Knowledge Sharing in the New World of Work : Effects of the New Way of Working

Arjan de Kok* · Roel Esten** · Remko W. Helms***

■ Abstract ■

The New Way of Working (NWOW) is changing the world in which we work today. The principles of NWOW are based on freedom of time and place to work, and steering on output (results) instead of input (presence). As NWOW is a relatively new phenomenon, research on the effect of NWOW on knowledge sharing in organizations is scarce. In this research two multiple-case studies were performed to investigate the effect of the New Way of Working on knowledge. In the first study (A) different knowledge sharing scenarios were used at organizations that were in the process of implementing NWOW. This provided the opportunity to compare the sharing of knowledge between 'NWOW workers' and employees that still worked in the traditional way (non-NWOW workers). In total 216 scenario results were evaluated to determine differences in channel choice between the traditional and new work environment. For the second study (B) a Knowledge Sharing Framework was developed, based on the theories of Nonaka and Alavi & Leidner. This framework was used to determine the type of knowledge shared, e.g. tacit or explicit knowledge, in 84 situations. Additionally, to measure the level of NWOW adoption, a NWOW Analysis Monitor was used. The results show that NWOW workers use more different communication channels than traditional workers. When knowledge workers become more mobile, they will exchange knowledge less explicit (codified) and more tacit (personalized), use less face-to-face communication, but more video calls and e-mail. The adoption of the principles of NWOW seems to have a balancing effect on the knowledge that is shared in a tacit and explicit way, which in the view of Scheepers et al. is an effective knowledge sharing strategy. The research results show organizations need to realize that the New World of Working is affecting the way knowledge is shared. Missing out on this development may result in the loss of important knowledge and impact the operation of organizations.

Keyword : New Way of Working, NWOW, New World of Work, Knowledge Sharing

1. Introduction

Where in the past many authors e.g. Hammer and Champy (1993) envisioned a 'New World of Work' with information technologies as rule-breaking for the way business processes would change, the last decade has shown an increase in pace in which new ways of working are being adopted in organizations. Bødker and Christiansen (2002) were one of the first to observe that 'new work is characterized by a mobile, networked technology, project-managed organization, and new office designs. The office designs are explicitly motivated by the wish to facilitate creativity, knowledge sharing and communication, carried out across a variety of settings : office, home, airports, coffee shops and cars.' The creation of new office spaces, that are breaking with all traditional rules and design concepts, is probably one of the most visible effects of the New Way of Working (NWOW). Offices transform from dull production facilities to inspiring meeting places, in which no effort is spared to create a new sense and experience of work (Waber et al., 2014). Though groundbreaking office (re)designs also happen outside the realm of NWOW, the combination with ICT usage and new working relations, is breaking old rules. Employees enter into new working relations in which they have the freedom to decide when and where to work, and they become responsible for their results, instead of being measured by their 'presenteeism' at the office (Johns and Gratton, 2013).

As the New Way of Working is still a relatively new phenomenon, scientific research on the effects on organizations and individuals is still scarce. One of the aspects that may be impacted by the new work environment is the way in which knowledge is shared. New ways of working may require, and result in, new ways of knowledge sharing. Not being able to cope with this new world of work may result in the loss of important knowledge, that is shared in ways that are not managed by today's traditional methods for managing knowledge sharing.

In this multi-case research, the effects of the New Way of Working on knowledge sharing was analyzed in two studies. The first study (A) focused on the changes in channel choice when sharing knowledge, the second study (B) focused on the changes in the type of knowledge that is shared. Chapter 2 describes the backgrounds of the New Way of Working, knowledge sharing, and channel choice. The research method is explained in chapter 3. Chapter 4 discusses the research results of the channel choice, the way in which the different types of knowledge are shared, and the effect of NWOW on knowledge sharing. This leads to a number of conclusions and recommendations for future research in chapter 5.

2. The New Way of Working and Knowledge Sharing

2.1 What is the New Way of Working?

In literature, the New Way of Working does not go by a single definition. Bijl (2011) defines NWOW as 'a vision for making work more effective, efficient, pleasurable and valuable for both the organization and the individual. This is achieved by placing people center-stage and, within limits, giving them the space and freedom to determine how they work, where they work, when they work, what they work with and with

whom they work. The New Way of Working aims to touch people's intrinsic motivation and entice them into giving their best in their work.' Baane et al. (2010) add : 'The work principles of The New Way of Working give maximal freedom to employees, on the basis of mutual trust. This trust is expressed in the freedom that employees have for carrying out their work in ways, times and locations that suit them best. The employees are evaluated based on their personal or on the team contribution to the result, rather than their presence. Thus the employees can engage in a working relationship that suits them best in terms of ambition, skills, lifestyle or stage of life.' In summary, the New Way of Working can be defined as 'a vision for the organization of work and the work environment in such a way that employees are enabled and motivated to work in an optimal way, that suits them best, in order to improve employee satisfaction and work-life balance. Key elements in this vision are the freedom and trust to be able to work anyplace and anywhere, a result oriented way of working, and offices with activity-based workplaces, that are designed to enhance interaction, engagement and creativity'.

The context of NWOW can be divided into three dimensions : Bricks, Bytes and Behavior. (1) Bricks, the physical dimension, addresses all aspects of the physical work environment, (2) Bytes, the technological dimension, that addresses all aspects concerning the use and application of ICT, and (3) Behavior, the personal dimension, which addresses all aspects concerning the manager-employee relationship and the way the employee works and experiences his or her work. Though the work principles of NWOW can also be applied in 'production and location based' work environments, they are best applied in the work environment of the 'knowledge worker' (Greene and Myerson, 2011).

2.2 Types of Knowledge Workers

Nowadays, the term knowledge worker often refers to office workers, however, this has not always been the case. The first professions that were identified as 'knowledge workers' were doctors, lawyers, scientists and academics (Green and Myerson, 2011). Later, Peter Drucker extends the term knowledge worker to include 'knowledge technologists.' These are computer technicians, lab analysts, paralegals and software designers; people whose work requires formal knowledge yet still contains elements of process work. He states 'knowledge technologists are now among the fastest growing class of workers' (Drucker 1999).

Greene and Myerson (2011) distinguish 4 different types of knowledge workers :
- The Anchor; has a consistent presence in the office; the Anchor is the person others go to in order to get information, hence they play a vital role in knowledge sharing within an organization;
- The Connector; depends on interaction with people from different departments and across different sections of the organization, but these interactions remain focused internally within the office building;
- The Gatherer; relies on relationships gathered away from the office. As a resource, the office is important as a place where they can distil, process and review information on their own or face-to-face with relevant colleagues;

• The Navigator; is rarely in the office at all, the Navigator works for the organization at arm's length. E.g. a contractor who is employed on a project basis, the nomad salesman who attends the office a few times a month, and the consultant who arrives for a meeting and needs access to a space where they can sit down and use their laptop.
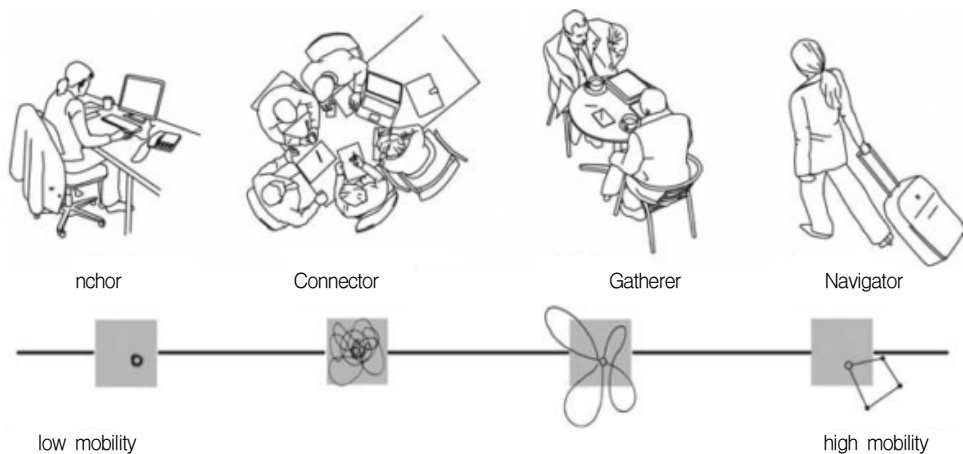
<Figure 1> shows the different types of knowledge workers and their mobility.

2.3 Knowledge Sharing Framework

Davenport and Prusak (1998) define knowledge as 'a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information. It originates in and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.' Ipe (2003) states : 'An organization's ability to effectively leverage its knowledge is highly dependent on its people, who actually create, share, and use the knowledge. Leveraging knowledge is only possible when people can share the knowledge they have and build on the knowledge of others. Knowledge sharing is basically the act of making knowledge available to others within the organization. Knowledge sharing between individuals is the process by which knowledge held by an individual is converted into a form that can be understood, absorbed, and used by other individuals. The use of the term sharing implies that this process of presenting individual knowledge in a form that can be used by others, involves some conscious action on the part of the individual who possesses the knowledge.'

Knowledge can be divided in explicit knowledge and tacit knowledge. Nonaka (1994) explains these two types of knowledge as follows : 'Explicit or codified knowledge refers to knowledge that is transmittable in formal, systematic language; Tacit knowledge has a personal quality, which makes it hard to formalize and communicate. Tacit knowledge is deeply rooted in action, commitment, and involvement in a spe-

<Figure 1> Type of Knowledge Worker and Mobility

cific context.' In other words, explicit knowledge is documented knowledge that can reasonably easily be transferred between people and systems, e.g. an instruction. Tacit knowledge however, is personalized knowledge, that is more difficult to share. It is acquired through study and experience, e.g. riding a bike.

Alavi and Leidner (2001) make a further distinction in the following knowledge types :

To collect the research data on the different types of knowledge sharing a Knowledge Sharing Framework was developed. This framework is a combination of the types of knowledge as defined by Alavi and Leidner, with the types of knowledge as described by Nonaka :

In the Knowledge Sharing Framework all choices for tacit or explicit knowledge sharing are registered, including the option of a mixed choice of tacit and explicit knowledge sharing (50/50). In the result section (Chapter 4) the Knowledge Sharing Framework is used to display the results for the individual cases, the results per type of knowledge worker, and the effect of the level of NWOW adoption on the type of knowledge shared in the cases.

The question on the type of knowledge sharing is : which strategy is the most effective for organizations? In their model of knowledge strategy and IT support Hansen, Nohria and Tierney (1999) argue that, in order to enable effective use of knowledge, organizations should select a 80/20 knowledge strategy mix of codified (explicit) and personalized (tacid) knowledge. Scheepers et al. (2004) do not reject this strategy, but they find organizations may evolve their knowledge strategy mix over time.
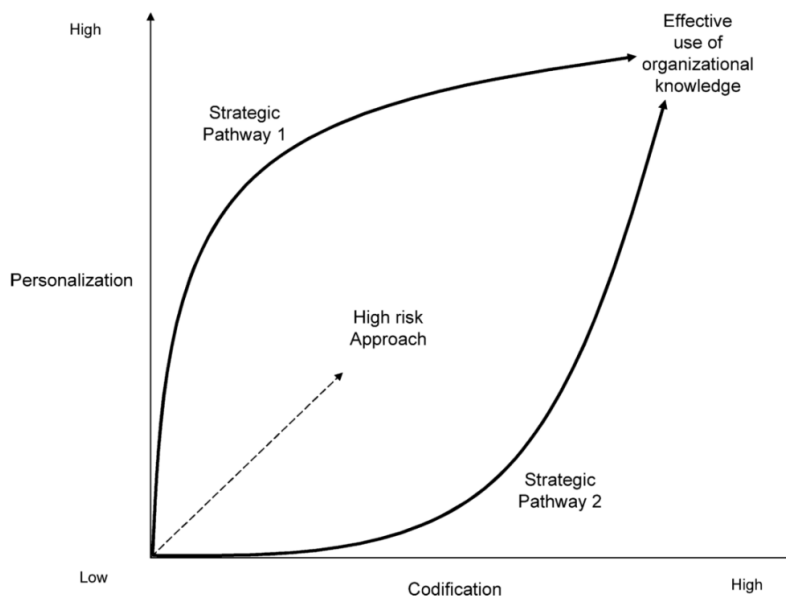
They propose two strategic pathways in the 'journey' towards effective use of organizational knowledge. The two pathways have an initial dominance for either codification or personalization,

〈Table 1〉 Knowledge Types (Alavi and Leidner, 2001)

Knowledge type	Definition	Example
Declarative	Know-about	What drug is appropriate for an illness
Procedural	Know-how	How to administer a particular drug
Causal	Know-why	Understanding why the drug works
Conditional	Know-when	Understanding when to prescribe the drug
Relational	Know-with	Understanding when to prescribe the drug
Pragmatic	Know-what	Useful knowledge; best practices, experiences, specifications, reports

〈Table 2〉 Knowledge Sharing Framework

Knowledge type	Mostly Tacit	50/50	Mostly Explicit
Declarative			
Procedural			
Causal			
Conditional			
Relational			
Pragmatic			

〈Figure 2〉 Model of Organizational Knowledge Strategy Evolution (Scheepers et al., 2004)

but over time a more balanced (50/50) mix of codification and personalization evolves as the most effective knowledge strategy.

2.4 Knowledge sharing and channel choice

It is often not clear what conditions lead an employee to choose a certain communication channel e.g. a face-to-face meeting, an e-mail or a phone call. Snyder and Lee-Partridge (2009) claim that employees nowadays have a wide array of information and communication technologies from which to choose, but may not make rational choices when determining what channel to use for sharing knowledge. Orlikowski (1992) states that research has confirmed the notion that technologies are non-deterministic, but that the employee's selection and use of technologies emerge from situated practices. In other words : employees tend to choose the channel for knowledge sharing based on their experience of availability, usability, effectiveness and convenience. This means that new ways of working and new technological opportunities will not affect the channel choice until the employee has gained sufficient satisfactory experience with this new channel.

Carlson and Zmund (1999) identify the following experiences as being particularly relevant for the channel choice :
- Experience with the channel;
- Experience with the messaging topic;
- Experience with the organizational context;
- Experience with communication
  co-participants.

The Media Richness Theory of Daft and Lengel (1984) describes organizational communication channels, possessing a set of objective characters that determine each channel's capacity to carry rich information. According to the Media

Richness Theory messages should be communicated on channels with sufficient and appropriate media richness capacities. Carlson and Zmund (1999) state that 'messages communicated on channels that are inappropriate to the equivocally of a situation and richness of the information sought to be transmitted may be misinterpreted by recipients or may be otherwise ineffective with regard to their intended purpose.' In both studies in this multi-case research all participants had access to the same set of communication channels, independent from their 'new' work environment.

2.5 NWOW Analysis Monitor

More and more organizations embrace the principles of the New Way of Working. When researching the effect of NWOW on aspects such as knowledge sharing, the question is relevant : to what extent have organizations adopted the principles of NWOW? Even when the phenomenon of NWOW as such is not known (for studies outside the Netherlands and Scandinavian countries), one could discuss that, any organization that focusses on implementing new ways of working has reached a certain level of NWOW adoption. The question is however : which level?

In order to be able to measure the current level of NWOW adoption, and the future desired state of NWOW implementation, a so called NWOW Analysis Monitor was developed (de Kok et al., 2014). The monitor enables an objective measurement of the level of NWOW adoption on 13 themes that are clustered on the before mentioned three dimensions : Brick, Bytes and Behavior.

These themes are :

Within each theme, topics are defined that can be rated on a 4-point Likert scale. Using weight factors, the result can be presented at the level of themes and dimensions. The NWOW Analysis Monitor has proven to be a useful instrument for measuring the current level of NWOW adoption and future desired level of NWOW implementation.

Though the NWOW Analysis Monitor is able to present results for both the current and future situation, including a gap analysis, and details for both managers and employees, in this research only the current level of NWOW adoption at the level of the three dimensions were used for a comparison between the case companies.

The NWOW Analysis Monitor results were used to plot the results of the Knowledge Sharing Framework against the level to which the organizations had adopted the principles of the New Way of Working. In this way a comparison could be made between the type of knowledge that is shared and level of NWOW adoption.

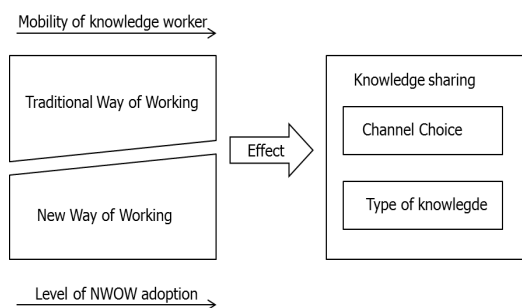⟨Table 3⟩ Dimensions and Themes of the NWOW Analysis Monitor

Bricks-Physical dimension	Bytes-Technological dimension	Behavior-Personal dimension
Flexible work location	Devices	Result-oriented management
Workplace design	Information availability	Result-oriented working
Sustainability and mobility	Knowledge availability	Trust and autonomy
	Communication	Satisfaction and work-life balance
	Collaboration	Culture and motivation

The results of this comparison are discussed in the results section.

3. Research Method

3.1 Research Approach

In this research the effect of the implementation of the New Way of Working on knowledge sharing was investigated. In particular the channel choice for knowledge sharing and the type of knowledge was researched.

〈Figure 3〉 Research Model

For this research two multiple-case studies were performed. Multiple case study A focused on the channel choice when sharing knowledge. In this study a comparison was made between workers in the traditional and the new work environment. Multiple case study B focused on the type of knowledge that is shared in a NWOW environment. In this study the level of NWOW adoption in the participating organizations was measured using the NWOW Analysis Monitor. In both studies the types of knowledge workers (Anchor, Connector, Gatherer, Navigator) were determined, enabling insight in the effect of the New Way of Working on the mobility of the knowledge worker.
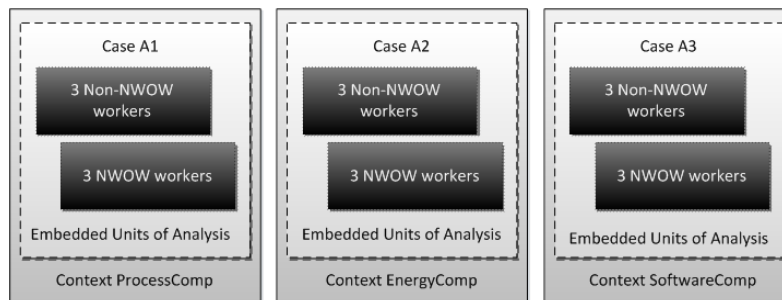
3.2 Multiple-Case Study A : Channel Choice for Knowledge Sharing

In the first multiple case study (A), three case studies were conducted at large Dutch for-profit organizations that were all in the transformation process towards NWOW. By choosing organizations that were in the process of implementing NWOW it was possible to make a comparison between employees from the same organization working according to the concepts of NWOW (NWOW workers) and employees that were still working in the traditional way (non-NWOW workers). In order to observe corresponding findings across the cases, an overall case study protocol was created with the same set of basic set of questions for both groups of workers in all cases (Yin, 2009). As the implementations of NWOW may vary in the emphasis on the different elements of NWOW, an additional context analysis was performed to gain insight in the way NWOW was implemented in each individual case company.

The selected organizations for study A were :
Case A1 : ProcessComp, a 22,000 employee multinational in health and nutrition;
Case A2 : EnergyComp, a 4,300 employee Dutch Energy Operator;
Case A3 : SoftwareComp, a 15,500 employee international software company.

In total 18 participants were interviewed, divided in groups of 3 non-NWOW and 3 NWOW workers per company. Apart from the context analysis, for the interviews of the participants a list of 12 knowledge sharing scenarios was used.

〈Figure 4〉 Multiple Case Study A : Comparison between NWOW and Non-NWOW Workers

In this study the effect of NWOW on the channel choice of NWOW workers, in particular in relation to the type of knowledge worker (Anchor, Gatherer, Connector, Navigator), was researched. For each knowledge scenario the participants were asked what channel they would choose. In total 216 (12×18) knowledge sharing scenarios results for channel choice were researched.

The (seven) channels defined for this research were :
- Face-to-face
- Video call
- E-mail
- Phone call
- Chat message
- Document sharing system
- Intranet message

The channel list was not exclusive, but appeared to be sufficient. Remark : when a video call was the preferred (and chosen) channel, a face-to-face meeting might in practice also be used when both parties happened to be nearby each other in the office. The details of this multiple-case study, with the used scenarios and intra- and cross-case analysis results, have pre-

viously been presented (de Kok et al., 2013), but not the effects of the channel choice on the type of knowledge workers.

3.3 Multiple-Case Study B : Type of Knowledge Sharing

In the second multiple case study (B), five case studies were conducted at large Dutch for-profit organizations that had all gone through a transformation process towards NWOW. As the implementations of NWOW varied across the case companies, and as this variation may affect the way knowledge is shared, again a context analysis was performed to gain insight in the way NWOW was implemented in each individual case company, and gain insight in the ways knowledge could be shared in the organization. Additionally, in order obtain comparable data on the level of NWOW implementation, the before mentioned NWOW Analysis Monitor was used. For the registration of the research results, the before mentioned Knowledge Sharing Framework was used for the individual case situations and type of knowledge workers.

Again, a case study protocol was used to observe corresponding findings across all cases (Yin, 2009). The case study protocol ensures the

cross-case validity of the findings, and allows cross-case comparisons. This protocol consisted of the context analysis, the Knowledge Sharing Framework, that was tailored to each individual case situation, and the use of the NWOW Analysis Monitor to analyze the level of NWOW implementation in each organization. The selected organizations for the case studies were : a large postal company, and four consulting companies in the field of Finance, Tax and ICT :

Case B1 : MailComp, a 31,000 employee Dutch mail and parcel distribution company;
Case B2 : ITconsult, a 2,500 (globally 130.000) employee IT consulting company;
Case B3 : FinAudit, a 3,600 (globally 190.000) employee Financial Auditing company;
Case B4 : TaxAudit, a 4,500 (globally 210.000) employee Tax and IT Auditing company;
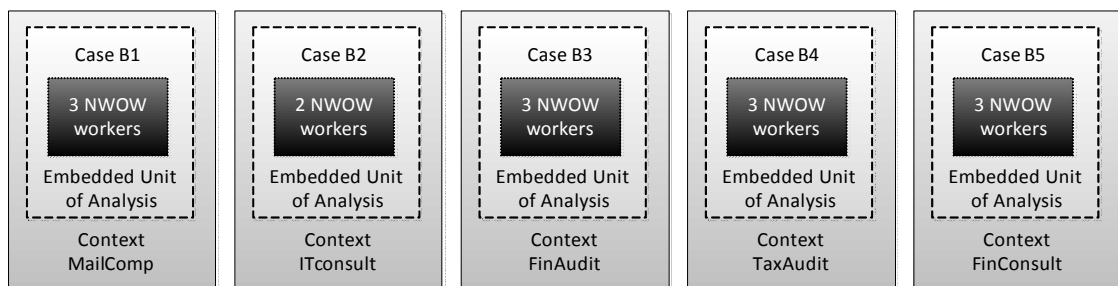Case B5 : FinConsult, a 4,500 (globally 210.000) employee Financial consult company.

Apart from the context analysis and use of the NWOW Analysis Monitor, in each case company two or three employees were interviewed. The interviews were used to populate the Knowledge Sharing Framework.
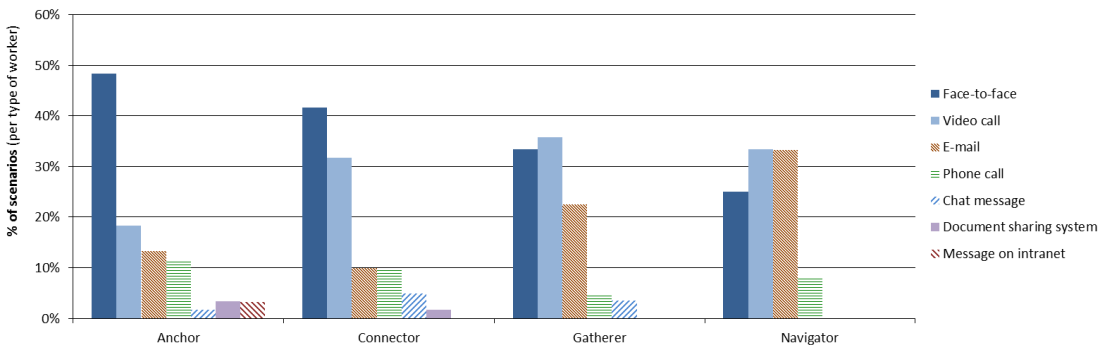
4. Research Results

4.1 Channel Choice and Type of Jnowledge worker

In the first multiple case study (A), the effect of NWOW on the channel choice was researched. To study the effect of the mobility of the knowledge worker on the channel choice, when sharing knowledge, the scenario results were plotted against the 4 types of knowledge workers of Greene & Myerson. Combined in all cases there were : 5 Anchors, 5 Connectors, 7 Gatherers and 1 Navigator. In order to be able to distinct between the types of knowledge workers, the results per type of knowledge worker have been set to 100%. This results in the following graph :
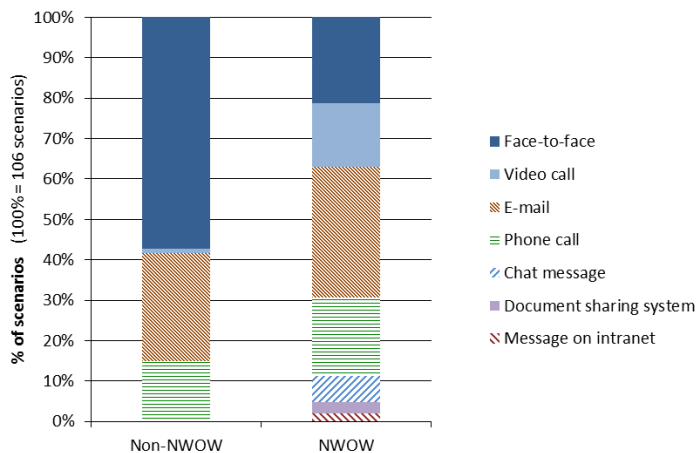
<Figure 6> shows a clear decline in face-to-face communication when the knowledge worker becomes more mobile. Instead, video calls and e-mail become more popular. Though there is an increase in e-mail, this does not cover the diminishment of face-to-face communication. This implies that, in a more mobile world, where it is physically not possible to meet face-to-face, workers seek the alternative that is most comparable (virtual face-to-face) to the channel they 'lost'. Phone calls are about equally used across

<Figure 5> Multiple Case Study B : Type of Knowledge Shared by NWOW Workers

<figure>

〈Figure 6〉 Channel Choice and Type of Knowledge Worker
</figure>

<figure>

〈Figure 7〉 Channel Choice for Non-NWOW and NWOW Workers
</figure>

all types of knowledge workers. When the mo-
bility increases communicating via the intranet
of a document sharing system becomes less po-
pular.

4.2 Effect of NWOW on Channel Choice

To investigate the effect of NOWW on the
channels choice, a comparison was made between
traditional non-NWOW workers and NWOW
workers. 〈Figure 7〉 shows the channel choice
for sharing knowledge across all three cases for
these two groups.

〈Figure 7〉 shows that NWOW workers use
more different channels to share knowledge than
non-NWOW workers. The NWOW workers cle-
arly have less preference for face-to-face com-
munication. Though in this study all participants
had access to the same tools/channel set, NWOW
workers use video calls almost as much as
face-to-face meetings, while non-NWOW works
almost never use video calls. The use of e-mail
and phone calls is comparable, and when shar-
ing knowledge NWOW workers also choose chat
messages, document sharing systems, and intra-
net messages. Further details on the effect of

NWOW on knowledge sharing of general and sensitive information can be found in previously mentioned publication (de Kok et al., 2013).

4.3 Knowledge Sharing Framework Results

In the second multiple case study (B), 14 participants were interviewed on how they would share knowledge, based the types defined by Alavi and Leidner (2001). This resulted in the following (6×14 = 84) points in the Knowledge Sharing Framework :

In order to be able to plot the results on a single 0% to 100% tacit and explicit knowledge scale, the middle 50/50 column is equally divided (between the Mostly tacit and Mostly explicit columns), and the result is expressed as a
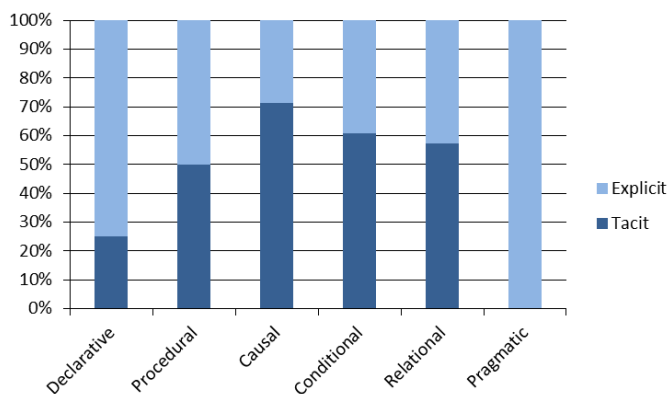
percentage.

This results in the following overview :

<Figure 8> shows declarative knowledge (know-about) is mostly shared in explicit form. The reason for this is that explanations are often documented, for learning purposes. Declarative knowledge may also be tacit, e.g. the explanation of the market position and players, though often the explanation is in combination with explicit knowledge. Context is therefore important. In this study procedural knowledge (know-how) was an exact 50/50 mix of explicit and tacit knowledge. This means procedural knowledge may be documented, e.g. in a methodology database or a quality system, but often an individual training is added. Causal knowledge (know-why) is the most tacit type of know-

〈Table 4〉 Knowledge Sharing Framework with Response of Participants on Type of Knowledge Shared

Knowledge type	Mostly Tacit	50/50	Mostly Explicit	Tacit	Explicit	Tacit	Explicit
Declarative	2	3	9	3.5	10.5	25%	75%
Procedural	5	4	5	7	7	50%	50%
Causal	8	4	2	10	4	71%	29%
Conditional	6	5	3	8.5	5.5	61%	39%
Relational	4	8	2	8	6	57%	43%
Pragmatic	0	0	14	0	14	0%	100%

〈Figure 8〉 Knowledge Sharing for the Different Types of Knowledge

ledge. Where the know-how is often documented, the knowing-why is in the head of employees and mostly shared in a personalized way. Conditional (know-when) and relational (know-with) knowledge are mostly shared in tacit form. Though some may be documented, most knowledge is shared in a personalized way. Pragmatic knowledge is always in explicit (codified, documented) form. Pragmatic knowledge is based on the documentation of best practices of the other 5 knowledge types. It is the externalization of the tacit knowledge on how, why, when and with what to perform work at best.

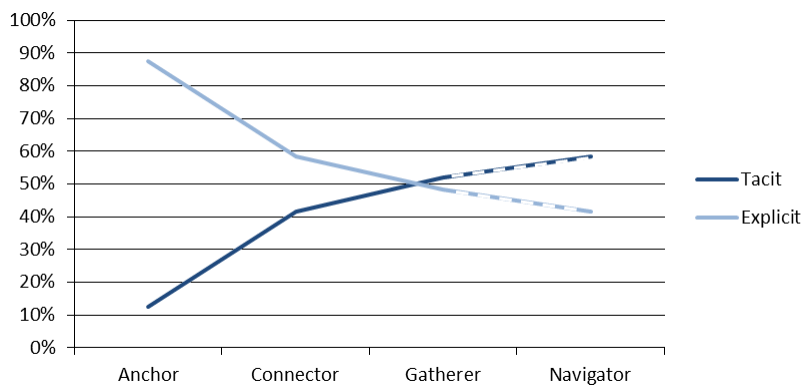## 4.4 Knowledge Sharing and Type of Knowledge Worker

When the knowledge Sharing Framework is divided by the types of knowledge workers, the following overview appears :

Again, in order to be able to plot on a single tacit/explicit scale the 50/50 score is divided equally between the tacit and explicit column.

This results is the following figure showing

〈Table 5〉 Knowledge Sharing Framework and Type of Knowledge Worker

Knowledge type	Anchor			Connector			Gatherer		
	Tacit	50/50	Explicit	Tacit	50/50	Explicit	Tacit	50/50	Explicit
Declarative	0	1	1	0	0	3	0	2	7
Procedural	0	0	2	2	0	1	3	4	2
Causal	0	0	2	1	2	0	7	2	
Conditional	0	0	2	1	2	0	5	3	1
Relational	0	2	0	0	3	0	4	3	2
Pragmatic	0	0	2	0	0	3	0	0	9
Total	0	3	9	4	7	7	19	14	21
	1.5		10.5	7.5		10.5	26		28
	13%		88%	42%		58%	48%		52%

〈Figure 9〉 Type of Knowledge Workers and Form of Knowledge Sharing

the types of knowledge workers.

<Figure 9> shows a gradual decline in explicit knowledge sharing against a growth in tacit knowledge sharing when knowledge workers becomes more mobile. The results for the Navigator has been extrapolated, as there were no Navigators in study B. This result implies that, as the knowledge worker becomes more mobile, knowledge sharing becomes more tacit (personalized) and less explicit (codified).

4.5 Knowledge Sharing Framework per Case

When the knowledge Sharing Framework is presented by case, the following overview appears.

<Figure 10> shows the graphical representation of the results in <Table 6>.
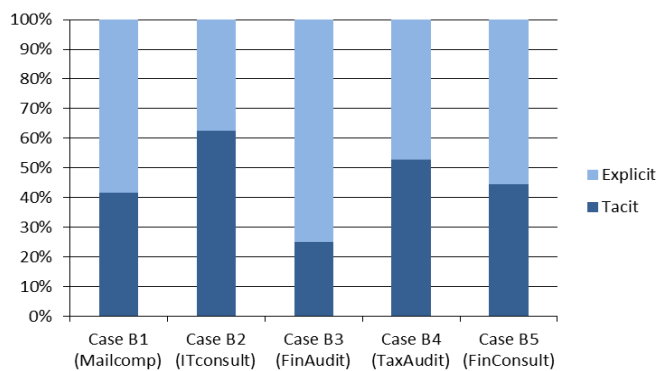
<Figure 10> shows Case B3 (FinAudit) relatively has the most explicit knowledge of all cases. This may be explained from the fact that Financial Auditing is a highly documented profession. A lot of rules and regulations are prescribed. New rules are not only discussed in meetings but also posted in knowledge repositories. In Case B2 (ITconsult) relatively most knowledge is shared in tacit form. Knowledge on IT architectures are mostly shared in face-to-face meetings, though the templates are stored in the knowledge repository.

4.6 Results NWOW Analysis Monitor

In the second multiple-case study, the case companies were scored on their current level of NWOW adoption by using the NWOW Analysis

<Table 6> Knowledge Sharing Framework per Case

Knowledge type	Research results-non aggregated			aggregated		in %	
	Mostly Tacit	50/50	Mostly Explicit	Tacit	Explicit	Tacit	Explicit
Case B1(Mailcomp)	4	7	7	7.5	10.5	42%	58%
Case B2(ITconsult)	6	3	3	7.5	4.5	63%	38%
Case B3(FinAudit)	2	5	11	4.5	13.5	25%	75%
Case B4(TaxAudit)	8	3	7	9.5	8.5	53%	47%
Case B5(FinConsult)	5	6	7	8	10	44%	56%

<Figure 10> Form of Knowledge Sharing per Case

Monitor. This resulted in the following score for the current level of NWOW adoption.

<Figure 11> shows that overall case B1 (Mail Comp), B4 (TaxAudit) and B5 (FinConsult) have the highest current levels of NWOW adoption (with B5 having the highest overall average of 3,2). From the context analysis the following can be remarked on the individual scores per case :

- Case B1 (MailComp) scores high on Bytes because the IT department has put effort in making mobile working possible, including a Bring (or Choose) Your Own Device policy (BYOD/CYOD), and having a good knowledge sharing infrastructure. Behavior scores high because management is focused on results rather than presence at the office.
- Case B2 (ITconsult) scores relatively low on the NWOW dimensions because the office is not flexible or sustainable, and though it is an IT company, the infrastructure for virtual collaboration and knowledge sharing is not optimal. In the Personal dimension there is a low employee satisfaction and motivation.
- Case B3 (FinAudit) scores overall low on the

dimensions because the employees still work in a relatively traditional office setting ,with little flexibility, traditional knowledge storage and knowledge sharing meetings that tend to be cancelled.

- Case B4 (TaxAudit) scores high on Bytes because of the effort invested in IT and knowledge systems, though mobile devices are seen as too insecure (no BYOD policy). For Behavior all aspects are implemented, e.g. result oriented working and empowerment of employees.
- Case B5 (FinConsult) scores high on Bricks because of the high workplace flexibility and sustainability score. The Bytes dimension score relatively high, though personalized devices are not allowed because of information security aspects. The Behavior section has an overall high score because of the result oriented way of working and the employee satisfaction.

4.7 Effect of NWOW on Knowledge Sharing Framework

Finally, a comparison can be made of the ef-

	Case B1 (Mailcomp)	Case B2 (ITconsult)	Case B3 (FinAudit)	Case B4 (TaxAudit)	Case B5 (FinConsult)
Bricks	2,1	1,8	1,1	2,2	3,0
Bytes	3,8	2,0	2,2	3,8	3,2
Behavior	3,2	2,0	2,0	3,3	3,3
Overall	3,0	1,9	1,8	3,1	3,2

<Figure 11> Level of Current NWOW Adoption per Dimension and Case

fect of the level of NWOW adoption on knowledge sharing. When the levels of NWOW adoption for Bricks, Bytes and Behavior are plotted against the type of knowledge shared in the Knowledge Sharing Framework, the following picture emerges :

In <Figure 12> the points for the three individual dimensions are connected via dotted curved lines. The figure shows that, when the level of NWOW adoption for Bricks, Bytes and Behavior becomes higher, the mix of explicit (codified) and tacit (personalized) knowledge sharing seems to balance (to 50/50). The effect is most clear for Bricks and Behavior, as the Bytes dimension has a 'hick-up' for case B5.

In <Figure 13> the overall score on the NWOW adoption level is plotted against the plotted against the type of knowledge shared in the Knowledge Sharing Framework.
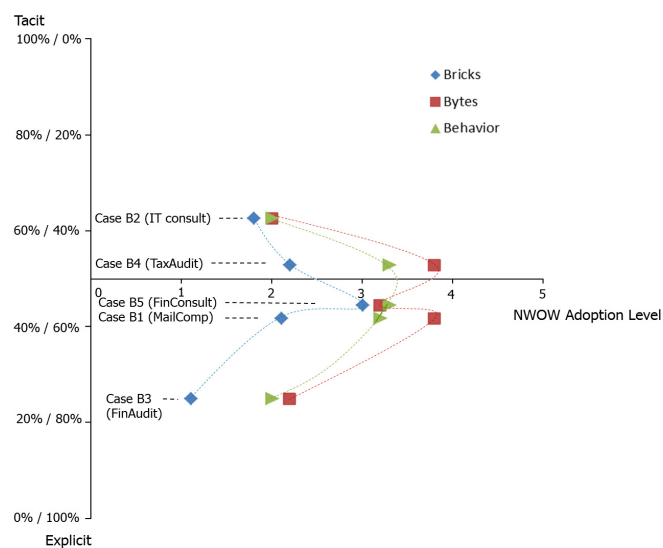
The cases are again connected via a dotted curved line. Also <Figure 13> shows that the (level of) implementation of the New Way of

Working seems to have a balancing effect on the mix of tacit and explicit knowledge. Partly this effect can be explained from the type of operation (see before), but partly the organizations that score higher on their NWOW adoption seem to have obtained a more balanced mix of tacit and explicit knowledge sharing. They not only have a more mature NWOW level, but also their knowledge sharing has evolved. It is interesting to see that these findings point in the same direction as the research of Scheepers et al. (2004), who found that an effective knowledge strategy mix for an organization may evolve over time to a balanced mix of codification and personalization.
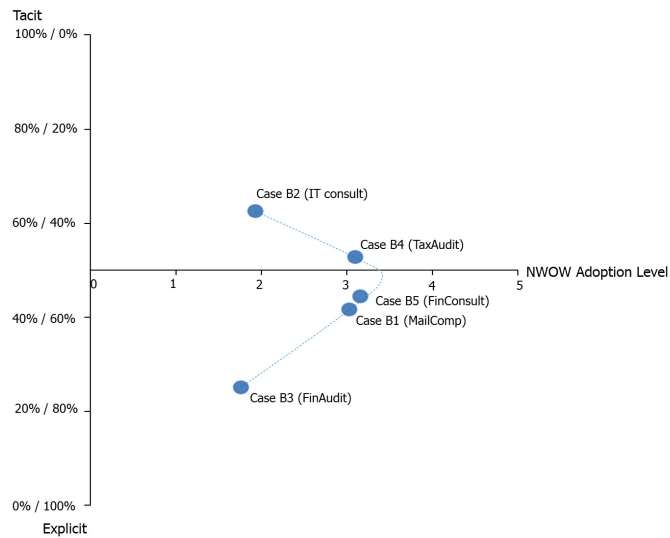
5. Discussion, Conclusions and Future Research

5.1 Discussion

As mentioned in the introduction, research on the New Way of Working is scarce. Comparable

<Figure 12> Level of NWOW Adoption per Dimension and Type of Knowledge Sharing

Tacit
100% / 0%

80% / 20%

Case B2 (IT consult)
60% / 40%

Case B4 (TaxAudit)

NWOW Adoption Level

Case B5 (FinConsult)
40% / 60%
Case B1 (MailComp)

20% / 80%
Case B3 (FinAudit)

0% / 100%
Explicit

〈Figure 13〉 Overall level of NWOW Adoption and Type of Knowledge Sharing

literature on the effect of NWOW on knowledge sharing in organizations can hardly be found. The combination of knowledge sharing and the implementation of NWOW make this research one of the first steps in this area. A critical note is however at its place. In total 8 cases were reviewed in two multi-case studies, resulting in 216 scenarios and 84 points in a framework, but the numbers could always be higher. Conclusions on mobility versus channel choice and type of knowledge shared, having only 18 participants in study A, and 14 in study B (with only one Navigator in study A and none in study B), should be taken with care. Also, the effect of NWOW on the type of knowledge sharing in the various cases could, to a certain extent, also be caused by other factors e.g. company culture or methodologies in use. The results should therefore be seen as a first indication of the direction knowledge sharing is heading for in the future, i.e. for those companies that implement new ways of working.

5.2 Conclusions and Future Research

The New Way of Working is impacting the way we work and share knowledge. To investigate the effect of NWOW on channel choice and type of knowledge sharing, 12 knowledge sharing scenarios and a Knowledge Sharing Framework were developed. These were used in two multi-case studies, resulting in 216 scenario results and 84 points in the Knowledge Sharing Framework.

The first multi-case study (A) shows that :
- The type of channels that are used, change when knowledge workers become more mobile; there is a clear decrease in face-to-face communication, while the number of video calls increases, as does the use of e-mail. In the new mobile world of working, knowledge workers seem to choose the most suitable and comparable communication channels that are at hand. This observation seems to fall in line with

Orlikowski (1992), who stated that employee's selection and use of technologies emerge from situated practices.

- Knowledge workers in the new world of work (NWOW workers) use a broader palette of communication channels than traditional knowledge workers (non-NWOW workers), though all had access to the same channels. NWOW workers use less face-to-face communication than non-NWOW workers, and more video calls. The broader use of channels, e.g. chat and internet messages, implies that in the new world of work, knowledge will be shared on more communication platforms.

The second multi-case study (B) shows that :

- Declarative knowledge (know-about) is mostly shared in explicit form. Causal knowledge (know-why) is the most tacit type of knowledge. Pragmatic knowledge is always shared in an explicit form. In general, knowledge is mostly shared in a mix of tacit and explicit forms. This implies that, in order to capture all knowledge shared, mechanisms need to be in place to capture both tacit and explicit knowledge sharing.

- When knowledge workers become more mobile, knowledge will be shared less in explicit and more in tacit form. This means that in the new world of work knowledge is likely to be shared less in a documented, and more in a personalized form. The implication of this is that knowledge becomes more 'fluid' in the new world of work.

- The level of adoption of NWOW seems to have a balancing effect on the type of knowledge shared, meaning organizations with a higher level of NWOW adoption have a more

equal mix (50/50) of tacit and explicit knowledge sharing. This observation seems to fall in line with the findings of (Scheepers et al., 2004) who found that an effective knowledge strategy mix for an organization may evolve over time to a balanced mix of codification and personalization.

Sharing knowledge is crucial for the continuity of organizations and the effectivity and productivity of knowledge workers. The way in which organizations are able to cope with the changes that the new world of work brings to their operation, will-to a certain extent-determine their future success. The contribution of this research to the (limited) literature in the field of NWOW and knowledge sharing is that the studies show that knowledge sharing changes because of the implementation of the New Way of Working. Knowledge is shared via more and different channels, and as knowledge workers become more mobile, the channel choice and type of knowledge sharing changes. Higher levels of NWOW adoption seem to have a balancing effect on the mix of tacit and explicit knowledge, which in the view of (Scheepers et al., 2004) is an effective knowledge sharing strategy. Organizations need to realize that, in order to facilitate new ways of knowledge sharing, new infrastructures are needed, that can capture and disseminate knowledge. When this is not realized and no proper action is taken, the result may be the loss of important knowledge that may be crucial for the organizations' operation.

These studies are only a first glance of the future that will emerge when new ways of working are implemented throughout organizations worldwide. There will always be more informa-

tion to explore and describe. The results of this study should therefore be used with care, as more future research on more cases should support these first findings.

References

Alavi, M. and D. Leidner, "Review : Knowledge Management and Knowledge Management Systems : Conceptual Foundations and Research Issues", *MIS Quarterly*, Vol.25, No.1, 2001, 107-136.

Baane, R., P. Houtkamp, and M. Knotter, *Het Nieuwe Werken Ontrafeld-Over Bricks, Bytes and Behavior*, Van Gorcum BV. ISBN 9789 023245858, 2010.

Bijl, D.W., *Journey Towards the New Way of Working : Creating Sustainable Performance and Joy at Work*. Par CC, ISBN : 978-94-90528-00-3, 2011.

Bødker, S. and E. Christiansen, Lost and Found in Flexibility. University of Aarhus, Center for New Ways of Working. Retrieved from http://pure.au.dk/portal/en/publications/lost-and-found-in-flexibility(cd3361c0-983b-11d a-bee9-02004c4f4f50).html, 2002.

Carlson, J.R. and Zmund, R.W., "Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions", *Academy of Management*, Vol.42, No.2, 1999, 153-170.

Daft, R.L. and R.H. Lengel, "Information Richness : A New Approach to Managerial Behavior and Organization Design", *Research in Organizational Behavior*, Vol.6, 1983, 191-233.

Davenport, T.H. and L. Prusak, *Working Knowledge : How Organizations Manage What They Know*, Harvard Business School Press, 1998.

Drucker, P.F., "Knowledge worker productivity : the biggest challenge", *California Management Review*, Vol.41, 1999, 79-94.

Hammer, M. and J. Champy, *Reengineering the Corporation : A Manifesto for Business Revolution*, Harper Collins Publishers Inc, ISBN 0-06-662112-7, 1993.

Hansen, M.T., N. Nohria, and T. Tierney, "What's Your Strategy for Managing Knowledge?", *Harvard Business Review*, Vol.77, No.2, 1999, 106-116.

Greene, C. and J. Myerson, "Space for Thought : Designing for Knowledge Workers", *Facilities*, Vol.29, No.1/2, 2011, 19-30.

Ipe, M., "Knowledge Sharing in Organizations : A Conceptual Framework", *Human Resource Development Review*, Vol.2, No.4, 2003, 337-359.

Johns, T. and L. Gratton, "The Third Wave Of Virtual Work", *Harvard Business Review*, Vol.91, No.1, 2013, 66-73.

Kok, A. de, B.E.W. Bellefroid, and R.W. Helms, "Knowledge Sharing and Channel Choice : Effects of the New Way of Working", *14th European Conference on Knowledge Management ECKM 2013*, 2013.

Kok, A. de, J. Koops, and R.W. Helms, "Accessing the New Way of Working : Bricks, Bytes and Behavior", *18th Pacific Asia Conference on Information Systems 2014*, 2014.

Nonaka, I., "A Dynamic Theory of Organizational Knowledge Creation", *Organization Science*, Vol.5, No.1, 1994, 14-37.

Orlikowski, W.J., "The Duality of Technology : Rethinking the Concept of Technology in Organizations", *Organization Science*, Vol.3, No.3, 1992, 398-427.

Scheepers, R., K. Venkitachalam, and M.R. Gibbs, "Knowledge Strategy in Organizations : Refining the Model of Hansen, Nohria and Tierney", *Journal of Strategic Information Systems*, Vol.13, No.3, 2004, 201-222.

Snyder, J.L. and J.E. Lee-Partridge, "Understanding Choice of Information and Communication Channels in Knowledge Sharing", *Proceedings of the International Conference on Information Systems*, 2009, 105.

Waber, B., J. Magnolfi, and G. Lindsay, "Workspaces That Move People", *Harvard Business Review*, Vol.92, No.10, 2014, 68-77.

Yin, R.K., "Case Study Research, 4th", 2009.

✦ About the Authors ✦

Arjan de Kok (a.dekok@uu.nl)

Arjan de Kok is PhD graduate at the Center for Organization and Information of Utrecht University in the Netherlands. His research topic is : The New Way of Working : the impact of Information Technologies and the effect on knowledge sharing. Before becoming a PhD graduate he obtained his Master of Business Administration degree from Liverpool University. He co-authored two books on Product Lifecycle Management, and (guest) lectures at Utrecht University. He has over 20 years of experience in business consulting, and is Partner Industry Consulting at Ordina.

Roel Esten (r.esten@uu.nl)

Roel Esten holds a Master in Business Informatics from Utrecht University, the Netherlands. He graduated on the topic of NWOW and its relation to knowledge sharing, and was University Assistant for knowledge management. He is currently a data analyst for financial organizations at EY Netherlands.

Remko W. Helms (r.w.helms@uu.nl; remko.helms@ou.nl)

Prof.dr.ir. Remko W. Helms is an assistant professor at the Department of Information and Computing Science at Utrecht University, the Netherlands, and a full professor in Information Systems at the Open University in Heerlen, the Netherlands. His research focuses on knowledge management and social media with a particular interest in knowledge sharing and transfer practices and structural analysis of (online) communities using social network and content analysis techniques. Publications on this research are published in peer-reviewed international conferences and journals. He serves on program committee of knowledge management and information systems conferences and acts as a reviewer for several major IS conferences, e.g. ECIS and ICIS, and IS journals, e.g. International Journal on Information Management and Knowledge Management Research and Practice. Services to the IS community further include being a department editor for AIS for social media (@AISconnect) and he is a founding member of the International Association of Knowledge Management.