projects at the Church of Sweden's central organizational level, was not involved at all in the PW. Instead, in claiming the ownership of the source code, the advertising agency exercised control of the PW's service layer. For the Church of Sweden, a non-profit organization that had spent ten million Swedish kronor on a marketing campaign, the inability to share the PW freely with its international counterparts was a major blow.

While beyond the scope of our study, it seems reasonable to speculate that the advertising agency was also undergoing changes associated with digitalization, which could at least partly explain the lack of agreement, in advance, regarding ownership of the source code and the church's later dissatisfaction with its lack of control. Still, we argue that organizations need to cultivate preparation for digital innovation efforts initiated by suppliers and manage them in such a way that mutual value creation occurs, rather than unwarranted disruptive changes.

Against this backdrop, we suggest that when undertaking digital innovation efforts, organizations need to consider how digital initiatives that originate in a particular organizational unit or business partner can be sustainably integrated with their digital processes and products, and how the initiatives may affect their overall long-term digital direction. This is, of course, massively complicated by the unpredictability of possible consequences, but an awareness that changes may be swift and unexpected is required, as is the capacity to react rapidly and flexibly to such changes.

6. Conclusions

This paper shows how serendipitous and unbounded digital innovation can emerge and evolve in a traditional organization, then highlights and discusses the nature of the unintended consequences that such innovation may engender. It empirically illustrates the

processes involved in a particular innovation (the Church of Sweden's PW), and how its open-ended nature was manifested as soon as users enacted it in practice. In several industries, physical spaces are still the main arenas for interaction with, and between, individual users of organizations' services. When faced with digitalization, organizations in such industries must consider whether they should continue organizing in a geographically based form. However, they also need to consider how the meaning of, in this case, a church can be deconstructed and reshaped to provide value for its users in the digital age. This paper shows how the Church of Sweden embarked on a rediscovery of the essence of its function in peoples' lives, albeit serendipitously, by focusing on prayer as an enduring element.

We investigated how serendipitous and unbounded digital innovation emerges and evolves in organizational settings, and its implications for an organization's overall digital direction. To do so, we drew upon data collected through a case study of the Church of Sweden. Following Walsham (1995), while our rich insights are analytically generalizable to theories of digital innovation, they are based on a single case study. Thus, our study opens up avenues for further research. For example, future studies could investigate the effects on core business processes when traditional suppliers and partners engage in digital efforts, and the roles of the layered modular architecture in the resulting changes. In particular, we encourage further exploration of organizational issues of control related to digital innovation in such constellations. We studied how a single novel web-based digital artifact was designed, deployed and governed. However, future studies should investigate not only other types of digital artifacts, but also the relationships between multiple unbounded digital innovations in an organization over time.

Notes

1. The Prayer Web was awarded the Epica d'Or award for best European interactive campaign and a diploma at the Swedish Guldägget awards.

2. Lutheranism is one of the major branches of protestantism. It is the most common type of Christianity practiced in the Nordic countries and several other countries or regions. There are more than 70m members of Lutheran churches globally (Wikipedia, 2018).

3. Our respondents use the term "pastoral work" when referring to the carrying out of such duties, while referring to the parish and diocese levels as "pastoral levels." We therefore use these terms in the remainder of the paper.

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