Digital Transformation in Healthcare: Enabling Employee Co-Creation through Web 2.0

Completed Research

Niels Frederik Garmann-Johansen
Agderforskning and University of Agder
niels.f.garmann-johansen@uia.no

Migle Helmersen
Agderforskning
migle.helmersen@agderforskning.no

Tom Roar Eikebrokk
University of Agder
Tom.eikebrokk@uia.no

Abstract

This article argues that employee co-creation, enabled by web 2.0 technologies, can contribute to successful digital transformation of healthcare services. The question of how to enable effective employee co-creation is under-researched (Lenka et al. 2017; Galvagno and Dalli 2014). Employee participation in co-creation is stated as an important enabler of digitalization and service improvements (Grönroos and Voima 2012). The Nordic Model for employee participation has proven successful for enhancing working life effectiveness and innovation (Nielsen et al. 2012). This article propose that these principles of employee participation can be further enhanced by using web 2.0 technologies for Enterprise Social Networks. The article concludes with a discussion of consequences for the digital transformation of healthcare services as well as implications for research and practice.

Keywords

Digital transformation, Employee, Healthcare, Co-creation, The Nordic Model, Web 2.0, Enterprise Social Networks, Enterprise Social Media

Introduction

The co-creation literature (Grönroos and Voima 2013; Lenka et al. 2017) has shown how the involvement of customers and partners in all stages of innovation and process transformation can add value to new products and services. But there is a gap in this literature regarding the role of employees in innovation and process transformation in large service-organizations like e.g. healthcare-organizations. This article will show how the process of digital transformation in healthcare services can benefit from employee co-creation, and how this can be achieved, using web 2.0 technologies. The propositions put forward here may contribute to both the digital co-creation model, and to healthcare innovation management practice. Healthcare technology and service innovations offer possibilities for a lower cost healthcare system that can meet new and increased demand for services. These changes can be referred to as servitization transformation; service innovation combining products (digital systems) and services for creating new value for end-users (Lenka et al. 2017). This literature put an emphasis on the need for interaction with both customers and providers (op. cit.). Customers are mobilized not only to express their views on existing services but also to take part in co-creating the design and implementation of new services. In the healthcare sector, this process of co-creation is believed to be an important enabler of service innovations as a response to the increased demand for healthcare services (Beaumont et al. 2014).

Despite this recognition of the need for co-creation, there is a general lack of research that can guide the utilization of the concept in healthcare. The gap is characterized by scarce knowledge about the factors that enable co-creation (Grönroos and Voima 2012; Frow et al. 2015). Few studies describe the role of employees in co-creation (Galvagno and Dalli 2014). This gap is of particularly importance in the research on digital transformation of healthcare, due to the important source of knowledge that employees represent.
Employees have first-hand knowledge of service demands, they know the process of service production from provider to client, and they have in-depth knowledge of the organization where new technologies and redesigned service production processes will be implemented. What is more, employees know their colleagues and can influence their behavior and acceptance of technology (Taylor and Todd 1995) and related changes in work processes (Eikebrokk et al. 2010). By including and stimulating employees in the process of co-creation, the organization can stimulate and utilize a new driving force in innovations both horizontally and vertically. Horizontally, this knowledge is utilized in the development of service innovations where employees know the service production processes from providers to customers and clients. Vertically, employees’ knowledge and influence are utilized when innovations are implemented in the organization as both a technical- and a social system. This vertical dimension, the co-creation between top management and all employees in the healthcare provider organization, adds a new source of value creation to the co-creation model (Garmann-Johnsen et al. 2018).

In healthcare organizations, nurses and other employees who are in direct touch with the patients, e.g. in homecare, accumulate detailed knowledge and experience about clinical practices. This detailed knowledge and experience is arguably of critical significance as input to the process of digitally transforming the same practices or creating totally new clinical practices. Likewise, employees can be instrumental in the redesign and implementation of new services. Employees can point out critical errors in the service design, seen from a caregiver to patient-relation point of view, that can overthrow otherwise beneficial changes. Hence, the overall aim of this paper is to close this gap in the literature by exploring how employees can be involved in co-creating new healthcare services. Specific objectives are to extend co-creation literature to healthcare; defining employees role in digital transformation and co-creation in healthcare, and to show how web 2.0 technologies can enable such employee co-creation in practice.

This article is organized as follows. The next section will present findings from the literature review on how employees can be involved in co-creation. Then, example-concepts found in literature is used to show how new technology can enable and ease the participation of employees. Finally, we conclude by proposing a framework for facilitating employee involvement that can stimulate co-creation and digital transformation of healthcare services.

**Literature Review**

This article base its proposition on the guiding principles of the Nordic Model (Nielsen et al. 2012), and web 2.0 technologies, enterprise social media, used in innovation management in organizations (Wehner et al. 2017). The so called Nordic model describes a working life arrangement that not only allows, but in fact requires by law, that employers and employees are cooperating on a regular basis. This article’s authors find that the importance of employees as a resource in the development of innovations and in the implementation of innovations, are by and large ignored fields in eHealth innovation research. The authors agree with Ramaswamy and Gouillart (2010) in that by giving all stakeholders more attention and influence in the development of a "co-creative enterprise", it is likely insight, revenue and profit will increase. However, how this can be done in an appropriate and feasible manner is not explained in the literature. To describe the organizational significance of employee involvement in co-creation, we will refer to Scandinavian literature from different areas including system development, leadership and innovation, especially the article “Capabilities for Innovation: The Nordic Model and Employee Participation” by Nielsen et al (2012). The Nordic Model consists of: “First, a comprehensive collective agreements system with coordinated bargaining between the partners at multiple levels; next, employee representation, participation, and cooperation on decisions at various levels; and third, a surveillance system for improving the work environment (Nielsen et al. 2012)”.

This opens for high employee involvement and describes a potential mechanism for enabling co-creation in the context of service innovations. In this model, employees are important for innovations, based on their education, experience and contacts upstream and downstream of the value chain. They also know their own organization with its culture, leadership, processes and technology. This model applied to the context of service innovation in healthcare will point at mechanisms that enable employees to contribute both to proposals for new service requirements. Employees can also give input on how these innovations can best be implemented in their own enterprise. Innovative projects will have extra strength when employees knowledge of service innovation (horizontally) is combined with their experience with service implementation (vertically), and when the goal and rationale of the project is effectively communicated by management (Garmann-Johnsen et al. 2018).

Although healthcare consists of highly specialized and complex work tasks and patient pathways, and is highly labor intensive, little has been done to research co-creation in healthcare in combination with
employee involvement. In countries like Norway, primary healthcare and homecare is the responsibility of local government on a municipal level. Employees are often involved in testing new types of welfare technology. But systematic employee involvement in problem analysis and -definition and deciding criteria for accepting or rejecting new technology pushes, seems absent in the eHealth (healthcare technology) literature. Perhaps are management hampered by the practical difficulties of involving all interested parties in large distributed service organizations?

To the rescue comes web 2.0, the use of social media within enterprises, also called Enterprise Social Media (ESM). ESM can facilitate an Enterprise Social Network (ESN), ESN being perhaps the most widely used term in information systems research, in this area (Wehner et al. 2017). This article seeks to inform leaders and practitioners, as well as research, on the rationale for how enterprises can leapfrog into involving and engaging employees on an enterprise-wide platform, using emergent ESM platforms like Workplace (by Facebook), Yammer, and likewise technologies. These technologies offer new opportunities, but also new challenges for eliciting employees proposals for new service requirements within eHealth, and inputs as to how these innovations can best be implemented in their own enterprise.

The problem formulation thus becomes:

1. How can the co-creation literature be extended to include employee involvement, in the context of healthcare?
2. How can web 2.0 technologies enable such employee co-creation in practice?

Oldham and Da Silva (2015) argue that three conditions are necessary if employees are to generate creative ideas:

- Access and exposure to new and diverse information
- Full engagement in the work role
- The experience of socioemotional or instrumental support.

Oldham and Da Silva briefly mention social networking platforms, alongside other types of information and communication systems; electronic communication tools (e.g. email, instant messaging, voice mail, faxing, and paging), electronic conferencing tools (e.g. data conferencing, voice conferencing, videoconferencing, discussion forums, and chat systems), and collaborative work management tools (e.g. file sharing, group calendars, events and polls).

To shed light on how Web 2.0 platforms can involve and positively engage employees in eHealth digital transformation processes, the authors performed a literature review on the University of Agder’s electronic library, February 2018. This library is connected to, and includes, the major search engines like e.g. Ebscohost, Scopus and Elsevier. The search criteria’s chosen where simply “Workplace”, “Facebook” and “Yammer”, as these names are some of the most known social media-platforms for use within enterprises. The search was modified to peer-reviewed articles. The search gave 69 hits: screening these, the authors found 24 articles that could shed light on the research problem. In the screening we included articles from other sectors than healthcare, as we perceived that other industries use of enterprise web 2.0 may also inform the eHealth area of concern. The articles that were excluded from the research, revolved around the use of social media platforms within the educational sector, something we perceived to be a special case, outside our scope. Most of the found, and deemed relevant articles are relatively recent, i.e. from the last three years, showing that this is an area of growing interest to social science and information systems researchers.

We used Webster and Watsons (2002) method for conceptualizing and grouping the finds. The results of the literature review are presented in the next section.

**Results with Found Concepts**

The literature review gave us insights within the following concepts and conditional factors:

- Customer satisfaction
- ESN adoption
- Gamification
- Human resource development
- Innovation ecosystems and urban planning
- IT governance
- Knowledge sharing
• Management
• Online design processes
• Organizational learning
• Risk factors
• Avenues for future research

Below are these finds with references to the (group of) reviewed articles that offered new insights into these concepts.

**Customer satisfaction**

Pintos study (2015) shows that customers’ (patients’) positive attitude toward social media can be an effective method to enhance PCM (patient-centered medicine) and, ultimately, satisfaction.

**ESN adoption**

Chin et al. (2015) illustrate that the likelihood of ESN use is significantly influenced by technological, organizational, social and individual factors. Sharma and Bhatnagar (2016) state that it takes a lot more than mere investing in social media work tools; organizations need to build a “culture of openness and transparency”, where employees not only “feel free” to share ideas and opinions but also “feel happy and involved” with high-touch points in their entire employment experience. Doing this, ESN can be utilized to build social capital (trust) within a company (King and Lee 2016). In Razmerita et al.’s study (Razmerita et al. 2016) drivers for user adaptation are identified as:

- Environment of helping others
- Monetary rewards
- Management support
- Management encourages and motivates knowledge sharing behavior, and
- Knowledge sharing is recognized

Barriers to adaptation of ESN-ESM are:

- (The perceived risks of) Change of behavior (from hoarding information to sharing information)
- Lack of trust
- Lack of time

**Gamification**

The Li et al. article (2011) identifies gamification as an important driver for making ESN (and ESM) work. They exhibit four case-studies; Google, Apple, Procter and Gamble, and Ace Hardware. Ace hardware uses the network to solve problems, and exchange ideas and experiences. Google allows employees to spend 20% of their time on their own-defined projects. These ideas are voted for on an “ideation white board”. On the Google Intranet; “MOMA” all information is compiled in to a searchable database, available to all employees. Procter and Gamble includes the employees of partners in their extended ESN, for ideas to new product-lines. Apple has gone further, and has built a whole ecosystem for revenue generating services (Li et al. 2011).

Gilbert et al. (2015) advocate establishing an idea-capture mechanism, using rewards and “Design Thinking” (Stickdorn et al. 2018) competitions. Although monetary mechanisms and career advancement are important, the “power of fame and franchising should not be underestimated”. Gamification can also be used to enhance learning from enterprise training (Cardador et al. 2017).

**Human resource development**

Allowing employees to “brand themselves” will create enterprise winners in the emerging economic environment for the information age, using social learning or e-learning tools (Cascio 2014).
Innovation ecosystems and urban planning

The innovation eco-system thinking can be extended to whole cities with their residents and businesses. This could be of interest also within an eHealth innovation context, as local government, in charge of primary healthcare, as in Norway, also has the double goal of stimulating business development, alongside solving healthcare needs. San Francisco city founded the ‘tech chamber of commerce’ sfcti.org. “An important stated goal of (sfcti.org) was to encourage member firms to make pro-bono interventions in the city’s urban infrastructures. The first public statement consisted of a short video circulated via social media (McNeill 2016).”

IT governance

Alimam et al. (2017) highlight the need to integrate ESM with the enterprise’s existing mechanisms for IT governance and architecture. As the enterprise wants to promote desirable behaviors like collaboration and innovation, integration of these behaviors into an enterprise wide framework seems necessary.

Knowledge sharing

Knowledge sharing is an important asset to an organization. Especially in distributed organizations, e.g., multinationals, the expatriates rely on ESM for teamwork (Omar et al. 2016). Social mechanism of a more light nature, sharing humor and other kinds of relief, may encourage use of ESM (Gibbs et al. 2015), and thus also for more directly productive work. Many organizations have social responsibility goals and strive to be able to hire and include employee-groups with special needs (Vohra et al. 2015).

Management

ESM needs to be managed, but there are no clear rules as to the level of management needed, it depends on the circumstances, according to (Guinan et al. 2014). The article advises three approaches; top-down, from middle management (middle out), and bottom up, depending on the context. In a context with many silos (relevant to e.g. a healthcare setting and its many stakeholder-groups), middle out may perhaps prevail as the best approach. Niell and Moody (2015) identified nine strategic roles and the associated responsibilities (involved in social media management) including policy maker, internal collaborator, technology tester, communications organizer, issues manager, relationship analyzer, master of metrics, policing, and employee recruiter. e-Leadership may be a lot different from ordinary hierarchical management. Avolio et al. (2014) produce a model that shows that the transition management will go through as enterprises become increasingly digital. In general, technologies tend to “flatten out” leadership, and decision-making. There will be a need for leadership development. ESN can be used to enhance such development (Cullen-Lester et al. 2017). Other studies (Korzynski 2013) show that online social networks are more useful for participative and consultative leadership style on social networking platforms than for directive leadership style (op. cit.). According to Korzynski (2013) the more employees are empowered, the more benefits can be realized from ESN-ESM.

Online design processes

One article presents a solution for implementing social media functions into a software development project. (Alvertis et al. 2016) reports from an EU-funded project, CloudTeams (Prinz 2018). The solution also entails connectors to third party services, and reward end-users for their participation in “campaigns”.

Organizational learning

The organizational learning aspect of ESN-ESM is disseminated in several articles found in the review. Increased emphasis on ESM may represent a new stress-factor for many employees. So the organizations should facilitate programs to improve employees digital literacy (van Zoonen et al. 2017). Increased intensity of collaboration in many environments, like e.g. press-work, creates the need for more fine-grained tracing of everyday activities (Pigg 2014).
Using quantitative survey-evaluation methods, Qi and Chau (2018) have tested the positive consequences of ESN-site (ESNS) usage, and confirm that “ESNS usage is an important antecedent of knowledge creation and knowledge sharing. ESNS usage is also an important contributor to organizational learning. Knowledge creation and knowledge sharing both mediate the path between ESNS usage and organizational learning (Qi and Chau 2018)”.

**Risk factors**

ESN-tool use is not without its risks, both reducing potential, and for direct economic loss. Comparing with the Excellence theory (Grunig 2013), Verheyden and Cardon (2018) finds that management ideology may hamper the information producing abilities of employees and also the realization of benefits from using social media. Employees’ use of ESM could potentially compromise business secrets: Värynen et al.’s (2013) conceptual article proposes eight questions to ask regarding what roles and authorities different categories of employees have. Based on this, strategies to meet knowledge protection challenges can be devised.

**Avenues for future research**

ESN is a topic in need of more research, according to Ellison et al. (2015): “As ESNSs are introduced into a wider range of organizations, it will become increasingly important to study, theorize, and design for the ways in which use of such tools is transforming knowledge sharing and other organizational practices (Ellison et al. 2015)”.

**Discussion and Proposition**

Based on the finds from the literature review and analyzing this through the lens of the general literature on co-worker co-creation, we can list several healthcare innovation capabilities provided by a broad participation in digital transformation and eHealth innovation processes, open to all involved employees in healthcare (illustrated in Figure 1.). This figure (1.) also illustrates the main benefits:

- Increased knowledge base
- Enhanced digital worklife ergonomics (digital systems that are better adapted to real life work-processes)
- Increased involvement and implementation
- Support from employees in designing and implementing change

![Figure 1. A conceptual model for sequential and overlapping process steps and impacts in co-creating digital transformation in healthcare](image-url)
Based on the review on web 2.0 concepts we will here present some propositions for how employee involvement can be secured, to achieve these desired benefits and capabilities. We propose that the effect of employing ESM be enhanced by adding a plan and structure to the co-creation process. When looking for a framework that can provide plan and structure, the authors have used the Design Thinking philosophy (Dorst 2011; Schneider and Stickdorn 2011) as a guide. Design thinking is a human-and needs-centric approach to innovation (op. cit.) that is well aligned with the needs of the very labor-intensive healthcare sector.

The British Design Council’s Double Diamond – model (Design-Council 2018) can thus be used as a framework for casting several of the ideas and concepts from the literature review as steps in a design process. The Double Diamond – model in its many variations has rapidly become a standard for guiding design processes in a user- and problem centric manner, associated with the Design Thinking philosophy (Stickdorn et al. 2018). The Diamond shape symbolizes activity levels through a time-line, and due to activities and material collected or produced peaking midway in each Diamond. The Double Diamond’s two parts revolve around problem and solution respectively, with decision milestones at start, end and in between the two “Diamonds”. The problem-Diamond is divided in two distinct phases:

- Discover (the features of the problematic area, and its stakeholders), giving insights into the problem
- Define – the area to focus on. Questions to ask are: “Which area matters most? Which area should we act on first? What is feasible?”

Starting joint problem-solving with the problematic situation, can widen the frame for (co-)creation (Dorst 2011). Arguably this opening of a discourse should encompass all employees to achieve the added value that the enterprise is striving for (op. cit.). The British Design Council states that; “One of the greatest mistakes is to omit the left-hand diamond and end up solving the wrong problem (Design-Council 2018).” This can underpin e.g. the concepts of knowledge sharing, organizational learning and the online design process. Having defined the problem, a brief for the design can be formed, thus starting the solution-Diamond, where the focus is to:

- Develop – potential solutions (in plural; testing different alternatives). “This process of trial and error helps designers to improve and refine their ideas (op. cit.)”
- Deliver – solutions that work, this tie narrowing the field based on decision criteria from the brief, and evaluations done underway

This should be comprehended as an iterative process. “This means that ideas are developed, tested and refined a number of times, with weak ideas dropped in the process. This cycle is an essential part of good design (Design-Council 2018).” We propose that this “wisdom of crowd”, especially using the inherent knowledge and wisdom of employees, can be mobilized throughout the process using ESN – ESM, for:

1. “Service innovation”; choosing the right problem; defining a new service blueprint (Bitner et al. 2008)
2. “Implementation”; including new eHealth measures; choosing the right solution

The process-structure should also include a joint process for digital governance, as the literature review has shown a need for management of ESN/ESM and the whole design process; measuring and ensuring other concepts found in the literature review (e.g. customer satisfaction, human resource development and risk factors), ref. Figure 2:

3. Process management, IT service transition governance (Eikebrokk and Iden 2012), consisting of:
   3.1. Setting goals (based on problem)
   3.2. Decision criteria (quality measures; based on problem definition and design brief, following the “Service innovation”; 1. above)
   3.3. Evaluation (evaluation the total solution, following the “Implementation”; 2. above. Also evaluating the whole design process)

E.g. polls on ESM (gamification) can be utilized for advising top managers, as to what measures should be prioritized, and how. If necessary, all steps and phases can be iterated until the aspired level of confidence in the measures and potential values are reached. Leveraging the increased knowledge base, and support of all employees, with defined criteria’s and milestones for decision-making, chances for successful implementations are optimized, and the potential risk for failed investments may be mitigated.
Adding the support process of process management, allows for having a holistic governance of parallel innovation projects and involving employees in the performance management of the whole segment of healthcare, as well in individual welfare technology projects (Nudurupati et al. 2016).

**Conclusion and Further Research**

This article has shown digital transformation and -innovation in healthcare can be enhanced through employee involvement in the co-creation process, with the help of web 2.0 technologies. The article contributes to the growing co-creation literature (Grönroos and Voima 2013; Lenka et al. 2017), by adding the vertical dimension of internal co-creation between healthcare management and all employees. This contributes to answering our first research problem; (1.) How can the co-creation literature be extended to include employee involvement, in the context of healthcare? The capabilities and benefits achieved are illustrated in Figure 1.

These capabilities and benefits are made practically feasible, even in larger, distributed healthcare organizations, by web 2.0 technologies (enterprise social media). We have shown examples of use cases and concepts found in literature, and proposed a process structure, that can inform healthcare managers, and web 2.0 vendors. This is a response to our second research problem; (2.) How can web 2.0 technologies enable such employee co-creation in practice? A framework for the enabling structure is devised and illustrated (in Figure 2.).

Further research could deal with the question of how such use of digital technology in the co-creation process, can enhance and clarify the role of employees. The clarity of roles and tasks for employees in introducing new technology at the workplace is also a necessary workplace environment factor, which prevents adverse health effects among employees (Karasek and Theorell 1990).

A model-test of the proposed framework (ref. Figure 2.) could show if successful implementation and outcomes are enabled, and risk-management of adverse health, safety and environment effects when introducing new technologies are improved.

Some healthcare organization have programs for encouraging open innovation (Chesbrough 2006) or capturing ideas from employees’ inventions, and some organizations use software for this, like e.g. Ideation360, Inductsoftware or the research-based CloudTeams (Prinz 2018). Further action- and design research could show how such software could involve and engage the whole organization in digital transformation and co-creation in combination with web 2.0 technologies.

**Limitations**

Our conclusion is partly based on search in scholarly literature within fields like information systems and management using specific search criteria. Other criteria might have given other finds of relevance to this article’s scope. There may be instances of web 2.0 ESN practice of interest to this research and reported in scholarly literature that has not been found by this articles authors.
REFERENCES


