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DIGITAL INNOVATION IN THE VALUE NETWORKS OF NEWSPAPERS

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DOCTORAL DISSERTATION

ABSTRACT

After decades of digital developments, we are now entering a truly digital era. Digital information and communication technology has become a naturally embedded part of the designed environment we live in. Most parts of life are today pervaded by digital products and services. Evidence of such immersion can be noted in, for instance, media consumption. This development is gradually shaping and cultivating a media environment that is ubiquitous. Such ubiquity is manifested in media's constant presence and the changes in media consumption in the purview of digital innovation. Indeed, digital innovation is not only a shift in technology. It alters existing value networks and calls for rethinking existing value perceptions. While this disruptive change driven by digitization can be found in many industries, this thesis focuses on its impact on value networks in the newspaper industry.

The digitization of newspapers started with the introduction of the internet in the 90´s and soon emerged into new media innovations. While these new media innovations have not replaced existing media, they have been disruptive to newspaper value networks. Recently, the emergence of yet another digital innovation is specifically interesting when studying changes to value networks of the newspaper industry: the e-paper. This innovation (a screen technology very close to print on paper) exhibits inherent values that make future replacement of print on paper a possibility. It is therefore regarded as a very promising technology in the newspaper industry.

This thesis can be positioned at the intersection of the friction between forces to embark on a new media trajectory and forces to hang on to the established structures and control. The research question addressed in this thesis is: *How are value networks of newspapers influenced by digital innovation?* Addressing the research question, a multi method approach was adopted to gain a broad understanding of how digital innovation influences value networks of newspapers. Drawing on digital innovation literature, the thesis presents a theoretical perspective with which to understand how digital innovation influences value networks. This perspective is instantiated as a model of value network configuration. The model emphasizes the multi-layered, dynamic, dialectic, and diametrical character of value networks in digital innovation. The model is offered as a basis and analytical tool to further explore value networks in digital innovation. This tool is useful for newspaper stakeholders when entering the digital era.

Keywords:	digital innovation, value network, value network configuration, ubiquitous media environment, e-paper, e-newspaper, newspaper industry
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I never really planned to take a doctorate, it sort of just happened. During my parental leave from consulting I was invited to do some extra hours of teaching at Halmstad University. I regarded this as a temporal arrangement before going back to the "real world". I never believed at that time that I still would be here today. I have stayed at Halmstad University since then and I have come to realize that is not a temporal arrangement. This is now my "real world". In 2005 I was admitted to the doctoral education at the IT University of Gothenburg and now I am writing the acknowledgements of my PhD thesis. I have been told that the acknowledgements are the pages most read in a thesis and I therefore feel very humble about writing these pages. There are so many to whom I am grateful.

Completing a PhD thesis is coming to an end of a challenging journey. However, this journey has not only been challenging to me. Also it has been very challenging to my family. First and foremost I will therefore thank my husband Lennart and our wonderful children Mimmi, Max and Leo for their patience and understanding during this journey. I love you so much - you are the most important part of my life!

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Maria Åkesson,

Tofta Solbacken, Halmstad, August 2009

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1. INTRODUCTION

Perhaps it is a truism to say that information and communication technology (ICT) has become a powerful driving force for innovation. Digital innovation has transformed the structure, processes, and boundaries of the business landscape. The escalating development of ICT has enabled the creation of radically new digital innovations (Yoo *et al.*, 2009). We are now experiencing how most parts of life are pervaded by digitized products and services (Zammuto *et al.*, 2007). This development is gradually shaping and cultivating an information environment that is ubiquitous. Indeed, digital products and services are naturally embedded in the interactions with our environments (Lyytinen and Yoo, 2002a). Evidence of such immersion can be noted in, for instance, education, public services, commerce, and media consumption.

Digital innovation is driven by digital convergence. Digital convergence allows for nearly anything to be digitized and absorbed into our information environments, powered by computing devices, communication networks, and user-generated content. This has led to disruptive effects in many spheres of human life. Not least, the media industry, which is the empirical context of this thesis, is undergoing a disruptive transformation. Digital innovations such as the iPod, Flickr, and YouTube are challenging traditional ways of producing, storing and distributing media content (Yoo *et al.*, 2009). As a result, the media landscape is changing into ubiquitous media environments (UME) where media is constantly present and changes the way media is consumed along the path of digital innovation.

Innovation is a term that widely refers to an outcome perceived as *new*, weather it is an idea, object, or process, as well as to the process of creating this newness (Slappendel, 1996). The newness may be a recombination of old ideas challenging the present order in such a way that it is new to the people involved (Van de Ven, 1986). Consequently a new idea needs to be translated into a product, service or process and taken into practice to be an innovation. Innovations are adopted when users integrate them in meaningful ways into existing social practices (Tuomi, 2006). Digital innovation refers to innovations enabled by ICT (Yoo *et al.*, 2009). Digital innovation is not merely a shift in technology. It also alters existing relationships within industries and with markets. It demands rethinking existing perceptions of customer value and reinvent existing concepts as a response to these alterations. This development forces organizations to seek new digital innovation opportunities to keep up with competition. The competitive implication of an innovation depends on how it adds value and how it challenges existing market know-how (Abernathy and Clark, 1985).

The value of an innovation is decided within a value network and realized through a business model (Christensen and Rosenbloom, 1995). Value networks extend organizational boundaries to profitably access resources in order to form a business model that creates and captures value in the innovation environment. Open innovation is a paradigm recognizing business models as the source of value creation and value capture (Chesborough, 2003;

Chesborough, 2006). According to the open innovation paradigm, organizations draw on external interactions and distributed knowledge in innovation processes, in contrast to traditional organizing of innovation as an internal activity (Vanhaverbeke, 2006). The network of relationships has been recognized as having a key role in the innovation process making organizations highly dependent on other organizations supply of for example new technology or knowledge (Van de Ven *et al.*, 2008). The network of stakeholders outside organizational and industry boundaries has also been acknowledged as important sources of innovation (Chesbrough and Rosenbloom, 2002; von Hippel, 2005).

Past Information Systems (IS) research has generally concerned ICT innovation applications, such as computing capability, system development processes, and services (Lyytinen and Rose, 2003). The main interest has been directed towards how organizations successfully adopt new ICT-based products and processes and how innovation itself can be a driver of organizational and business development (see e.g. Swanson, 1994; Lyytinen and Rose, 2003; Fichman, 2004). This line of research has sought to explain how ICT innovation can be managed and utilized to improve organizational performance. With the introduction of new computing devices and services aimed at consumer markets, another line of research interest has emerged. This research is directed towards understanding the development, diffusion, and adoption of digital innovations on consumer markets, for example new mobile services or new digital products (see e.g. Pedersen, 2005; Constantiou *et al.*, 2007; Mallat *et al.*, 2009). This line of research provides an understanding of how and why new digital products and services are accepted and adopted or not, commonly focusing on how a new product or service, that has already been developed and offered to a market, is received.

Lately an increased interest has been directed towards an understanding of the structures and dynamics of networks of organizations and other actors in the innovation space (see e.g. Lyytinen and Damsgaard, 2001; West, 2003; Van de Ven, 2005; Tuomi, 2006; Boland *et al.*, 2007; Andersson *et al.*, 2008; Yoo *et al.*, 2008). This line of research suggests that innovation is a collective achievement by many actors participating from their own technological frames and business interests, often with different meanings and conflicting interests (Van de Ven, 2005; Yoo *et al.*, 2005). This view of innovation as a distributed process characterized by uncertainty and ambiguity, has gained increased interest as a result of the escalating digitization. Attributable to digital innovations, digital innovation processes are becoming increasingly knowledge intensive and networked (Tuomi, 2006). Networks of organizations are dependent on other networks (Tuomi, 2006) and individual organizations are highly dependent on other organizations competences, resources and knowledge (Vanhaverbeke and Cloodt, 2006). The transformative power of digitization is challenging the frames of networks in digital innovation to move towards distributed and heterogeneous structures spanning organizational and industry boundaries in line with the open innovation paradigm (Yoo *et al.*, 2008).

1.1 Research Question and Objective

The innovation process spans from the practice of inventing to the process of realizing value, and the adoption by a community (Van de Ven *et al.*, 2008). The value of an innovation

is determined and created within interorganizational value networks. In innovation literature, value network is described as *"the context within which a firm identifies and responds to customers' needs, solves problems, procures input, reacts to competitors, and strives for profit"* (Christensen, 1997, p. 36). This context may include relationships and exchanges with suppliers, customers, and strategic business partners. Digital innovation leads to transformation of existing value networks (Jonsson, *et al.*, 2008), or even to disruption of value networks and business models (Christensen, 1997; Vanhaverbeke and Cloodt, 2006), and tends to create a need for new and wider relationships and knowledge exchanges (Simard and West, 2006; Yoo *et al.*, 2008).

This thesis approaches digital innovation in the value networks of newspapers. Newspapers are engaged in networks of relationships with, among others, newspapers, publication system providers, advertising agencies, advertisers, and consumers. Digital innovation has transformed and widened the relationships of newspapers. Newspapers have not been engaged with for example telecom providers until the opportunity of offering mobile news services on mobile platforms emerged. New digital services such as mobile internet, social media and so forth are changing newspaper relations to consumers, and thereby the value networks (Ziv, 2005). Value networks have been recognized as very important to realize the potential values of digital innovation (Vanhaverbeke and Cloodt, 2006). Even so, relatively little attention has been paid to how digital innovation influences value networks (West *et al.*, 2006). This thesis attempts to meet this call for research by addressing the research question:

How are value networks of newspapers influenced by digital innovation?

The newspaper industry is indeed experiencing the challenges triggered by digital innovation. Constant introduction of new digital technology, increased mobility, changing media consumption and advertising patterns, as well as digital convergence are radically changing the newspaper industry. Undeniably, the digitalization of newspaper publishing has not been trouble-free. It has been very difficult to innovate value, business models and value networks that enable profitable business in digital media. There exists significant uncertainty related to the value networks of newspapers in digital environments (Ziv, 2002; Picard, 2003). This uncertainty has started a debate about the survival of traditional newspapers [1; 2; 3]. Even so, it can be noted that no new media has up till now replaced another in the newspaper industry. That is, digital innovations adopted by newspaper organizations have not been disruptive in the meaning that they have replaced existing technology but rather disruptive to their value networks as acknowledged by Christensen and Davis [2]. Each new digital innovation has led to changed or new value networks, meaning that the socio-technical frames for decisions and value creation have been disrupted.

Now, yet another digital innovation is affecting the value networks in the newspaper industry: the e-paper. The characteristics of this innovation, (a screen technology very close to print on paper) exhibit inherent values that make future replacement of print on paper possible. It is therefore regarded as a very promising technology in the newspaper industry.

However, this prospect is highly challenging to existing industry structures. The traditional business models of newspapers are built on control over production and distribution of content. This thesis is grounded at the intersection of the friction between forces to embark on a new media trajectory and forces to hang on to the established structures and control.

1.2 Approaching Digital Innovation in Value Networks

The research reported in this thesis was conducted within the European project DigiNews. This project investigated how e-paper can enable a new media service innovation, the e-newspaper. To study this setting, the thesis draws on two main areas of research: ubiquitous computing and open and digital innovation. First, the thesis draws on ubiquitous computing as it is represented in IS literature (see e.g. Lyytinen and Yoo, 2002b; Sörensen and Yoo, 2005; Lindgren *et al.*, 2008). Inspired by visions of ubiquitous computing as expressed by Weiser and colleagues in the 90´s, this literature conceptualizes seamless availability of services independently of time and place, ingrained in social and professional life. Second, the thesis draws on open and digital innovation as it is described in organization and IS literature (see e.g Chesbrough *et al.*, 2006; Van de Ven *et al.*, 2008; Yoo *et al.*, 2009). This literature conceptualizes innovation as a networked process spanning organizational boundaries. The key concepts from digital and open innovation to inform this thesis are innovation networks and value networks.

Addressing the research question, I adopted a multi method approach (Mingers, 2001) to gain a broad understanding of how digital innovation influences value networks of newspapers. By combining several data collection methods, a broader understanding of the research phenomenon can be gained (Mingers, 2001; Walsham, 2006). The aim is to contribute with a theoretical perspective on how digital innovation influence value networks to guide future studies as well as practice.

This thesis consists of a cover paper and a collection of six individual papers. The cover paper is structured as follows. Following this introduction, I will in section 2 present the empirical context of the thesis, the newspaper industry. The theoretical underpinning is presented in section 3 followed by the research method in section 4. Section 5 outlines the contributions from the individual papers and presents a model of value network configuration in digital innovation. Furthermore, implications for theory and practice as well as directions for future research are discussed. Section 6 provides concluding remarks of the thesis. After the cover paper follows the collection of six papers. These papers are listed hereafter in the order that they will be referred to in the cover paper.

PAPER 1 Ihlström Eriksson, C., Åkesson, M., Bergqvist, M., and Ljungberg, J. (2009). Forming a value network - analyzing the negotiations between actors in the e-newspaper case. *Proceedings of the Forty-Second Annual Hawaii International Conference on System Sciences* (CD-ROM), January 5-8, 2009, Computer Society Press.

PAPER 2 Åkesson, M. and Ihlström Eriksson, C. (2008). From Multi Channel Publishing towards a Ubiquitous Media Environment, *TAGA Journal,* Vol. 4, pp. 126-148.

PAPER 3 Åkesson, M. (2007). Value proposition in m-commerce: exploring service provider and user perceptions. *Global Mobility Round Table Conference*, Los Angeles, May 31-June 2.

PAPER 4 Åkesson, M. and Ihlström Eriksson, C. (2009). Advertising Challenges in Ubiquitous Media Environments. In: Pousttchi, K.; Wiedemann, D.G. (Eds.): *Handbook of Research on Mobile Marketing Management*. Information Science Reference, Hershey (in press).

PAPER 5 Ihlström Eriksson, C., Kalling, T., Åkesson, M. and Fredberg, T. (2008). Business Models for m-services - exploring the e-newspaper case from a consumer view. *Journal of Electronic Commerce in Organizations*, Vol. 6, No. 2, pp 29-57.

PAPER 6 Ihlström Eriksson, C., Åkesson, M., Svensson, J., and Fredberg, T. (2007). Introducing the e-newspaper - identifying initial target groups. *Journal of Media Business Studies*, Vol. 4, No. 3, pp. 41-62.

2. RESEARCH CONTEXT – THE NEWSPAPER INDUSTRY

Newspaper industry is at this writing moment under pressure. The Economist titled an edition in August 2006 "Who killed the newspaper?" [3]. The point made was that printed newspapers are under a death role as a consequence of the digitization of media. Newspapers all over the world are suffering from falling circulation and declining advertising revenues as readers and advertisers are turning to digital media. Even though newspaper services have been present on the Internet since the mid 90´s and in mobile phone platforms since the end of the 90´s newspapers have not been capable of building a strong digital business. The traditional business models of newspapers have not worked very well in digital media and the competition has been difficult to meet. Today, we are witnessing how newspaper companies are shutting down. This is a revolutionary development in the newspaper industry.

This situation has provoked a great need for innovation in the newspaper industry (Küng, 2008). However, the inertia in newspaper industry, especially in management and ownership mindsets, has lead to a culture where the printed newspaper is regarded as the "perfect" news service and that change is something negative. The attitude has been that digital media are cannibalizing on print media and that the effort must be directed towards saving the printed newspaper from the digital threats rather than exploring and innovate news services in digital media [4]. The consequence of this mindset has been that newspapers have been moderate on their digital innovation journey so far.

2.1 EARLY MEDIA INNOVATIONS

Historically, there are media innovations to account for in the newspaper industry. The first and most essential innovation was the movable type printing press invented by Gutenberg in mid 1400's. This was the beginning of mass-production and distribution of printed news. Newspaper industry has a long history and newspapers as we know them today have been printed on paper since the beginning of the 17th century. The oldest newspaper still publishing in print is the Dutch newspaper Opregte Haarlemsche Courant from Haarlem, first published in 1656. The first successful newspaper in America was the Boston News-Letter in 1704 [5].

The second innovation influencing the newspaper industry was the telegraph, invented in 1844. The telegraph radically changed the way newspapers gathered material and how they could spread breaking news. Newspapers role in satisfying the information needs in society became very important. Advertising also became a very important means of market communication. In mid 1800's, newspapers were the most important source of information for people and businesses in the industrialized world [5].

In the first half of the 20th century, the radio and television entered the media market. These media innovations diffused very quickly and became an alternative information source

to newspapers. To protect themselves against this threat, newspapers were forced to develop their printed newspapers to be more attractive to media consumers. However, these media innovations never really challenged newspaper industry economy. Newspaper industry has been very profitable over time compared to other industries (Picard, 2003). Since the Second World War the print newspaper market has been mature and apart from evening press very few new newspapers have started or shut down since then. In other words, newspaper industry has up until recently led a quiet and undisturbed life.

2.2 Digital Media Innovations

The pressing situation experienced in the newspaper industry today started with the Internet challenging the traditional business model (Picard, 2003). In 1994 the Swedish evening newspaper Aftonbladet started to publish on the Internet. This was the starting point of newspapers digital journey. The internet offered a new publishing channel with the emergence of new news genres such as the online newspaper, pdf newspapers, and mail news services. Most newspapers worldwide have an online edition today. However, it has been troublesome for newspaper companies to profit from online newspaper services. Only recently has advertizing revenues started to increase and it has been, and still is, very difficult to charge for content online. The same difficulty is now experienced when offering mobile services. Indeed, mobile devices and wireless access to content do not only offer new opportunities but is also challenging to the core business of newspapers.

The situation has been met with cutting costs and making production more efficient (Picard, 2006). In spite of the opportunities afforded by digital technology, little efforts have been made to innovate customer value propositions, whether media consumer or advertiser customer value. Newspaper industry has been "stuck" in historical success and very reluctant to change (see e.g. Boczkowski, 2004; Picard, 2006). Little action has been taken to expand markets, reach new audiences, or provide new services and products as a response to this changing media landscape (Picard, 2006). As media economist Robert G. Picard argues: "To create lasting value, the business fundamentals of who they are, what they are, and how they serve readers and advertisers need to be examined by newspapers" (Picard, 2006, p.11). This will require innovation capability and entrepreneurship infrequently found in newspapers in recent years (Picard, 2006). The print model has become a strait jacket holding back innovative efforts in digital media.

However, newspaper industry has been more innovative when it comes to technology for production such as publishing systems, content management systems, and advertisement systems. In newspaper industry, innovation has most often been a closed activity within an organization or within industry. There has been little interaction and networking outside organizational and industry boundaries. Technology has been developed in-house or bought into the organization and innovation control and management has been centralized (Picard, 2006).

Today, many newspaper organizations are putting more effort into digital media to find new business opportunities. Some refer to themselves as media houses publishing in multiple channels offering services anytime and anywhere. Innovation efforts are put into new

services like the e-newspapers discussed in this thesis. However, the digitization of newspaper media drives newspaper organizations to engage with new actors. In the case described in this thesis, newspaper organizations and device producers engage in forming a value network around a new digital innovation, the e-paper.

2.3 The E-paper Innovation

E-paper is a common term for digital displays that imitate print on paper. One of the most common e-paper technologies is Electronic-Ink (E ink). E ink is a technology using tiny microcapsules to appear as black and white spots on a sheet of paper. These microcapsules contain negatively charged black particles and positively charged white particles enclosed in a clear liquid. By applying positive and negative electric fields the particles move from the top and bottom of the micro capsule and thereby a white or black dot appears on the display surface [6]. Figure 1 illustrates an example of E ink printed on e-paper.

Grafik: Martin Gradén, © Sundsvalls Tidning

Figure 1. The principle of e-paper displays

In Figure 1 a printed page appears as a newspaper page (1) on an e-reader device. The page contains the printed letter ***e*** (2). The letter ***e*** is created by black and white spots (3), in turn accomplished by applying negative versus positive charge to the black and white particles contained in the microcapsules (4).

E-paper technology does in other words not use any backlight to illuminate pixels. The E ink spots are reflected like ordinary print on paper which allows a wider viewing angle compared to other digital display technologies. The more light the better reading conditions, like with print on paper. E-paper enables high resolution and high contrast displays. The resolution is about 160-167 dpi which is the same as printed newspapers, and 16 levels of grayscale which enables a reading experience close to print on paper (see Figure 2).

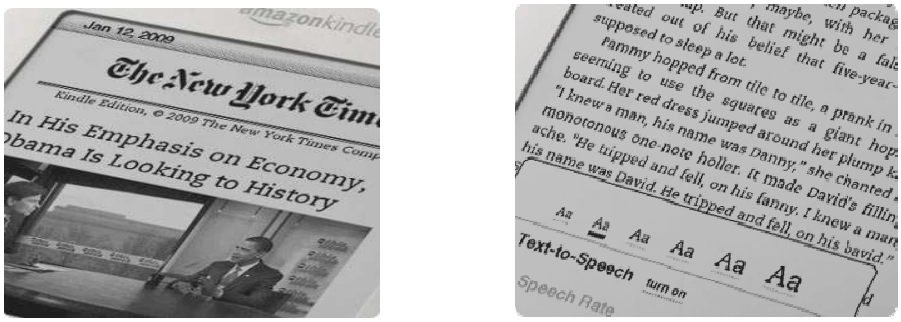

Figure 2. The New York Times on an Amazon Kindle device with e-paper display [7]

As can be seen in Figure 2 the E ink print on e-paper clearly mimics traditional print on paper. Another advantage with e-paper is the very low power consumption. A printed text or image does not require any power to be maintained. It is only the printing that requires power. Further, e-paper is thin, light weighted, and durable. It is also possible to mark, draw and take notes on e-paper just like on ordinary paper as shown in Figure 3.

Figure 3. Handwriting on an iRex iLiad device with e-paper display [8]

These characteristics enable utilizing e-paper to design light weighted devices with high readability displays and very low power consumption. On the other hand, there are some disadvantages compared to competing display technologies. One disadvantage is the difficulties with color on e-paper displays. Color filters have been used but these techniques compromise the resolution and brightness of the display [9]. In particular, this is a disadvantage for newspaper publishing and advertising. Another disadvantage is the low refresh rate making for example animations unacceptably slow. E-paper is still under development, a lot of R&D efforts are put into developing e-paper technology further. For example color and bendable displays are under development. Philips research has announced a new approach to color e-paper that may offer bright and clear color displays [8; 9]. Thin and flexible e-paper is announced by for example Fujitsu, Plastic logic, and Readius displayed in Figures 4, 5 and 6 [10].

Figure 4. Fujitsu flexible e-paper

Figure 5. Plastic logic flexible e-paper

Figure 6. Readius® flexible and rollable e-paper

There are several e-reader devices on the market. E-readers are devices dedicated for reading using e-paper technology. However currently there are only monochrome displays implemented in these devices. Examples of e-reader devices are the Amazon Kindle, Sony Reader, Bookeen Cybook, STAReBOOK and iRex iLiad [10]. The iRex iLiad was the device used in the DigiNews project which this thesis is based on. There are many newspapers that are available in e-reader devices. For example the New York Times, Wall Street Journal, Le Monde and Shanghai Daily publish on the Amazon Kindle. Examples of newspapers availiable in the iRex Iliad are the The Washington Post, The Guardian, The Times, The Daily Telegraph, Daily Mail, The Age, Le Figaro, and The Irish Times.

The most common model behind these publishing platforms is that the newspaper consumer buys the newspaper from a service provider. In the Amazon case newspapers are available through the Amazon Kindle Store [11]. The newspapers on the iRex iLiad are available through Newspaper Direct [12]. There are also newspapers that offer newspaper services directly to their customers such as the French financial newspaper Les Echos that offer subscriptions to the iRex iLiad through their own website [13]. The Hearst Corporation has recently announced that they will launch their own e-reader device designed specifically for newspaper publishing with larger size allowing more complex layouts and advertising [14].

Like many other media sectors, newspapers are turning to digital technologies with hope of finding a silver bullet to overcome the severe economic situation. There are hopes of the e-paper innovation becoming a piece of a puzzle that will save newspapers from their pressing situation. However, there are many pieces that need to fall into place for this to happen. Even if there are several advantages with e-paper devices for newspaper publishing there are also challenges. Some are related to the e-paper technology (monochrome and slow refresh rate), and to the design of devices (most are more suited for book reading than newspaper reading) [10]. Others are related to media consumers and advertisers adopting e-newspapers in the numbers and pace required to make business lift. However, as this thesis will demonstrate, there is no silver bullet in the digital technology as such. The most challenging for newspaper industry is to act concertedly in the process of forming the value networks and business models that will support the e-newspaper business.

3. THEORETICAL BACKGROUND

This thesis draws on two main research areas in IS: *ubiquitous computing* and *digital and open innovation*. The ubiquitous computing literature intends to serve as a background to situate and describe the digital innovation space within which this research has been conducted. The concepts from ubiquitous computing provide a language to describe the innovation space and the ongoing digitization in the newspaper industry. In this thesis, I refer to this innovation space as ubiquitous media environments (UME). Concepts from digital and open innovation function as an analytical framework to interpret how value networks are influenced by digital innovation.

3.1 UBIQUITOUS INFORMATION ENVIRONMENTS

Ubiquitous computing was introduced by Mark Weiser (1991), at the Computer Science Lab at Xerox PARC, to describe a computing environment where information technology is naturally embedded in physical and social interactions with our environment. About ten years later, ubiquitous computing started to attract attention from IS researchers presenting ideas and results in dedicated IS journals and conferences (Lyytinen and Yoo, 2002b; Sørensen and Yoo, 2005; Topi, 2005; Yoo and Lyytinen, 2005). In this research, ubiquitous information environments have been described as the next wave of computing environments following the era of personal and stationary computing. Different themes have been addressed, often characterized by visionary and experimental approaches. Examples are organizational and social implications (Lyytinen and Yoo 2002a; Yoo and Lyytinen, 2005), design issues (Henfridsson and Lindgren, 2005) innovation (Andersson *et al.*, 2008), e-business (Roussos, 2006), and value creation (Jonsson *et al.*, 2008).

Given the development of mobile and interactive technologies as well as new media applications and converging network technologies, IT penetration of everyday life has increased dramatically (Zammuto *et al*, 2007). Ubiquitous information environments are becoming as important part of private life as it is of working life. Therefore, it is of equal importance to understand ubiquitous information environments in every-day life, beyond organizational and work settings (Sørensen and Yoo, 2005). Digital information and communication technology has become a naturally embedded part of the designed environment we live in.

One vision of ubiquitous information environments that has inspired many IS researchers, was a research commentary presented by Lyytinen and Yoo (2002b) in the journal *Information Systems Research.* Lyytinen and Yoo (2002b) portrayed ubiquitous information environments to be characterized by a heterogeneous assemblage of integrated socio-technical elements. In this thesis, this framework has functioned to situate and describe the digital innovation space in the newspaper industry. As pictured in Figure 7, ubiquitous information environments have a layer of information infrastructure and a layer of digital services.

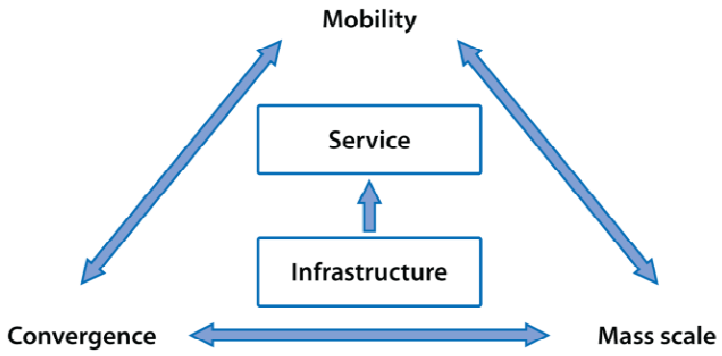

Figure 7. Ubiquitous information environments (Lyytinen and Yoo, 2002b, p. 378)

The infrastructure layer enables seamless distribution of services, anytime and anywhere adapted to users' context. Depending on the resources at hand, and the contextual circumstances, users interact with a multitude of interconnected devices in a given situation. The infrastructure is heterogeneous, geographically dispersed, and institutionally complex without any centralized coordination mechanisms. The development of ubiquitous information environments is influenced and enabled by three interdependent key drivers: *mobility*, *digital convergence* and *mass scale* (Lyytinen and Yoo, 2002b). *Mobility* refers to physical as well as social movements of users, objects, and services that move across and between devices. *Digital convergence* refers to integration of infrastructures for processing and distributing services to a multitude of devices, mobile as well as stationary. *Mass scale* concerns the availability of infrastructure and services at a global level as well as mass scale volume and diversity of services. Ubiquitous information environments surround all levels from individual, to working group, organizational to the interorganizational level.

Drawing on this framework of ubiquitous information environments, the term ubiquitous media environments (UME) is used in this thesis to represent a vision of future media environments enabling device independent distribution of media services in integrated infrastructures, and in mass-scale. Relating to the newspaper industry this is a scaled up vision compared to today's media landscape. Still, geographical and language zones are barriers in the media landscape. In this vision, media would target any-one who can benefit from the media content and adapt that content to users' situation.

Such media environments would enable distribution of media services including advertising content to any media consumer, anywhere, at anytime, and to any device. Therefore, a very central aspect of UME, as in any ubiquitous computing environment, is the *context* of use (Abowd and Mynatt, 2000). This means that information about the background and specific circumstances surrounding the use situation is deployed in adapting services. Context information is any information that can be used to characterize a situation such as location, identity, state of people, groups, and computing resources (Dey, 2001). In this view, context is regarded as information related to the situation in which interaction occurs. Context can also be regarded as a relational property between objects and activities (Dourish, 2004). This means that context is dynamically shaped in action rather that pre-defined and stabile.

The innovation journey leading to UME has started but I believe there is a long way ahead before we would see UME as a taken for granted media landscape. For the newspaper industry, this development has disruptive consequences. As described in the previous section, traditional newspaper industry largely rests on a solid socio-technical base, centrally owned and controlled within the industry. The development towards UME is leading this industry into a mass-scale socio-technical environment out of any single organization´s or industry's control. Ubiquitous information environments have been described as consisting of a web of equipment, techniques, applications, and people that creates a social context including the infrastructure that supports its development and use and the social relationships and processes of its use (Boland *et al.*, 2007). This means that these environments are not designed in a system design process in a classical meaning; there is no clearly defined system owner or centralized control. Rather it resembles an ecological environment that media exists in and has to adapt to and live in together with others.

As recognized in the previous section there is a pressing need for innovation in the newspaper industry. Given that media is being increasingly digitized, the industry is more and more engaging in digital innovation to identify new business opportunities. However, to identify and exploit business opportunities and create value in ubiquitous environments is very challenging (Fleisch and Tellkamp, 2006). This is the challenge for and within the value networks of newspapers in UME innovation spaces.

3.2 Value Networks in Digital and Open Innovation

Networks of relationships have been recognized as having a key role in the innovation process. The innovation process spans from the practice of inventing to the process of realizing value, and the adoption by a community. Typically, an innovation process is a non-linear cyclic process divided in three periods: an initiation, a developmental, and an implementation period. The innovation process is terminated when an innovation is adopted or abandoned (Van de Ven *et al.*, 2008). Targeting at a desired outcome, the innovation process can be described as the development and implementation of new ideas by people engaged in relationships. The relationships often extend organizational boundaries since a single organization rarely has the resources, competencies, and legitimacy needed alone. These networks of relationships span several levels, from personal relationships, to formal relationships between organizations to relationships within an industry infrastructure (Van de Ven *et al.*, 2008).

There are two main categories of networks in innovation literature: *innovation networks* and *value networks*. The innovation network is more related to research and development of innovation while the value network is related to realizing and commercializing the inherent value of an innovation (Vanhaverbeke and Cloodt, 2006). The innovation network is formed when an innovation process is initiated to supply the knowledge, capabilities and resources required in the innovation process (Van de Ven *et al.*, 2008). When the process has proceeded to a suggestion that can be translated into value propositions the value network is starting to take form. The process of transforming the inherent value of an invention may require networks with other participants, activities and exchanges than the network needed

in the process of inventing. These two network constellations might be very integrated and difficult to distinguish. Value networks and innovation networks can be regarded as mirroring images (Vanhaverbeke and Cloodt, 2006). While the innovation network resolves when the innovation process is terminated, the value network continues to exist in the product or service lifecycle.

In this thesis, the focus is on value networks. Even so, the close relationship and blurred boundaries between innovation network and value network as well as the view that value network and innovation network are mirror images, makes it relevant to visit related literature on innovation networks to better understand value networks. The following subsections will present a description of *the nature, dynamics,* and *structure* of value networks.

3.2.1 THE NATURE OF VALUE NETWORKS

Value networks are of complex nature. First, the nature of value networks is closely interrelated to value and business models of an innovation. The role of *value networks* is to link innovation potential to *value* mediated through the *business model.* Second, value networks are *multilayered and interconnected* in systems of value networks, and they exist in hierarchies as well as in parallel (Christensen and Rosenbloom, 1995). Value networks include the set of actors and interactions needed to achieve the determined value of an innovation (Allee, 2008). Outside organizations' boundaries, value networks include relationships to suppliers, technical solution providers, investors, strategic business partners, customers and so on. For example, the value network of a new mobile news service may include relationships between content providers such as newspapers, mobile phone operators, advertisers, and mobile phone users. A value network is initiated during the innovation process by a focal actor creating the relations needed to realize business opportunities of an innovation.

The inherent *value* of a new innovative technology is determined within the value network and realized through a value creating process (Chesbrough and Rosenbloom, 2002; Yoo and Lyytinen, 2005). The traditional view of value creation is the activities an organization performs to create a value proposal. The value chain framework presented by Porter (1985) explains value creation as a chain of activities performed by organizations that contribute to the value of a product or service offered to the market with the objective of maximizing profit at a minimum cost. This approach is challenged in the digital economy (Allee, 2000). Digital economy is dynamic and characterized by rapid development and high competitiveness (Amit and Zott, 2001). Norman and Ramirez (1993) argue to shift from a single organization´s value chain thinking to value network thinking where all stakeholder co-produce value. This includes co-creation of value with and between customers (Stabell and Fjellstad, 1998; von Hippel, 2005). Value network is a more inclusive and flexible structure than the value chain construct and therefore regarded to fit better to the networked value creation in digital innovation (Alle, 2008). A value network creates value through complex and dynamic exchanges of three types of value currencies: goods, services, and revenue; knowledge; and intangible benefits (Allee, 2000). According to Allee

(2000) knowledge and intangible values are of equal importance as revenue exchanges, not the least in the information and knowledge economy. For instance, Göteborgs-Posten may offer knowledge about and access to their newspaper consumers as a value currency in a value network.

The relations in the value network are linked by the *business model* defining the value creation process from which the different actors capture value (Chesborough and Rosenbloom, 2002). The business model is the architectural configuration of the components of transactions needed to realize business value and related to a focal actor who organize and has the strongest incentive (Amit and Zott, 2001). From a focal actor's point of view, the business model describes how organizations, customers, suppliers and so forth are linked. This includes identifying customer segments and the structures for value creation and value capture (Chesborough, 2003). This means that different organizations will have different business models within the same value network. For example, Le Monde has one business model connected to the publication of an e-newspaper service on an e-reader device whereas a device producer such as iRex has another. Still they co-create the value related to the e-newspaper service within the value network. Even though a business model refers to a particular focal actor its impact spans organization boundaries (Amit and Zott, 2001). Orchestrated by organizations architecting business models, network members are aligned to realize value targeting a defined customer base (Vanhaverbeke and Cloodt, 2006). Different customer segments may have different value perceptions, in other words the same underlying digital technology may have different inherent values depending on market segment. The value network shapes the roles in the value creating process (Christensen and Rosenbloom, 1995) and thus value is dependent on how the value network is designed and vice versa (Vanhaverbeke and Cloodt, 2006).

Indeed there is a close interrelationship between the value network, value and business model around innovation as illustrated in Figure 8.

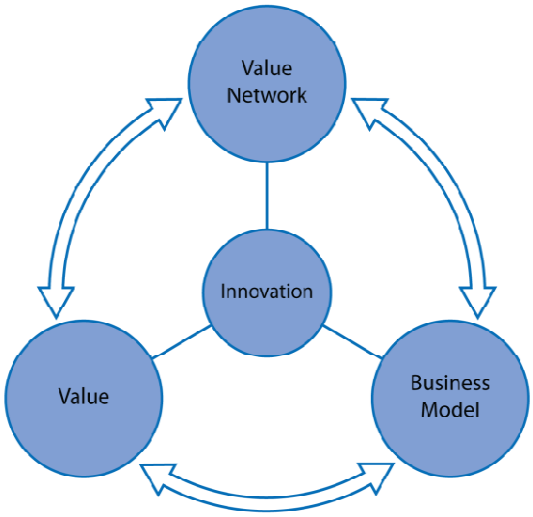

Figure 8. Value network interrelationships

This model can be regarded as a recursive model of value networks in the meaning that the model refers to value networks itself as a component of a system of interrelationships centered on innovation. These different components are interconnected forming different domains of innovation (Chesbrough and Rosenbloom, 2002). In Table 1, these components are summarized from literature.

Component	Description	Literature
Value Network	The context, relationships, and interactions needed to achieve the determined value of an innovation.	Allee (2000; 2008), Christensen and Rosenbloom (1995), Vanhaverbeke and Cloodt (2006)
Value	Value of an innovation is determined within the value network and co-created through exchanges of goods, services, and revenue; knowledge; and intangible benefits.	Allee (2000), Chesbrough and Rosenbloom (2002), Yoo and Lyytinen (2005)
Business Model	The configuration of the relations and transactions needed to realize and capture value.	Amit and Zott (2001), Chesborough and Rosenbloom (2002)

Table 1. The components of the value network model

The model of value network interrelationships provides an understanding of the nature of value networks. The complexity of the nature of value networks is, in addition to the interrelated nature, associated to value networks being *multi-layered and interconnected* system of networks (Christensen and Rosenbloom, 1995) and innovation paths (Henfridsson *et al.*, 2009). For example, Sundsvalls Tidning is part of the value network of the printed newspaper, of the online newspaper, of local mobile news services as well as local radio. The value networks surrounding these businesses are not the same since they are built on different relations, exchanges and business models. Still, they are interwoven and interconnected on different levels and thereby innovation paths within each have influence on the others.

Another aspect of the multi-layered nature of value networks is related to the levels of competition. As demonstrated in the open source software business, an open value network structure offer advantages such as preventing underinvestment in complementary assets, favoring wide-spread adoption over strong value capture leading to positive networks effects, and as a result of wide-spread adoption scale of economy effects (West, 2007). This results in a shift of competition level from between organizations to between networks of organizations. Van de Ven (2005) takes a strategic view and argues that organizations that run in packs have better conditions to succeed in innovation. Running in packs is a metaphor for innovation processes that are collective, with organizations simultaneously cooperating and competing as they develop and implement an innovation. The advantages on the co-operation side of running in packs are the possibilities of sharing resources, competences, costs and risks. The competition side is driven by each individual organization´s self-prevailing interests. The higher the number of actors in a value network the more difficult it

is to distribute value captured within the value network. The strength of the network depends on the relative advantage of being a participant in the network compared to other network constellations (Vanaverbeke and Cloodt, 2006). These tensions create dynamics in the value networks.

3.2.2 THE DYNAMICS OF VALUE NETWORKS

Value networks are not static; they dynamically change over time (Christensen and Rosenbloom, 1995). The dynamics of value networks in digital innovation is related to several different aspects. First, as highlighted above, the *co-opetition in digital innovation* creates dynamic behavior. Second, constant *improvements and development of digital technology* change network structures or even cause emergence of new value networks. Third, the *systemic character of digital innovation* tends to drive organizations to multi-layered networked innovation environments. Lastly, digital innovation tends to lead to *contradictory behavior.*

The *first* aspect of the dynamics of value networks is related to the conflicting goals of *co-opetition in digital innovation* (Vanhaverbeke, *et al.*, 2006). To jointly create customer value competitive to alternatives on the market along with maximizing value captured for the organization itself needs to be balanced with allocating value capture among other participants in the value network to ensure relative advantage compared to competing networks (West *et al*., 2006). As stated by Yoo *et al.* (2005), successful digital innovation calls for strategies that enable organizations to organize broad socio-technical networks, accordingly widening network relations. As the innovation process proceeds, the network is transformed and reconfigured as new visions or needs develops. When new actors are enrolled, the perception of the innovation is negotiated. In these negotiations, organizations might have to compromise their own ideas in order to align conflicting interests. For instance, content providers such as newspapers, service providers, and device producers have conflicting interests on e-reader platforms. These interests are negotiated with for example device producers such as iRex and service providers like Amazon in order to identify business models that balance value captured among network participants. As long as the balance is not satisfactory to the participating network members the value network will be changing. This results in a dynamic digital innovation processes, characterized by not only technical complexity in but also complex political processes within the associated networks (Yoo *et al.*, 2005; Van de Ven *et al.*, 2008).

Along with the *second* aspect of *improvements and development of digital technology,* the structures of the value network changes over time. Digital technology advancements may cause migration of innovations to new networks, and new technological paradigms may cause the emergence of new value networks (Christensen and Rosenbloom, 1995). In the newspaper industry for example, new digital innovations have been adopted with the result of new emergent but still interconnected value networks that influence each other. Boland *et al.* (2007) demonstrated in the domain of architecture, engineering, and construction that innovations travel across innovation spaces like a wake. Out of single distinct innovations, wakes of innovations were created that overlapped and interacted with each other. These

wakes affect other innovation contexts in a recursive manner. Thus, a wake of innovation can export path-dependence within and across networks and may be part of the initial conditions of another innovation process (Van de Ven *et al.*, 2008). The same technology can thereby play different roles in different value networks (Christensen and Rosenbloom, 1995). For example, the e-paper innovation plays very different roles in value networks related to media content compared to value networks related to public displays in for instance department stores.

The *third* aspect of the dynamics of value networks is related to the *systemic character of digital innovation* (Maula *et al.*, 2006). Chesbrough and Teece (1996) introduced the notion of systemic innovation to represent an innovation whose value can only be realized in a system of complementing innovations. As a result, systemic innovation has influence beyond a single innovation context and requires networked coordination. The E ink innovation for instance, has created a system of interrelated innovations like e-paper, e-readers, and e-newspapers that complement each other. Changes in a products or service architecture, for example that one component of the architecture changes (such as enabling color e-paper displays), presents more subtle changes in adjusting to the new architecture but also potentially offers opportunities to improve strategic advantages (Henderson and Clark, 1990). This involves innovating business models and creating new markets. Improving the strategic advantages challenges the organizations knowledge of the market and customers (Abernathy and Clark, 1985). As a result Christensen and Rosenbloom (1995) argue that an innovation can be complex even if it is technically simple. New and radically different business models from an organizations competition may force a focal actor to set up or join networks beyond their traditional relations (Vanhaverbeke and Cloodt, 2006). The complexity is related to the degree of mobility required in and across value networks (Christensen and Rosenbloom, 1995).

Lastly, the nature of digital innovation seems to create *contradictory behavior.* Digital innovation drives organizations to widen their interorganizational relationships (Simard and West, 2006), span boundaries of knowledge creation and sharing (Jonsson *et al.*, 2009), and to more distributed and heterogeneous knowledge and control structures (Yoo, *et al.*, 2008). However, there also seems to be contradictory driving forces in play. Jonsson *et al.* (2009) illustrate in a study of remote diagnostic systems how organizations changed their boundary spanning behavior in contradictory ways. Organizations crossed and created new boundaries on the on hand, and reinforced existing boundaries on the other. These contradictory processes re-shaped existing boundaries and practices as well as the role of IT in boundary spanning from a mediating role to an enabling role. Similar patterns were observed by Henfridsson *et al.* (2009) in the auto industry. Designers enacting new innovation paths were observed to negotiate and re-negotiate dominant structures with emergent structures. This behavior created contradictions between established structures and new innovation trajectories. The resulting innovation dialectics potentially transforms established structures into new socio-technical configurations (Henfridsson *et al.*, 2009). Van de Ven *et al.* (2008) explain this dialectics as a cycle of divergent and convergent behavior. Divergent behavior explores and expands new innovation directions, ideas, competences,

and relationships. Convergent behavior is an integrating and narrowing process. Divergent behavior increases complexity while convergent behavior reduces complexity. These cycles can exist at different levels and parallel in time and changes the structure of value networks. Taken together, these aspects of value network dynamics have effect on value network structure. In Table 2 the aspects of value network dynamics in digital innovation are summarized.

Aspect	**Literature**
Improvements and development of digital technology	Christensen and Rosenbloom, 1995; Boland *et al.*, 2007
Systemic character of digital innovation	Maula *et al.*, 2006; Vanhaverbeke and Cloodt, 2006; Christensen and Rosenbloom, 1995
Co-opetition in digital innovation	Vanhaverbeke, *et al.*, 2006; Yoo *et al.*, 2005; West *et al.*, 2006
Contradictory behavior in digital innovation	Henfridsson *et al.*, 2009; Van de Ven *et al.*, 2008; Jonsson *et al.*, 2009

Table 2. Aspect of value network dynamics in digital innovation

3.2.3 THE STRUCTURE OF VALUE NETWORKS

The structure of value networks differ along several dimensions. These dimensions concern among others: *interorganizational relations; coordination and control; knowledge resources; market linkages;* and *competence.*

The nature of *interorganizational relations* within a value network forms one structural element. Simard and West (2006) discuss how two dimensions of network ties differentiate networks. The first dimension polarizes deep ties where knowledge is homogenous from wide ties where knowledge is heterogeneous and more difficult to capture. The second dimension, formal versus informal ties, polarizes planned and contracted ties from ties characterized by personal and social contacts. These two dimensions explain how interorganizational ties influence innovation potential (see Figure 9).

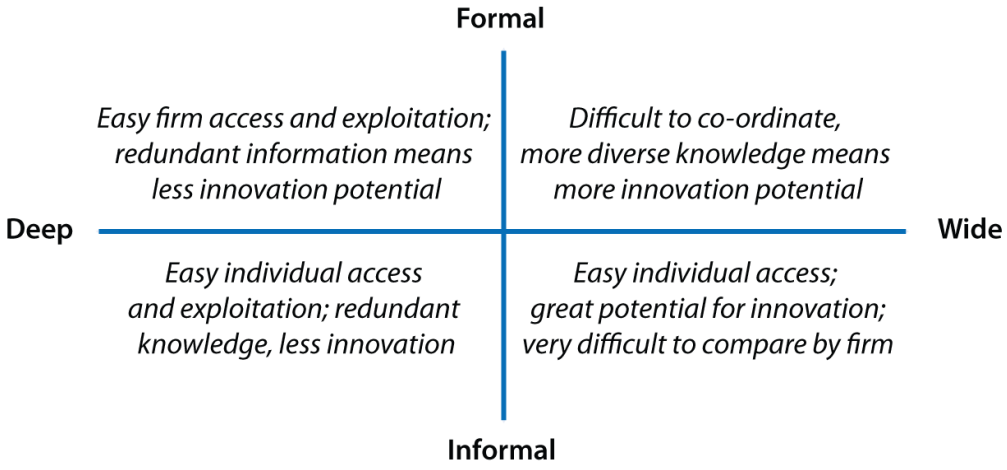

Figure 9. Dimensions of interfirm ties (Simard and West, 2006, p. 235)

Simard and West (2006) argue that wide ties have greater potential to reach radical innovation and deep ties seem to lead to incremental innovation. Radical innovations establish new core designs whereas incremental innovations are minor improvements or adjustments to products or services (Henderson and Clark, 1990). In informal networks it is more difficult to manage and control knowledge exchanges than in formal networks. This agrees with Yoo *et al.* (2009) who argue that the outcome of an innovation process is very influenced by the configuration of the network. Adding to this complexity, digital innovation in some cases forces actors without any previous history into new networks (Yoo *et al.*, 2009). This can be observed in the newspaper industry that today is engaged in value networks in digital media in parallel with the traditional print media.

As a result of the massiveness of digitization digital Innovation processes are becoming increasingly distributed (Yoo *et al*, 2009), not the least in ubiquitous environments (Jonsson *et al*, 2009). Distributed innovation processes change roles and relationships within networks as has been demonstrated in offshore software development (Ågerfalk and Fitzgerald, 2008; Olsson Holmström *et al*., 2008). Yoo *et al.* (2009) argue that new types of innovation networks are emerging. These new innovation network structures can be classed by two dimensions: the homogenous verses heterogeneous *nature of knowledge resources and the distribution of coordination and control* over actors and resources in the network (Yoo *et al.*, 2009). These two dimensions lead to four different archetypes of innovation networks; singular, distributed, systemic, and doubly distributed networks (see Table 3).

Heterogeneity of knowledge resources		Distribution of coordination & control	
		Centralized	**Distributed**
	Homogeneous	**Singular** innovation form	**Distributed** innovation form
	Heterogeneous	**Systemic** innovation form	**Doubly Distributed** innovation form

Table 3. Four types of innovation networks (Yoo *et al.*, 2009, p. 19).

The singular and distributed network classes require homogenous knowledge resources to be identified and assembled. The difference is that singular networks are similar to traditional closed innovation structures such as an internal R&D department managing and controlling the innovation process within an organization. The distributed network class forms a network with distributed coordination and control, like in the open source software community. These two classes mostly involve incremental digital innovations. This is in line with the observation by Simard and West (2006), that overlapping and redundant knowledge bases in interorganizational ties tend to lead to incremental innovation. The systemic and doubly distributed classes of innovation networks are heterogeneous assemblages of multi-disciplinary knowledge resources. Like the singular network, the systemic network is characterized by centralized control structure, typically within a single organization. The doubly distributed network is without hierarchical control. This is the most complex structure of the four. The systemic and the doubly distributed structures involve architectural innovations.

Adding to incremental and radical innovation Hendersen and Clark (1990) describe that changes in the core design concepts leads to modular innovation and changes in the relations between these leads to architectural innovation. Architectural innovation challenges organizations knowledge bases and may have significant competitive implications. These ideas can be linked to the ideas of Abernathy and Clark (1985) who suggest a framework explaining innovations according to their *effects on markets and competences*. These two axis form a typology of four innovations types: regular, niche, architectural, and revolutionary (Figure 10).

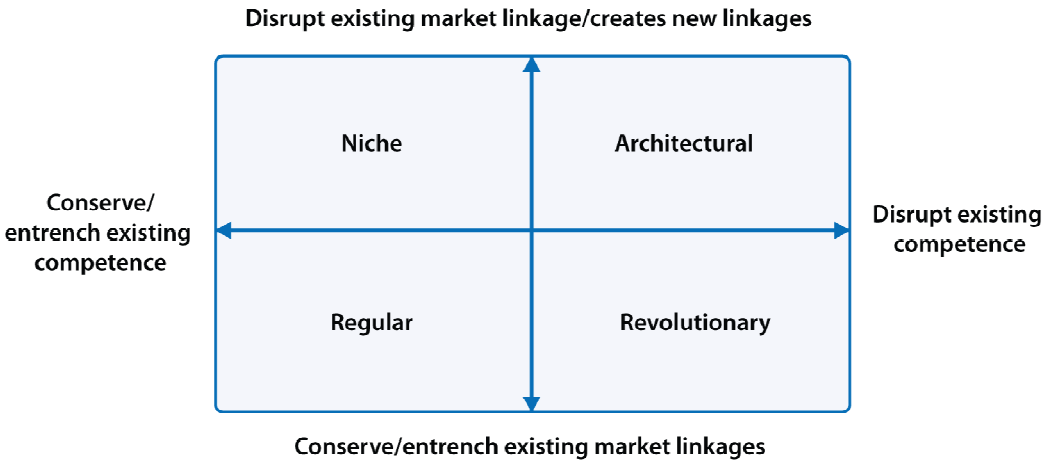

Figure 10. The transilence map (Abernathy and Clark, 1985, p. 8).

The framework in Figure 10 is grounded in an innovation´s product or service lifecycle and highlights that innovations can be disruptive to market and customer linkages as well as disruptive to competence in production system. Seemingly, the later would also apply to the value creating process. During the product or service lifecycle, innovations may shift from one type of innovation to another. The architectural innovation type involved in doubly distributed networks thus has the most disruptive effects on market linkages and competences in the value creation process. Yoo *et al.* (2009) argue that movement towards doubly distributed networks is required for digital innovation, and that digital information infrastructures increasingly will support this type of innovation networks.

Against this background, dimensions of structures along which value networks differ can be identified. Table 4 summarizes these dimensions.

Dimensions		
Interorganizational relations (Simard and West, 2006)	Formal	Informal
	Deep	Wide
Distribution of coordination and control (Yoo, *et al.*, 2009)	Centralized	Distributed
Knowledge resources (Yoo, *et al.*, 2009)	Homogenous	Heterogeneous
Market linkage (Abernathy and Clark, 1985)	Entrenched	Disrupted
Value creation competence (Abernathy and Clark, 1985)	Entrenched	Disrupted

Table 4. Structural dimensions of value networks

This overview shows that the nature of digital innovation indeed influences value networks. It is clear that value networks in digital innovation are multi-layered and that the dynamics of network changes is highly complex. Further it is clear that knowledge, competences, relationships and control are diverse and heterogeneous. Still, innovation networks are recognized as an important research area in IS (Yoo *et al.*, 2009) to be further examined. Even though innovation networks and value networks are closely related, value networks are a specific class of networks (Vanhaverbeke and Cloodt, 2006). Therefore, there is an interest in specifically addressing value networks concerning these aspects. Although value networks are recognized as very important in digital and open innovation literature, there is little IS work presented that highlights these aspects related to value networks. Further, it is important to emphasize that one organization can participate in multiple and parallel value networks. Different types of networks are recognized in literature (Yoo *et al.*, 2009) but there is little discussion on what the implications are for organizations participating in more than one network. There is a need to understand this complexity from a theoretical as well as a managerial point of view (Vanhaverbeke and Cloodt, 2006). In particular, there is a need to understand how the nature, dynamics, and structure of value networks are influenced by digital innovation and in turn how that influences value network configuration (West *et al.*, 2006; Yoo *et al.*, 2009).

Building on this theoretical background, this thesis attempts to fill this gap in literature by seeking to develop a theoretical perspective to help explain how digital innovation influences value network configuration. The next section presents how this gap has been addressed.

4. RESEARCH METHODOLOGY

All research rests on some underlying philosophy of how to achieve an understanding of the research phenomenon, including assumptions of what makes research legitimate and how the research should be conducted to develop new knowledge that is well-grounded and relevant. I will start this section with a brief background to the philosophical underpinning of this research. Then, I describe the DigiNews project and explain the methodological details including research design, data collection, and data analysis. In addition, I outline a reflective account of my research process by self-assessing it according to an established set of criteria of interpretive research.

4.1 PHILOSOPHICAL UNDERPINNINGS

This thesis is based on an interpretive perspective. Such a perspective posits that our knowledge of reality is a social construction by human actors (Walsham, 1993). Meaning is created and associated when people interact with the world around them and is embedded in socially constructed representations such as language, consciousness, shared meanings and artifacts (Klein and Myers, 1999). Given this view of meaning-creation, it is necessary for the interpretivist researcher to study phenomena by seeking to understand the social construction of meaning that is associated with the research setting (Orlikowski and Baroudi, 1991).

Interpretive research in IS is typically associated with case studies, action research, and ethnographies (Walsham, 2006). Regardless of the specific methodology chosen, the fundamental base of interpretive research is the researcher's involvement, ranging from passive observation to intentional action. In fact, the researcher's involvement in fieldwork is the basis for collecting data that is useful for interpretive analysis.

The hermeneutic circle is described by Klein and Myers (1999) as the fundamental principle of interpretive analysis. The hermeneutic circle suggests that new understanding of the whole is constructed from an understanding of individual parts, and in turn, the individual parts are understood with reference to the whole in an iterative process. This iterative process and interrelationship between the whole and the parts forms the hermeneutic circle (Klein and Myers, 1999).

This research seeks to understand how digital innovation influences value networks. Manifested as a hermeneutic circle, my research process entailed multiple iterations between dissecting the parts of value networks and seeking to build them up as a coherent whole. For instance, iterating between value perceptions of the e-newspaper and interorganizational value networks as a whole is an example of such iteration. This iterative process is influenced by the interpretive researcher´s prior assumptions, beliefs, values, and interests (Orlikowski and Baroudi, 1991). In my case, this pre-understanding was initially strongly related to my educational and professional background in business administration and information systems. During the project time, I learned more about the newspaper

industry and about newspaper organizations, which has influenced my understanding as a result of the close relationship built up with the newspaper participants. The studies of parts of value networks have been influenced by the understanding obtained while studying another. While every attempt to rationalize this process risks over-simplification, it is fair to say that the cover paper presents my understanding of value networks as a whole while the individual papers pay attention to different parts.

My understanding of value networks builds on research conducted within the DigiNews project (ITEA 03015). DigiNews was a two-year collaborative research project, including several major newspaper companies, technology firms, and universities across Europe. This project can be described as an interpretive study in which a multiple method approach was adopted in order to get a rich understanding of the research topics.

4.2 The DigiNews Project

DigiNews was an ITEA project. ITEA is a cluster program within EUREKA aiming at supporting the competitiveness of European companies through international collaboration in creating links and networks of innovation. The primary outcome of ITEA programs is therefore not academic research but rather business development.

Nevertheless, ITEA projects are very suitable to study emergence of value networks. ITEA projects are oriented towards building networks in which participants share the risk and benefits of IT innovation, aiming at realizing useful and commercially relevant innovation value. The DigiNews project was initiated by Philips Applied Technology in Belgium in collaboration with the Swedish Newspaper Publishers' Association. The Swedish part of the project was funded by VINNOVA (The Swedish Governmental Agency for Innovation Systems). The project started in mid-year 2004 and ended mid-year 2006. The Media IT[1] group, of which I am a member, was engaged in the project six months prior to the official start of the project. It also engaged in follow-up studies and evaluation that lasted six months after the official project ending. In total, I therefore worked with the project participants for three years.

The overall goal of the DigiNews project was to explore market oriented research and development issues for an electronic newspaper enabled by e-paper technology. The e-newspaper in the DigiNews solution was tested on an e-reader device under development by Philips Applied Technologies which continued to be developed and manufactured in iRex, a start-up company originating from Philips Applied Technologies. In the project the iRex device iLiad was used for demonstration. The newspaper content was produced by some of the participating newspapers in collaboration with the Media IT group from Halmstad University.

The project consortium consisted of complementing companies and research institutions from Belgium, Spain, Netherlands, France, Germany and Sweden. The Media IT group was

[1] For more information about Media IT see media-it.hh.se. Carina Ihlström Eriksson and Jesper Svensson are the colleagues from Media IT I worked with in the DigiNews project.

engaged by the Swedish Newspaper Publishers' Association during the project application phase in addressing design and business model issues. The Media IT group was primarily working with the newspaper partners in the project. The Swedish newspaper partners were Aftonbladet, Göteborgs-Posten, Nerikes Allehanda, Norrköpings Tidningar, Sundsvalls Tidning, Sydsvenskan, and Östgöta Correspondenten. European newspapers were Concentra Media in Belgium, De Telegraaf in the Netherlands, and Le Monde in France.

The business theme of the project is the part discussed in this thesis. The newspapers were the focal actors in our studies. The value network being under formation and the relating aspects of value networks has been studied with the perspective of the newspaper organizations as the main reference point of the e-newspaper value, value network, and business model. However, these concepts have a wider scope than one organization or a group of organizations (Amit and Zott, 2001), in this case the scope is spanning industry boundaries.

4.3 Research Design – a Multi-method Approach

Innovation research is multi-layered in that it spans across multiple levels of analysis. It ranges from the individual level to the interorganizational and regional levels (Gupta *et al.*, 2007). Likewise, as highlighted by Amit and Zott (2001), researching business issues require multiple perspectives and theories to explain the phenomenon. In a similar vein, Vanhaverbeke and Cloodt (2006) call for multiple theoretical frameworks to explain the complex nature of value networks in digital innovation.

Given the multifaceted nature of value networks, I adopted a multi-method approach to understand the influence of digital innovation on value networks (Mingers, 2001). Multi-method approaches refer to the combination of different methods, often qualitative and quantitative methods, to generate more comprehensive explanations of complex phenomena. Mingers (2001) argues that there are several reasons for this approach. First, combining methods from different paradigms allows a richer understanding of the complexity of reality since they focus on different aspects. Second, research is typically a process with different types of activities making different methods useful at different phases of research.

On a detailed level, Petter and Gallivans (2004) suggest five motives for using mixed methods: triangulation, complementarity, development, initiation, and expansion. They recognize triangulation motives as seeking accuracy and validity to results by applying different methods, each strengthening the weaknesses of another. The complementarity motive uses mixed methods to examine different aspects of the same phenomena or to examine overlapping phenomenon. Development refers to the motive of using one method to help develop another primary method, for example using interviews to inform the design of a questionnaire or vice versa. Initiation is conducted to find contradictions in order to reframe the understanding of a phenomenon. Finally, expansion motive aims at expanding the scope and breadth of the research to generate a more comprehensive understanding than a single method can offer. This motive is also recognized by Mingers (2001) as a possibility to widen the scope of a study to take in wider aspects. The multi-method

approach in this thesis is driven by an expansion motive to generate a broad and comprehensive understanding of how digital innovation influences value networks.

In adopting only one theory, a limited view of the research phenomenon is gained (Mingers, 2001). As stated by Walsham (1993), "theory is both a way of seeing and a way of not seeing" (p. 6). Accordingly, the individual papers included in this thesis are drawn on different theoretical areas to focus on a specific part. Theories are often linked to a methodological approach for data collection and analysis. Nonetheless, different theoretical lenses and analysis techniques can be applied to the same data to expand the understanding of results (Traut and Jessup, 2000). Following this line of argument, research on complex and multi-layered phenomena such as value networks require several means of data collection and analysis.

A multi-method approach does not necessarily require interaction between the different methods (Mingers, 2001). The importance is that the different methods are applied to different aspects of the phenomenon studied in order to generate a comprehensive understanding of complex phenomena. Interviews are part of most interpretive studies. Even though interviews are a rich source for interpretations, they should be supplemented with other sources (Walsham, 2006). In this interpretive study we have used a number of different data collection methods including interviews, workshops, documents, and questionnaires. The last mentioned may require a special comment in relation to interpretive research. Quantitative data are according to Walsham (2006) perfectly valid input to an interpretative study. Quantitative results can be interpreted as a social construction (Mingers, 2001).

By using different data collection techniques and models for analysis in addressing different aspects of value networks we have expanded the scope and breadth of the research to generate a more comprehensive understanding. In doing so, we have to some extent been able to cope with the multifaceted nature of the phenomenon with the aim of expanding the theoretical understanding value networks in digital innovation.

4.4 Data Collection and Analysis

The different data collection activities in the DigiNews project and relation to papers are presented in Table 5 along the project timeline.

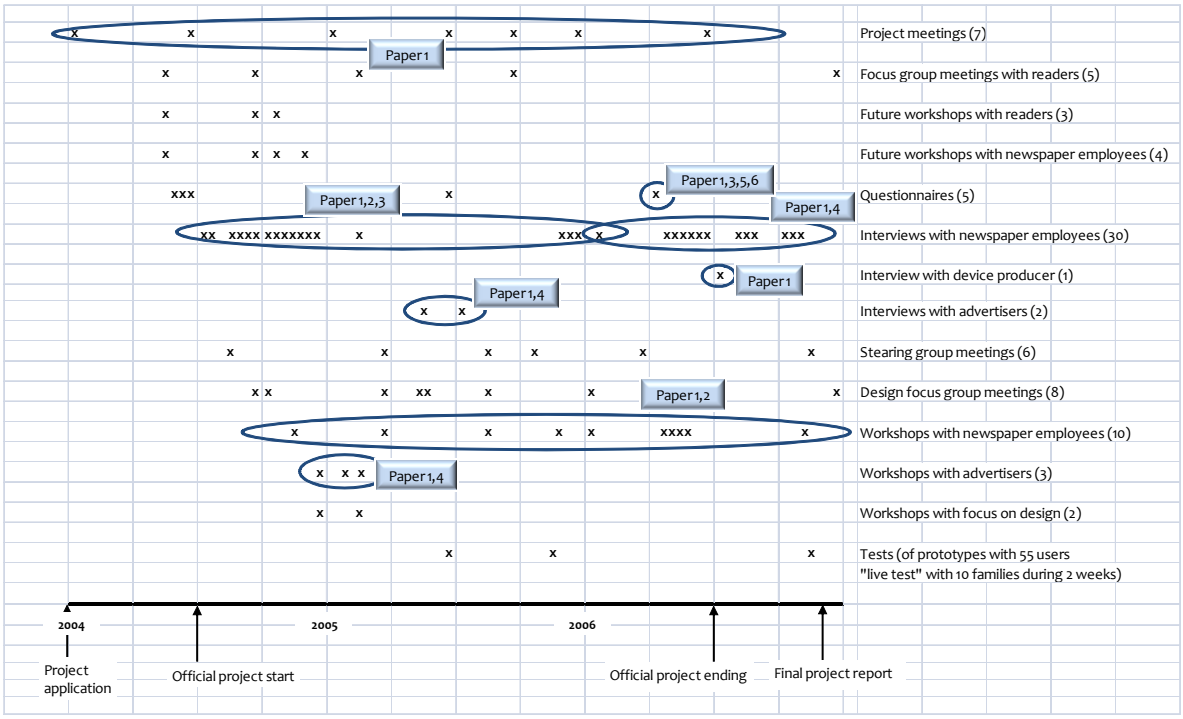

Table 5. Data collection activities in DigiNews

The individual papers of the thesis are based on the data collection activities marked with reference to the related papers (see Table 5). In the following, I will briefly present the different data collection and analysis methods used in this thesis. For more details on data collection and analysis I refer to the individual papers.

Interviews were used to assess interpretations from different stakeholders on different aspects and on different levels. Interviews were primarily used in newspaper organizations, where for example, respondents from management level were interviewed to get an understanding of business concerns on the organizational and industry levels. Newspaper staff from different departments such as editorial, and advertising department were also interviewed concerning their working domains. In addition, there were two interviews with advertisers and one with the project leader from the device producer. These interviews were conducted to get a deeper understanding of specific topics related to their areas.

Workshops were used primarily as a source to collect data about beliefs and expectations related to a future e-newspaper. Workshops were used with newspaper staff, newspaper readers, and advertisers. We chose to use workshops because of the interactive approach allowing us to not only interact with participants but also to observe and interpret how the participants acted and talked about the subject among each other. This allowed us to gain an understanding of their contextually-grounded social experience.

Questionnaires were used as a source to understand the perspective of a wide newspaper audience. All questionnaire data was collected among newspaper readers. The questions were operationalized from theory on different subjects. The questionnaires were tested and

revised with respondents to avoid misunderstandings and alternative interpretations of statements. The data was collected with online questionnaires at Swedish newspaper sites and stored in SPSS files.

Project documentation such as the project application and reports to ITEA, minutes of project meetings and steering group meetings, as well as correspondence between project partners during the project were also used for analytical purposes.

These data collection methods were used to gather rich data from the newspaper companies but also to provide an understanding form related stakeholders. The division of these data sources between different stakeholders is presented in Table 6.

Actors	**Data source**
Publishers	30 interviews, 16 workshops, 8 focus group sessions, project meetings, project documentation
Readers	5 focus group sessions, 3 workshops, 3 user tests and interviews (19 respondents, 36 respondents and 12 respondents respectively), 5 questionnaires
Advertisers	3 workshops, 2 interviews
Device producer and technical solution providers	1 interview, project meetings, project documentation

Table 6. Data sources related to stakeholders

The collected data has been analyzed with different theoretical frames and different approaches depending on type of data. Qualitative data from for example interviews and workshops were analyzed using theory guided themes and coding to interpret meanings. Thematic coding was used with non hierarchical coding arrangements. The coding process was initiated using a priori codes based on themes informed by examining literature that also guided the data collection. Transcribed data material was marked with assigned colors for data categorization. In the coding process, new themes also emerged from the data. When new themes emerged they were coded and applied to the whole dataset re-examining previous coding. The coding was based on identifying related key-terms and on examining similarities and contrasts of wording. All coding and interpretation was done in an iterative process with at least two researchers involved in order to ensure consistency. Respondents were in hesitant cases consulted about adequacy of interpretations of data. Data from questionnaires was analyzed using statistical methods. These methods include bivariate analysis such as correlation analysis and comparing variables cross groups as well as multivariate data analysis such as factor analysis. SPSS software was used in all quantitative analysis. The conclusions from the different analysis were input to the interpretations of the value network phenomenon as a whole. These interpretations were done on the basis of concepts from literature on networks in innovation. The relationship between the papers, data collection and analysis is presented in Table 7.

Parts	Paper	Theoretical frame	Data collection	Analytical approach	Contribution from parts	Interpretive lens for the whole	Contri-bution from the whole
Value Network	1	Genre (Yates and Orlikowski, 1992; Shepherd and Watters, 1998) and actor network theory (Callon, 1986; Latour, 1992)	DigiNews Case	Thematic coding	Tensions in the formation of value networks ⇨	Concepts of networks in digital innovation (e.g Abernathy & Clark, 1985: Christensen & Rosenbloom, 1995; Chesborough & Rosenbloom, 2002; Chesborough *et al*, 2006; Van de Ven *et al*., 2008; Allee, 2008; Yoo *et al*., 2009) ⇨	Model of value network config-uration
	2	Platform logic framework (Sambamurthy and Zmud, 2000)	Interviews (18) and workshops (9)	Thematic coding	Challenges of aligning new value networks in UME ⇨		
Value	3	Model of value proposition dimensions (Clarke, 2001)	Interviews (18) Survey (1388)	Thematic coding of interview data. Descriptive statistics and factor analysis of survey data	User vs. provider discrepancy of mobile service value dimensions ⇨		
	4	Context adaptation interrogatives (Abowd and Mynatt, 2000)	Interviews (15) and workshops (9)	Thematic coding	Balancing conflicting values of advertising in UME ⇨		
Business Model	5	Business model construct (Hedman and Kalling, 2003)	Survey (3626)	Factor analysis and correlation	Emerging ubiquitous business model for media content ⇨		
	6	Adopter categories (Rogers, 1995)	Survey (2976)	Comparative analysis of cluster groups	Initial target groups for digital media innovations ⇨		

Table 7. Data collection and analysis in relation to papers

Since the motive with mixing methods was to expand the scope of research and broaden the understanding of the phenomenon the use of the contributions from the different parts were designed as a multilevel approach (Mingers, 2001). This means that they were not designed as a sequence of studies one contributing with distinct input to the other, but rather as studies complementing each other with different aspects on different levels. Thereby, the various papers represent different parts of value networks on different levels and from different perspectives. They relate to the model of value networks according to Figure 11.

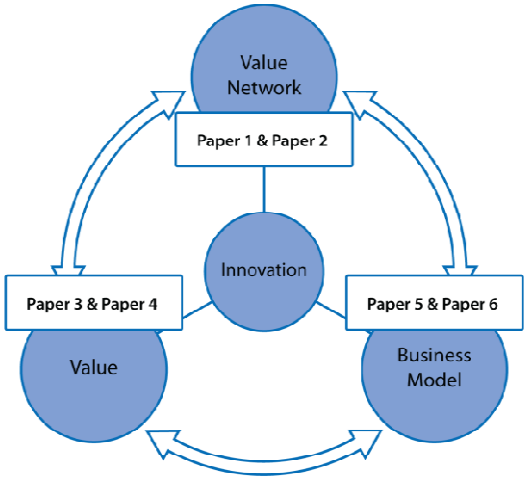

Figure 11. Relation between papers and model of value networks

A summary of each paper is presented in the next section. As these papers are co-authored with colleagues there is good reason to present my own contribution to data collection and analysis in each paper. This is summarized in Table 8.

Papers		**My contribution**
Paper 1	Ihlström Eriksson, C., Åkesson, M., Bergqvist, M., and Ljungberg, J. (2009). Forming a value network - analyzing the negotiations between actors in the e-newspaper case. In *Proceedings of HICSS'42*, Big Island, Hawaii.	Second author, equally responsible for data collection and analysis with the first author
Paper 2	Åkesson, M. and Ihlström Eriksson, C. (2008). From Multi Channel Publishing towards a Ubiquitous Media Environment, *TAGA Journal,* Vol 4, pp. 126-148.	First author, both authors equally responsible for data collection and analysis
Paper 3	Åkesson, M. (2007). Value proposition in m-commerce: exploring service provider and user perceptions. *Global Mobility Round Table Conference*, Los Angeles, May 31-June 2.	Single author, responsible for data collection and analysis
Paper 4	Åkesson, M. and Ihlström Eriksson, C. (2009). Advertising Challenges in Ubiquitous Media Environments. In: Pousttchi, K.; Wiedemann, D.G. (Eds.): *Handbook of Research on Mobile Marketing Management*. Information Science Reference, Hershey (in press).	First author, both authors equally responsible for data collection and analysis
Paper 5	Ihlström Eriksson, C., Kalling, T., Åkesson, M. and Fredberg, T. (2008). Business Models for m-services - exploring the e-newspaper case from a consumer view. *Journal of Electronic Commerce in Organizations*, Vol. 6, No. 2, pp 29-57.	Third author, equally responsible for data collection with the other authors, main responsible for data analysis
Paper 6	Ihlström Eriksson, C., Åkesson, M., Svensson, J., and Fredberg, T. (2007). Introducing the e-newspaper - identifying initial target groups. *Journal of Media Business Studies*, Vol. 4, No. 3, pp. 41-62.	Second author, equally responsible for data collection with the first author, main responsible for data analysis

Table 8. Authors contributions to papers

By synthesizing the contributions from the various papers addressing different aspects and reflecting on the contributions as a whole, a deeper understanding of the influence of digital innovation on value networks emerged. The theoretical base for the interpretations on a meta-level evolved over time in response to the empirical findings, as well as studies of current literature on digital innovation. The main contribution in the cover paper presented in section 5.4 is a model of value network configuration. The model was shaped through an iterative process between theory and empirical data and between the parts and the whole, guided by the hermeneutic principle.

4.5 Reflections on Research Approach

Conducting interpretive research (Walsham, 2006), it might be useful to reflect upon the extent to which my research can be justified in view of its tenets. Such self-assessment can take different forms (Klein and Myers 1999; Golden-Biddle and Locke 1993; Walsham 2006).

I have chosen to use the principles outlined by Klein and Myers (1999) in self-assessing my research. These principles are grounded in the fundamental principle of the hermeneutic circle. Table 9 presents a summary of the principles as presented by Klein and Myers (1999).

Principles for interpretive field research
1. *The fundamental principle of the hermeneutic circle* This principle suggests that all human understanding is achieved by iterating between considering interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all other principles.
2. *The principle of contextualization* Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.
3. *The principle of interaction between the researchers and the subjects* Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants.
4. *The principle of abstraction and generalization* Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action.
5. *The principle of dialogical reasoning* Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.
6. *The principle of multiple interpretations* Requires sensitivity to possible differences among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.
7. *The principle of suspicion* Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.

Table 9. Summary of principles for interpretive field research (Klein and Myers, 1999, p.72).

Principle 1 is a meta-level principle that represents the fundament for human understanding. The fundamental principle of hermeneutics has been the basic principle that this research rests on in terms building an understanding by iterations between the parts and the whole.

The *2nd principle* of contextualization is reflected upon in the section describing the newspaper industry as well as in several of the individual papers as far as the newspaper industry setting is concerned. This description aims at providing the academic audience with the background needed to understand the current situation in the newspaper industry. Further, presenting the literature on ubiquitous computing is intended to provide an understanding for the emerging digital innovation space. These two backgrounds form the starting point to understand the changes to value networks influenced by digital innovation situated in the newspaper industry. The understanding of how value networks are influenced is grounded in the history as well as in studies of the present, and interpretations of how activities produce new emergent structures.

Reflecting on *principle 3* involves reflecting on my interactions with the research subject as an IS researcher. This reflection is related to the discussion of authenticity by Golden-Biddle and Locke (1993). Authenticity refers to being genuine to the field by conveying that the researcher has "been there" and that the researcher´s understanding is genuine to the field. In the DigiNews project the Media IT group interacted very closely with the participants from newspaper companies. We have paid many visits to different newspaper sites for conducting interviews, workshops, and tests. During our visits we have also socialized with newspaper employees in their every-day work settings. Further, the project meetings have given us opportunities to socialize with participants from several different organizations and participate in their interactions about the newspaper industry. Involvement is according to Walsham (2006) a spectrum of different styles and it changes often over the time the research is conducted. In this research I have in some periods been very actively involved in representing the newspaper organizations interest in the value network. At other times the style of involvement has been more of a neutral interviewer within the newspaper organizations in the meaning of not representing any specific newspaper organization or any specific interests within the newspaper organizations. As understood from the above, we have built up very close relationships with the participating newspaper organizations in DigiNews. As a consequence, we sometimes experience the disadvantage of losing the benefit of a fresh outlook as discussed by Walsham (2006). This can be exemplified by our self reflection on our participation in the DigiNews meetings, where we afterwards realized that we sometimes interpreted discussions more from the viewpoints of the newspaper organizations interest than from our own research contribution. However, in the process of looking back at my research process in writing articles and this cover paper I have been able to hold a critical distance.

The *4th principle* regards abstraction and generalization. In interpretive studies, theory is important as a "sensitizing device to view the world" (Klein and Myers, 1999, p. 75). Depending on the focus of different studies of parts, different theories and methods have informed the analysis. In each case, we have carefully related details of the studies to the general conclusions made. For example, this has been done by using quotes from interviews

and workshops mediating observations in the respondents own language to link details from the studies to the abstractions or generalizations made through theoretical lenses. In iterating between understanding the individual details and understanding the phenomena as a whole, following the hermeneutic principle, further conceptualizations have been made presented in this cover paper. The logical reasoning leading to these conceptualizations are clearly linked to each individual paper in order to present the reader with the possibility to follow the abstractions to the details.

Next, *principle 5,* referred to as dialogical reasoning, is related to the description of the philosophical underpinnings of this research. In clearly stating the roots and underlying interpretive perspective behind this research, the reader is presented with the fundamental stand of this research. The involvement in interpretive research is not value-less, rather the interpretations rest on researchers' prior assumptions, beliefs, values, and interests that influence the research (Orlikowski and Baroudi, 1991). In the studies the engaged researchers have continuously discussed how data was analyzed and interpreted. In these discussions we have been alert on our own beliefs and if these beliefs are consistent and relevant to the conclusions. Further, we have not limited interpretations to theoretically informed concepts but also let new themes emerge.

Principle 6 regards multiple interpretations of data. During the three years that we were involved with the newspaper companies in these studies we have revised our preconceptions as a result of revealing conflicting interpretations. These conflicting interpretations have been revealed within single organizations, between different newspaper organizations and between different actors in the DigiNews project as a whole. In fact, one of the papers (paper 1) included in this thesis presents several conflicting interpretations. These conflicting interpretations have also been the source of some of the conceptualizations of value networks in digital innovation presented in this cover paper. One example is the conflicting interpretations between the participants in the project of the value of an e-newspaper to the media consumer customer and to the advertising customers.

Finally, in taking *principle 7* into account, I will just shortly comment on the strong culture within the newspaper industry. Newspapers have a long history with relatively little change. Given this there are a number of beliefs or common "truths" that often influence discussions. Interestingly, these "truths" are internationally shared as we have experienced them within DigiNews but also in our interactions with newspaper representatives at international conferences with participants from all parts of the world. After taking some of these "truths" into account in our studies we have been able to understand that they are historically inherited rather than grounded in the present. In fact some of the slow innovation capability in the newspaper industry could have its explanation in some of these beliefs.

5. RESEARCH CONTRIBUTIONS

This thesis builds on a collection of published journal and conference papers that have been peer-reviewed by the international community of scholars. In addition, the cover paper synthesizes these contributions into a coherent and relevant perspective on value networks in digital innovation. In particular, I present a conceptual model of value network configuration and a set of related implications.

This section first summarizes each individual paper and provides an overview of how they are linked to the overall contribution of the research. Thereafter, I also present related papers, which report results from the DigiNews project that have influenced my understanding. Following the paper presentation, I discuss the influence of digital innovation and the emerging UME on value networks in the newspaper industry. Lastly, the model of value network configuration in digital innovation and implications for research and practice are outlined.

5.1 SUMMARY OF RESEARCH PAPERS

The paper presentation is organized according to Figure 11 (see section 4.4) presenting the relationships between *value network*, *value*, and *business model*. The summaries are based on the primary focus of each paper but there are overlapping discussions between the three themes.

Value Networks

Paper 1 – Tensions in forming value networks

The first paper addresses the process of forming a new value network in digital innovation. In this paper concepts form genre theory were used as a tool to understand the characteristics of the digital innovation and a set of concepts related to actor network theory to capture the process of network formation. Based on the DigiNews project as a case, empirical data from interviews, workshops, focus groups, surveys, project meetings, project documentation, and user tests were analyzed. The aim was to understand how the negotiations between different stakeholders, e.g. newspaper publishers, device producers, readers and advertisers, unfolded in forming a value network around the e-newspaper. The insights from the DigiNews project show how the value network created around a digital innovation is dependent on the convergence of different interests. The pattern of negotiations revealed that there are opposing forces in play. On the one hand the actors are striving to mobilize for example new actors, competences and customer bases in an open network. On the other hand, strong actors are striving to become an obligatory passage point and stabilize the network by taking a focal actor position in a more closed and fixed network. In the DigiNews case these forces resulted in a dead-lock situation between the device producer and newspaper publishers as both strived after taking the focal actor position in the value network.

Ihlström Eriksson, C., Åkesson, M., Bergqvist, M., and Ljungberg, J. (2009). Forming a value network - analyzing the negotiations between actors in the e-newspaper case. Proceedings of the Forty-Second Annual Hawaii International Conference on System Sciences (CD-ROM), January 5-8, 2009, Computer Society Press.

Paper 2 – Challenges of aligning new value networks with existing in UME

This paper investigates the challenges of aligning a new value network with existing value networks. Drawing on a study with newspaper publishers in Sweden, Belgium, France and the Netherlands consisting of 18 interviews and 9 workshops this paper demonstrates that content providers publish in multiple channels and thereby they also exist in a multitude of infrastructures. On the basis of the platform logic framework (Sambamurthy and Zmud, 2000) the analysis shows that each infrastructure has its value network, which in turn means that content providers exist in many parallel and interrelated value networks. The findings show that value networks in multiple channel publishing environments are closely related to infrastructure. The nature of UME will have implications on value networks openness and flexibility. Value networks will need a fluid and flexible structure to cope with changes in very short cycles. The heterogeneity and dynamics of value networks will increase in UME.

Åkesson, M. and Ihlström Eriksson, C. (2008). From Multi Channel Publishing towards a Ubiquitous Media Environment, TAGA Journal, vol 4, pp. 126-148.

Value

Paper 3 – Content provider vs. media consumer discrepancy of mobile media service value dimensions

In this paper the content provider and consumer value perceptions of mobile media services is compared using a model of value proposition dimensions of mobile commerce (Clarke, 2001). The content provider perceptions were analyzed from an interview study with 18 newspaper publisher representatives. The media consumer perception of value was analyzed from a dataset of 1388 media consumers who regularly use mobile media services. The findings show that there are similarities as well as differences in perceptions of value held by content providers and media consumers of mobile media services. Content providers perceived media consumer value dimensions to be *ubiquity*, *localization*, *personalization*, *convenience*, and *content provider/consumer relationship*. The analysis of media consumer perceptions revealed that ubiquity and service provider/user relationship were perceived as general service characteristics by media consumers rather than value dimensions. The value dimensions were identified as *localization*, *personalization*, *convenience* and *socialization*. This paper demonstrates that mobility indeed is a strong value driver in media. However, it also highlights a disparity between content providers' assumptions of customer value and customers actual value perception. For example, social values were a much stronger value dimension than publishers expected. These findings show that value is redefined and that the value drivers identified in UME leads to an increased divergence of media services.

Åkesson, M. (2007). Value proposition in m-commerce: exploring service provider and user perceptions. Global Mobility Round Table Conference, Los Angeles, May 31-June 2.

Paper 4 – Balancing conflicting values of advertising in UME

UME offer new opportunities for content providers to innovate advertiser customer value. This paper explores the opportunities with ubiquitous advertising based on interviews and workshops with 20 advertisers and 34 content providers. There are indeed many new promising values to offer advertiser customers such as increased reachability, targeting individual customers, tailored advertising, enhanced interactivity, tracing and tracking information etc. With this prospect in view, this paper discusses how content providers relation to customers in the value network is changing. On the basis of context adaptation interrogatives (Abowd and Mynatt, 2000), the increased complexity of balancing media consumer and advertiser values is highlighted. This paper contributes with an increased understanding of the implications on value brought by the heterogeneity, diversity and, dynamics in UME.

Åkesson, M.and Ihlström Eriksson, C. (2009). Advertising Challenges in Ubiquitous Media Environments. In: Pousttchi, K.; Wiedemann, D.G. (Eds.): Handbook of Research on Mobile Marketing Management. Information Science Reference, Hershey (in press).

Business Models

Paper 5- Emerging ubiquitous business models for media content

Using the e-newspaper innovation as an example, this paper shows that there indeed are new emerging structures for business models in UME. This paper presents a business model framework for future e-newspapers based on customer preferences. The findings are based on a survey among media consumers with 3626 respondents. After a presentation of the newspaper innovation the respondents were asked questions drawing on a business model construct (Hedman and Kalling, 2003). Through a factor analysis, three aspects of consumer preferences were identified: u*biquitous access*, p*restige of news source* and *local anchorage and advertising*. These were thereafter correlated with media consumer behavior and e-newspaper preferences indicating three possible market segments matching these aspects. The paper suggests an integrated business model framework consisting of three models, i.e. *ubiquitous*, *local,* and *prestige* models, with the ubiquitous model as a new emerging model. This ubiquitous business model is more customer pull oriented and brings increased diversity due to heterogeneity of for example devices, use-situations, and customer profiles.

Ihlström Eriksson, C., Kalling, T., Åkesson, M. and Fredberg, T. (2008). Business Models for m-services - exploring the e-newspaper case from a consumer view. Journal of Electronic Commerce in Organizations, Vol. 6, No. 2, pp 29-57.

Paper 6 - Initial target groups for digital media innovations

The sixth and final paper explores how different groups of media consumers differ with respect to the adoption of new innovative digital media services. Data was collected from in total 2976 respondents through the web sites of three Swedish newspapers on the theme of media consumption, technology use, and preferences of media products and services. Based on a set of key questions, the dataset was split in four groups in the analysis; early adopters, active media consumers, engaged media consumers (i.e. those who were identified as both early adopters and active media consumers), and finally, those who did not fit in any of the previous categories. A comparative analysis was conducted between these four groups in order to identify and explore important media consumer groups that can be used as initial target groups for media innovations. The engaged media consumer group proved to have stronger preferences than the other three groups and emerged as a very interesting initial target group for new digital media innovations. The paper expands the existing framework of early adopters (Rogers, 1995), which is closely to the technological aspects of a product, by including users that are more interested in the social and content-related aspects of media services. This paper shows that the adoption drivers of digital media innovations do not distinctly separate technology and content. Digital media innovation adoption is influenced by several innovation layers such as service, device and distribution. This paper demonstrates that the business models strategies for market diffusion would gain from a more inclusive view of an innovation than in traditional diffusion of innovations literature in recognizing that adoption of digital media is increasingly dependent on media content.

Ihlström Eriksson, C., Åkesson, M., Svensson, J., and Fredberg, T. (2007). Introducing the e-newspaper - identifying initial target groups. Journal of Media Business Studies, Vol. 4, No. 3, pp. 41-62.

5.2 Related Research Papers

Given the focus of this thesis, the articles included in my analysis of value networks in digital innovation represent a subset of the research conducted in the DigiNews project. There are also related papers that report from the development and design of the e-newspaper that have influenced me during the project as I have been engaged in the empirical studies as well as co-authored the papers. Thus, these papers also manifest my research process as a PhD student. I have written the following papers that were deemed to be overlapping or outside the scope of my focus in the thesis (see Table 10), and therefore not included as contributions.

Paper	Year
Ihlström Eriksson, C., *and* Åkesson, M. (2008). Ubiquitous Advertising Challenges. In *Proceedings of 7th International Conference on Mobile Business*, Barcelona.	2008
Ihlström Eriksson, C. *and* Åkesson, M. (2007). An Interorganizational Learning Approach to New Innovations: Exploring the e-newspaper Case. In *Proceedings of the 4th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning*, Cape Town, October 15-16.	2007
Ihlström Eriksson, C., Åkesson, M. *and* Hakeröd, J. (2007) Advertising in Ubiquitous Media Environments. In *Proceedings of the 30th Information Systems Research Seminar in Scandinavia*, Finland.	2007
Ihlström Eriksson, C. and Åkesson, M. (2007). Introducing the e-newspaper - Audience Preferences and Demands. In *Proceedings of the International Conference on Electronic Publishing, ELPUB 2007*, Vienna, June 13-15.	2007
Åkesson, M. and Ihlström Eriksson, C. (2007). The vision of ubiquitous media services: How close are we? In *proceedings of HCI International*, Beijing, July 22-27.	2007
Ihlström, C., Åkesson, M., Svensson, J. and Fredberg, T. (2006). Audience view on new technology for media consumption. Accepted to the *International Workshop on Consuming Audience*, Copenhagen, Denmark, September 29-30.	2006
Åkesson, M. (2006). Mobile service value – presenting the newspaper publisher view on how to attract users and advertisers. In *Proceedings of the 29th Information Systems Research Seminar in Scandinavia*, Denmark.	2006
Åkesson, M. and Ihlström, C. (2006). Designing and evaluating the calm e-newspaper. In *Proceedings of ECIS 2006*, Göteborg.	2006
Åkesson, M. and Ihlström, C. (2006). Towards a Ubiquitous Media Environment - adding the e-newspaper channel. In *Proceedings of TAGA 2006*, Vancouver.	2006
Ihlström, C., Svensson, J., and Åkesson, M. (2005). Participatory Design of Future Every Day IT Artifacts - Engaging readers and publishers in designing the e-newspaper. In *Proceedings of the 28th Information Systems Research Seminar in Scandinavia*, Norway.	2005
Ihlström, C., Sabelström Möller, K. and Åkesson, M. (2005). The Challenge of Production in e-paper Publishing - from new consumption to new workflows. Presented at In *proceedings of TAGA 2005*, Toronto.	2005
Ihlström, C., Svensson, J. and Åkesson, M. (2005). How would you like your e-newspaper? - converging the best of two worlds. In *proceedings of HCI International 2005*, Las Vegas.	2005
Ihlström, C., Svensson, J. and Åkesson, M. (2005). Designing the Future e-newspaper - the da Vinci Approach. In *proceedings of HCI International 2005*, Las Vegas.	2005
Ihlström, C., Åkesson, M. and Nordqvist, S. (2004). From Print to Web to e-paper - the challenge of designing the e-newspaper. In *Proceedings of ICCC 8th International Conference on Electronic Publishing, ELPUB 2004*, Brasilia, pp. 249-260.	2004

Table 10. List of additional publications related to the DigiNews Project

5.3 Influence on Value Networks

Even though the development and design of the e-newspaper is not the focus in this thesis, there is reason to comment on the e-newspaper as a digital innovation since it is around this innovation that value networks, value and, business models emerged. The e-newspaper innovation can be regarded as the result of a wake (Boland *et al., 2007)* of innovations starting with the enabling E ink technology, the application of E Ink technology in e-paper display technology, and the application of e-paper in reading devices (see Figure 12).

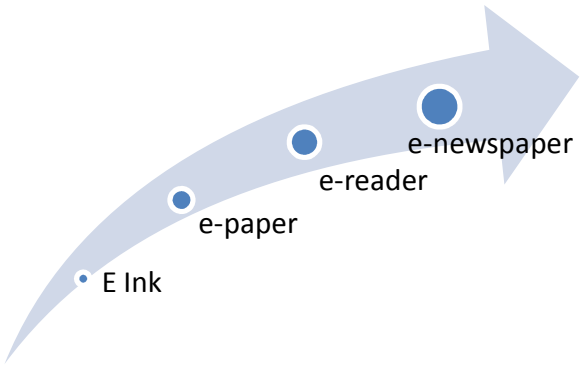

Figure 12. Innovation wake

Given this, the e-newspaper innovation is dependent on multiple layers of complementing innovations and can thus be regarded as a systemic innovation system (Maula *et al.*, 2006). In DigiNews, the two top layers were represented: the e-newspaper and the e-reader. The e-reader was primarily represented by the device producers and the e-newspaper by newspaper organizations, both complementing each other. For example, the value of an e-reader would not be realizable without media content, and in turn, the e-newspaper concept is dependent on the architecture of the e-reader product system. In other words, the e-newspaper innovation is linked to a larger business system spanning not only organizational boundaries but also technological paradigms and industry boundaries.

The e-newspaper innovation has in this research been in focus to understand how digital innovation influence value networks. In synthesizing the results from the different papers in this section Figure 13 presents a summary of how digital innovation and the emerging UME has influenced value networks of newspapers drawn from the parts presented in the papers. The influence of digital innovation on value networks is discussed with reference to literature on networks in digital innovation and examples from the DigiNews project.

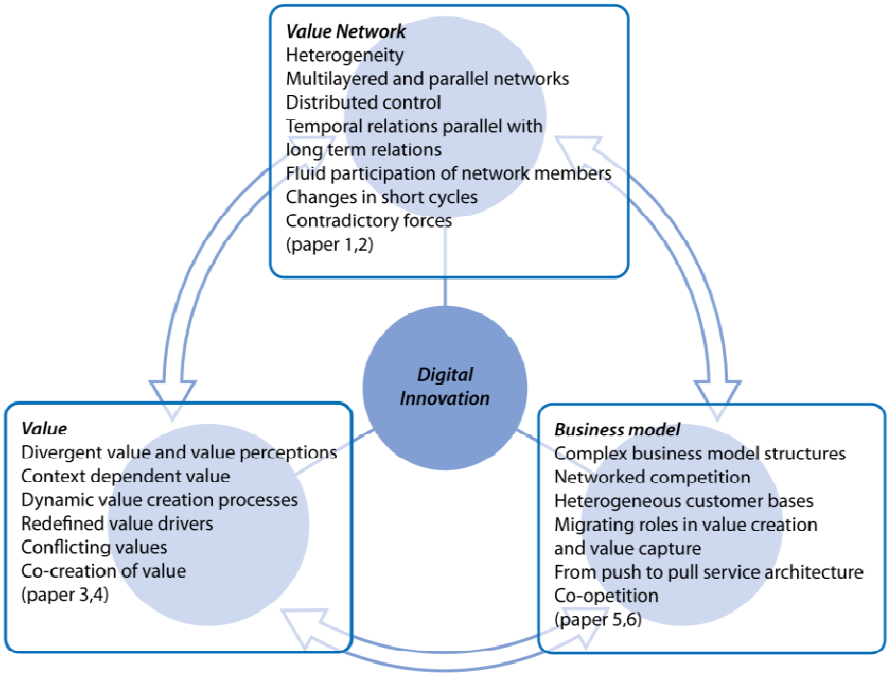

Figure 13. Overview of results from the individual papers

Influence on value network

Digital innovation has clearly influenced value networks in the newspaper industry. As shown in the DigiNews case (paper 2), the emerging heterogeneous technology and business environment drive value networks into new structures in line with the observations by Yoo *et al.* (2009). The emerging structure is characterized by heterogeneous knowledge bases and distributed control. The e-newspaper for example, is a result of bringing knowledge from the newspaper industry together with knowledge from applied digital technology. Adding to the complexity there is a strong trend and escalating digitization of media content. In the newspaper industry case, it has been observed that traditional media still exist in parallel with new media innovations, and in networks crossing organizational and industry boundaries, as well as spanning over several innovation layers. This leads to newspaper organizations existing in an environment characterized by multi-layered heterogeneity and existence in multiple parallel networks (paper 2). These networks differ in character depending on the type of and maturity of media innovation but they also differ in character depending on types of knowledge and control (Yoo *et al.*, 2009) and types of relational ties (Simard and West, 2006). As opposed to traditional media such as the printed newspaper, new digital media are associated with networks with heterogeneous markets, distributed control over network and business model, and wide and informal ties in the network. As can be observed in the DigiNews case, long term relationships exist in parallel with temporal relationships and participation by network members is at times fluid (paper 2).

Further, the structure of value networks is not static (Christensen and Rosenbloom, 1995), in the newspaper industry it can be observed that value networks changes in shorter cycles as a consequence of digital innovation (paper 2). The DigiNews case also demonstrates that there are contradictory forces to value network changes (paper 1) in line with observations from other industries (Henfridsson *et al.*, 2009; Jonsson *et al.*, 2009). On the one hand there are driving forces to mobilize for example new actors, competences, markets in an open and flexible network. On the other hand, strong actors are striving to stabilize the network by establishing themselves as obligatory passage points taking control over the value network (paper 1). This is corresponds with the observation by Van de Ven *et al.* (2008) that there is convergent as well as divergent behavior in innovation. These contradictory forces of mobilizing and stabilizing create dynamic changes with actors continuously entering and leaving the value network, as observed by Yoo *et al.* (2005) in the telecom industry.

Influence on Value

The emergent divergence and heterogeneity brought by UME is indeed very challenging for value creation (Fleish and Tellkamp, 2006). The character of UME with converging technology leads to a great divergence in services and service distribution. This means that value cannot always be pre-defined but rather created in real-time use. Value in UME is a synthesis between the content, the device and how it is distributed in relation to the context (paper 3). Consequently, value creation is required to be dynamic and contextually adapted to the user´s situation (paper 4). In UME, value creation is increasingly distributed across diverse contexts. Thus, value *creation* is exceedingly context dependent (Abowd and Mynatt, 2000), likewise customer *perception* of value is context dependent (paper 3) thereby redefining value dimensions of ubiquitous media. The observations from DigiNews show that this applies for media consumers (paper 3) as well as advertiser customers (paper 4) in newspaper industry. The dyadic customer base of media industry also leads to very challenging balancing of conflicting values (paper 4). Still customers, wheather media consumers or advertisers, are vital in co-creating value and are also potential sources of new innovations (Stabell and Fjellstad, 1998; von Hippel, 2005). Accordingly, the relationship to customers is becoming of increasingly strategic importance in the value network.

Influence on Business Model

Business models in UME are characterized by high complexity. Not only are the business opportunities related to UME very challenging (paper 5), but they are also forcing the system of innovation levels from a hierarchy of supplier and customer relationships to a network of co-opetition relationships (Van de Ven, 2008; West, 2007). One obvious example from the DigiNews project is the relationship between the device producers and the newspapers. Historically, these two actors have not had any relationship since content and devices have not been coupled in value propositions or in business models. In DigiNews, both had motives to connect content and device. The motive from the device producer was to enable value of an e-reader with quality media content. For the newspapers the motive was to influence the development of a digital device suited for newspaper content in order to design value propositions incorporating a newspaper dedicated device (paper 5). The

linkages and roles between different stakeholder´s value capture defined by the business model are migrating and a co-dependence of roles in the business model is emerging. In the DigiNews project this was reflected on the device producers intending to sell newspaper content through their content management system and the newspaper organizations intending to sell devices branded with the newspaper brand. Further, the convergence of technology and media leads to a pull oriented nature of a service architecture in UME (paper 5). Reaching anyone, anywhere, in any device, at anytime with any content and adapting content to the use situation leads as described earlier to redefined value drivers. Consecutively, the divergence and heterogeneity of customer needs and customer bases concerning media consumers as well as advertisers increase. In turn, this requires reassessing customer target groups and markets (paper 6). As a result, new market knowledge is required from new external resources (Vanhaverbeke and Cloodt, 2006) thus creating a need for heterogeneous knowledge resources. Heterogeneous knowledge bases drives new digital innovation (Yoo *et al.*, 2009) as also observed in the DigiNews case. This leads to changing business models and disruption of value creating competence and market linkages (Abernathy and Clark, 1985). In DigiNews, the business model emerged as the most challenging issue in negotiations since the e-newspaper challenged traditional business models in newspaper industry as well as the appliance industry. The concept of the e-newspaper was indeed challenging to their strong brands and identities within their industries respectively. The different organizations all had their interpretation of business models. Especially, the relationship to end customers was the most challenging to agree on. Not in respect to optimize customer value but rather to secure strong positions in the value network. In the DigiNews case this led to the newspaper companies and the device producers not agreeing on business models. This highlights the competition side of the co-opetition nature of value networks in digital innovation in line with the discussion by Van de Ven *et al.* (2008).

In summary, this research demonstrates that digital innovation indeed influences value networks in the newspaper industry. *First*, it is highlighted that value networks in digital innovation are dynamic and exist in multiple layers and in parallel. For example, value networks related to the printed newspaper exist in parallel with networks related to on-line newspapers, to mobile news services, and the emerging networks related to e-newspapers. *Second*, the empirical analysis unfolds the dialectic nature of change in mobilizing and stabilizing efforts. For instance, newspaper organizations are engaged in mobilizing new partners and seek new business in digital media innovation, at the same time they are putting effort into stabilizing their position in the new emerging networks. *Third,* it is demonstrated that there are diametrically different structures of value networks with convergent structures related to more mature media and divergent structures related to new digital media innovations. For example, the value networks related to mature media services such as the online newspaper are characterized by centralized control, homogenous knowledge bases and well established ties. The emergent networks related to e-newspapers in the DigiNews case is on the other hand characterized by heterogeneous knowledge bases and fluid participation. These networks are interrelated but still have very different structures.

This highlights the complexity related to organizations existing in multiple value networks at different levels and of very different structures and reconfigured through dialectic processes. There is indeed a need to understand how value networks are reconfigured. The model of value network configurations presented in the next section is an attempt to conceptualize such an understanding.

5.4 The Model of Value Network Configuration

On the basis of conceptualizations of networks in innovation (see e.g. Yoo *et al.*, 2009; Van de Ven *et al.*, 2008; Vanhaverbeke and Cloodt, 2006; Chesbrough and Rosenbloom, 2002) and the observations from digital innovation in newspaper value networks, this thesis presents a model which I term *the model of value network configuration.*

Important concepts of the model of value network configuration are: *value networks* in movement, *directions* of movement and the *structural poles* between which value networks move. Value networks in movement refer to value networks being dynamic and in continuous change. Directions of movement refer to value networks moving back and forth in two dialectic directions through change by the conflict of the opposing forces of mobilizing and stabilizing. Lastly, structural poles refer to the diametrically opposite structures, convergent structure and divergent structure that value networks move between. These three concepts form a set of components building up the model of value network configuration. The model as depicted in Figure 14, consists of a) the model of value network with interrelationships to business model and value, b) two dialectic directions of movement – mobilizing and stabilizing, and c) two diametrical poles – convergent structure vs. divergent structure.

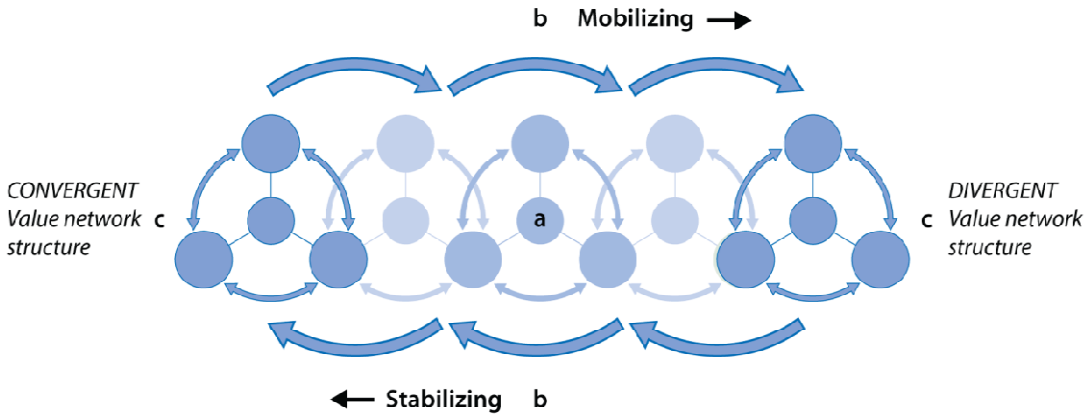

Figure 14. Model of value network configuration

Component a) value network

Component *a* represents value network and the interrelationship with value and business model. The interrelationship between these is centered on innovation. The role of the value network is to realize innovation value through the business model embedding the value creation and the relationships within the value network. The relationships within and

between value networks are characterized by co-opetition. Further, value networks are multi-layered and exist in parallel. For example, one organization can participate in several value networks that exist in parallel and in hierarchies related to different digital innovations. These parallel networks can be positioned differently between the diametrical structures. Value networks continuously and dynamically change and thus move between the different structures. The movement of a value network can be triggered or amplified by for example innovation on another innovation layer, influences from outside the value network boundaries such as radically changed competition, from informal ties within the network, and from customers within the network. The movements of value networks may be of very different pace, the more divergent structure, the faster pace in shorter cycles. The degree of movement an innovation requires in and between value networks is related to type of innovation. Regular and incremental innovations are more related to convergent structure whereas architectural and radical innovations are more related to divergent structure. This model confirms that value networks are *multi-layered* and in constant *dynamic* change through their existence.

Component b) mobilizing and stabilizing

Component b reflects the directions of movement of value networks in two directions. These directions are driven by two dialectic processes, mobilizing vs. stabilizing. Mobilizing refers to divergent behavior of for example mobilizing new market knowledge, new customer bases, new actors from areas outside the focal actor's traditional cooperation and competition. These efforts cause movement of the value network towards divergent structure. Stabilizing refers to convergent behavior by for example stabilizing the structures of the value network by centralizing control, defining customer bases, standardizing business model structure, and formalizing and deepening ties with actors with aligned interests. Stabilizing efforts initiate movement towards convergent value network structure. The co-opetition in value networks ads to this dialectic relationship by the need for securing the advantage of participating in the network is greater than participating in competing networks. Each time participants enters or leaves the network the stability is shaken. Moreover, the greater the uncertainty in value creation, the greater uncertainty in network relations there are. Architectural and radical digital innovation, at least initially, are characterized by this uncertainty and starts movements towards divergent network structure. We can expect more mobilizing efforts the more radical or architectural an innovation is and the more experimental the business model is. On the other hand, we can expect more efforts to stabilize as an innovation is changing its role in the value network. Over time, an innovation that was architectural can change in its meaning to the network, as the technology matures efforts to standardize and clearly defined value creation, business models and relations will initiate stabilizing movement towards convergent structures. This model suggests that value network reconfiguration is *dialectic*.

Component c) convergent structure vs. divergent structure

The convergent and divergent structures form a set of *diametrical* structures of value networks. The convergent structure is characterized by formal and deep network ties,

centralized coordination and control, homogenous knowledge resources, and entrenched market linkages and value creation competence. Typically, value networks far to left in the model are associated with incremental or regular innovation. The values are mature and well known and the competence required in value creation is entrenched. The divergent structure is characterized by informal and wide ties, distributed coordination and control, and disrupted market linkages and value creating competence. Value creation and market knowledge is disrupted by radically new technologies or business concepts. New emerging value networks centered on architectural and radical digital innovation start from the right, and as the innovation is diffused and adopted and the technology and market matures, the value network will move towards the left. The more convergent the structure is the more stabile it is, until it is challenged or disrupted. The more divergent structure the more uncertainty there is in the value network but also the more flexible and susceptible it is to changes in the environment. The model suggests that value networks configuration is *diametrical*.

The model of value networks configuration proposed in this thesis, explains that the dialectics between convergence and divergence of value networks is driven by two processes: mobilizing and stabilizing. In the model, value networks are understood as dynamic, multi-layered, dialectic, and diametrical. Table 11 summarizes the nature of the components in the model of value network configuration.

Component	Nature of component	Observation from DigiNews
a Value network	Value networks are *multi-layered* and exist in a system of interwoven innovation layers, and *dynamically* change and move between different structures	Multiple interconnected value networks related to e-paper, e-readers, e-newspapers etc Newspaper organizations existing in traditional publishing value networks in parallel with new value networks in digital media, for example value networks related to printed newspapers in parallel with e-newspaper value network
b Mobilizing and stabilizing	Mobilizing and stabilizing are two *dialectic* processes that rule the movement between convergent and divergent structures.	Efforts to open networks and engage with new technologies, actors and identify new markets were observed. When business opportunities became clearer efforts to take control and stabilize for example business models, value and relations were observed.
c Convergent and divergent structure	Convergent and divergent structures are two *diametrically* different structures that value networks move between.	Value networks related to traditional media such as printed newspapers were observed to be stabile, fixed relationships, well defined value and business models etc. Value networks related to new digital media were observed to be more open and flexible with more external relationships and fluid participation. Value and business models more flexible and variable.

Table 11. Components of the model of value network configurations

The model of value network configurations affords examining digital innovation from innovation process to market. Focusing on networks instead of single organizations efforts to diffuse innovations allows more balanced analysis of digital innovation not limited to the boundaries of organizations or markets. The model of value network configuration is intended to explain key aspects of the value network in digital innovation phenomenon and the relationships and interactions between these key aspects. This view of value networks encourages analysis of value networks processes through which value networks are reconfigured. There are a number of research implications as a result of the model of value network configuration.

5.5 Research Implications

The research in this thesis was conducted during a three year period following the DigiNews project. Naturally it is very challenging to summarize all the insights gained during this time. The individual papers following this cover paper represent some while others are presented in related papers (see Table 9). Here, I will discuss the research contribution provided by the model of value networks configuration in digital innovation presented in the cover paper.

5.5.1 Implications for Theory

This research contributes to the research on digital innovation in information systems by portraying a new way of understanding the complex nature of value networks in digital innovation. In addition to understanding value networks as multi-layered and dynamic, this thesis suggests understanding value networks as dialectic and diametrical. Attempting to broaden the knowledge of this phenomena I here make the following propositions.

Proposition 1: Recognizing value networks in digital innovation as multi-layered helps us understand linkages in and between value networks.

The multi-layered nature of value networks in digital innovation is largely related to the systemic character of digital innovation and closely related to the business model. Adding to previous literature recognizing the multi-layered nature of value networks (Christensen and Rosenbloom, 1995; Maula *et al.*, 2006) this research shows that organizations participate in parallel networks with different positions and that the meaning of the digital innovations is interpreted differently by various participants in different positions in the value network. Analysis of value networks not taking this multi-layered nature into account runs the risk of missing out on linkages outside a single value network context that influence the behaviors and structures within the value network under study.

Proposition 2: Recognizing value networks in digital innovation as dynamic helps us understand patterns of change.

The main components and the relationships in a value network can be regarded as relatively stable if studied at one point in time. Confirming previous research (Christensen and Rosenbloom, 1995; Van de Ven *et al.*, 2008) this model recognizes that value networks constantly change during their existence. Rather than regarding value networks in digital innovation as changing in a linear mode or evolving uncertainly according to ad hoc

reactions, this model suggests understanding the change as dynamic. This work contributes to previous literature in recognizing the dynamic nature of value networks we can understand that these constant changes occur at different pace and with different outcomes.

Proposition 3: Recognizing value networks in digital innovation as dialectic helps us understand points of tension and instability in the networks.

The dialectic attribute suggests that value networks in digital innovation are characterized by complex co-dependencies as suggested by previous research (Vanhaverbeke, *et al.*, 2006; Simard and West, 2006; West *et al.*, 2006). Further there are contradictions between established structures and new configurations brought by digital innovation (Henfridsson *et al.*, 2009; Jonsson *et al.*, 2009). This work shows how this leads to contingencies of contradicting efforts of mobilizing and stabilizing. In attempting to understand this constant change, this research suggests that it is fruitful to distinguish analytically between mobilizing activities causing changes that move the network towards divergent structure, from stabilizing causing changes that move the value network towards convergent structure. While digital innovation encourages a movement towards a divergent structure, business negotiations have been shown to be invoking movement towards convergent structures. Not recognizing this attribute in analysis of value networks would provide a limited view of the sources of tension and instability in value networks.

Proposition 4: Recognizing value networks in digital innovation as diametrical helps us understand managerial challenges in digital innovation.

The diametrical attribute suggest that the dimensions along which these opposite structures take form presents a wide spectrum of different value network structures as discussed in previous research (Abernathy and Clark, 1985; Simard and West, 2006; Yoo *et al.*, 2009). This work contributes by illustrating that organizations concurrently participate in multiple interconnected value networks which challenges management since different structures call for differing managerial capabilities. The diametrical attribute imply a need for understanding the need for dynamic managerial capabilities in digital innovation.

5.5.2 Implications for Practice

Clearly, the newspaper industry is in the midst of disruptive change. The development towards UME is pushing value networks of newspapers towards divergent structure while the value networks related to mature media are more convergent. For management of focal organizations to plan and organize value networks these are very important insights. The same strategy cannot apply to all structures of value networks. Up until today, innovation efforts in the newspaper industry have been highly directed towards technology and not so much on business model and value network levels. An increased awareness of how value networks are influenced by digital innovation is hopefully useful for newspaper industry to bring the core of newspaper value into the digital era.

Some concrete proposals can also be made. In view of the background of newspaper industry presented in section 2, there are some observations that can be of guidance for newspaper industry on their digital journey. *First*, there is indeed a pressing need for newspaper stakeholders to continue and intensify digital innovation efforts, and prioritize efforts on innovating value and business models relating to media consumers as well as advertising customers. In this course, it is important to recognize that value drivers are a moving target. The era when a business model can last as long as the printed newspaper model has, is most likely history.

Second, newspapers would benefit from thinking less in mass-media and more in relational and experience media. Media consumers have high expectations on media experience and advertising customers on connecting to markets. Thereby, I would argue, it is more important to know your customer than to own your customer.

Third, there is a need to open the innovation culture to a networked innovation environment. In this spirit, newspaper companies would gain from recognizing the strategic advantages of co-opetition also outside industry boundaries.

My *fourth* and last proposal regards re-thinking the identity which still today is very closely related to the paper news is printed on. Newspapers have very high competence as quality content providers but need to develop their mindsets on the relation between content and the media through which the content is made available. This research gives guidance towards a direction where context is put in focus rather than publishing channel. Newspaper brands are very strong content brands. It can be expected that the development towards UME will make content brands more important since media devices without content are uninteresting. With media constantly present in our every-day lives, people are likely to turn to trusted brands. If so, this could be the start of a golden era for content providers. However, this is not to say media consumers are willing to pay for content unconnectedly since value is dependent on a synthesis of several layers, for example the unity of content, presentation and distribution. As affirmed in this thesis, there is a need for business model innovation.

As a final point, these proposals are naturally not to be regarded as a roadmap for success. Each newspaper is an individual in the industry and has specific circumstances to put these proposals in relation to. Be that as it may, I hope they can be useful to nourish fruitful discussions of newspaper's future innovation paths.

5.5.3 Directions for Future Research

There are several implications for future research coming out of this thesis. First, future empirical work is needed to develop, revise and confirm the proposed model. This could be done by expanding the empirical context to other industries and to other types of innovations. By studying the influence of digital innovation on value network configuration in other contexts, the results from this thesis can be further developed and expand the basis for validation and generalization. Especially significant is to pay more attention to the

linkages between different network layers and between different levels in the network architecture.

Further, the model of value network configuration does not directly take in hand how the different structures of value networks interact. Future research could analyze the relationships between different value network structures more in depth, especially networks with overlapping participation and the relation to type of digital innovation.

Especially interesting is to determine the forces underlying mobilizing and stabilizing behavior and how these drivers interplay in order to deepen the understanding of value network configuration. Since there is a strong convergence trend in media industry this topic is very timely.

Lastly, this research was conducted in a setting where we were fortunate enough to follow the emergence of a new value network. Conducting studies of value networks over a longer period of time would deepen our understanding of the phenomena and result in advanced theoretical insights of value networks.

There are naturally limitations to this research. One is that it has been conducted with the newspaper industry as the focal actor meaning that concepts of value networks, business model and value have been interpreted through this industry lens. Another is that the research did not include all layers of the systemic e-newspaper innovation. Furthermore there are alternative methodologies that could be applied to examine the influence of digital innovation on value networks. For example, in depth industry case studies with longitudinal data could generate deeper understanding and theoretical insights.

Even so I believe that the suggested models are abstracted in the conceptualizations in such a way that they may be utilizable in other settings where value networks in digital innovation are of research interest.

6. CONCLUDING REMARKS

The model of value network configuration is intended to highlight key aspects of the value network phenomenon and suggest typical relationships influencing value networks in digital innovation. This intention is a corollary of the research question: *How are value networks of newspapers influenced by digital innovation?* Firstly, this thesis presents theoretical concepts and their relations applicable to understand value networks in digital innovation. These are presented as a) a model of value networks nature, b) aspects of value network dynamics, and c) dimensions of value network structure. Secondly, the influence of digital innovation on value networks was demonstrated with the development towards UME in the newspaper industry. Finally and most importantly, this thesis proposes a theoretical perspective with which to understand how digital innovation influences value networks. This perspective is instantiated as a model of value network configuration. The model emphasizes the multi-layered, dynamic, dialectic, and diametrical character of value networks in digital innovation.

The proposed model of value network configuration can inform future investigations of value networks in digital innovation along the proposed theoretical implications of this thesis. Focusing on value networks may allow deeper insight into the inherent complexity and uncertainty involved in future digital innovation. The research in this thesis challenges current ways of understanding value networks as a single construct. The model of value networks configuration can serve as a basis for developing a richer understanding of value networks in digital innovation by providing a vocabulary and analytical tool to explore the nature of value networks in digital innovation.

I strongly believe that we are merely in the beginning of the digital era. The benefits *and* consequences of digitization are probably up to now only observable on the surface. In this thesis the digitization of newspapers has served as an example. Newspaper publishing and the newspaper industry has been very stabile and fairly unchanged for hundreds of years. Now, it is shaken in its foundations by digitization. However, the core value of newspaper publishing is not to my firm belief the print on paper but quality content and high integrity. These values are not outdated in the digital era and UME which I am confident e-paper will be part of in more developed forms. How the newspaper industry and newspaper publishing will participate in future value networks of UME and e-paper platforms will probably be shaped by actions taken in the near future.

It is therefore a privilege to be able to continue this line of research within the newspaper industry. The Media IT research group at Halmstad University has been invited and will take part in the formation of the International e-Reader Association (IeRA) initiated by American newspaper companies. The IeRA initiative is aiming at an open innovation process and formation of value networks of newspaper publishing on e-paper platforms. The initiators therefore invite a broad spectrum of international actors to participate such as newspaper companies, device producers, technology developers, service providers, software

companies, and academic institutions. The role of the Media IT group in the IeRA will be to coordinate the academic research within the association. Further, the Media IT group is engaged with a group of local Swedish newspapers in a two year project to explore future engagement of users in local social media with an open innovation approach. Thereby I can conclude this thesis by saying: *it now begins.*

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