

# The New Way of Working: An Empirical Assessment of Organizational and Technological Effects

Arjan de Kok

The New Way of Working: An Empirical Assessment of Organizational and Technological Effects.

Doctoral thesis.  
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ISBN	978-94-92679-29-1
Author	Arjan de Kok
Cover	Mendel de Kok ( <a href="http://www.mendl.com">www.mendl.com</a> )
Print	Print Service Ede
Keywords	The New Way of Working, new ways of working, teleworking
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The New Way of Working:  
An Empirical Assessment of Organizational and  
Technological Effects

Het Nieuwe Werken: een empirische studie van  
organisatorische en technologische effecten  
(met een samenvatting in het Nederlands)

PROEFSCHRIFT

ter verkrijging van de graad van doctor  
aan de Universiteit Utrecht op gezag van  
de rector magnificus, prof. dr. G.J. van der Zwaan,  
ingevolge het besluit van het college  
voor promoties in het openbaar te verdedigen op  
maandag 5 februari 2018 des ochtends te 10.30 uur

door

Adriaan de Kok

geboren op 20 augustus 1962  
te Woerden

Promotoren: Prof. dr. S. Brinkkemper  
Prof. dr. ir. R.W. Helms

## Preface

This dissertation is about the changing nature of work. As a business and IT consultant, working in various organizations for over 25 years, changes in work environments are my line of business. It may seem that the way we work hardly changes from day to day, but over time the change is enormous. It is hard to imagine how organizations could operate in the past without computers, because today, people go home when the network goes down. In the nineties, changes were mostly IT-driven, based on the new technological possibilities. Around the millennium a shift started to emerge. The Internet bubble busted, which seemed to be a serious set-back for the expectations of a high-tech future. While the expectations were possibly too high at the time, they were not completely in vain. Developing Internet protocols was labor-intensive, and it would take another seven years before the first iPhone, with app-based software, was released. Still, an awareness began to emerge that the way we worked needed to change radically. This time, the change was not driven by IT but from an organizational and, interestingly, architectural point of view. Pioneers in the field realized that, with the way our work was changing, our offices needed to change as well. IT would merely be the enabler of change. The Internet would not be the goal but the medium. It was the beginning of what later would become known as the New Way of Working.

Having always had the conviction that work should above all be enjoyable and not boxed between walls of bricks and time, I started following the emerging developments with interest. It would take another decade, until 2010, for me to decide I wanted to research this phenomenon in more scientific depth. I am very grateful that Remko Helms, a former colleague and at that time assistant professor at Utrecht University, was willing to become my supervisor. It would take another half year before the ideas had condensed into a research proposal that was discussed with the head of the Information and Computing Sciences department, professor Sjaak Brinkkemper. With almost all existing PhD research focusing on software development processes, he had the open-mindedness to take on a 'stranger in their midst', and become my promotor. This was the beginning of a journey of which the result lies before you. This dissertation represents over six years of research. It has been my goal to write as clear and understandable as possible, in order to make this work assessable to all who are interested. This work is more than my individual personal endeavor. Which brings me to the expression of a few words of gratitude to those who have been my companion on this journey.

First of all, I wish to thank my fellow researchers: Jonas Koops, Bart Bellefroid, Roel Esten and Yvette Lubbers of Utrecht University, and Jon van Zwieten of Radboud University Nijmegen. Without your hard work and perseverance this result would not have been accomplished.

I wish to thank those who helped me shape and sharpen my research: The anonymous reviewers of the papers, my fellow PhD candidates who gave feedback on my papers, Ralph Foorthuis and Jurriaan van Reijse (PhDs of Utrecht University), Prof. Lidwien van de Wijngaert (Radboud University Nijmegen), Prof. Jungwoo Lee (Yonsei University Seoul, Korea). Your advice has been instrumental in improving this research.

I wish to thank the staff of the Information and Computing Sciences department of Utrecht University: Rik Bos, Slinger Jansen, Marco Spruit, Jan Martijn van der Werf, Fabiano Dalpiaz, Sergio España, and all others; for organizing the PhD and Research colloquia, and inviting me as guest lecturer in your courses.

I wish to thank the members of the reading committee: Prof. Jason Thatcher (Clemson University, USA), Prof. Stefan Klein (Universität Münster, Germany), Prof. Eric van Heck (Erasmus University Rotterdam), Prof. Bart van den Hooff (VU University Amsterdam), Prof. Albert Boonstra (University of Groningen). Thank you for your feedback and efforts in assessing this dissertation.

I am most thankful for my promotor, professor Sjaak Brinkkemper. Sjaak, thank you for your open-mindedness in accepting me as your PhD. I have great respect for your scientific insight, sharpness, and relentless enthusiasm for science.

Beyond all, I wish to thank professor Remko Helms. Remko, you were immediately enthusiastic in becoming my supervisor. Even after you became a full-professor at the Open University, you kept investing your time and effort in me and this research. Thank you for all the discussions we had, for your valuable input that helped improve this research. Becoming a full-professor also means you are no longer my co-promotor, but have become my promotor.

I wish to thank my children; Jochem, Mendel and Emiel. Thank you for your understanding of me being occupied with my research, and the discussions we had. I am very proud that two of you (as university rules only allows two) will stand next to me as my para nymphs during my public defense.

Finally, I wish to thank my wife Madeleine. Madeleine, thank you for supporting me all those evenings, months, years, in doing this research, writing papers, and being away for conferences. Thank you for never complaining but always being there for me and the family. You are my life companion.

I wish you, the reader, all the best in reading parts or all of this dissertation, and I hope this study will enrich you.

*Arjan de Kok, January 2018*

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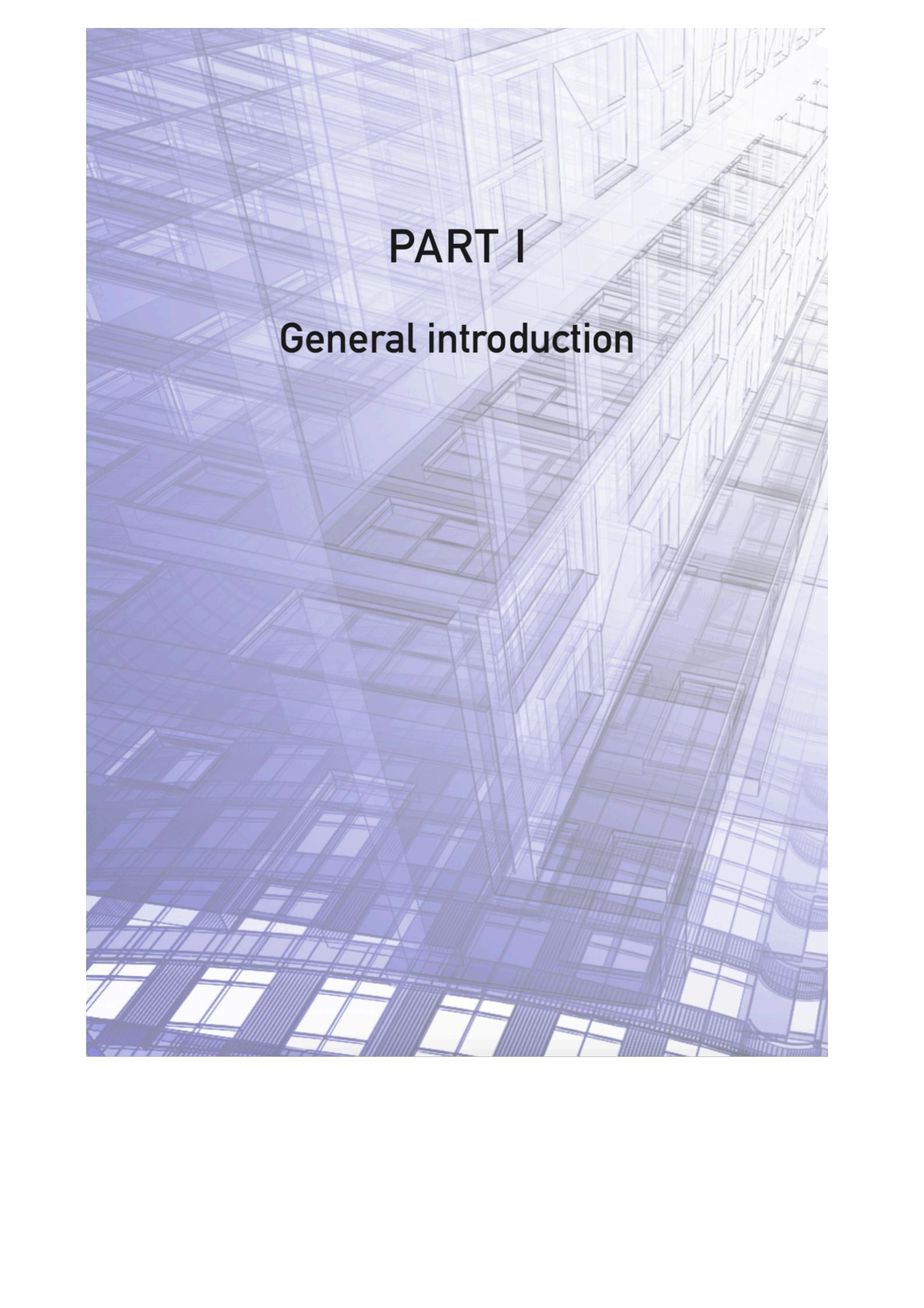
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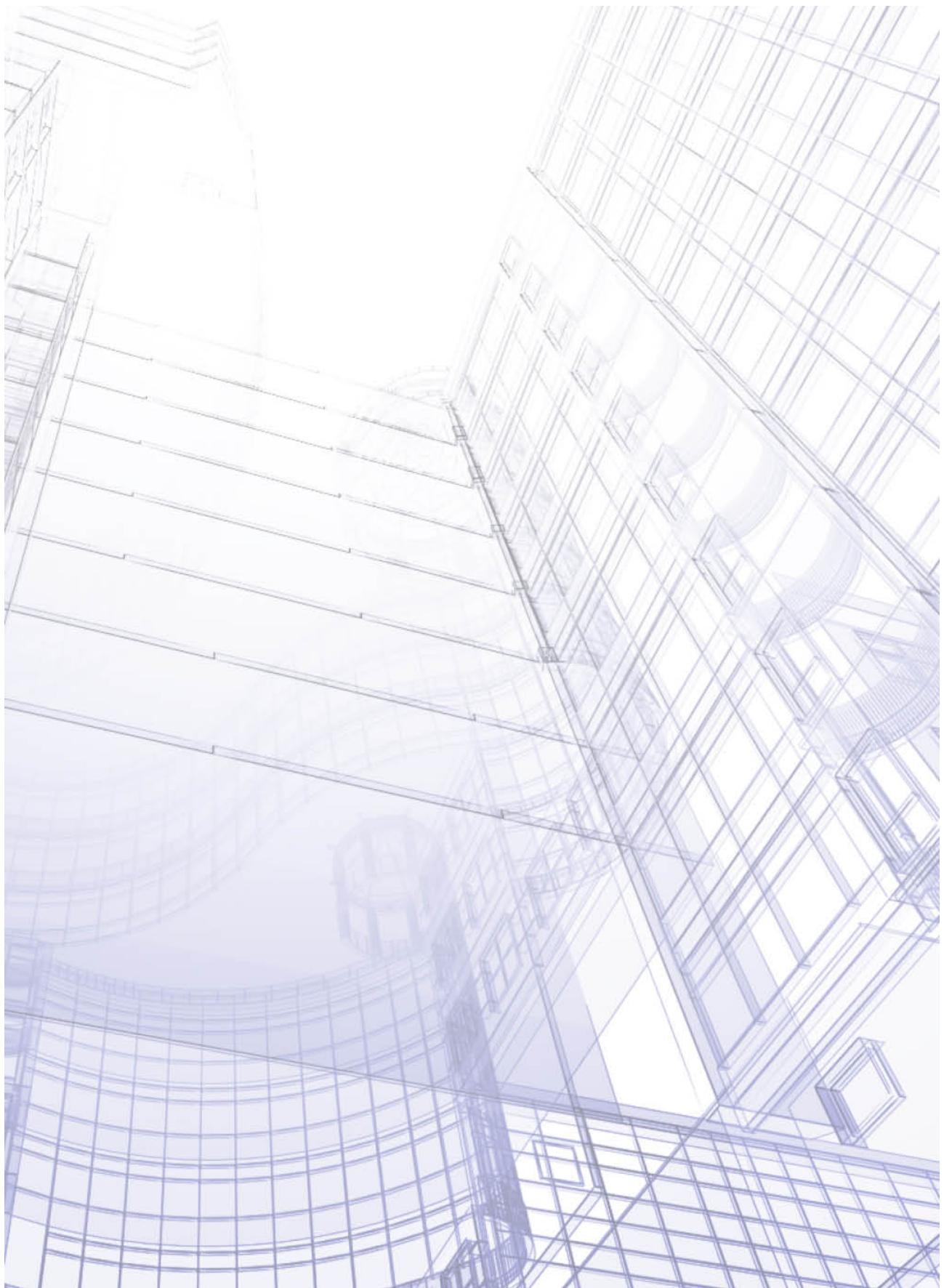
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The background of the image consists of a complex, abstract architectural structure composed of numerous thin, light-colored lines forming a three-dimensional grid. This grid creates a sense of depth and perspective, resembling a wireframe model of a building or a series of overlapping architectural sections. The lines are primarily horizontal and vertical, with some diagonal elements, creating a pattern of small, rectangular frames that cover the entire surface.

# **PART I**

## **General introduction**



# **Chapter 1**

---

## **Introduction**

### **1.1 The changing nature of work**

This section contains a first introduction to the research topic; the New Way of Working<sup>1</sup>. In this section, the impact of the Industrial Revolution and the emergence of the New Way of Working is discussed.

#### **1.1.1 The challenge of the 21<sup>st</sup> century**

The world in which we work is changing. The advancement of information technologies is conceived as one of the major causes for the changing nature of work. Work is no longer restricted to a certain time or place. Work may even cross the traditional boundaries of organizations. As information has become available to everyone anywhere, companies are placed in a global playing field. Offshoring of activities and technological innovations change the work that has to be performed and puts higher demands on skills and knowledge levels of employees. Organizations are forced to adapt to an ever-changing work environment. They need to find ways in which knowledge sharing can be optimized and mobile working is enabled in a secure way. The ability of organizations to address these changes will contribute to their success, and to being an attractive employer for existing and new generations of workers; the Digital Natives or Net Generation, that are living lives immersed in technology (Prensky, 2001; Tapscott, 1998). The challenges companies face in the 21<sup>st</sup> century, force them to act and work differently from the traditional, early 20<sup>th</sup> century, work principles of the Industrial Revolution. Bryan & Joyce (2007) state: 'Trying to run a company in the 21<sup>st</sup> century with an organizing model designed for the 20<sup>th</sup> century places limits on how well a company performs. It also creates massive, unnecessary, unproductive complexity; a condition that frustrates workers and wastes money.' When we realize the world around us is rapidly changing, we realize we need to find new ways of working.

#### **1.1.2 A brief review of the history of work**

In past centuries, apart from slavery, people worked on the land or in crafts in a relatively independent way. Knowledge intensive work was learned in a master-

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<sup>1</sup> The content of this section is based on parts of published work: Kok, A. de. (2016). The New Way of Working: Bricks, Bytes and Behavior. In: Lee, J. (Eds.). *The Impact of ICT on Work*. Springer Science & Business Media. 9-40.

apprentice relationship and often performed in guilds or other professional associations. It was not until the Industrial Revolution, which began in the nineteenth century, when major changes in work and the way we work occurred. The ability to mechanize simple or complex work tasks dramatically changed the role of the worker. The principles of Frederick Taylor, as described in the Scientific Management theory (Taylor, 1911), defined the worker as being an integral part of a well-oiled machine. The division of labor into small repeatable tasks became a way of increasing worker productivity. To control the worker output, management layers were created, resulting in a hierarchical top-down organization; the Machine Bureaucracy was born (Mintzberg, 1978). Taylor's principles did not restrict themselves to industrial production facilities; offices were also seen as 'paper-processing-and-production' facilities, leading to a deeply embedded industrial mind-set, that this is the way work should be done.



Figure 1-1 The Industrial Revolution and mind-set

The result of Scientific Management was a low-level employee control with virtually no opportunities for personal development. Though the Hawthorne studies in the mid-1920s already suggested social factors were more important predictors of employee performance than physical ones (Wickström, 2000), it was not until the 1960s that job enrichment, giving employees some of the responsibilities that used to belong to their supervisors, started to emerge. Herzberg defined job autonomy as one on the most important motivators (Herzberg, 1966). In the 1960s, things slowly started to change: Employees were no longer considered to be machines, but creatures with needs and desires, such as autonomy and responsibility; individuals, who become motivated by need fulfilment. The Job Characteristics Model from the 1970s gave notice to the fact that employees' needs were important predictors of employees' responses to their work environment (Hackman & Oldham, 1976). In the 1980s and 1990s the increased industrial competition fueled the notion that organizations needed to drastically change the way they operated; business processes became a focal area. In their seminal work on business process improvement, Hammer & Champy (1993), describe a 'New World of Work', with process-based tasks and a flat, non-hierarchical, organization model. They define information technology as 'rule-breaking' for the way business processes would radically change. One of the 'breaking rules' they address is 'information being available on multiple places at the same time, even on portable devices'.

By the end of the 1990s and early 2000s the concept of virtual, boundary-less, high performance and collaborative organizations emerges, abandoning all traditional organizational structures (Child & McGrath, 2001; Ghoshal & Bartlett, 1997). In their research on organizational form in an information-intensive economy, Child & McGrath (2001) present the main themes for the traditional hierarchical bureaucracy and the new horizontal organizational form (table 1-1).

	Conventional Perspective	Emergent Perspective
Goal setting	Top-down	Decentralized
Exercising power	Concentrated	Distributed
Size of units	Preference for large	Preference for small
Leadership function	Control and monitoring of specific objectives through formal	Guidance, management of conflicts
Vision	Dictated	Emergent
Structure	Hierarchy	Team and work groups
Primary unit of analysis	Firm	Production system or network
Boundaries	Clearly specified and durable	Permeable and fuzzy
Objective	Reliability and replicability	Flexibility
Regulation	Vertical	Horizontal
Integrity	Rule-based	Relationship-based
Assets	Linked tot organizational units	Structure independent of assets
Functions and roles	Specialized	General
Uncertainty	Absorbtion	Adaptation
Rights and duties	Relative permanence	Impermanence
Governance	Efficiency oriented	Innovation oriented

*Table 1.1 Conventional and emergent perspectives on organizational forms*

Even though work has changed in the past decennia, the changes have occurred in a slower pace than often anticipated. Due to the cost and (low) functionality of IT systems, many of the early expectations only partly became reality. Meel (2011) states that at that time technologies were not yet able to provide the speed, power, and ease of use, that people need for mobile and flexible work styles, or they were just too expensive.

### 1.1.3 The emergence of the New Way of Working

In 1995 the Dutch architect Erik Veldhoen was asked by Interpolis, a Dutch insurance company, to design their new head office building. Inspired by modern offices in Scandinavia of Ericsson and Digital, where status symbols for the executive board had been completely eliminated, Veldhoen suggests to completely abandon the traditional office layout (Veldhoen,1995). Instead of the management residing on the top floor in their own luxury offices, he designs an open office with the executive board visible on the first floor, sitting amongst their employees. In the new head office there would be no more fixed offices or workplaces, but concentration- and communication workplaces, room for leisure and catering, wireless telephones and -networks and paperless working with all

documents digitally available. The completely digital environment enabled employees to work at any desk, but also at home or elsewhere.



*Figure 1-2 Impressions of Interpolis' new office design*

(Photography: Jonathan S. Igbaras, Morley Von Sternberg)

Because this new concept also almost halved the number of workplaces and square footage needed, Interpolis did not need to build a twin tower but only a single office tower; a direct saving of 55 million euro. Instead of employees leaving the company, because they had no more personal workspace, Interpolis became an attractive employer. The new work environment, at that time called 'flexible working', propelled the desired entrepreneurship. By 2001 the revenue of Interpolis had tripled and the company had moved from the 11<sup>th</sup> to the 4<sup>th</sup> place on the ranking of insurance companies in the Netherlands. Customer satisfaction rose from 6.1 in 1996 to 7.4 in 2000 and 8.4 in 2008 (on a scale of 10). Between 2006 and 2010 Interpolis was chosen five times in a row as the Netherlands' favorite and most trustworthy insurance company. The Interpolis case did not remain unnoticed; over one hundred thousand visitors from the Netherlands and abroad came to the office, and in the following years new initiatives proved the 'new work' concepts were universally applicable (Pous & Wielen, 2010).

In 2005, inspired by the book 'The World is Flat' (Friedman, 2005), Bill Gates launches a vision on the future of work and the role of software technology. The executive briefing is called 'The New World of Work' (Gates, 2005). Gates argues that over the past decades software has been used to build bridges between disconnected information islands, but access to information is no longer the main problem. The new challenge is how to make sense of all this information that tends to overload the modern information worker. In the New World of Work, information-worker software should help the information worker adapt and thrive in an ever-changing work environment. In his view the future of work and work spaces is not only a major challenge for the world's largest software company but for almost any organization and any employee in the world. Following the executive briefing, Microsoft (USA) releases a white-paper titled: 'Digital Workstyle: The New World of Work' (Microsoft, 2005). It states: 'Empowering people to work more efficiently and effectively in the 'digital work style' of the New World of Work should be at the center of any organization's strategy as it addresses the coming era of rapid change and increasing global integration.' The Dutch version of the paper is called 'Digitale werkstijl: het nieuwe werken', or:

'Digital Workstyle: The New Way of Working', marking the beginning of the term the New Way of Working (MicrosoftNL, 2005). The new Microsoft head office of Microsoft Netherlands, which opened in 2007, was designed based on the radical redesign principles that were first implemented a decade ago. The largest and most popular space in the building is the grand café, the first room after entering the building, with lounge seats where people can meet in an informal setting.



*Figure 1-3 Impressions of Microsoft's new office*

Microsoft also radically changed the way of working. Employees had to define their own results and discuss their objectives and contribution to the organization with their superiors. The managers had to transform to coaches, supporting their employees in reaching their goals. Office working hours were completely abandoned. Instead of ending up with an empty office, the office attendance increased, as employees realized they needed to network to reach their goals. The office became the central meeting place, a community of colleagues and clients. Again, over one hundred thousand visitors came to the Microsoft office, and a special team was directed to organize tours and explain the concepts of the New Way of Working. To obtain scientific metrics Microsoft asked Erasmus University to perform research before and after the move to the new office. In 1994 employees rated their work-life balance with a 5.4 (on a scale of 10), in 2008 this had changed to 8.3 (Van Heck et al., 2011). For three years in a row (2009-2011) Microsoft Netherlands won the 'Great Places to Work' award. Though Microsoft does not publish any internal financial data, the Facility Manager mentions savings of around 500.000 euro per year on internal moves and another 500.000 euro on telephone and travel costs for an 800-staff organization (Lonkhuyzen, 2009; Bijl, 2011).

The result was that many companies and governmental organizations decided to implement the New Way of Working. An example worth mentioning is Rabobank's Unplugged project. In 2007 Rabobank, a triple-A rated bank with 60.000 employees, decided to build their new head office completely in line with the concepts of the New Way of Working. The preparations were thorough; they first renovated an empty office completely in the style of the new head office to allow departments to get used to the new working environment, before actually moving to the new head office (Bijl, 2011). The 'Rabo Unplugged' project introduced result contracts with employees describing the output of their work. As the employees needed to get used to this phenomenon and had to learn to stand up

for themselves, trainings were organized. The first results showed an increase of employee satisfaction of between 20 and 30%, and a significant and structural saving on accommodation facilities (Biji, 2011).

On the basis of a macro-economic survey, PricewaterhouseCoopers concluded the Dutch Gross Domestic Product (GDP) could grow by 1% because of the New Way of Working related increased labor productivity (PwC, 2011). The Dutch government began to establish legislation to regulate the new flexible labor conditions (GovernmentNL, 2011). The effect of New Way of Working in organizations did not remain unnoticed in the rest of the Dutch society. The term 'The New Way of ...' became a popular way of promoting innovation in any area. For example: a project to innovate the way children learn at school (with tablets) is called 'The New Way of Learning' (*Het Nieuwe Leren*).

## 1.2 Impact of NWOW and research perspectives

This section discusses the organizational and technological impact of the New Way of Working and the research perspectives for assessing this impact.

### 1.2.1 Impact of the New Way of Working

Implementing NWOW is more than organizing work and responsibilities differently. The objectives of NWOW can only be reached by addressing the right combination of organizational and technological aspects. Based on the Business Process Management Assessment model (Cornelissen et al., 1995), figure 1-4 shows the Assessment model for the New Way of Working.

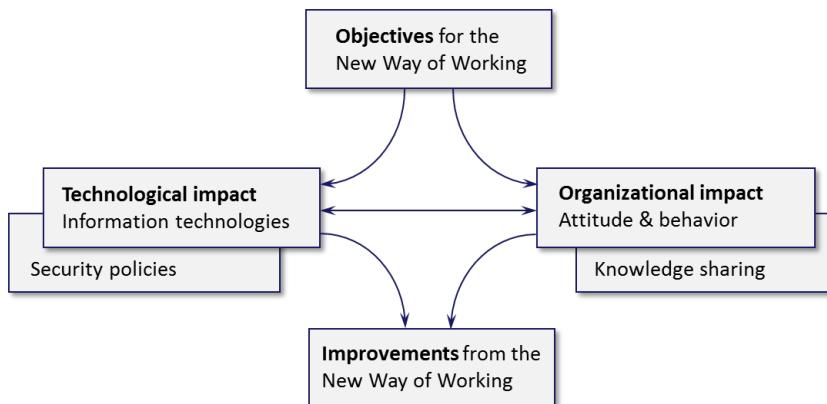


Figure 1-4 Assessment model for the New Way of Working

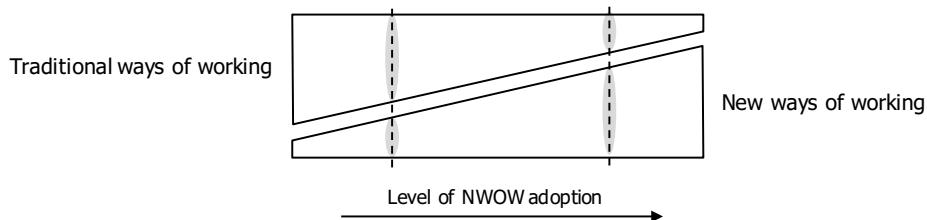
The Assessment model (figure 1-4) shows that the objectives for NWOW and the implementation of its concepts will have both an organizational and technological impact. On the organizational side, the implementation of NWOW will affect the attitude and behavior of employees. Also, the interaction between employees and the way they share knowledge will be impacted. On the technological side, the

implementation of NWOW will affect the use of (mobile) information technologies and have impact on the security policies. The organizational and technological aspects also interact.

It is the successful combined implementation of organizational changes, supported by information technologies that will generate the projected improvements. To achieve this result, all effects need to be assessed and properly addressed. This research aims to assess these effects, in order for organizations to be able to address them and leverage the potential benefits and improvements from the transition towards the New Way of Working. The New Way of Working impacts more organizational and technological aspects than the attitude of employees, knowledge sharing and IT and security policies. In this research, the focus is on these aspects, as they represent the most important factors that need to be addressed for the success of the implementation of the New Way of Working in organizations. When expectations are not properly managed, or the implementation of the concepts of NWOW is not accepted, or when knowledge can no longer be shared and interaction is lost, failure lies ahead. The same goes for the role of information systems and information security policies; when mobile working is not well supported or made impossible, dissatisfaction can be expected.

### 1.2.2 Research perspectives

The goal of this dissertation research is to assess the organizational and technological effects of the implementation of the New Way of Working. In order to assess these effects in the right context, it is important to be able to determine where an organization stands in its transition from traditional ways of working towards new ways of working (figure 1-5).



*Figure 1-5 Level of NWOW adoption*

Implementing new ways of working often results in a change of the ‘mix’ between traditional ways of working and new ways of working (Baane et al., 2010). This is schematically shown in figure 1-5 in the size of the ellipses. The assessment of the NWOW adoption level provides the base or ‘lens’ for all research in this dissertation.

Though the principles of NWOW can be applied in a production and location based work environment (e.g. Semler, 1989, 2001, 2004), they can best be applied in knowledge-intensive firms (Alvesson, 2004). As most modern forms of

work involve some use of computer technology, the competencies required to perform most jobs have changed (Burke & Ng, 2006). Information technology has given rise to the creation of a generation of knowledge workers; employees whose work is primarily intellectual and non-routine in nature, and which involves the creation and utilization of knowledge (Hislop, 2005). The main focus in this research is on the knowledge worker, that becomes more flexible and mobile in the transition towards NWOW (Greene & Myerson, 2011). Information technologies need to support this more flexible and mobile work setting in a secure way (figure 1-6).

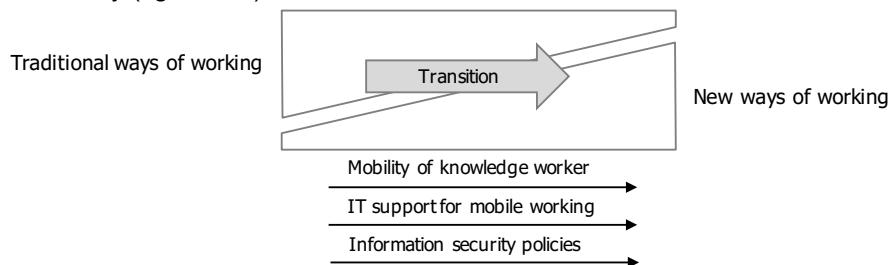


Figure 1-6 Transition towards NWOW

The transition towards NWOW in figure 1-6 shows the main elements that form the research perspectives of this dissertation: (1) the knowledge worker him/herself, that is confronted with the implementation of NWOW; this element is researched in the transformational perspective, (2) the increased flexibility and mobility, changing the interaction between knowledge workers; this element is researched in the knowledge management perspective, and (3) the changes in IT support and information security policies; these elements are researched in the IT and information security perspective.

There are more elements involved in the transition towards new ways of working, such as the changes in physical office lay-out and in the manager-employee relationship. These elements belong to research fields of Facilities management and Organizational management. These elements will be briefly touched and discussed, but are not the primary subject of research in this dissertation, of which the main focus is in the research fields of Information systems and Knowledge management.

In the section below, the three research perspectives will be further discussed.

- (1) ***The transformational perspective*** focuses on the individual employee or knowledge worker, that is confronted with the New Way of Working. The employees, but also the managers, are confronted with a new work environment. Not only physical, by a new office lay-out, but also on a personal and organizational level. On the one hand, there is the trust and freedom of organizing one's own work to become more flexible, on the other hand there is the pressure of becoming more responsible for one's own results. The organizational hierarchy with the control of employees is impacted, as employees become more flexible in organizing their work

and more mobile with their work location. The transformation may be experienced differently by different types of personalities, with every person being unique in his or her attitude towards new ways of working and coping with change.

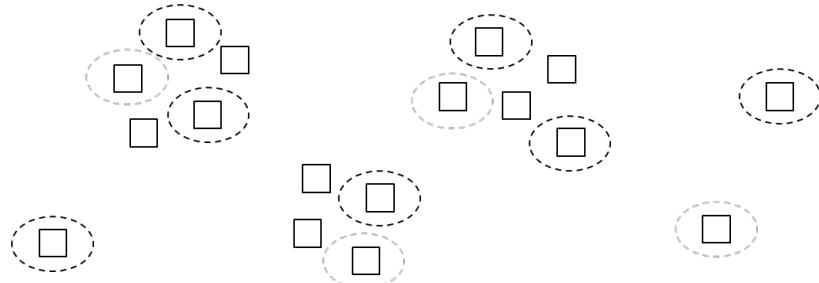


Figure 1-7 The transformational perspective

Figure 1-7 schematically shows the individual knowledge worker, located somewhere in the organization, and the focus of the transformational perspective. This focus is shown by the dashed ellipses. As research always has its limitations in reaching all employees in an organization, not all employees have an ellipse.

- (2) **The knowledge management perspective** focusses on the interaction of the individual knowledge worker with his/her work environment. This perspective focusses on the interaction of knowledge workers with others, and the sharing of knowledge with colleagues within the team, between teams, and with superiors. The geographic separation of knowledge workers in a NWOW setting may require, and result in, new ways of knowledge sharing. Where formal meetings that require physical presence are less likely to take place, alternative channels need to be chosen.

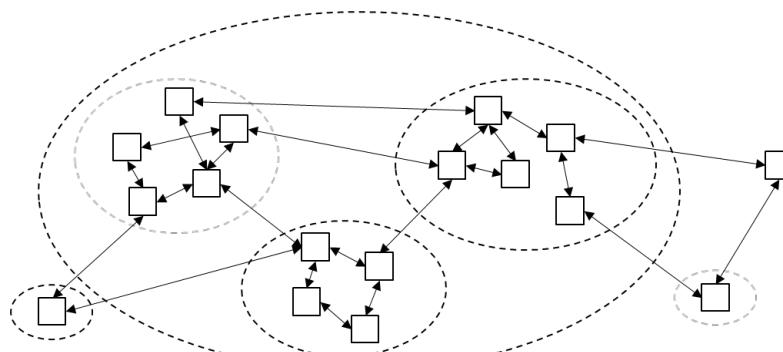


Figure 1-8 The knowledge management perspective

The knowledge management perspective is schematically shown in figure 1-8, that extends on figure 1-7. The focus (ellipses) is shown for the different levels of peer-to-peer, team- and organizational interactions.

- (3) ***The IT and information security perspective*** focusses on the role of digital mobility and security policies. Information technologies play an important role in enabling the new work environment. As work becomes more flexible in time and location, mobility and IT support of mobile working becomes crucial. Also, the consumerization of IT, known as Bring Your Own Device (BYOD) and Choose Your Own Device (CYOD), are inevitable components in the future IT infrastructure of organizations. Having more corporate data on mobile devices, whether personal or company-provided, brings along higher risks of data loss and breaches. This forces organizations to adopt information security policies to address these issues. Enabling the freedom to work anyplace anywhere, may necessitate, and result in, less freedom in accessing all data when needed.

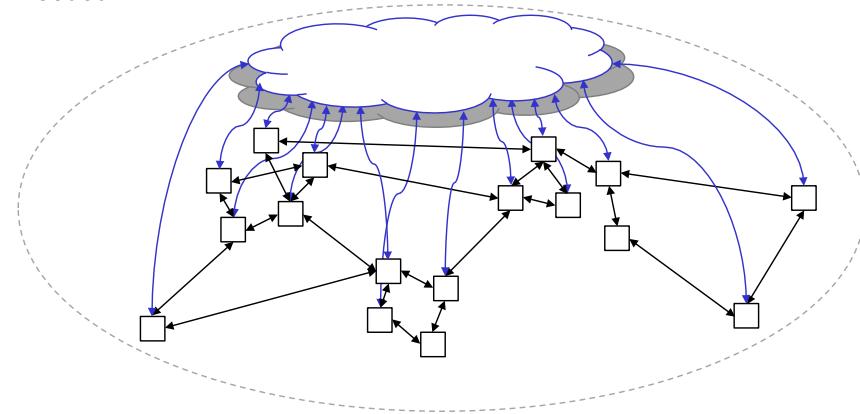


Figure 1-9 *The IT and information security perspective*

The IT and information security policies perspective is schematically shown in figure 1-9. The focus (ellipse) in this perspective is on the complete organization including its IT systems, that may be in-house or hosted via the Internet. The curved blue lines show the individual employees connected to the information systems, that are schematically shown as residing 'in the cloud'. The information security policies are symbolized by the shadow that needs to be 'passed' to reach the information in the cloud.

### 1.3 Research questions

This dissertation addresses the effects of the New Way of Working, that is: the effects of mobile working, IT and information security on the way we work, share knowledge and interact. The main research question is:

*MRQ: What are the organizational and technological effects of the  
New Way of Working on employees and organizations?*

The main research question will be addressed in three parts, based on the three perspectives, with each its own research sub-question. The parts will address the mentioned (1) transformational perspective, (2) knowledge management perspective, and (3) IT and information security perspective. The combination of parts aims to provide an overview of the effects of the New Way of Working on employees and organizations. The three parts are preceded by a general introduction that elaborates on the definition of the New Way of Working and the three main pillars or dimensions: Bricks, Bytes and Behavior, representing the work environment, information technologies, and personal aspects. Based on a literature review, special attention is given to the differences between the New Way of Working and telework.

*RQ1: How does the attitude change during the transformation process  
towards the New Ways of Working?*

This part addresses the transformational perspective. Organizations that implement NWOW go through a transformation process, and struggle to find the right strategy to cope with these developments (Baane et al. 2010). Assessing the change of attitude during the implementation of NWOW requires insight in the status and expectations of the transition towards NWOW. Having insight in the current situation and the desired future situation enables organizations to focus on their approach of implementing NWOW and manage expectations (Mettler & Rohner, 2009). A so-called NWOW Analysis Monitor was developed to enable organizations to assess the current level of NWOW adoption, and provide guidance for future initiatives in adopting NWOW practices. The monitor is the leading thread or common theme throughout this dissertation, providing consistency among all researched aspects. The monitor results are combined with an assessment of the attitude and the change in attitude towards NWOW during the transition process. The attitude of employees and managers towards the implementation of NWOW will also be researched from the viewpoint of personality traits (Davis et al., 1964). The change in attitude in the transformation process will be monitored in a longitudinal study, extending a time frame of one year. Monitoring the attitude and adequately responding to feedback are important factors for the success of NWOW implementations.

*RQ2: How is knowledge sharing behavior of knowledge workers affected by the New Way of Working?*

This part addresses the knowledge management perspective. One of the aspects that is impacted by the new work environment is the way in which knowledge is shared (Snyder & Lee-Partridge, 2009). In this section a model on knowledge sharing is developed with scenarios for knowledge sharing on different levels of the organization (De Long & Fahey, 2000; Ipe, 2003). The model is tested in two multi-case research projects at companies in the process of implementing NWOW. Also the changes in the mix of tacit and explicit knowledge, i.e. knowledge based on personal experience that is shared, and knowledge that is codified and stored, is reviewed (Nonaka, 1994). Not being able to cope with knowledge sharing may result in the loss of knowledge that is shared in ways that are not managed by today's traditional methods for managing knowledge.

*RQ3: What is the effect of NWOW and security policies on the employee and organization?*

This part addresses the IT and information security perspective. One of the key aspects of NWOW is the ability to work anytime, anywhere, which is assumed to lead to higher levels of work-life balance and productivity (Van Heck et al., 2012). There may however be a downside to the newly gained freedom, because employees might not be able to balance work and personal life well, resulting in increased stress levels (Nehaves et al., 2012). Also, organizations have struggled to develop information security policies to accommodate the growing importance of mobile working in a NWOW context.

The research in this part elaborates on the effects of the New Way of Working, mobile IT and information security policies, and their influence on the employee and organization. Based on the Extended Technology Acceptance Model (Venkatesh & Davis, 2000) a Technology and Risk Assessment model is designed to assess the perceived satisfaction with mobile working devices versus the information security risks. The final research in this dissertation combines all aspects of NWOW, mobile working, and information security policies in one large research model, generating insight on the effects on employees and organizations.

## 1.4 Research relevance

### 1.4.1 Scientific relevance

The New Way of Working is a relative new phenomenon with still limited research. Most literature on new ways of working concerns new working procedures in healthcare. Teleworking or telecommuting, an aspect that is related to NWOW, has more widely been researched in the past decades (Dimartino & Wirth, 1990; Baruch, 2000; Gajendran & Harrison, 2007). In general, telework research focuses on the aspects related to working from home instead of in the office. These aspects often concern the combination of work with childcare tasks, and the managerial control over employees that are 'not in sight'. Also, the aspect of the possible loss of productivity is often subject of research (Duxbury & Neufeld, 1999; Bailey & Kurland, 2002; Sullivan, 2003). In telework, the essence of work does not change, merely the location where work is executed changes. The managerial control stays the same, though more remote. Changes in the nature of work, because of new technologies, should coincide with changes in the way work is structured and in how people experience work in their daily lives. Although information technologies are shifting the nature of work, the structure of most organizations is still based on images of work associated with the Industrial Revolution (Barley & Kunda, 2001; Leonardi et al., 2010). In the New Way of Working the essence of work changes. Work becomes flexible, task based, and offices become meeting places instead of working facilities (Van Heck et al., 2012). Thereby, NWOW covers a whole new range of aspects, such as mobile working at any time and on any location, knowledge sharing, information security, and last but not least: result based working and management (Meel, 2011). This dissertation encompasses both research in the field of organizational behavior as in the field of IS systems. Where the New Way of Working received relatively little attention in organization and IS sciences, this dissertation intents to extent existing literature as it expands on aspects such as the effects of the transformation towards new ways of working, knowledge sharing and use of information technologies. The research on the three mentioned perspectives of the New Way of Working provides a broad overview, adding additional insight to existing literature in this field.

### 1.4.2 Societal relevance

The New Way of Working should not only be seen as a remedy for reducing traffic congestions. Higher satisfaction of employees with their work, reduction of sick leave, and improvement of productivity and organizational results are aspects that impact society on a larger scale. Governments and unions are becoming more convinced of the positive effects of NWOW and recommended stimulation of regulation on flexible working conditions (GovernmentNL, 2011; UnionFNV, 2013). The New Way of Working has a growing interest. Organizations that were early adopters in the past decade of the concepts of new ways of working are now looking for an extension or optimization of achieved results. Other

organizations are either in process of implementing the concepts or plan to do so in the near future. Research is therefore needed on the conditions for the successful implementation of the New Way of Working.

## 1.5 Research methods

This section provides an overview of the applied research methods throughout this dissertation. Various research methods are applied throughout the chapters of this work, such as case study research and survey research. Table 1.3 gives an overview of applied research methods per chapter in this dissertation.

Research method	Chapter						
	1	2	3	4	5	6	7
Literature research	x	x	x	x	x	x	x
Design Science Research		x					
Case study research		x	x	x	x	x	
Survey research		x	x	x	x	x	x

Table 1.3 Overview of research methods per chapter

### 1.5.1 Literature research

The most applied research method in this dissertation is literature research. All chapters contain literature research as the basis on which the research design is built. In this chapter (1) structured literature research was performed on the differences between NWOW and telework. Literature research also formed the basis for the multi-level design of the analysis tool in chapter 2. Chapter 3 adds literature research on personality traits, or the 'Big Five'. In chapter 4 the concepts of knowledge sharing are introduced, followed by a specification of the Knowledge Sharing Framework in chapter 5. Chapter 6 extends the research with the literature on consumerization of IT and security aspects, and the Technology Acceptance Model. In chapter 7, a complex model with variables and measurement items is built, based on existing literature on employee satisfaction and organizational performance.

### 1.5.2 Design Science Research

In chapter 2 the Design Science Research (DSR) approach was adopted to develop the NWOW Analysis Monitor (Hevner et al., 2004; Vaishnavi & Kuechler, 2004). Based on the DSR literature, the methodology with five steps, including the iteration of steps, was applied, leading to the development of the artifact i.e. the NWOW Analysis Monitor. In the DSR approach the developed artifact needs to be evaluated and communicated. This was done in two cases.

### 1.5.3 Case study research

Case study research is applied several times in this dissertation. The advantage of case study research is that it can be applied both for theory building and theory testing (Yin, 2009). In chapter 2 a test case and live case were used to test the developed monitor. In chapter 3 a longitudinal case study was performed in an organization in the Building & Construction sector, implementing NWOW. In chapter 4 the results of three cases in three organizations in the Process-, Energy- and IT-software sectors, that are in the process of implementing NWOW, are compared. Chapter 5 contains a multi-case study in five organizations in the Distribution, IT-, Finance- & Tax advisory sectors. Chapter 6 uses an overall case study protocol for the research in four organizations.

In a number of cases, interviews with subject matter experts were conducted. For the monitor (chapter 2) a number of experts on the implementation of NWOW were interviewed. In chapter 4 a subject matter expert was interviewed for the vision on knowledge sharing from a NWOW point of view. In chapter 6, IT security experts were interviewed for the security threats of (mobile) devices.

### 1.5.4 Survey research

After literature research, survey research was the most used research method in this dissertation. The NWOW Analysis Monitor (chapter 2) was often part of these surveys. In total, over the course of all researches, almost 1,200 respondents filled in the monitor. Survey research was often combined in a mixed method research approach with interviews, to receive a more complete impression of the respondents' survey answers and feedback. The interviews were often semi-structured and open, allowing respondent to give additional comments. Though the (on-line) questionnaires contained room for comments, the mixed method research approach allowed the capture of additional background on the reasoning of respondents. In chapter 3, for the analysis of personality treats in relation to the satisfaction with NWOW, specific non-disclosed personal interviews were performed.

Based on the survey research, statistical analyses were performed. Chapter 3 contains a correlation analysis on personality treats and satisfaction with NWOW. Chapter 7 is the main statistical analysis chapter. The primary statistical method for the data analysis in chapter 7 is the Partial Least Squares variant of Structured Equation Modeling (PLS-SEM). The chapter contains an evaluation of the inner (structure) and outer (measurement) research model and a number path- and correlation analyses.

## 1.6 Key concepts

This section discusses a number of key concepts of the New Way of Working<sup>2</sup>. After the positioning and definition of NWOW, the three main pillars or dimensions; Bricks, Bytes and Behavior, are discussed. In addition to the section on the emergence of NWOW, the impact of inspiring offices will be shortly reviewed. The last part will focus on the differences between the New Way of Working and telework.

### 1.6.1 The New Way of Working and NWOW

The section on the changing nature of work explained the emergence and spread of the New Way of Working. In this section the use of terminology on (1) the New World of Work and (2) New Ways of Working, is briefly discussed. (1) In the executive briefing of Microsoft, the term the New World of Work was used. This term can be found in literature, where it is sometimes used in relation to general observations of the new work environment, and in other cases in relation to the vision of Microsoft (see e.g. Heerdt & Bondarouk, 2009). In general, the preference in this dissertation is for the term the New Way of Working rather than the New World of Work, also to avoid confusion with the vision of a commercial organization. (2) In scientific literature, the term: New Ways of Working, with an s, can also be found. The difference between the term New Ways of Working and the New Way of Working is very small. The nuance is that 'the New Way of Working' can be seen as the overall concept, the umbrella, of which the implementation leads to 'new ways of working'. In this dissertation, the New Way of Working and its abbreviation: NWOW, refer to this overall concept. The wording: new ways of working mostly refers to its operationalization. New Ways of Working can also be seen as a term that broadens the focus: there is no single 'New Way of Working' but multiple roads that lead to new ways of working. It is a conscious editorial choice not to use TNWOW, or tNWOW, as the abbreviation for the New Way of Working, because these abbreviations are unnecessary long. Because the difference between the terms the New Way of Working and New Ways of Working is almost negligible, the reader has the freedom to read NWOW as 'New Ways of Working' or 'the New Way of Working'.

### 1.6.2 Positioning of NWOW in fields of research

In this section the positioning of the New Way of Working in various fields of research will be discussed, in particular the relationship with the research fields: Organizational management, Knowledge management, Information systems, and Facilities management.

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<sup>2</sup> The content of this section is based on parts of published work: Kok, A. de. (2016). The New Way of Working: Bricks, Bytes and Behavior. In: Lee, J. (Eds.). *The Impact of ICT on Work*. Springer Science & Business Media. 9-40.

In the brief review of the history of work (section 1.1.2), the effects of the Industrial Revolution and the Scientific Management theory of Taylor (1911) were discussed. They led to the low-level managerial control of employees, who were deprived from all personal development. The reaction from the job enrichment theory (Herzberg, 1966; Hackman & Oldham, 1976) eventually led to the emergence of virtual, boundary-less, collaborative organizations (Ghoshal & Bartlett, 1997). Child & McGrath (2001) indicate that traditional hierarchical structures disappear in the new horizontal organization. Organizations with flattened corporate structures are more likely to attract the younger workers of the Net Generation, who have less patience for climbing the corporate ladder (Burke & Ng, 2006).

The emerging organizational form drives changes in managerial behavior and leadership styles (Hofstede, 1980; Bass & Bass, 2008). The manager becomes a coach and mentor, facilitating subordinates to enhance skills, improve performance and achieve goals (Ellinger et al. 2006, 2010; Joo, 2012). Coaching has been linked to increased job satisfaction, personal capability, motivation, organizational commitment, and decreased turnover (Orth et al., 1987; Evered & Selman, 1989; Yarnall, 1998). Evered & Selman (1989) even postulate that coaching is the essential feature of effective management, and that creating a culture for coaching is a core managerial activity. The old management paradigm of control, order and compliance objectifies and alienates employees, whereas coaching engages and empowers employees to outperform. In the New Way of Working, a coaching management style that provides trust and autonomy to employees is a crucial element in enabling result based working. In his research on leadership styles Hofstede defines power distance, the degree of hierarchy and acceptance of autocratic leadership, as one of the cultural dimensions that influence leadership (Hofstede et al., 2010; House et al., 2002). Countries with a 'low power distance' tend more towards dialogue than obedience; the manager is not seen as the boss but as the coach. Besides the Netherlands, the Nordic countries e.g. Denmark and Sweden score low on power distance.

The organizational transition in the 20<sup>th</sup> century entailed the shift from an industrial to a knowledge based society, in which knowledge workers play a pivotal role (Drucker, 1969, 1999). Instead of physical products, knowledge becomes an asset, and the creation, transfer and utilization of hard-to-imitate knowledge determines the competitive advantage of an organization (Teece, 2000). Knowledge sharing and the successful transfer of knowledge from the older generation to the next generation become the most important priorities for organizations (Burke & Ng, 2006). In the knowledge-intensive organization, knowledge workers typically work in different kinds of environments that are characterized by low hierarchies, high flexibility and low dependence on time and place (Pyörä, 2003, 2009; Alvesson, 2004; Ruostela et al., 2015). These work characteristics correspond well with the working principles of the New Way of Working.

The new work environment influences the opportunity to share knowledge, because employees become more mobile and meet less face-to-face. This aspect is not new; in large international organizations the distance between employees already had to be bridged. Distance-shrinking technologies, such as information systems, play an important role in overcoming this obstacle (Kirsch, 1995; Lorentzen, 2008). Information systems can facilitate opportunities to share knowledge, and even create new opportunities to work together with people from inside and outside the own organization, enabling more diverse groups to be formed. Ellison et al. found that enterprise social networks are increasingly being introduced for knowledge sharing, in particular in distributed multinational organizations (Ellison et al., 2015; Treem & Leonardi, 2013).

The usability and adoption of IT is an important aspect in enabling mobility and supporting new ways of working. Alter (1999) theorizes that the operation and significance of an information system is best understood in terms of the work system it serves. Work systems are systems in which participants perform a business process, using information and other resources, to produce an outcome. Organizations typically contain multiple work systems. An information system processes information to serve work systems, by providing information for decision making, structuring or controlling the work, or automating some of the work. The impact of the information system on the work system's performance is determined by how well it performs its support role, for instance in supporting and enabling mobile working. A poorly designed information system can make a structured work system inefficient or prevent it from operating at all. The quality of the user interface may have a significant impact on the amount of voluntary usage (Gefen & Keil, 1998). In the Technology Acceptance Model (Davis, 1989, 1993; Venkatesh & Davis, 2000) user-related variables, such as perceived usefulness and perceived ease of use, determine the individuals' information system acceptance. This acceptance of information systems is crucial in achieving the projected benefits of NWOW.

In the emergence of NWOW (section 1.1.3), the importance of the role of office design in facilities management, and flexible open plan offices in the implementation of new ways of working, was discussed (Duffy, 2000). Davenport (2005) found the introduction of a new workspace was most often the catalyst for a broad redesign of the knowledge work environment. Allen (1977, 2007) found that 'interaction-promoting facilities' are the prime vehicle for transmitting ideas, concepts, and other information necessary for ensuring effective work performance, because they enhance contact and communication. Hua et al. (2010) found consistent evidence that the layout of various collaborative spaces in a workplace directly impacts office workers' perceptions of how well the work environment supports collaboration. Finally, Kornberger & Clegg (2004) state that managing space creatively necessitates a generative building that organizes the flows of communication, knowledge, and movement. The section on inspiring offices (1.6.5) elaborates on the role and function of office design.

The above research fields have various relationships with the concepts of NWOW, and in return, determine the positioning of NWOW in these fields. The redesign of the work environment often functions as the catalyst for the process, whereas the adoption of IT has the role of its enabler, and the change in managerial behavior and the empowerment of employees as its goal. NWOW can be positioned as a broad field of research, in which multiple elements from the above research fields are addressed at a varying depth.



*Figure 1-10 Positioning of NWOW in research fields*

The varying depth of the focus of NWOW is schematically shown by the (random shaped) spider in figure 1-10. The figure shows the scope of this study is limited, as NWOW encompasses a broad field of research. The emphasis of this study is not on the development of an overarching theory, integrating all research fields into one comprehensive theoretical model, but rather on performing an empirical study in area of the three mentioned perspectives. Though the research fields of Organizational management and Facilities management are touched and discussed, the three perspectives mainly focus on the research fields of Information systems and Knowledge management.

### 1.6.3 Definition of the New Way of Working

The New Way of Working does not yet go by a single definition. In 2002, Bødker & Christiansen of the Aarhus University' Center for New Ways of Working in Denmark, characterize 'new work' 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'. Bijl (2011) defines the New Way of Working 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.' Ruostela et al. (2015) define new ways of working as 'non-traditional mobile and flexible work practices, settings and locations using sufficient IT tools, as a novel approach to improve the performance of a knowledge-intensive organization.' Baane et al. (2010) argue that the New Way of Working is an umbrella term, which organizations variably use to state their social innovation initiatives. They observe four work principles in the New Way of Working:

1. Time and location free work: working anytime, anywhere;
2. Steering workers towards achieving results: manage your own work;
3. Free access to knowledge and ideas: unlimited access and connectivity;
4. Flexible work relations: my size fits me.

The work principles mean to give maximum freedom to employees, based on mutual trust. This trust is expressed in the freedom that employees have for carrying out their work in ways, and at times and locations that suit them best. Employees are evaluated based on their personal or team contribution, and on results, rather than their presence in the office. In this way 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 best 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 results-oriented way of working, and offices with activity-based workplaces, that are designed to enhance interaction, engagement and creativity.

#### 1.6.4 Bricks, Bytes and Behavior

Van Heck et al. (2012) describe how establishing new ways of working, using advanced mobile work technologies, created changes in three interrelated areas: people, place and technology. Baane et al. (2010) found the implementation of New Way of Working at organizations is characterized by the combination of the aspects on three dominant levers. They state: 'The breaking down of traditional concepts of work is taking place on the basis of three dominant levers of business: Housing, IT and behavior, in other words: Bricks, Bytes and Behavior'. These three levers can be seen as the three dimensions that define the New Way of Working:

- (1) Bricks, the physical dimension or the work environment;
- (2) Bytes, the technological dimension or the use of information technology;
- (3) Behavior, the personal dimension or the organization of work and work relations.

Though the third dimension also includes organizational aspects e.g. management and control, the dimension is not called the organizational dimension to emphasize the pivotal role of the employee as person and individual in the environment of the New Way of Working. These three dimensions will now be discussed in more detail.

#### *Bricks, the physical dimension*

This dimension contains the aspects that deal with the work environment and facilities. The new work environment focuses on flexible work and activity-related or activity-based workplaces. In practice, this means that the office is (re)designed in such a way that there are concentration places to support quiet and concentrated work and meeting places where workers can discuss issues. But there may also be brainstorm places, chat places and relax places. In the Netherlands, the (re)design of offices and the work environment experiences a huge revival because of the New Way of Working. Organizations often directly relate the implementation of the New Way of Working to the opening of a new office building or the re-design of their existing office space. Without this simultaneous change of the office and work environment the concepts of the New Way of Working are almost never implemented.

#### *Bytes, the technological dimension*

This dimension contains the aspects that deal with the use of information technology and sharing data; the hardware, software, information use, storage and sharing of data and knowledge. The most important characteristics are the real-time availability of information and the access to all data via networks, or 'the Cloud' at all places, preferably on multiple devices. The use of information technology enables the creation of a virtual work environment including virtual communication capabilities. Johns & Gratton (2013) describe this as the 'third wave of virtual work': after the virtual freelancer and virtual corporate colleague the virtual co-worker arises, the untethered knowledge worker that can perform tasks anywhere at any time. They state that 'presenteeism' has come to mean showing up at an office even when you could be more productive elsewhere. IT systems should be intuitive and based on the activities and tasks that need to be performed 'work-the-way-you-want', rather than force the user to work in a way the environment predicts. The use of work-related devices can enhance productivity. Laptops, tablets and smartphones are better equipped for mobile work than desktop computers. The virtual environment also enables the use of personal hardware; consumerization or Bring Your Own Device (BYOD). Though many companies do not yet have a BYOD program in place, the reality is that employees already bring their personal devices to work (Gillett, 2012; Citrix, 2013). Forrester Research found that 52% of the information workers use three or more devices for work. They predict that by 2016 there will be 760 million tablets in use, most for use both at work and at home (Gillett, 2012). Though the security aspects of protecting business data fragmentation on a broad range of personal devices is a challenge, (IT) managers increasingly realize this trend

cannot be stopped, and therefore needs to be managed. Because of the security aspects, a number of organizations have implemented a Choose Your Own Device (CYOD) policy, allowing employees to choose from a range of mobile devices with pre-installed security management software (Citrix, 2017).

#### *Behavior, the personal dimension*

The third dimension contains the broad scope of aspects that deal with the organization, the manager-employee relation, and the human-work relation. Research from the Hay Group showed that highly engaged employees are on average 50% more likely to exceed expectations than the least-engaged workers. Companies with highly engaged employees outperform firms with disengaged workers by 54% in employee retention, 89% in customer satisfaction, and fourfold in revenue growth (Goffee & Jones, 2013). In the New Way of Working, the most important aspects in the Personal dimension are trust and autonomy of the employee, delegation of responsibilities (empowerment), and result-based work agreements. Freedom and mutual trust form the basis for the new work relation, instead of hierarchy and managerial control. Activities may be performed in different work settings and communities in- and outside the organizational boundaries. These new work forms may also impact the conditions under which workers are employed and rewarded. As the worker has the freedom to choose when and where to work, the balance between work and personal life becomes an important aspect for the individual employee.

#### 1.6.5 Inspiring offices

With the changes in way we work, the role of the workplace is changing too. One of the most visible effects of the implementation of the New Way of Working in organizations is the radical re-design of office space; the creation of new office space that is breaking with all traditional rules and design concepts. The office, as we know it, has not kept up with the pace of the transitions of the tools we use every day. Offices therefore need to transform from dull ‘production facilities’ to inspiring meeting places, in which no effort is spared to create a new sense and experience of ‘work’. Creating inspiring offices also happens outside the realm of the New Way of Working. Companies like Google and Virgin use their office design as a way to inspire employees and increase creativity (Groves et al., 2010).

Creating inspiring offices does not have to come at a great cost. While gaining on attractiveness and efficiency, the actual cost per employee may even go down (Gillen & Jeffery, 2014). Also, the time lost on distractions can be reduced (Laing et al., 2011). The use of office space is often very inefficient; most desks are unoccupied for most of the day. Research shows that office utilization peaks at only 42% on any given day (Laing, 2013). This could imply that, using the logic of an industrial mind-set, the best solution is to eliminate ‘wasted’ office space by compressing activities into a flexible, smaller, office. Though flexibility does improve efficiency and reduce cost, this is by no means the objective of creating inspiring offices. The real challenge is that office space will boost creativity,

eliminating or transcending the need to reduce costs. The office of the future has inspirational, wireless networked, shared, multipurpose spaces that redefine organizational boundaries. It creates intentional or unintentional collisions and collaboration between people from different disciplines and backgrounds. The logic behind this is, that when people collide, have encounters and unplanned interactions, performance improves and creativity and innovation is triggered. Spaces that are designed to promote such encounters increase the likelihood of collisions, and data show that more collisions create positive outcomes (Waber et al., 2014). In fact, money spent on improving personal productivity, could better be used to design workspaces that promote collisions and interactions that will make organizations – not individuals – more successful. Based on the view that physical proximity leads to more casual interactions, which in turn may lead to breakthroughs for products, companies like Apple, Yahoo! and Google belief that having workers collaborate in the office is crucial to their success (Isaacson, 2011; Kastelein, 2014). In some cases, like at Yahoo!, existing telework arrangements were even reversed to foster communication and collaboration (Vidyarthi et al., 2014).

No matter how well technology supports working in a virtual world, physical face-to-face interactions have not lost their importance. The most valuable form of communication remains face-to-face, followed by phone. The least valuable forms of communication are e-mail and text. Research found that 35% of the variation in a team's performance, can be accounted for simply by the number of face-to-face exchanges among team members (Pentland, 2012). Too much communication will however decrease performance, as it consumes too much of the 'working time'. Informal communication also remains important: the best predictors for the productivity of a team are the team's energy and engagement outside the formal meetings. Together these two factors explain one-third of the variations in group performance. The coffee machine is not a cost but a gain. Teams with denser, more frequent, and more diverse interaction patterns are more productive as a whole (Reagans & Zuckerman, 2001).

Proximity boosts communication; we are four times as likely to communicate regularly with someone sitting six feet away from us, as with someone sixty feet away, and almost never communicate with colleagues on separate floors or in separate buildings (Allen, 1977). Distance-shrinking information technologies have not bridged this gap. Co-located workers e-mail each other four times as frequently as colleagues in different locations, leading to 32% faster project completion times (Waber et al., 2014).

In the past decade, digital-savvy workers, escaping from the office but also avoiding the isolation of working at home, found a solution for their need to interact: co-working spaces. The initial organic growth of co-working locations, also called third-place offices, has by now become one of the new ways to encounter and engage. And with success: in a survey under 1500 co-workers 75% of them report an increase in productivity, and 80% an increase of their business network (Foertsch & Dullroy, 2012).

Even though work has become mobile and distributed, physical interactions and work environments remain vital. The question is how to optimize the range and variety of the work environment, so it may become an instrument for workers to encounter and engage. The answer seems to lie at hand: create inspiring co-working spaces and increase the chance of collisions. As co-working locations are open to anyone, organizational boundaries within offices are likely to fade. New offices will support co-habited workspaces: co-working locations not only for own personnel but also for workers from outside the organization. In the future, offices may become small cities, neighborhoods, where communities encounter and engage, and in which the probability of many different kinds of interactions (i.e. social, intellectual, commercial) is enhanced and facilitated.

### 1.6.6 The differences between NWOW and telework

The concepts behind the New Way of Working are not new as such. The ideas of mobile working, desk sharing, video conferencing and paperless, open offices, originate from the 1970's or before (Meel, 2011). Though the ideas were there, Meel states that they were by no means common or widely adopted at that time. Often, the information infrastructure was simply inadequate to support remote working, and management lacked vision to change the hierarchical control setting. Meel warns however, that we should not be too quick to denounce new ways of working as recycled old 1970s ideas.

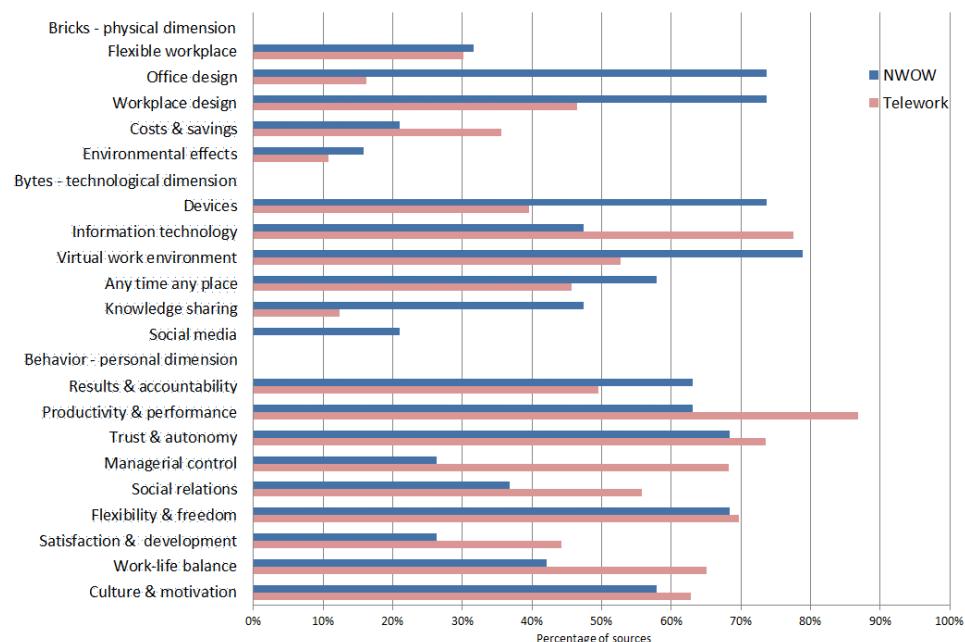
Though telework plays a role in the New Way of Working, the primary focus of NWOW is on the fundamental change in the way the work is done. In the New Way of Working remote working is not primarily meant for being able to work at home; it is used as one of the tools to maximize work flexibility and effectiveness, as well as enjoyment. Coming to the office at 11 instead of 8 or 9 o'clock and doing one's e-mail at home is more effective than losing unnecessary time in traffics congestions. Also, one may choose to bring the children to school in the morning, or go to the gym, and finish work later that evening. Employees that choose not to work remote are free to come to the office and work at the normal office hours, but still work result-based. The New Way of Working can therefore exist without teleworking.

Similar to the New Way of Working, telework has multiple definitions. Dimartino & Wirth (1990) analyzed 50 definitions of telework, finding that 60% of the definitions are based on a combination of at least two of the three main concepts: organization, location and technology. Baruch (2000) defines telework as: Location of the workplace, partially or fully independent from the location of the employer; Use of information technology (IT), mainly personal computers, e-mail, faxes and telephones; and Organizational form and communication link to the organization. Limburg (2009) also defines three elements for telework design: Location, referring to the introduction of a structural distance between the individual worker and the organization (co-workers and managers). IT, whose role undergoes major changes in a dispersed organization. Management, as this often shows up as a major stumbling block for making teleworking successful. The definitions of Dimartino & Wirth, Baruch and Limburg have large similarities with

the three dimensions of the New Way of Working: Bricks, Bytes and Behavior. These three dimensions can therefore serve as the base for the comparison of differences between NWOW and telework.

The analysis of the differences between the New Way of Working and telework was investigated based on the use of terminology in NWOW and telework literature (Kok & Helms, 2012). A Structured Literature Research approach was used to structure past findings, describe concepts or themes, and develop a model for future research (Webster & Watson, 2002). In total 148 sources were analyzed.

The main themes that were found in the NWOW and telework literature were clustered under the three dimensions, and are shown in figure 1-11. The figure shows the percentages of the sources in NWOW and telework literature that address these themes.

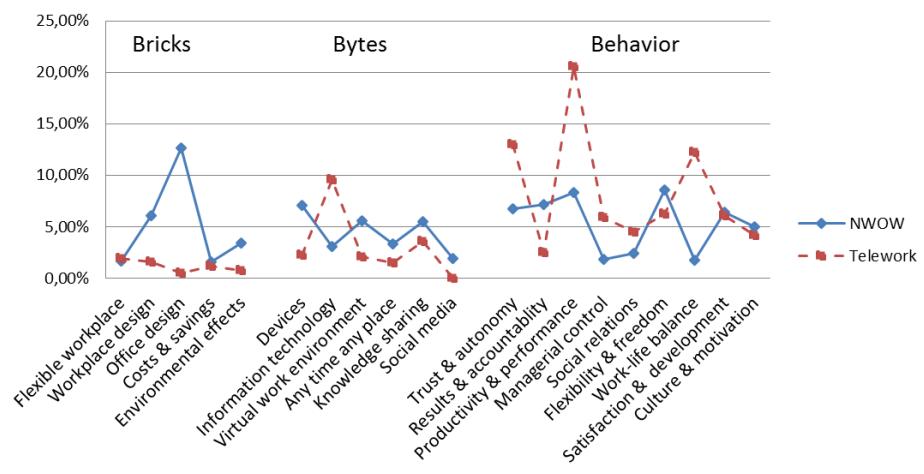


*Figure 1-11 Percentage of NWOW and telework sources addressing themes*

The analysis in figure 1-11 shows that for Bricks, NWOW literature has more focus on the office- and workplace design: 74% of the sources mention the office- and workplace design, versus respectively 16% and 47% in telework literature. Telework literature has more focus on costs and savings. For Bytes, devices and the virtual work environment are addressed more in NWOW literature. Knowledge sharing is (relatively) mentioned in almost four times as much NWOW sources. Telework more often mentions information technology (in general). There are no references in telework literature to (the use of) social media. For Behavior, over

85% of the telework literature addresses productivity & performance, implying that the vast majority of telework literature addresses this theme. Also, managerial control is mentioned in almost three times as much sources in telework literature. NWOW literature has slightly more references to results and accountability.

The next step was to analyze the frequency of words used in these themes. The Grounded Theory method (Urquhart, 2001) was used to abstract keywords from the NWOW and telework literature. This was performed by analyzing all literature sources for frequently used words, using the NVivo tool. Keywords (and key phrases) were also gathered by open coding while studying the literature sources. Using NVivo, queries with keywords were executed on the sources, resulting in (in total over 8,000) references that were clustered by theme (in NVivo node trees).



*Figure 1-12 Percentage of NWOW and telework sources that address themes*

The result of this analysis is in figure 1-12, and shows the percentage of the references to the themes in NWOW and telework literature. For Bricks, NWOW literature has clearly more references to workplace- and office design. For Bytes, NWOW literature more often mentions devices and the virtual work environment, while telework literature more often addresses information technology in general. For Behavior, there are more references in telework literature for trust & autonomy, productivity & performance, managerial control and work-life balance. With over 20% of all references, productivity & performance is clearly an often-discussed theme in telework literature. NWOW literature has more references to results & accountability.

This lead to the following highlights of differences between telework and the New Way of Working:

- (1) Bricks: In telework the location of the workplace mostly refers to working either at home or at the office. In the New Way of Working the physical

dimension mostly refers to the re-arrangement of the work environment; the drastic redesign of the office to activity-based work places with concentration and meeting places.

- (2) Bytes: In telework information technology is used to enable remote working in general. In the New Way of Working information technology is used to create the freedom to work anywhere at any time, and enable (virtual) collaboration.
- (3) Behavior: In telework the personal dimension often refers to the employee-manager arrangements on autonomy and in particular productivity. The New Way of Working more often is about making work more efficient and enjoyable. Freedom and trust are key ingredients and direct supervision belongs to the past and is replaced by accountability for results.

In summary, there are overlaps in telework and the New Way of Working, but the focus often differs. The most evident differences are the focus in the New Way of Working on the office (re)design, and the focus in telework literature on the performance and productivity. Perhaps, the difference between telework and the New Way of Working can best be explained in the following way; In telework the employee is confronted with two worlds: the ‘new world’ outside the office, with a perceived form of freedom, and the ‘old world’ inside the office. From a managerial point of view the work has however not changed: working remote only changes the location where work is performed, not the supervision and control over the work. The New Way of Working brings the new world inside the office and replaces managerial control by trust and responsibility for results. As the work itself changes the worker is now in a situation where the two worlds are almost seamlessly connected; work can be done at any place and at any time in the same organizational setting. Creating this ‘one-world-concept’ is possibly the biggest difference between the New Way of Working and telework.

## 1.7 Dissertation outline

In the implementation of New Way of Working, employees are confronted with a new work environment, not only physical, by the introduction of flexible open offices, but also technological by the use of mobile IT, and on the personal level in the communication with colleagues and managers. Because work becomes more mobile there is less face-to-face contact and this may affect aspects such as knowledge sharing. The use of information technology and IT security may have both positive as negative effects on productivity, job satisfaction and work-life balance. These three perspectives, (1) the transformational perspective, (2) the knowledge management perspective, and (3) the IT and information security perspective form the central parts of this dissertation.

The dissertation comprises of five parts. The three central parts each have 2 chapters covering one of the three research questions and perspectives. The three central parts are preceded by an introduction, and completed by a part with the conclusions of this research. Each part is briefly described in the outline below. The papers in the chapters have been included ‘as-is’ or ‘as-published’,

apart from the Introduction chapter, for which a selection of the original publication was made. This means that the introduction to NWOW for the reader of the (original) paper contains overlaps with the Introduction chapter in this study, and can be skipped when reading this dissertation.

## Part I General introduction

### *Chapter 1. Introduction*

In the first chapter the research topic is described, with the relevance of the research, the research questions, the research methods and key concepts. The introduction to the New Way of Working is based on parts of the published work: Kok, A. de, (2016). *The New Way of Working: Bricks, Bytes and Behavior*. In: Lee, J. (Eds.). *The Impact of ICT on Work*. Springer Science & Business Media. 9-40.

## Part II The transformational perspective

### *Chapter 2. Assessing the New Way of Working:*

#### *Bricks, Bytes and Behavior*

In chapter 2 an assessment methodology for organizations in the transition towards NWOW is described. This methodology was developed to analyze the current and future desired level of adoption of NWOW in organizations. The chapter describes the development of the so-called NWOW Analysis Monitor, using the Design Science Research approach, and the evaluation of the artifact (monitor). The monitor is the underlying theme for almost all other research, as the monitor is used in other research to assess the adoption level for NWOW of the organizations involved. The chapter is based on: Kok, A. de, Koops, J., & Helms, R. W. (2014). *Assessing the New Way of Working: Bricks, Bytes and Behavior*. *Proceedings of the 18th Pacific Asia Conference on Information Systems, PACIS 2014*.

### *Chapter 3. Attitude towards the New Way of Working:*

#### *A Longitudinal Study*

Based on the methodology developed in chapter 2, this chapter examines the attitude of employees and managers towards NWOW. A longitudinal case study, that was performed over a one-year timeframe, is presented with the attitude before the implementation of NWOW, and after the transition. An analysis of the relationship between personal traits and attitude towards NWOW is added. The chapter is based on: Kok, A. de, & Helms, R. W. (2016). *Attitude towards the New Way of Working: A Longitudinal Study*. *Proceedings of the 24th European Conference of Information Systems, ECIS 2016*.

## Part III The knowledge management perspective

This part addresses the perspective of Knowledge Management.

### *Chapter 4. Knowledge sharing and channel choice: Effects of the New way of Working*

Chapter 4 discusses the aspect of knowledge sharing in organizations and the effect of the implementation of NWOW. The chapter focusses on knowledge workers and the changes in channel choice for sharing knowledge. This is evaluated for both general and sensitive knowledge, and on multiple communication levels; colleague, superior and organization. The chapter is based on: Kok, A. de, Bellefroid, B., & Helms, R. W. (2013). Knowledge Sharing and Channel Choice: Effects of the New Way of Working. *Proceedings of the 14th European conference on knowledge management, ECKM 2013*.

### *Chapter 5. Knowledge sharing in the New World of Work: Effects of the New way of Working*

Chapter 5 further elaborates on chapter 4 and focusses on the type on knowledge that is shared in organizations that are in the transition towards NWOW. Special attention is given to the optimal mix of tacit and explicit for knowledge sharing. Chapter 5 is based on: Kok, A. de, Esten, R., & Helms, R. W. (2015). Knowledge Sharing in the New World of Work: Effects of the New Way of Working. *Journal of Information Technology Services, KITS, 14(2), 315-335*.

## Part IV The IT and information security perspective

### *Chapter 6. Mobility, security and employee satisfaction in a Choose Your Own Device (CYOD) environment*

Chapter 6 focusses on the ICT aspects of the implementation of mobile working. Organizations struggle with the security of the new work environment. The aspects of Bring Your Own Device (BYOD) and Choose Your Own Device (CYOD) are discussed and evaluated for their impact on data security in organizations. In five cases employees are reviewed in their satisfaction with current devices and their wishes for mobile working. The work in chapter 6 was presented in: Kok, A. de, Lubbers, Y., & Helms, R. W. (2015). Mobility and Security in the New Way of Working: Employee Satisfaction in a Choose Your Own Device (CYOD) Environment. *Proceedings of the 9th Mediterranean Conference on Information Systems, MCIS 2015*.

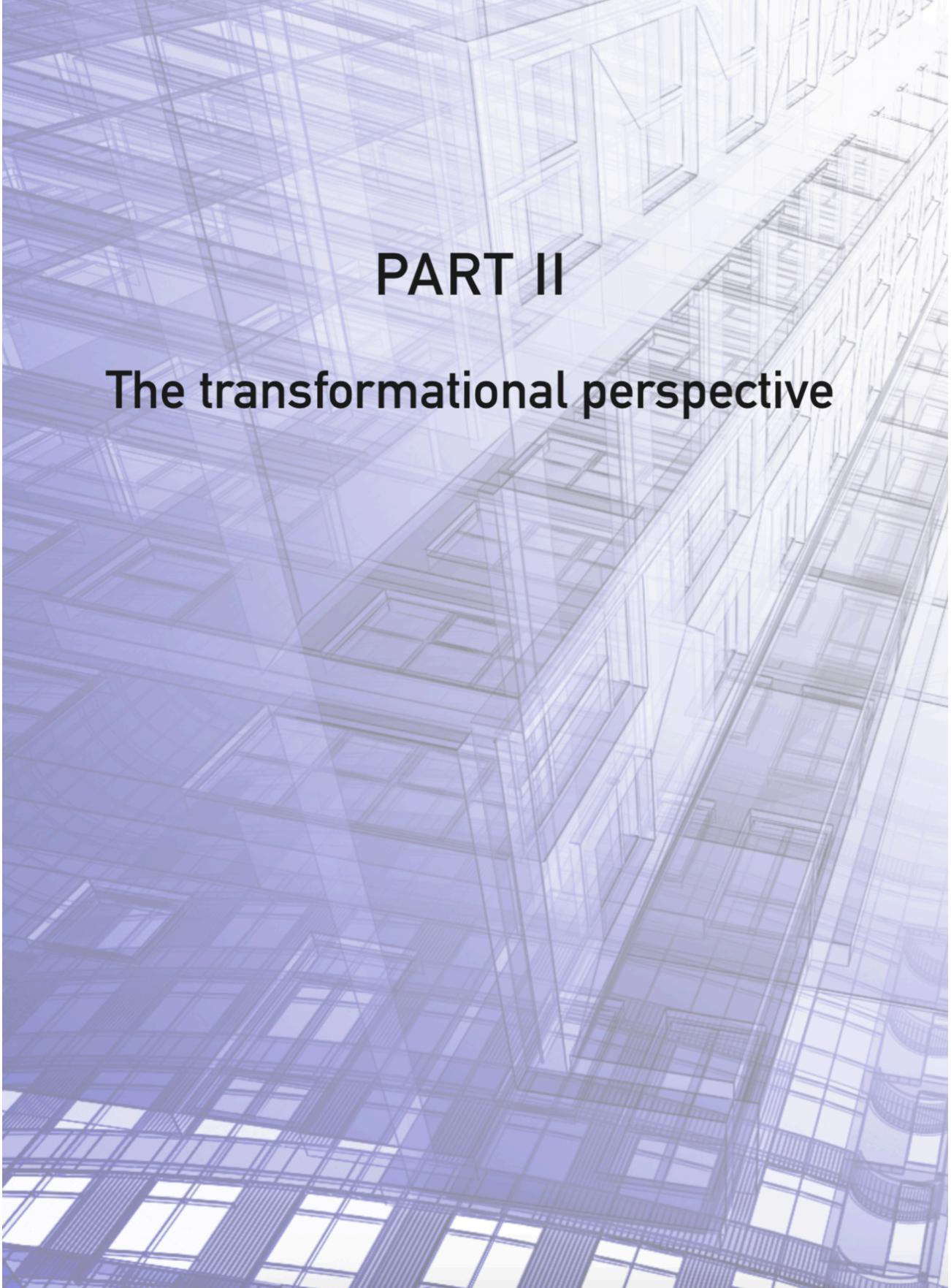
*Chapter 7. The effects of the New Way of Working and information security policies on employees and organizations*

Chapter 7 builds on the previous chapter but focusses on the effects of the implementation of NWOW and the use of information security policies (ISPs) on employee engagement and organizational performance. For this a broad market survey was performed with over 1,000 respondents and over 600 usable data entries. The unit of observation is broad and includes all types of employees, office / knowledge workers and operational staff. The results are analyzed using the Partial Least Squares variant of Structured Equation Modeling (PLS-SEM). Chapter 7 is based on: Kok, A. de, Foorthuis, R. M., Thatcher, J. B., & Helms, R. W. (2017). The Effects of the New Way of Working and Information Security Policies on Employee Engagement and Organizational Performance. *Submitted for journal publication*.

## Part V Conclusion

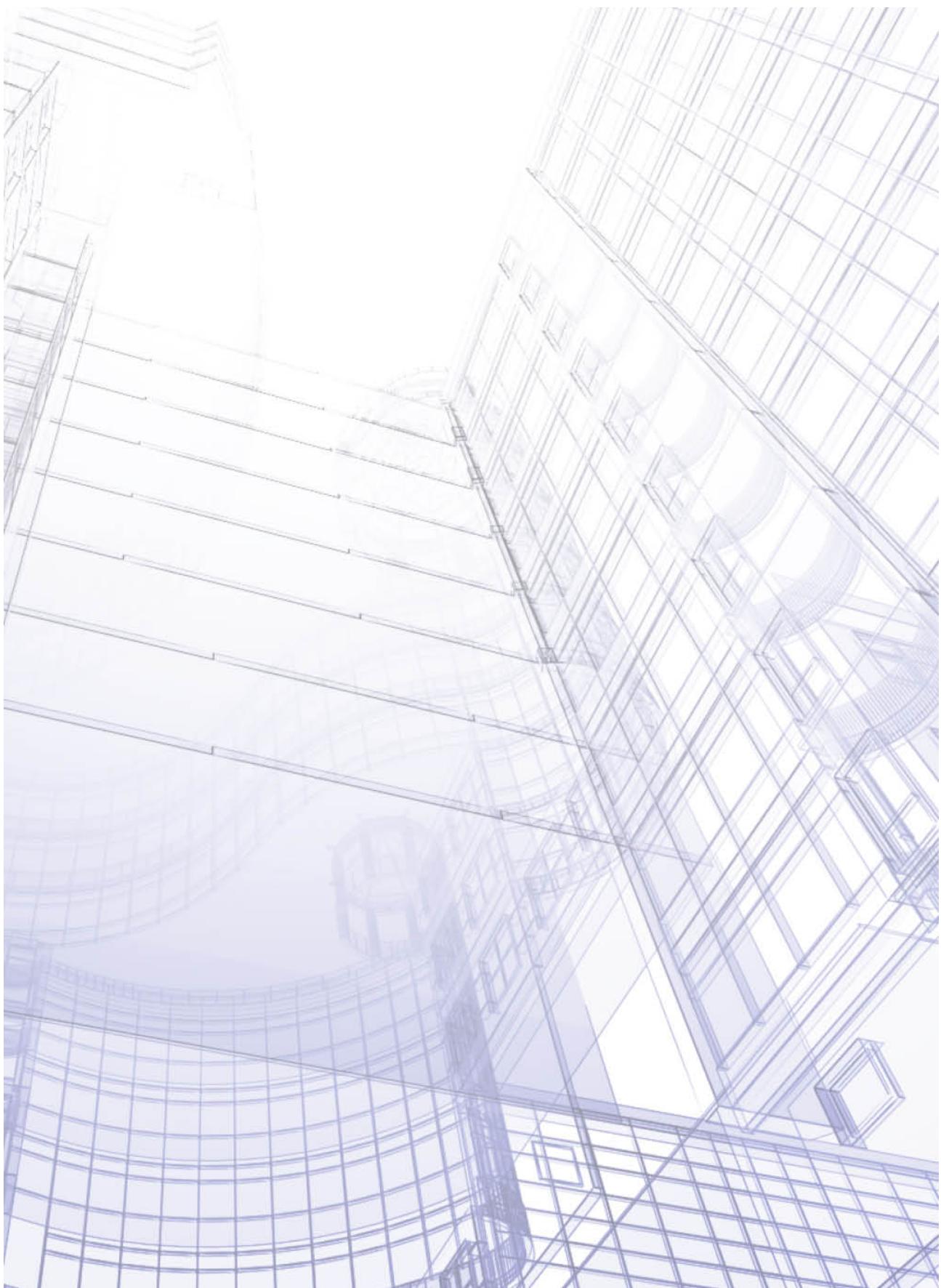
*Chapter 8. Conclusion, discussion and future research*

In this final chapter, the main research question and the three derived research questions are reviewed. The contribution and limitations of this dissertation is discussed, as well as the limitations and future research in the field. The chapter is completed with a number of observations and a personal reflection on the work.

The background of the slide features a complex, abstract architectural design composed of numerous overlapping wireframe cubes. These cubes are rendered in a light gray color, creating a sense of depth and perspective as they recede into the distance. Some cubes have small, dark rectangular windows or openings, adding to the architectural complexity. The overall effect is a modern, geometric, and somewhat futuristic representation of a building's structure.

## PART II

### The transformational perspective



## **Chapter 2**

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# **Assessing the New Way of Working: Bricks, Bytes and Behavior**

*Work and the work environment are rapidly changing. Information and communication technologies transform the work environment, providing the flexibility of when and where to work. The New Way of Working (NWOW) is a relatively new phenomenon that provides the context for these developments. It consists of three distinct pillars that are referred to as Bricks, Bytes and Behavior. These pillars formed the basis for the development of the NWOW Analysis Monitor that enables organizations to determine their current level of NWOW adoption and provides guidance for future initiatives in adopting NWOW practices. The level of adoption is determined from both the manager's and employees' perspective as they might have a different perception and/or expectations regarding NWOW. The development of the multi-level NWOW Analysis Monitor is based on the Design Science Research approach. The monitor has been evaluated in two cases, forming two iterations in the design science research cycle. It has proved to be a useful assessment tool for organizations in the process of implementing NWOW. In future research the NWOW Analysis Monitor will be used in quantitative research on the effects of the implementation of NWOW on the organization and its performance.<sup>1</sup>.*

### **2.1 Introduction**

#### **2.1.1 The transformation of work with IT**

Work and the work environment are rapidly changing. Information and communication technologies facilitate new ways of collaboration and communication. The Internet and mobile devices provide a flexibility that enables teleworking, or telecommuting: working away from the office (Dimartino & Wirth, 1990; Depickere, 1999; Shin et al., 2000; Baruch, 2000, 2001). Teleworking reduces unproductive time spent in traffic, but introduces other issues such as

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<sup>1</sup> This chapter is based on: Kok, A. de, Koops, J., & Helms, R. W. (2014). Assessing the New Way of Working: Bricks, Bytes and Behavior. *Proceedings of the 18th Pacific Asia Conference on Information Systems, PACIS 2014*.

work-life balance, as it becomes possible to work any time anywhere. Bill Gates (2005) stated: 'All of these changes are giving people new and better ways to work, but they also bring a new set of challenges: a deluge of information, constant demands on their attention, new skills to master and pressure to be ever more productive.' Starting to use all these new 'abilities' does not mean organizations will become more effective. If the organizational model is not changed together with the changed work environment, employees may become less productive instead of more. Bryan & Joyce (2007) have already stated: 'Trying to run a company in the 21<sup>st</sup> century with an organizing model designed for the 20<sup>th</sup> century places limits on how well a company performs.'

A broader context is therefore needed in which all aspects of the work environment are addressed. The New Way of Working (NWOW) is a relatively new phenomenon that builds on the experience of teleworking, but provides a broader context in which all aspects concerning the new work environment and digital work style are addressed. This concept 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, addresses all aspects concerning the use and application of IT, and (3) Behavior, the personal dimension, which addresses all aspects concerning the manager-employee relationship and the way the employee works and experiences his work. The New Way of Working is more than teleworking or telecommuting; besides the freedom to work in any place and at any time, NWOW embodies the redesign of offices to accommodate task-based workplaces, with concentration places and meeting places, and a results-oriented way of working in which freedom and trust play an important role. Though the principles of NWOW can be applied in 'production and location based' work environments, they can best be applied in the work environment of the 'knowledge worker' (Greene & Myerson, 2011).

The New Way of Working does not go by a single definition. Bødker & Christiansen (2002) characterize 'New work' 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.' Bijl (2011) defines NWOW as 'a vision for making work more effective, efficient, pleasurable and valuable for both the organization and the individual, giving people, within limits, the space and freedom to determine how they work, where they work, when they work, what they work with and with whom they work.' In summary, Baane et al. (2010) observe four work principles in the New Way of Working: (1) Time and location free work: 'Anytime, anywhere'; (2) Steering workers towards achieving results: 'Manage your own work'; (3) Free access to and use of knowledge, experiences and ideas: 'Unlimited access and connectivity'; (4) Flexible work relations: 'My size fits me'. They add: 'These work principles 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

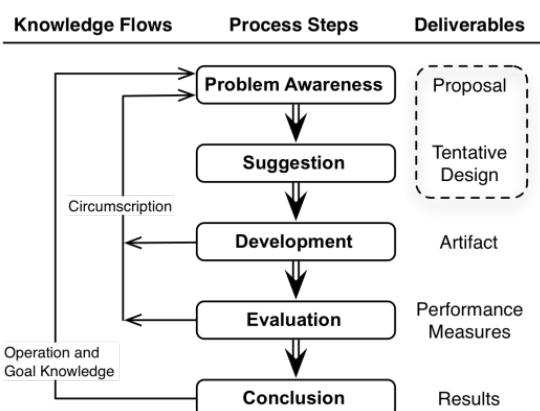
based on their personal or on the team contribution to the result, rather than their presence. Thus the employees can engage in a working relationship that suits them best in terms of ambition, skills, lifestyle or stage of life'. Organizations are showing a growing interest in the New Way of Working. Especially in The Netherlands, the spread and impact of NWOW has increased over the past years (Kluwer, 2011; PwC, 2011), but also other countries in North-West Europe (e.g. Denmark, Belgium) show a growing interest (Aaløkke et al, 2005, Kluwer, 2011). Lastly, multinationals such as Philips implement NWOW across the globe (Bijl, 2011).

### 2.1.2 Importance of an Analysis Monitor for NWOW

Though the principles of NWOW are not new as such, Baane et al. (2010) found that organizations that implement all four work principles of NWOW go through a transformation process, even when telework arrangements were already in place (Bellefroid, 2012). Embarking on an implementation of NWOW is therefore not an overnight decision as many business processes will be affected by the transition, including the changes employees will face. For organizations that plan to start the transition process towards new ways of working, the knowledge on two 'levels' is critical: 'Where do we stand today?' and 'Where do we want to be in the future?' Without this knowledge every transition is doomed to fail as the vision of what to improve is lacking (Mettler & Rohner, 2009). The analysis of the current and desired situation, including insight in the gaps that will need to be bridged, is therefore an important ingredient for the success of the transformation towards NWOW. To enable this, an instrument for assessing the current and future level of NWOW in organizations was developed, called the 'Analysis Monitor for the New Way of Working', in short: the NWOW Analysis Monitor. The objective of the NWOW Analysis Monitor is to be able to perform a relatively quick overall assessment, providing the organization with insight and focal points for additional research. The monitor should therefore be as compact as possible and easy to use, whilst still being able to give sufficient insight on the views of managers and employees on the current and desired level of NWOW adoption. It should be based on the right aspects that are affected by the NWOW implementation, and provide the right overview and balance between all these aspects. By clear reports it should provide the organization insight on the current and future state of NWOW implementation and the gaps to be bridged. The NWOW Analysis Monitor can also be part of a larger study: in the future, it will be used for quantitative research on the positive relationship between the level of adoption of NWOW and organizational performance, employee satisfaction and work-life balance. In the following chapters the development, test and evaluation process of the NWOW Analysis Monitor is discussed. Section 2.2 describes the research method, based on the Design Science Research approach. Section 2.3 describes the model development of the analysis and calculation model. In section 2.4 the evaluation of the NWOW Analysis Monitor in a test case and live business case is discussed, followed by the conclusions and suggestions for future research.

## 2.2 Research approach

As described in the introduction, organizations that plan to implement the principles of the New Way of Working need insight on where they stand to today and where they want to be in the future. The problem is that NWOW is a new concept to these organizations; this means they struggle to define their current and position and future expectations. In order to create a solution to this problem a Design Science Research (DSR) approach was chosen. DSR has attracted significant interest in the Information Systems field following the publications of Hevner et al. (2004) and Vaishnavi & Kuechler (2004). The philosophy behind DSR is that knowledge in a certain field can be generated and/or enlarged by means of constructing an artifact. At its core DSR is a problem solving process (Hevner et al, 2004). The general methodology of DSR, as proposed by Vaishnavi & Kuechler (2004), is shown in figure 2-1.



*Figure 2-1 General methodology of Design Science Research*

The DSR methodology consists of five steps, including the opportunity to iterate some of the steps if the process outcomes show areas for improvement. After becoming aware of the above problem, the (knowledge) gap was closed by researching the aspects that affect organizations implementing NWOW. These aspects were identified by performing a literature research. The artifact (i.e. the NWOW Analysis Monitor) that is designed forms a proposal for the description of NWOW. The artifact therefore needs to be developed based on the idea that the core is formed by a model that is able to describe or distinguish between the main features of NWOW. In the DSR approach the developed artifact needs to be evaluated. This was done in two cases, leading to two iterations in the design science research cycle: a test case and a live case (Yin, 2009). Figure 2-2 gives an overview of the development process of the NWOW Analysis Monitor, based on the DSR approach.

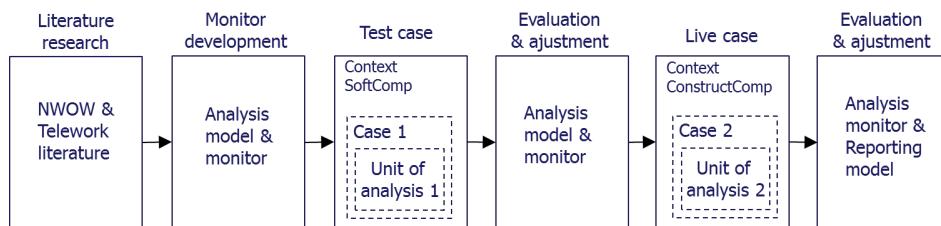


Figure 2-2 DSR based approach for the development of the NWOW Analysis Monitor

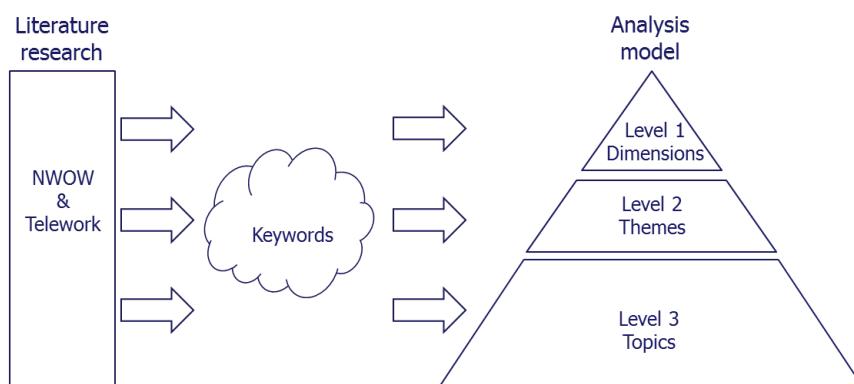
The literature research was used to develop an analysis model for the monitor (see next section). The prototype of the NWOW Analysis Monitor was developed in conjunction with SoftComp, a division of a 650 employee international software advisory and implementation company that has experience in NWOW implementations in The Netherlands. The monitor was validated in two cases. The most important evaluation criteria were completeness of the model, ease of use and usability of the results. As SoftComp itself was in the process of implementing NWOW internally, they served as the test case company for the NWOW Analysis Monitor. The test case results were evaluated and a number of adjustments were made to the monitor. Next, the monitor was used in a live business situation in a division of ConstructComp, a 3,500 employee Dutch construction company, that was in the process of implementing NWOW. The live case results were analyzed and led, with some adjustments to the monitor, to the final NWOW Analysis Monitor.

## 2.3 Model development

### 2.3.1 Literature research and analysis model

The literature research was performed in electronic repositories, such as Emerald, Wiley Online, Mendeley, JSTOR and Google Scholar. During this research it became clear that the New Way of Working is a relative new phenomenon in scientific literature. The number of publications on NWOW is still limited, and only a few publications could be found. To obtain a more complete overview of the field, additional literature on telework (including telecommuting) was researched. In total 148 literature sources were analyzed: 129 articles on telework and 19 sources on NWOW. The goal of the literature research was to obtain a relevant multi-level structure of dimensions, themes and topics for the NWOW Analysis Monitor. However, in the telework and NWOW literature such a categorization of themes appeared to be non-existent.

Inspired by the Grounded Theory approach (Urquhart, 2001), an analysis was performed on all literature sources to obtain relevant keywords that could be categorized into themes. Additional to the reading and open coding of sources, an analysis was performed using the NVivo analysis software. The combined analysis led to a list of 78 unique keywords that were clustered into themes. This clustering process of relevant themes was performed in conjunction with SoftComp, that has practical experience in NWOW implementations in organizations. Not all aspects that were found in literature were used in the monitor as they needed to have a relevance in relation to the implementation of NWOW. E.g. 'gender differences' is an aspect that is discussed in literature but it has no practical relevance when determining levels of NWOW adoption prior to an implementation of NWOW in an organization. The themes were clustered under the three dimensions: Bricks, Bytes and Behavior. Figure 2-3 represents this process.



*Figure 2-3 Literature research and multi-level analysis model*

Based on the literature research, topics were defined that were grouped under the themes. The objective of these topics is to serve as a recognizable translation of the higher level theme to the employee or manager. For example, under the theme 'Flexible work location' one of the topics was: 'I am allowed to determine where I want to work' (phrasing for employees), or 'The employees are allowed to determine where they want to work' (phrasing for managers).

### 2.3.2 Dimensions, themes and topics

The literature research resulted in a multi-layer analysis model with dimensions, themes and topics, see also figure 3. For the top-level the previously mentioned physical, technological and personal dimensions; Bricks, Bytes and Behavior, were used. These three dimensions are used in both NWOW and telework literature and therefore provide a good basis for the assessment of the New Way of Working, and the framework for underlying themes and topics. The clustering of keywords derived from the Nvivo analysis, and the additional open coding, led to a total of 13 themes that were grouped under these dimensions.

Table 2-1 gives an overview of the dimensions and their themes.

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

Table 2-1 Dimensions and themes

The table shows the themes that were defined for the NWOW Analysis Monitor. The themes are the main ‘axes’ on which the results of the analysis will be presented. Most themes are found under the technological and personal dimensions: Bytes and Behavior. The themes do not need to be equally spread over the dimensions, the correct scoring and relevance is determined in the calculation model.

The next step was to define appropriate topics under the themes. Initially 114 topics were defined, divided over the various themes. This was a laborious process. The topics were defined in conjunction with SoftComp and evaluated with Microsoft Netherlands. Table 2-2 shows the topics under the theme Workplace design with the weight factor for each topic.

Topic	Weight factor
The work location is aimed at promoting collaborative working together.	15
The work places have been created in such a way that they are inspiring for the employees.	10
There are places in the building where employees can work in silence (concentration places).	10
There are places in the building where employees can (project wise) work together in a team.	10
There are places in the building where employees can chat and socialize with colleagues.	5
There are different types of meeting rooms in the building where meetings can be held or where meetings with external parties can be held.	5
There are hardly any vacancies in the building(s); the occupancy is good (over 70%).	10
Because the work locations are flexible there are few internal office moving.	10
There is a monitor, keyboard and mouse available at every desk to connect a laptop on.	5
The offices measure up to the standards and demands of the present time.	5
The improvement of the work location has the continuous interest of the organization.	15
Total	100

Table 2-2 Topics with weight factors for Workplace design

For the collection of analysis data, a web survey was arranged with all the topics. In the survey all topics can be filled out for the current and the future desired situation. For the conduction of the survey and the storage of data the SurveyMonkey software was used.

Figure 2-4 shows part of the web survey for the above topics.

The screenshot shows a web-based survey titled 'NWOW Analysis Monitor'. At the top left is the logo of Universiteit Utrecht. On the top right is a 'Close questionnaire' button. Below the logo, the title 'Bricks - managers' is displayed. A section header 'Workplace design - current situation' is followed by ten statements, each with a 4-point Likert scale from 'Not true' to 'Completely true'. The statements are:

- The work location is aimed at promoting collaborative working together.
- The work places have been created in such a way that they are inspiring for the employees.
- There are places in the building where employees can work in silence (concentration places).
- There are places in the building where employees can (project wise) work together in a team.
- There are places in the building where employees can chat and socialize with colleagues.
- There are different types of meeting rooms in the building where meetings can be held or where meetings with external parties can be held.
- There are hardly any vacancies in the building(s); the occupancy is good (over 70%).
- Because the work locations are flexible there are few internal office moving.
- There is a monitor, keyboard and mouse available at every desk to connect a laptop on.
- The offices measure up to the standards and demands of the present time.
- The improvement of the work location has the continuous interest of the organization.

Figure 2-4 Example monitor with topics for Workplace design

Considering that topics are phrased differently for managers and employees, two separate lists of topics were created and included in the web survey. Based on the answer whether the respondent is a manager or an employee, a different list of topics is displayed<sup>2</sup>.

### 2.3.3 Calculation model

The next step was to be able to automatically process the retrieved analysis data in the monitor to produce relevant output. Based on the multi-level analysis model a calculation model was developed. The goal of the calculation model is to present the dimensions and themes for the current and future situation in an understandable way. The chosen approach was derived from the RACE model, the Readiness Assessment model for Concurrent Engineering (Khalfan et al., 2001). In this model themes are presented along the axes of a spider diagram for the current and future situation. The advantage of this type of presentation is that in one overview a broad context can be visualized.

Figure 2-5 gives a schematic overview of the calculation model and the results that are obtained from this model.

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<sup>2</sup> For the NWOW Analysis Monitor with the complete list of topics see the web link:  
[https://nl.surveymonkey.com/s/NWOW\\_Analysis\\_Monitor](https://nl.surveymonkey.com/s/NWOW_Analysis_Monitor)

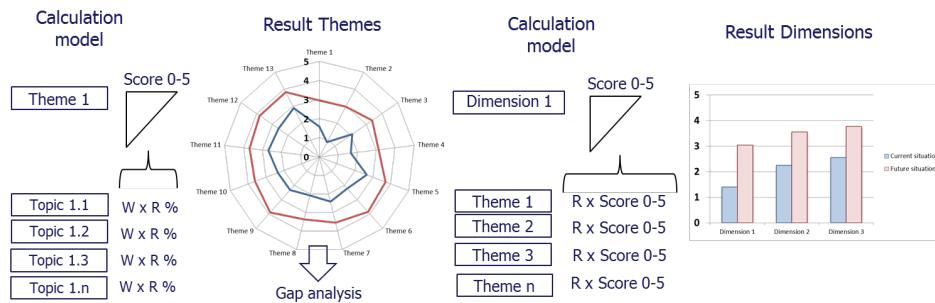


Figure 2-5 Overview calculation model and results

The core of the calculation model is formed by the topics; the topics determine the score for the themes and consequently the score for the dimensions. The number of topics per theme, as well as the number of themes, had to be flexible. One theme might have three topics, another one five. Also, dimensions did not need to have the same number of themes. To enable this flexibility, each topic was given a weight factor (W) that determined the relative weight of that topic for the parent theme. The total of the weight factors for all topics is always 100 points per theme. At a higher level the themes were given a relevance factor (R) to determine the relevance of that theme for the parent dimension. The total of the relevance factors is always 100% per dimension. The weight and relevance factors were pre-determined and fixed in the calculation model. For the determination of the weight and relevance factors interactive sessions were executed at the SoftComp as well as with the manager responsible for NWOW at Microsoft Netherlands. In the monitor each topic can be answered using a 4-choice (Likert type of) scale for both the current and future situation. For the current situation the choices that indicate the current state are defined in terms of applicability (true/not true), for the future situation the answer can be given in terms of importance. The choices were connected to a 4-stage rating from 0 to 100%. Figure 2-6 shows (an example of) the scoring model for topics.

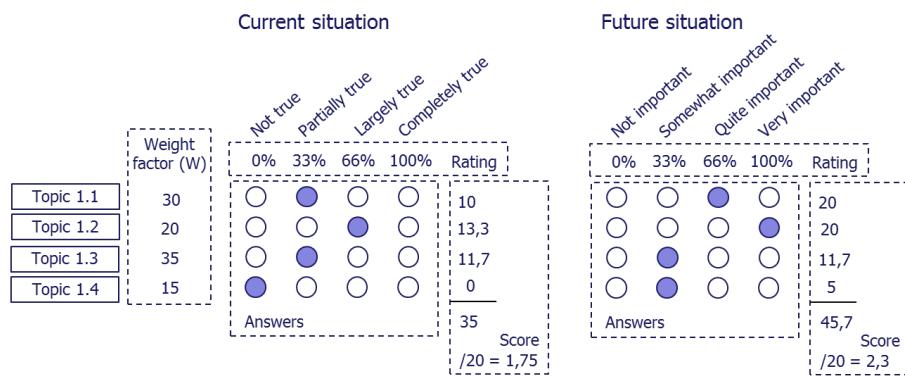


Figure 2-6 Scoring model (example) for topics

For the presentation of the calculated result per theme a 5-point presentation scale is used. The total score in points, in the example above 35 for the current and 45,7 for the future situation, is divided by 20 to produce the 5-point score. The calculated results are presented in a spider diagram. For the gap analysis the results can be presented as a table showing the (top) gaps for themes and topics. Figure 2-7 shows the scoring model for the themes. As mentioned before a pre-determined relevance factor (R) was attributed to the themes, based on their relevance or (relative) importance of the theme for the dimension.

	Current situation		Future situation	
	Relevance factor (R)	Score themes	Score dimension	Score themes
Theme 1	35 %	1,75	0,61	2,3
Theme 2	40 %	2,05	0,82	2,55
Theme 3	25 %	1,35	0,34	1,85
			1,77	0,46
				2,27

Figure 2-7 Scoring model (example) for themes

The result is again a 5-point scale that is presented as a bar chart (see right part of figure 2-5).

The calculation model in the NWOW Analysis Monitor was designed to support both the combined and separate analyses of the results of managers and employees on all levels (dimensions, themes, and topics). The presentation on the level of dimensions and themes leads to different bar charts and spider diagrams (see figure 2-5 and the next chapter).

Inspired by the INK-management model for the assessment of organizational maturity (Hardjono & Bakker, 2002), a gap analysis was developed, based on the differences in the scoring of the topics. The analysis result is presented in the form of a top-10 list of the topics with the largest gaps between the current and future situation (top-10 list is not shown here). This list can be generated for both the overall results as well as for the managers and employees separately. By comparing the two separate top-10 lists the differences between the topics managers and employees can be analyzed showing the most important ones to be improved. The differences can be discussed and researched and become focal points in the coming implementation of NWOW.

The calculation model for managers and employees is similar, in order to be able to combine overall results. In this way, the NWOW Analysis Monitor can support both the combined and the separate results of the managers and employees by taking the average of the overall outcomes. In the next chapter the advantage of having combined and separate scores for managers and employees will be shown and discussed.

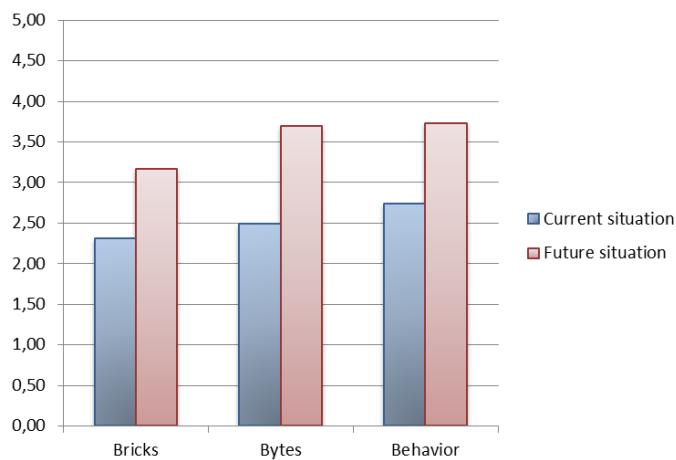
## 2.4 Evaluation of the NWOW Analysis Monitor

### 2.4.1 Test case results

The first case, the test case, was executed at SoftComp. This company supported the development of the NWOW Analysis Monitor based on their experience in NWOW implementations, but was also in the process towards (re)implementing the New Way of Working internally in their own organization. In the past, SoftComp already started a NWOW implementation, but because of the financial crisis this initiative was stopped in 2008. Mid 2012 a new team was formed to re-initiate the implementation of NWOW. The monitor was filled out by 16 people: 3 managers and 13 employees.

In the section below some of the results of the NWOW Analysis monitor will be shown and discussed. Due to space limitations not all results, for example the gap analysis, can be shown.

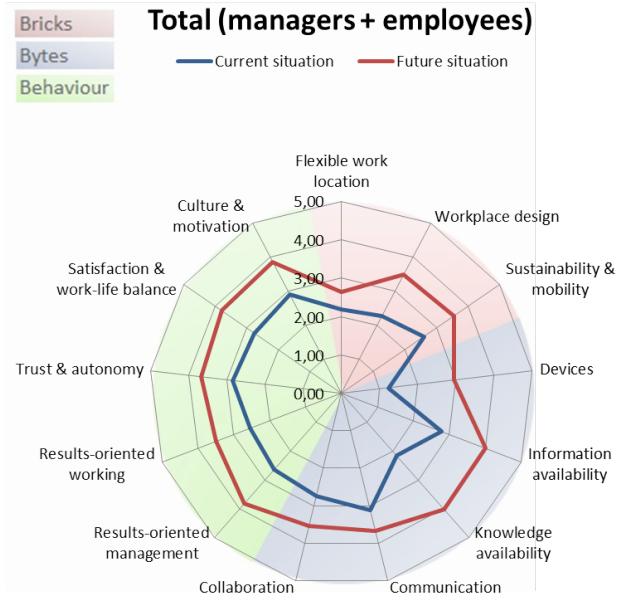
The overall result for Bricks, Bytes and Behavior at the level of dimensions is shown in figure 2-8.



*Figure 2-8 Test case results for dimensions*

The figure shows that the initial (current situation) level for Bricks, Bytes and Behavior is not very low: 2.5 on a 5-point scale. It should be expected that an organization has some initial level of NWOW adoption, but the level of 50% is relatively high. The explanation for this could be the partial former NWOW implementation that was already performed in the past. SoftComp expects to make another step in the re-implementation of NWOW. The overall result for the dimensions shows they desire to make the biggest step for the dimension Bytes (1.2 point).

Figure 2-9 shows the overall score of the themes in the current and future situation (managers and employees combined). The colored areas in the graph show the themes belonging to the same dimension.



*Figure 2-9. Test case results for themes*

Figure 2-9 shows that the largest gaps are in Knowledge availability (1.85), Devices (1.73) and Workplace design (1.22). Overall, the smallest gaps are in the themes of behavior.

In the discussion of the results, the management recognized the gap for devices, as the majority of employees work on old laptops and (smart)phones. The big gap in knowledge availability meant a special focus was needed in the implementation on NWOW on making knowledge available to employees by using databases, enabling knowledge sharing between employees, and improving access to knowledge. The gap in Workplace design signaled the need for attention to be paid to the right design of the workspace environment in the new situation.

The NWOW Analysis Monitor can also differentiate between the managers and employees. Figure 2-10 shows the result for the current situation for the managers and employees.

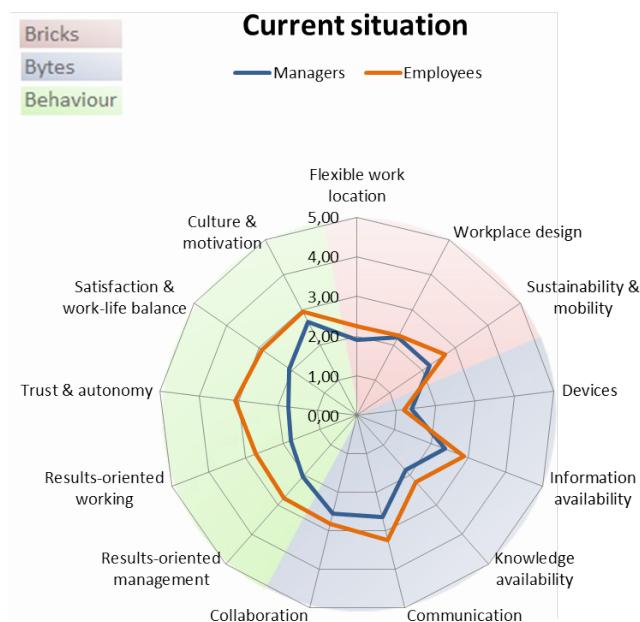


Figure 2-10 Test case results for managers and employees in current situation

Interestingly, the managers are more negative about the current situation than the employees, especially for the themes in Behavior. For instance, the theme Trust & autonomy scores 1.75 for the managers, but 3.0 for the employees. This is a positive message for the management; their employees are more positive about their (current) freedom and autonomy. There is therefore a difference in perception. For the future situation (figure not shown) the score is about the same for managers and employees, so the expectations on the future adoption level of NWOW are about equal. The view on the current state of devices is equally low for managers and employees, as discussed before because of the old devices in use.

In the gap analysis for the topics, the separate top-10 lists for managers and employees (tables not shown here) showed there were only three corresponding topics in the top-10. This means the expectations on the level of themes (see figure 2-10) may seem quite similar, but on the underlying topics there are significant differences. It was discussed that this result justified a further detailed study of the actual expectations of managers and employees for NWOW at SoftComp.

### 2.4.2 Evaluation of the test case

In the Design Science Research approach the artifact (i.e. the NWOW Analysis Monitor) needs to be evaluated. The evaluation criteria for the NWOW Analysis Monitor were completeness of the model, ease of use, and usability of results.

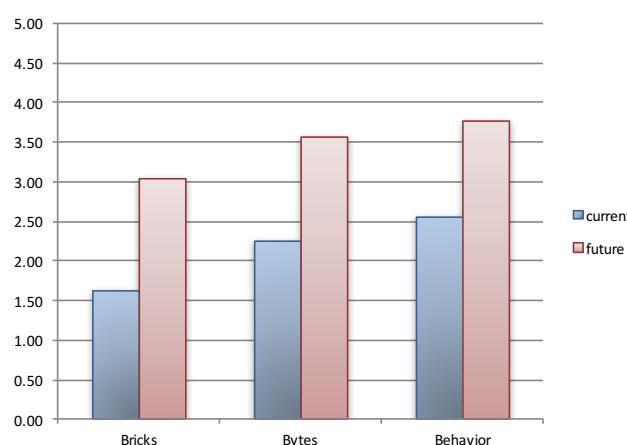
The main criticism of the monitor, as used in the test case, was that it took too much time to fill out the questionnaire. In total 114 topics had to be filled out for both the current and future situation, which means at least 228 choices and mouse clicks, aside from the general questions. The respondents were asked to measure the time taken by filling out the monitor. The average time needed was 27 minutes, too long in the view of many respondents. This criticism was taken very seriously. In several sessions including a session with the manager of NWOW implementations at Microsoft Netherlands, the number of topics was reduced. This was done by critically reviewing all topics for each theme with the following questions: 'Is this topic distinctive enough?', 'Are there redundant topics?', 'Isn't the topic actually asking the same question as another topic in another way?', 'Is there causality between topics?' i.e. Does fulfilling one topic automatically lead to the answer of another topic?, and 'Can two topics be combined or rephrased to become one topic?' The result of these sessions was that the total number of topics was reduced from 114 to 77. The average time to fill in the monitor dropped to below 20 minutes, which was regarded as acceptable.

Another remark was that some respondents would like the option: Not Applicable or 'I don't know'. This remark was not incorporated in the monitor, as this would make the calculation model much more complex. The calculation model would need to support the re-calculation of remaining filled-in topics per theme if a respondent would answer N.A. on one or more topics. As the total weight factor of topics per theme was predefined and fixed at 100 points, a re-calculation would need to take place, as one or more topics were not applicable (0). To obtain the same balance between themes as before the weight factor of the remaining topics would need to be increased to result in a 100 point total again. If N.A. were an option for all questions many re-calculations could be needed. In theory it could even be impossible to recalculate to a total of 100 points, when all topics under a theme were considered not applicable by a respondent. This would result in possible instability of the monitor (divided by 0). It was decided to add an explanation to the monitor, explaining the meaning of the themes and topics to the respondent, to help answering the topic that were not clear to the respondent.

The completeness of the model and usability of the results of the NWOW Analysis Monitor was perceived as good. A number of the results were recognized and appealed to the management, especially the gap analysis gave ground to debate.

### 2.4.3 Live case results

The second case was performed at a division of a 3,500 employee construction company (ConstructComp). At the end of 2012 the division was in the process of starting their first NWOW implementation, with the intention to roll NWOW out to other divisions at a later stage. All employees and managers of the division, in total 250 persons, received an e-mail explaining the NWOW Analysis Monitor, and asking them to participate. In total 66 respondents filled out the survey: 11 managers and 55 employees. Figure 2-11 shows the overall results at the level of dimensions.



*Figure 2-11. Live case results for dimensions*

It is interesting to see that the score for the current situation is lower in this live case than in the test case. This supports the idea that the partial pre-implementation of NWOW in the past at SoftComp may indeed have led to a higher initial score for the level of NWOW adoption in the current situation. The biggest gap is for Bricks; the respondents expect the largest shift in the actual physical change of the work environment.

Figure 2-12 shows the overall score for all themes in the current and future situation.

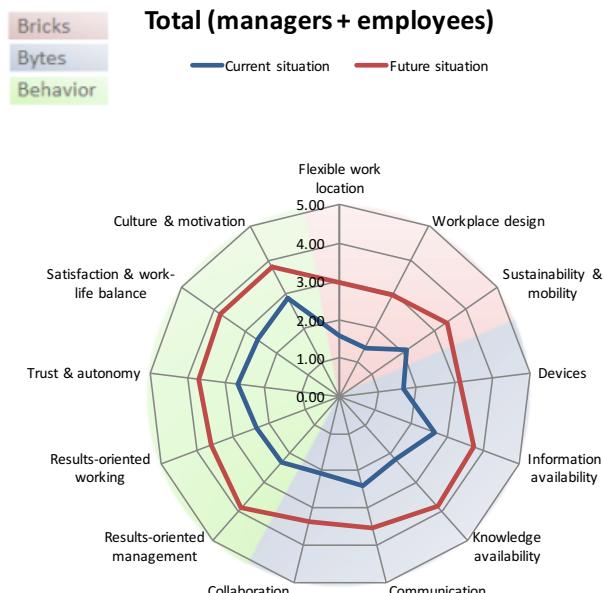


Figure 2-12. Live case results for themes

The largest gap is for Knowledge availability (1.64), followed by Results-oriented management (1.56) and Workplace design (1.54). Managers and employees expect NWOW to have a large impact on Knowledge availability. It is interesting to see that the theme Knowledge availability was also a largest gap in the test company. Having better access to available knowledge in the future appears to be an important expectation for organizations. Results-oriented working is one of the core organizational principles of the New Way of Working. At ConstructComp both managers and employees (figures not shown) expect to make a large step in the area of improving results-oriented working.

It is also interesting to see that, when comparing the responses of managers and employees for the current situation (figure not shown), the employees are again somewhat more positive than the managers on a number of themes for the dimension Behavior. However, the difference is smaller than in the test case. The employees are more motivated and satisfied with their work and enjoy a higher level of trust in the current situation than managers think they do. For the future situation the picture is again quite similar for managers and employees.

In the top-10 lists of topics with the largest gap between the current and future situation for managers and employees (not shown) there were seven corresponding topics. This means the perception of the current situation and the future expectations of managers and employees in this case (ConstructComp) are more aligned than in the test case (SoftComp).

#### 2.4.4 Evaluation of the live case

The adjustments made to the NWOW Analysis Monitor proved to be effective. The main previous criticism that it took too much time to fill out the monitor was not brought up again. Although the participants were not asked to measure the time involved, the general perception was that it was not too extensive. In fact, there were no major points of criticism in the live case. The question for a N.A. or 'I don't know' option was however raised again, although the themes and topics were explained in the introduction to the monitor and an accompanying guide was provided.

The (new) major shortcoming of the monitor in the live case appeared to be a good reporting mechanism. In the test case all results were still collected by hand, but in the live case many employees and managers asked for a report with the results of their own individual input in the monitor. This led to the development of a reporting tool, in which both the individual and total results could be automatically generated, printed and supplied (in pdf).

The NWOW implementation team and the management of ConstructComp were very satisfied with the results. It helped them gain more specific insight in the expectations of managers and employees for NWOW. The analysis report with the overall results was spread among all 250 employees of the division of ConstructComp.

### 2.5 Conclusion and future research

In an ever-changing world, where information technologies and new ways of working transform the work environment, organizations struggle to find the right strategy to cope with these developments. Having insight in the current situation and the desired future situation enables organizations to focus on their approach of implementing the New Way of Working.

The NWOW Analysis Monitor was developed to enable organizations to assess their current level of NWOW adoption and provide guidance for future initiatives in adopting NWOW practices. The NWOW Analysis Monitor is based on the three pillars of NWOW: Bricks, Bytes and Behavior, thus providing a balanced overview of all aspects concerning the physical work environment, technological developments and the manager-employee relationship. The Design Science Research (DSR) approach was used to develop the monitor, using two cases as iterations in the design science research cycle. Based on the case studies the questionnaire was shortened and a reporting mechanism was added. In this way the monitor became a broad and usable analysis instrument.

The research of 148 literature sources on telework and NWOW led to a multi-level analysis model with 13 themes clustered under the three above dimensions of NWOW. Under these themes 77 topics were defined to provide a broad analysis of all aspects concerning NWOW. The defined multi-level categorization of the NWOW Analysis Monitor is an addition to the literature in this field, as no

existing categorization was found. It might also be useful for other scientific research in the area of telework and NWOW.

The gap analysis between the current and future situation, and the possibility of evaluating the different perspectives of managers and employees, has proven its practical usefulness for the involved organizations. The NWOW Analysis Monitor therefore fills a void in lacking knowledge for organizations on how to position themselves in the current adoption level of NWOW and how to approach future expectations with regard to NWOW.

Besides the practical contribution as a useful assessment tool for organizations, there is also a scientific contribution. The NWOW Analysis Monitor will serve as a measuring instrument for future quantitative research on the effects of the implementation of NWOW on the organization and its performance. This research could support or reject the positive relationship that is claimed in practitioner literature on the effects of the adoption of NWOW on employee satisfaction and work-life balance.

## **Chapter 3**

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# Attitude towards the New Way of Working: A longitudinal study

*Information and communication technologies are rapidly transforming the work environment, providing flexibility of when and where to work. The New Way of Working (NWOW) is a relatively new phenomenon that provides the context for these developments. In this case research three reviews were performed over a one-year timeframe, evaluating the attitude of managers and employees towards the New Way of Working. Special attention was given to the relationship between personality traits (the 'Big Five') and satisfaction with NWOW. The case results show that, in general, managers and employees are and remain positive towards NWOW, though the actual effects of the implementation of NWOW on work and the work environment are often limited or hard to quantify. The personality survey shows there is a significant positive relationship between conscientiousness, being (self) disciplined, and satisfaction with NWOW. There is a negative relationship for neuroticism; sensitive employees. This leads to the conclusion that the New Way of Working is not beneficial to all. Where (self) disciplined employees may thrive well in the new work environment, high neuroticism (sensitive) persons may have problems to adapt to the newly gained freedom.*<sup>1</sup>

### **3.1 Introduction**

The New Way of Working (NWOW) is a relatively new phenomenon that has a growing interest in organizations. NWOW focuses on the optimization of work and the work environment in order to improve employee productivity and job satisfaction (Bijl, 2011). Especially in the Netherlands and the Nordic countries, the spread and impact of NWOW is increasing (PwC, 2011, 2013; Meulen, 2014), but also in other countries there is an increased interest. As NWOW is an emerging phenomenon, scientific research on the effects of the concepts of NWOW on organizations and individuals is still scarce. This case research

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<sup>1</sup> This chapter is based on: Kok, A. de, & Helms, R. W. (2016). Attitude towards the New Way of Working: A Longitudinal Study. *Proceedings of the 24th European Conference of Information Systems, ECIS 2016*.

focuses on the attitude of managers and employees towards NWOW in time; before and after the implementation of NWOW. Special attention is given to the satisfaction with NWOW in relation to personality traits. These traits were researched based on the ‘Big Five’ personality traits: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

The following sections describe the New Way of Working and the possible relationship between personality traits and the satisfaction with NWOW. The research method is explained in section 3.2. Section 3.3 discusses the research results. This leads to a discussion of results and a number of conclusions in section 3.4.

### 3.1.1 What is the New Way of Working?

There is not yet a single definition for the New Way of Working in the literature. 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’. The NWOW has three distinct pillars or 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 IT, 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.

The New Way of Working is often considered to be similar to teleworking but it is more than that; it embodies the redesign of offices to accommodate task-based workplaces and a results-oriented way of working in which freedom and trust play an important role. The concepts of the New Way of Working are not new as such. The ideas of mobile working, desk sharing, video conferencing and paperless, open offices originate from the 1970’s or before. Meel (2011) gives an overview of these early ideas, but concludes that they were by no means common or widely adopted at that time. Possible explanations may be that the technologies at the time were not yet able to provide the speed, power and ease of use that people need for mobile and flexible work styles, and the corporate mindset. It seems that managers were simply not yet ready for these ideas, not willing to provide employees with the high levels of autonomy that come with mobile and flexible ways of working. Some industries and companies were more progressive than

others, but in general office organizations were command-and-control structures, characterized by hierarchy and rigidity, and little freedom for individual employees (Meel, 2011). Meel warns not to be too quick by denouncing new ways of working as recycled ideas from the 1970s.

As research in the field of NWOW is still scarce, in order to get an impression of effects on employees, we need to look at previous research on the effects of flexible working and teleworking. Gajendran & Harrison (2007) noted that employees experience more freedom and autonomy in a flexible work environment with teleworking. This work flexibility also facilitates a better work-life balance (Steenbergen & Ellemers, 2009), and reduces costs for the employer as less office space is needed (Workman et al., 2003). Golden & Veiga found a reversed U-shaped effect: there is a certain optimum in the level of teleworking and work satisfaction (Golden & Veiga, 2005, 2008; Golden, 2006, 2007). Konradt et al. (2003) found that employees teleworking more than 50% of the workweek experienced different stressors and motivations relative to office-centered and non-teleworking employees working at least 50% of their workdays in a central location. Gajendran & Harrison (2007) found that those who telework more than 50% have more negative relationships with co-workers than lower-intensity teleworkers. There seems to be a tipping point at 50%, but personality factors could also play a role.

The aim of this paper is to gain more insight in how the attitude of workers, confronted with the implementation of the New Way of Working, changes over time. Have they become more positive or negative, and what changes have occurred in their daily work and work environment? Based on the before mentioned aspects of NWOW, the expectation is that by NWOW they are able to work anywhere and anytime, be more flexible in their work location, and choose task-based workplaces. Also, they could experience more freedom in their work, a more coaching management, and a better work-life balance. Personality traits may influence the way people perceive and deal with changes. For this reason, in this research additional study was performed on the relationship between personality traits and the satisfaction with the New Way of Working.

### 3.1.2 Personality traits and the New Way of Working

Besides the attitude towards NWOW, the satisfaction with NWOW in relation to personality traits will be researched. In Psychology, the research on the behavior of people lead to a model of personality traits, known as the Five Factor Model (FFM), or the 'Big Five' (Tupes & Christal, 1961; Digman, 1990; Barrick & Mount, 1991). The five factors are labelled as: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, referred to by the acronym OCEAN. The Person-Environment (P-E) Fit Theory of Davis et al. (1964) states that a fit between the personal traits and the (work) environment leads to a higher degree of satisfaction. In the following section the five personality traits will shortly be discussed in the light of NWOW; i.e. in the light of teleworking, flexible working, and open offices literature, as there is no NWOW literature available on this subject.

- Openness (to experience; curious vs. cautious). Openness can be defined as creativity, in search for innovation and intellectual stimulation (Goldberg, 1990; McCrae & Costa, 2003). High openness people can be perceived as unfocused, low openness people are often pragmatic, sometimes closed-minded. Gainey & Clenney (2006) report a positive relationship between openness and the attitude towards flextime and teleworking.
- Conscientiousness (organized vs. careless). Conscientious people can be described as disciplined, organized, efficient, goal oriented and precise (Barrick & Mount, 1991). Low conscientious people are flexible and spontaneous, but can be perceived as sloppy and unreliable. Haddon & Lewis (1994) stated that being able to work routine-based, independent and disciplined, and being able to divide the available time independently, are important characteristics for successful teleworking.
- Extraversion (outgoing vs. reserved). People that score high on extraversion can be described as assertive and socially engaged (Barrick & Mount, 1991). Gainey & Clenney (2006) found a positive relationship between extraversion and flextime, in which employees can determine on their own work location. Extravert people prefer an environment with much stimulation and social interaction, as they seem to be energized by the interaction with others (Eysenck, 1967, Daniëls et al., 2000). McCusker (2002) found that satisfaction with open offices have a positive correlation to extraversion. NWOW promotes activity-based work places in an open-office environment.
- Agreeableness (friendly vs. detached). Agreeable people can be described as cooperative, friendly, helpful, honest and reliable (Goldberg, 1990; McCrae & Costa, 1991). Clark et al. (2012) found a significant positive relation between agreeableness and the attitude towards teleworking. People that score high on agreeableness were found to deliver good results, when working with a lot of interpersonal interactions (Mount et al., 1998).
- Neuroticism: (sensitive vs. confident). Neuroticism is associated with emotional instability, fear and uncertainty (Goldberg, 1990). Persons that score high on neuroticism are according to McCrae & Costa (2003) more often frightened and worried, more often experience feelings of depression, and they are sensitive to changing conditions. Clark et al. (2012) therefore argue that persons that score high on neuroticism prefer to work separately, thus experiencing less factors that may influence their mood. Kwapil et al. (2002) found that people that score high on neuroticism feel less connected to their colleagues. Clark et al. (2012) found a significant negative relationship between neuroticism and the attitude towards teleworking.

## 3.2 Research method

### 3.2.1 Case design

In this research the attitude towards the New Way of Working before and after the implementation was surveyed. For this research a case study was performed

in an independent 250 employee Infrastructure Division of a 3,500 employee Dutch building & construction company. In total 3 reviews were conducted in a timeframe of one year. A schematic overview of the case design (Yin, 2009) is in figure 3-1, figure 3-2 shows the case execution.

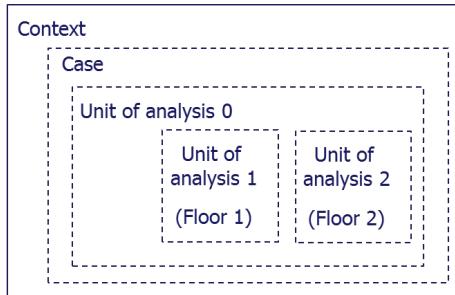


Figure 3-1 Case design

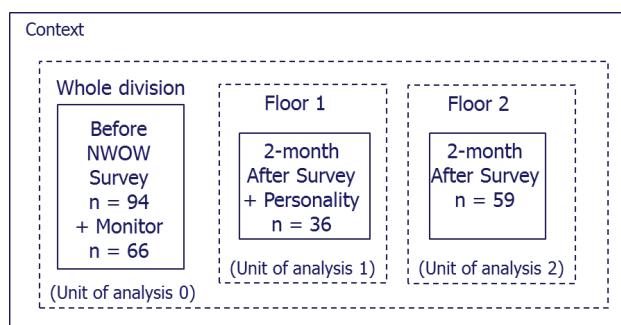


Figure 3-2 Case execution

The first review was performed 2 months before the implementation of NWOW started. For this review all 250 employees of the division were approached (by e-mail), and asked to participate. The review consisted of two parts. The first part was a survey with a small number (5) of general questions on office location, working hours and attitude towards NWOW. The second part was (the request to fill in) the NWOW Analysis Monitor, with 77 questions; this analysis tool is explained in the next paragraph. In total 94 persons filled in the general survey; 14 managers and 80 employees. The NWOW Analysis Monitor was filled in by 66 respondents; 11 managers and 55 employees.

The New Way of Working was introduced and implemented floor by floor. This is a common approach by many organizations; since the new work environment fulfills such an important part of the implementation of New Way of Working, it often coincides with 'opening' of the new office space. This meant that in this implementation, it depended on the departments that were housed on 'redesigned floor', when they would be confronted with the New Way of Working.

Two months after the first floor was ‘opened’, the approximately 85 employees of the departments housed on that floor were addressed for the second review. This review also consisted of two parts. The first part (A) was a questionnaire (of 36 questions) on several topics concerning the NWOW implementation, such as the work environment, use of IT tools, and the manager-employee relationship. The question on the attitude towards NWOW was repeated, but the participants were also asked to indicate if they had become more positive or negative in their attitude towards NWOW. In total 36 people participated; 6 managers and 30 employees. For the second part (B) the participants were asked if they were also willing to participate in a personality test. This test consisted of a 15-question survey on personality traits from the validated personality test of Emmerik et al. (2004), based on the Mowen Personality Scale (Mowen, 2000). The survey was followed by a short interview, meant to give the respondent the opportunity to give additional feedback. All 36 respondents agreed to participate in the personality test. The survey on personality traits was executed with the support of Dries et al. (2013), and will be discussed in the results section<sup>2</sup>.

Half a year later, the renovation of the second floor was finished. Again, two months after the opening, approximately 85 people of the departments housed on the second floor, were approached to participate in the third review. This review consisted only of the before mentioned 36-question survey (Part A). In total 59 people responded; 10 managers and 49 employees. This means that in total 95 people (16 managers, 79 employees) participated in (Part A of) the After-NWOW-implementation survey. All results were analyzed and presented to the NWOW implementation team and division management.

### 3.3 The NWOW Analysis Monitor

More and more organizations embrace the principles of the New Way of Working. When performing research on the implementation of NWOW, the question becomes relevant: to what extent have organizations adopted the principles of NWOW, and what are their future expectations? Even when the phenomenon of NWOW is not known as such (for studies outside the Netherlands and Scandinavian countries), one could discuss that, any organization that focusses on implementing certain aspects of new ways of working, may have already reached a certain level of NWOW adoption.

In order to be able to measure the perceived current level of NWOW adoption, and the future desired level of NWOW implementation, a so called NWOW Analysis Monitor was developed (Kok et al., 2014). The monitor gives an indication of the perceived level of NWOW adoption on 13 themes that are clustered on the before mentioned three dimensions: Brick, Bytes and Behavior. The dimensions and themes are shown in table 3-1.

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<sup>2</sup> For the content of the survey on the implementation of NWOW and the personality traits, see Part A and B of the survey on: [https://nl.surveymonkey.com/r/NWOW\\_Evaluation](https://nl.surveymonkey.com/r/NWOW_Evaluation).

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

Table 3-1 Dimensions and themes of the NWOW Analysis Monitor

Within each theme, topics are defined that can be rated by the respondent on a 4-point Likert scale. Using weight factors, the results are calculated and can be presented at the level of themes and dimensions. The NWOW Analysis Monitor is able to present results for the current and future situation, including a gap analysis, and also details for managers and employees<sup>3</sup>. In this research the Analysis Monitor was used to get an indication of the perceived level of NWOW adoption and future expectations for the New Way of Working.

### 3.4 Research results

#### 3.4.1 Attitude towards NWOW before implementation

Two months before the implementation of NWOW started, 14 managers and 80 employees participated in a review of their attitude towards NWOW. The results were positive; over 75% of the respondents had a moderately, positive or very positive attitude towards the New Way of Working. The attitude of managers and employees towards NWOW is shown in the figures 3-3 and 3-4.

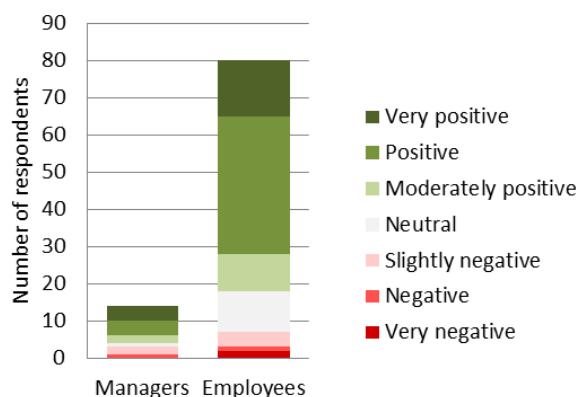


Figure 3-3 Attitude towards NWOW (Absolute numbers)

<sup>3</sup> For the NWOW Analysis Monitor with the complete list of topics see the web link: [https://nl.surveymonkey.com/s/NWOW\\_Analysis\\_Monitor](https://nl.surveymonkey.com/s/NWOW_Analysis_Monitor)

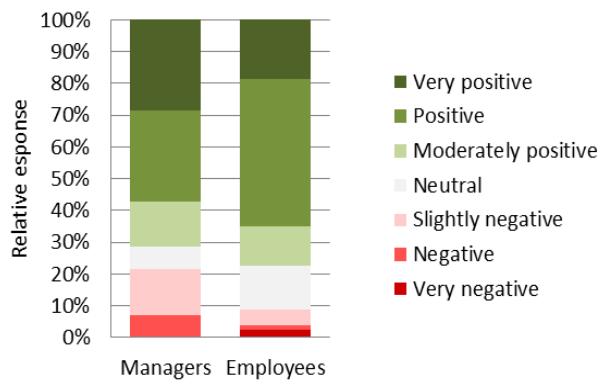


Figure 3-4 Attitude towards NWOW (Relative percentages)

Relatively, managers are a bit more negative than employees, though the majority tends to be positive or very positive. Of the employees 2% are very negative. In their vision (comments) NWOW will only be implemented as a cost-saving measure, not to support the employees in reaching more work satisfaction. The respondents were also asked how many days per week they usually spent at the (head)office.

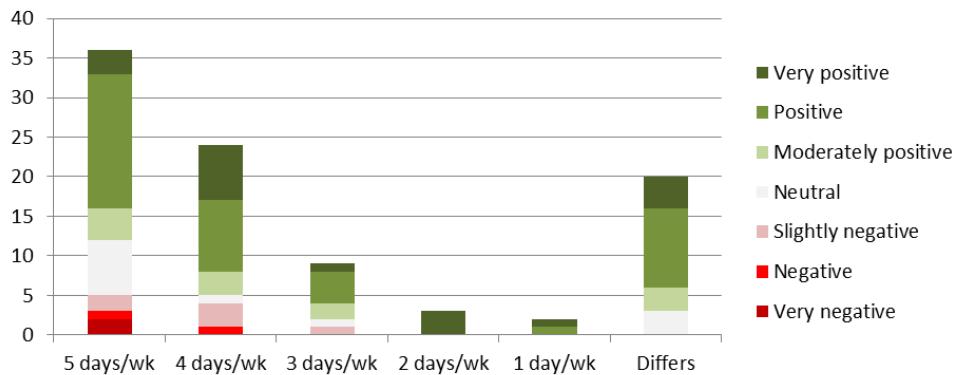


Figure 3-5 Attitude towards NWOW and days at the office

The analysis of office days per week clearly shows that the most negative responses came from those who spent 4 to 5 days a week at the office. The reason for these negative responses can partly be lead back to the fear of losing one's own desk in the new environment. As the new flexible office has a 'clean desk policy', a number of respondents commented they did not see the need to clean out their desk by the end of the day, when returning to the same desk in the morning. This is a commonly heard comment, also in other implementations of NWOW. For this reason, Microsoft Netherlands chose to exclude departments with a full-time desk function, such as Personnel and IT Support, from the open flex office concept.

### 3.5 Results of the NWOW Analysis Monitor

The second part of the 'Before-NWOW' survey consisted of the NWOW Analysis Monitor. In total 66 respondents (11 managers and 55 employees) filled in the 77-questionnaire survey. Figures 3-6 and 3-7 show the result on the level of themes, for the managers and employees, for the current and future (desired) situation.

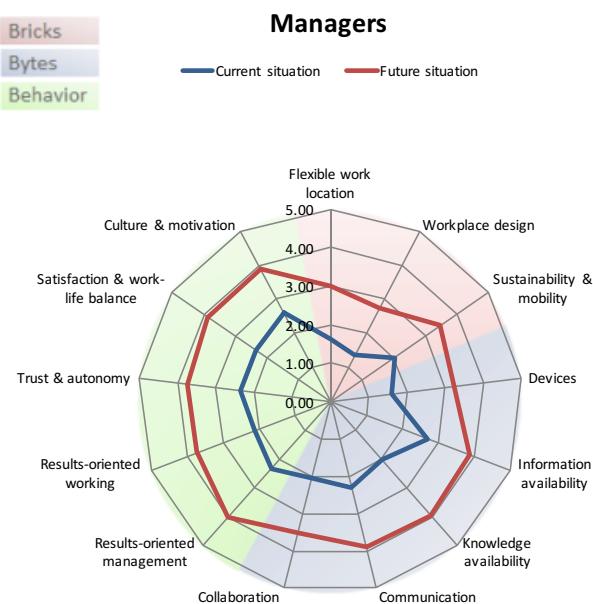


Figure 3-6 Results NWOW Analysis monitor for managers

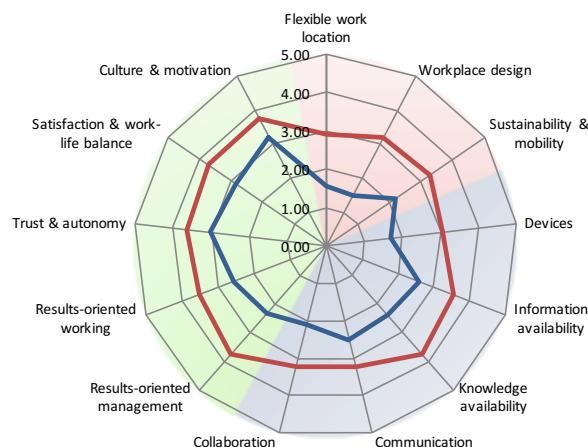


Figure 3-7 Results NWOW Analysis monitor for employees

The image for the managers in comparison with the employees for the current and future situation is reasonable consistent. The managers have a bigger gap (than employees) for the theme Knowledge availability (1.92 vs. 1.35), the biggest gap for employees is Workplace design (1.70 vs. 1.39 for managers). Overall, employees are more positive on the current situation, in particular on Trust & autonomy and Culture & motivation. Overall, managers have a slightly higher expectation for the future situation, in particular for Communication. The top-10 gap analyses of the most important topics (lists not shown here) for managers and employees, have 7 matching topics on both lists. This indicates that the expectations on the lower level (topic) also have much similarities for managers and employees.

### 3.6 Attitude towards NWOW after implementation

Two months after the openings of the first and second floor, the personnel housed on those floors was again addressed, and asked to participate in an After-NWOW-implementation survey. The results are in figure 3-8 and 3-9.

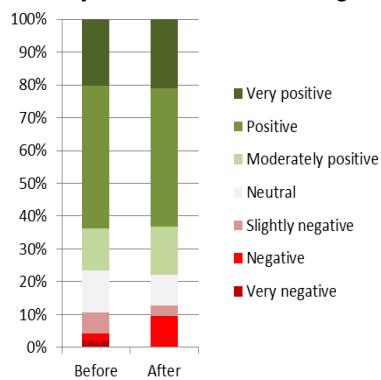


Figure 3-8 Attitude towards NWOW before and after implementation



Figure 3-9 Attitude towards NWOW with details for managers, employees and floors

The attitude towards NWOW before the implementation (i.e. the combination of managers and employees as shown in figure 3-4), and the combined figures of floor 1 and 2 after the implementation is shown in the figures 3-8 and 3-9. Figure 3-8 shows that the positive group has remained the same size, but the neutral and very negative group have diminished at the cost of more negative respondents. Figure 3-9 shows the details for the managers and employees before and after the implementation. These are again split by floor. The figure shows that managers have become a bit more positive, but employees have become more negative. The split per floor shows that both for managers and employees the attitude towards NWOW of the respondents from the second floor is more negative than from the first floor.

Though the Before and After groups are almost the same size (94 and 95), it should be noted that the individual respondents to the three reviews are different, though with overlaps. In the review of the first floor 13 of 36 (36%) of the respondents also participated in the Before-NWOW survey, for the second floor this was 33 of 59 (56%).

To obtain a better comparison of the change in attitude before and after the implementation, the participants were all asked if there was a change in their attitude: had they become more positive or negative towards NWOW? This result is shown figures 3-10 and 3-11.

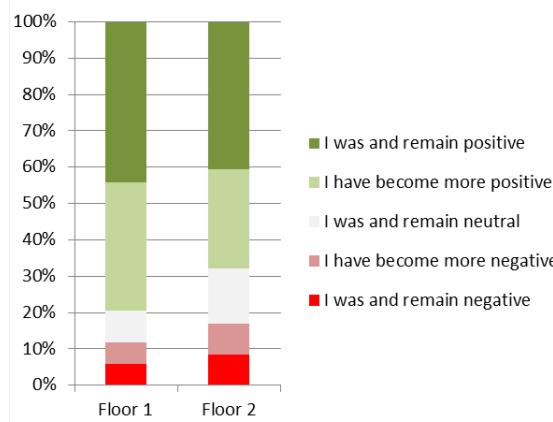


Figure 3-10 Change in attitude towards NWOW

A more accurate picture of the before and after situation is shown in figure 3-10: overall the attitude of the participants towards NWOW has become a bit more positive after the implementation; i.e. the number of the people that have become more positive is bigger than the number of those who have become more negative. Apparently the Before-NWOW group from the total division (figure 3-3 and 3-4) contained relatively more positive respondents, not housed on the first or second floor.



Figure 3-11 Change in attitude for managers and employees per floor

Figure 3-11 shows that relatively managers have become more positive than employees.

As observed before at figure 3-9, the figures 3-10 and 3-11 clearly show that the attitude towards NWOW on the second floor is less positive than on the first floor. This is partly due to the fact that the number of respondents that were already negative upfront, and that remained negative, is bigger on the second floor. It can also partly be explained from the fact that – due to budget cuts – the second floor was re-designed with a smaller budget than the first floor. For instance: on the first floor a trendy 'Work café' was designed, but to cut back on the costs, the second floor only had a small kitchenette. There was less money spent on decoration and design-furniture, giving the floor a more 'dull' appearance. Also, there were more flex-desks in the same area than on the first floor, leading to respondents commenting on a 'crowded feeling' with more rumor and disturbances.

### 3.7 Assessment of the implementation of NWOW

In the reviews on both floors the participants were asked to agree or disagree on a number of aspects concerning the implementation of NWOW. The questions and results are clustered in three sections, based on the before-mentioned three dimensions: (1) Bricks, the physical dimension; the work environment, (2) Bytes, the technological dimension; the use of IT, and (3) Behavior, the personal dimension; the manager-employee relationship and work-life balance. Because of the small differences between the responses of the first and second floor, the response has been combined for both floors.

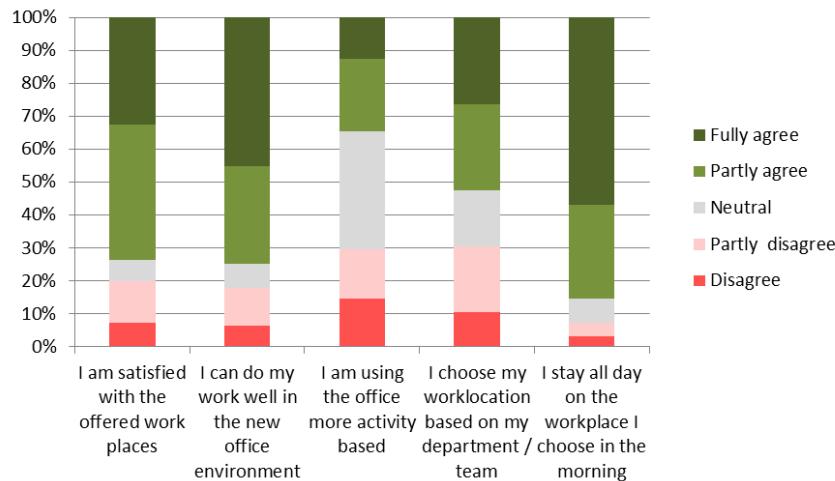


Figure 3-12 Assessment of the NWOW implementation - Bricks

The result for Bricks, the physical dimension, is shown in figure 3-12. The figure shows that about 75% of the respondents partly or fully agree they are satisfied with their new work environment, and can perform their work well in it. Overall the office is however not used more activity-based: only 35% indicate to have made some changes in that area. Over 50% choose their work location based on where the colleagues of their team or department are seated. Also, 85% of the respondents stay on the same workplace all day. The implementation seems to be largely missing out on one the aspects of NWOW; a more flexible and task-based use of the workspace.

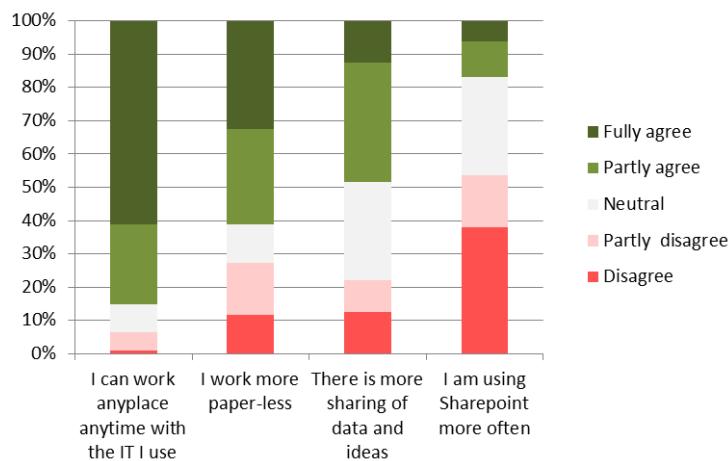
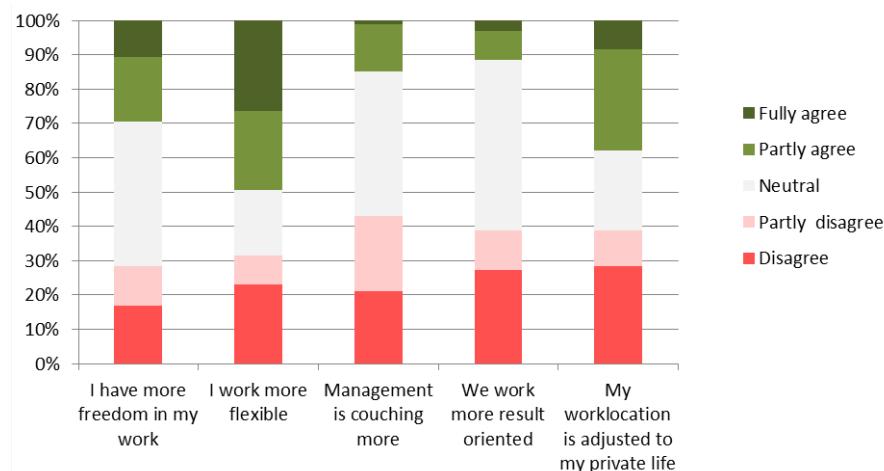


Figure 3-13 Assessment of the NWOW implementation - Bytes

The response in relation to Bytes, the information technology in use, is shown in figure 3-13. The ability to work anyplace anytime has clearly been achieved; 85% of the respondents partly or fully agree on that. Over 60% of the respondents say they work more paper-less, though almost 30% comment they often still work from printed documents. Almost 50% of the respondents partly or fully agree they share more data and ideas in the new environment, the other half is neutral or sees no changes. Most respondents partly disagree or disagree they use document tools such as SharePoint more than before. This indicates that, though to a certain extent more ideas are shared (in tacit form), the capturing of data and ideas (in explicit form) still needs attention.



*Figure 3-14 Assessment of the NWOW implementation - Behavior*

The response on a number of topics of Behavior, the personal dimension, is shown in figure 3-14. Overall, the respondents agree less with the statements of Behavior than the statements of Bricks and Bytes (less green and more red). The attitude towards having more freedom at work differs; the same number of respondents agree as disagree. Almost 50% of the respondents partly or fully agree they are working in a more flexible way. The coaching by management has clearly not increased, as does the results-oriented work. An improvement of the work-life balance is partly or fully achieved by about one-third of the respondents, while almost 40% partly disagree or disagree their work-life balance has improved. These results show that in particular the third dimension, the manager-employee relationship and work-life balance, has received insufficient attention in this implementation of NWOW.

### 3.8 Satisfaction with NWOW and personality traits

Two months after the opening of the first floor an additional study was performed on the factors that may influence the satisfaction with the New Way of Working. This survey consisted of two elements: the relationship between the satisfaction with NWOW and personality traits, and the relationship between the satisfaction with NWOW and colleague- or task based choices. This is the choice for a work-location based on colleagues or based on tasks to perform. The correlation analysis of the factors that influence the satisfaction with NWOW lead to the following overview.

Variables	<i>r</i>							
	1	2	3	4	5	6	7	8
1. Satisfaction with NWOW	-							
2. Openness	.06	-						
3. Conscientiousness	.43**	.20	-					
4. Extraversion	-.28	-.04	-.34*	-				
5. Agreeableness	.16	.53**	.38*	.11	-			
6. Neuroticism	-.22	.09	-.78	-.18	-.08	-		
7. Colleague-focused choice	.32	.04	.46**	-.20	.10	.11	-	
8. Task-focused choice	.67**	.24	.42**	-.30	.24	-.07	.37*	-

*n=36 \* = p < .05 and \*\* = p < .01*

*Table 3-2 Correlation between factors that influence the satisfaction with NWOW*

Column 1 (Satisfaction with NWOW) in table 3-2 shows that (besides the task-focused choice) there is only one significant positive relationship (0.43,  $p<0.01$ ) for personality traits and satisfaction with NWOW; That is the relationship between conscientiousness and satisfaction with NWOW. Though in the Introduction researches indicated a number of (significant) positive relationships, this research can only credit Haddon & Lewis (1994) for their observation that being able to work independent and disciplined (conscientious) is an important characteristic for successful teleworking, in this case satisfaction with the New Way of Working. The positive relationship between openness and flex-time and teleworking, that Gainey & Clenney (2006) found, is small (0.06) and not significant (at  $p<0.05$  level) in this research. Also, the significant positive relationship between agreeableness and the attitude towards teleworking, that Clark et al. (2012) found, is positive (0.16) but not significant in this research. The positive relationship with extraversion and satisfaction with open offices, that McCusker (2002) found, is not positive, but negative (-0.28), in this research.

This research endorses the findings of Clark et al. (2012), who found a significant negative relationship between neuroticism, or (highly) sensitive employees, and the attitude towards teleworking, though the relationship in this research (-0.22) is not significant (at  $p<0.05$  level). Apparently, the New Way of Working is not beneficial for all. Judge & Cable (1997) found that neuroticism is negatively related with attraction to innovative, decisive and rewards-based cultures;

characteristics that are related to the principles of the New Way of Working. The research of Slijkhuis (2012) on work structures and the effectiveness of NWOW, supports these findings; persons with a high Personal Need for Structure (High PNS), do not perform well in the work environment of the New Way of Working.

Finally, the choice for a colleague-focused or task-focused work location both have a positive relationship with the satisfaction with NWOW, though only the task-focused choice has a significant positive relationship ( $0.67, p<0.01$ ). This is an interesting finding in the light of the previous result (for Bricks, figure 3-12), where most respondents say they base the choice of their work-location on the location of colleagues (from the same team or department), rather than task-based. The choice to work where colleagues are housed, may lead to more interaction, but also more distraction. This research indicates that, in the end, this choice may not lead to a higher satisfaction with NWOW. For conscientiousness, both choices for colleague-focused or task-focused work locations have a significant positive relationship to the satisfaction with NWOW ( $0.46$  and  $0.42, p<0.01$ ). This leads to the conclusion that, being conscientious or (self)-disciplined, leads to a higher satisfaction with the New Way of Working, either when working among colleagues or on a task-based work location.

### **3.9 Discussion and conclusions**

#### **3.9.1 Discussion**

Performing case research on the satisfaction of the implementation of the New Way of Working always has its limitations. In this case the company (had to) cut back on costs during NWOW implementation, probably leading to more negative results for the second floor review. Also additional research after yet another year was denied, making it impossible to draw conclusions on the satisfaction with the New Way of Working on an even longer time span. A larger population could have possibly led to statistically more significant relationships for the personality traits, such as found in literature, but because of the time-constraints for the participants, part B (the personality test) had to be omitted in the survey of the second floor. It would have also been better to have more than one case company, but finding organizations that are willing to participate in such time-consuming, and thereby costly, turned out to be challenging. Time is not only a limiting factor; people also forget what they previously said or answered. An analysis of the answers to the question ‘How did your attitude towards the New Way of Working change?’ showed that a number of the respondents, that participated in the ‘Before-NWOW’ review, were probably incorrect in their later responses. E.g. some answered they became more positive, while previously they were already very positive. This may be yet another reason for the already discussed differences between the figures 3-8 and 3-10. The results of the analysis on the relationships between the personal traits and satisfaction with NWOW only partly supports previous research findings. Partly this ‘missing significance’ can be lead back to the size of the review, as a larger population often leads to more significant relationships. Another factor that may explain the

differences is the gender of the review group; 30 were male, only 4 female, 2 wished to remain anonymous. In telework research relatively more people that work from home and part-time are women, who try to combine work and personal life.

### 3.9.2 Conclusions

The New Way of Working is impacting the way we work; it impacts satisfaction concerning our work and our work-life balance. To investigate the attitude towards NWOW, before and after the implementation, and the relationship with personality traits and work satisfaction, a case study was designed, showing the following results:

- In general, managers and employees have a positive attitude towards the implementation of the New Way of Working, and they remain positive after the implementation. Respondents that have a negative attitude towards the implementation of NWOW mostly work full-time at the office. The fear of losing their own desk in the new flexible open office environment could contribute to this negative attitude.
- Though about 75% of the respondents indicate they can perform their work well in the new environment, only 35% choose their work location based on the task they need to perform. Over 50% choose their work location based on the location of their colleagues, and 85% do not change their work location during the day. In this case, more task-based use of the workspace, one of the aspects of NWOW, has only partly been accomplished.
- It is positive that 85% of the respondents can work from any location, and over 60% work more paperless. Although the implementation of NWOW seems to have improved the sharing of ideas and data (in tacit form) to a certain extent, more use and storage (in explicit form) in a document management system has however not been accomplished.
- Though almost 50% of the respondents partly or fully agree they are working in a more flexible way, this is not supported by a more coaching role of management. The work has not become more results-oriented, and an improvement of work-life balance is only achieved by about one-third of the respondents. This shows that the manager-employee relationship, and a better work-life balance, has received insufficient attention in this implementation of NWOW.
- The study on the relationship between personality traits and the satisfaction with the New Way of Working shows only a significant positive relationship for conscientiousness. This indicates that (only) being (self)-disciplined leads to a higher satisfaction with NWOW.
- The choice for a colleague-focused or task-focused work location both have a positive relationship with the satisfaction with NWOW; the task-focused choice has a significant positive relationship. For conscientiousness both relationships are significant positive, leading to the conclusion that being

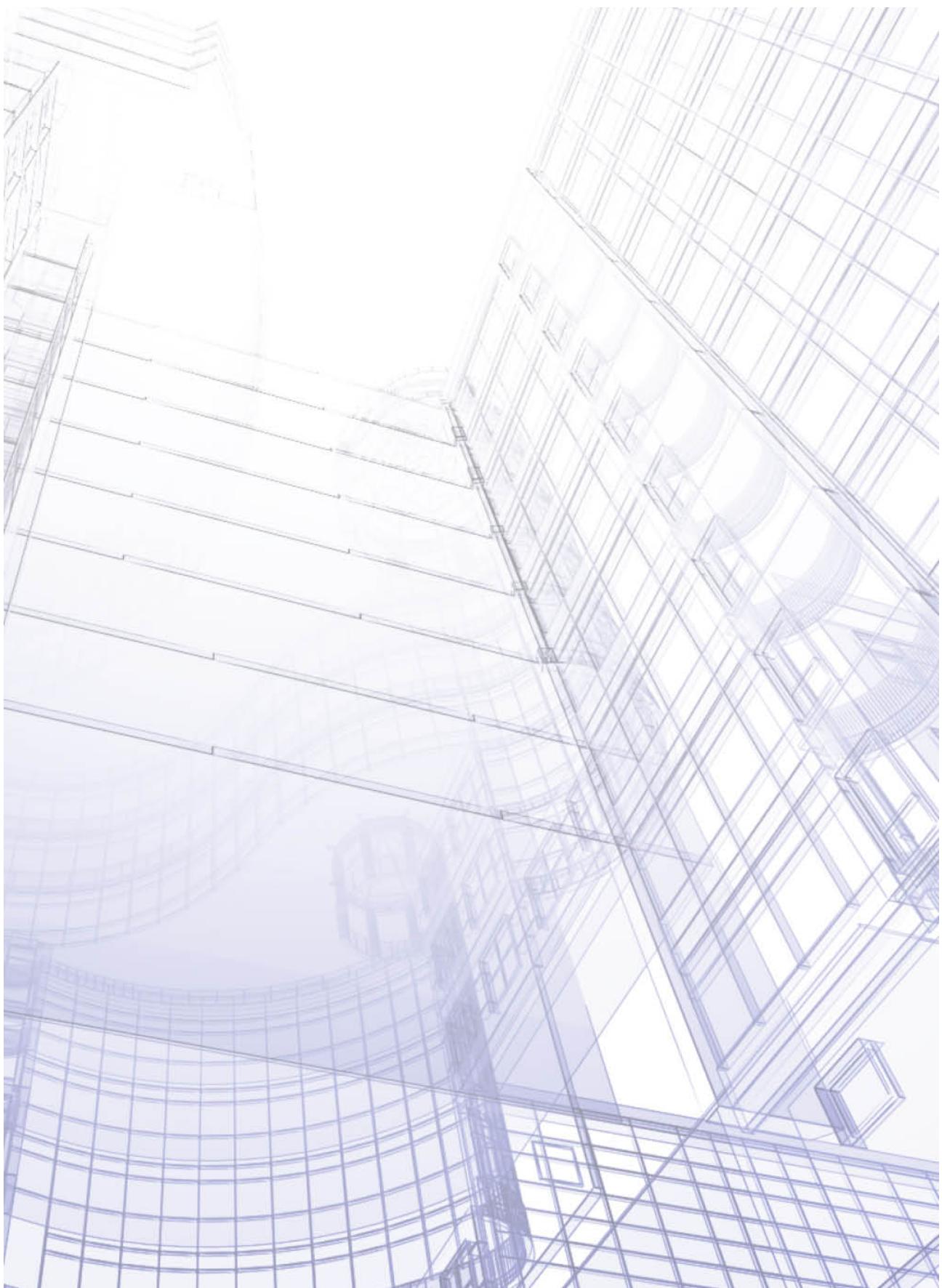
conscientious, or (self)-disciplined, leads to a higher satisfaction with NWOW, either when working among colleagues or at a task-based work location.

The way in which organizations are able to cope with the changes that the implementation of the New Way of Working brings to their operation, will - to a certain extent - determine the satisfaction of their employees, and their future success. The contribution of this research to the (limited) literature in the field of NWOW is that the case shows that, in general, managers and employees are and remain positive towards NWOW. It appears to be however hard, to score well on all aspects of NWOW, limiting the actual effects of the implementation of NWOW. The personality test shows that NWOW may not be beneficial to all employees. In particular high neuroticism (sensitive) employees may struggle in the new work environment. Where high conscientiousness (self-disciplined) employees seem to thrive well, these employees may suffer under the newly-gained freedom. This puts an extra load on management, having to recognize those in need of more guidelines and structure, while at the same time coaching those who are able to better perform in the new environment.

Future research could include aspects such as improved worker productivity in relation to the implementation of NWOW, and the contribution of NWOW to organizational profitability. This research is only a first step, providing 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 information 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.

## **PART III**

### **The knowledge management perspective**



## **Chapter 4**

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### **Knowledge sharing and channel choice: Effects of the New Way of Working**

*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 there is still little research, especially on the effects of NWOW on knowledge sharing channel choice in organizations. Based on the theories of Ipe, De Long & Fahey, and Snyder & Lee-Partridge a unified model for knowledge sharing was developed with twelve scenarios. These scenarios were designed for sharing knowledge of general and sensitive information on different levels of the organization. A multi-case research was performed at three companies that were all in the process of implementing NWOW. This provided the opportunity to compare within the same company the sharing of knowledge of NWOW workers with employees that still worked in the traditional way, Non-NWOW workers. In total, 216 scenarios results were obtained and evaluated. The companies who were further in their implementation of NWOW showed a more distinct pattern of differences between NWOW and Non-NWOW workers, but overall a number of differences were consistent. NWOW workers more often share information in an informal way compared to Non-NWOW workers, especially when sharing knowledge on sensitive information. Though all workers had access to the same channels, NWOW workers used a broader palette of channels to share knowledge than Non-NWOW workers. The differences are most clear when sharing knowledge on sensitive information; NWOW workers use multiple channels, while traditional non-NWOW workers use less channels, e.g. face-to-face communication, in a more formal way. Organizations can benefit from the results of this research that identifies the direction of changes in knowledge sharing by the implementation of NWOW.<sup>1</sup>.*

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<sup>1</sup> This chapter is based on: Kok, A. de, Bellefroid, B., & Helms, R. W. (2013). Knowledge Sharing and Channel Choice: Effects of the New Way of Working. *Proceedings of the 14th European Conference on Knowledge Management, ECKM 2013*.

## 4.1 Introduction

The New Way of Working (NWow) is a relatively new phenomenon that has a growing interest in organizations. NWOW focuses on the optimization of work and the work environment in order to improve employee productivity and job satisfaction (Bijl, 2011). Especially in The Netherlands the spread and impact of NWOW is increasing (Kluwer, 2011; PwC, 2011), but also in other countries there is an increased interest. As NWOW is an emerging phenomenon, scientific research on the effects of the concepts of NWOW on organizations, individuals and in particular knowledge sharing is still scarce. The New Way of Working may however have substantial effects on knowledge sharing, which organizations do not realize today. The result can be that important knowledge is lost because it is shared in ways that are not managed by today's traditional methods for managing knowledge sharing. For this reason it is important to research the effect of NWOW on knowledge sharing in organizations.

This multi-case research focuses on effects of NWOW on knowledge sharing of general and sensitive information at different levels in the organization. In particular the effect of NWOW on the channel choice and the choice for a formal or informal way of communication was researched by the use of scenarios that painted a certain knowledge sharing situation. The selected companies that were in the process of implementing NWOW were a 22,000 employee global multinational that is active in health, nutrition and materials, a 4,300 employee Dutch Energy DSO (Power Distribution System Operator) company, and a 15,500 employee international software development and IT support company.

The following sections describe the factors that influence knowledge sharing. The research method and scenarios are explained in section 4.2. Section 4.3 discusses the research results. Besides the channel choice the reason for this channel choice and the choice for formal or informal communication is evaluated. This leads to a number of conclusions and recommendations for future research in section 4.4.

### 4.1.1 What is the New Way of Working?

There is not yet a single definition for the New Way of Working in the literature. 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.' The New Way of Working is more than teleworking; it embodies the redesign of offices to accommodate task-based workplaces, and a results-oriented way of working in which freedom and trust play an important role.

Baane et al. (2010) observe four work principles in the New Way of Working: (1) Time and location free work: 'Anytime, anywhere'; (2) Steering workers towards

achieving results: 'Manage your own work'; (3) Free access to and use of knowledge, experiences and ideas: 'Unlimited access and connectivity'; (4) Flexible work relations: 'My size fits me'. They add: 'These work principles 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'.

#### 4.1.2 Channel Choice and Opportunity to Share

In the choice of the communication channel e.g. a face-to-face meeting, an e-mail or a phone call, Snyder & Lee-Partridge (2009) state it is not clear what conditions lead an employee to use the phone instead of the intranet to share knowledge. They 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) adds 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 working methods and new technological opportunities will not affect the channel choice until the employee has gained sufficient satisfactory experience with this new channel.

Carlson & 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 & 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 & 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.'

Ipe (2003) states the Opportunity to Share can be formal or informal. Rulke & Zaheer (2000) refer to the formal opportunities as purposive learning channels, designed to explicitly acquire and disseminate knowledge. Informal opportunities

are relational learning channels, based on personal relationships. Okhuysen & Eisenhardt (2002) add: 'Formal opportunities provide a structured environment, including instructions, to share knowledge. They not only create a context in which to share knowledge but also provide individuals with the tools necessary to do so'. Knowledge shared through formal channels tends to be mainly explicit in nature (Nonaka & Takeuchi, 1995). Most knowledge is shared in informal settings (Jones & Jordan, 1998; Pan & Scarbrough, 1999; Truran, 1998). Face-to-face communication allows building of trust, which in turn is critical to sharing knowledge (Ipe, 2003).

#### 4.1.3 Factors that influence knowledge sharing

Davenport & Prusak (1998) defined 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'. Ipe (2003) notes: '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.' King (2006) defines knowledge sharing as 'the exchange of knowledge between and among individuals, and within and among teams, organizational units, and organizations.' He adds there is a difference between knowledge transfer and knowledge sharing: 'transfer implies focus, a clear objective, and unidirectionality, while knowledge may be shared in unintended ways multiple-directionally without a specific objective.'

For the purpose of this research three views from the literature on factors that influence knowledge sharing were combined into a unified view or model on knowledge sharing. Each of the three researches is briefly presented after which the unified model for knowledge sharing is presented.

First, Snyder & Lee-Partridge (2009) found that the level of sensitivity had a major influence on the channel choice for team knowledge sharing and they distinguished the following types of knowledge sharing:

1. Sharing general organizational information;
2. Sharing sensitive organizational information;
3. Sharing general project information;
4. Sharing sensitive project information.

Second, De Long & Fahey (2000) found that culture impacts the way in which people share knowledge and identified the following types of knowledge sharing:

- a) Vertical interaction with (senior) management;
- b) Horizontal interaction with individuals at the same level in the organization;
- c) Special behavior for teaching and dealing with mistakes.

Third, Ipe (2003) noted that the motivation to share is influenced by the trust, power and status of the recipient. Trust evolves from the interpersonal relationship. This means that the level of familiarity with a superior or a colleague influences the motivation to share knowledge.

The combination of the before mentioned views on knowledge sharing leads to the following unified model that describes the different types of knowledge sharing:

Number	Scenario
1,2	Sharing general or sensitive knowledge with the organization at large
3,4	Sharing general or sensitive knowledge with the project team or sub-unit
5,6	Sharing general or sensitive knowledge with a familiar superior or team leader
7,8	Sharing general or sensitive knowledge with an unfamiliar superior or (senior) manager
9,10	Sharing general or sensitive knowledge with a familiar colleague or team member
11,12	Sharing general or sensitive knowledge with an unfamiliar colleague or co-worker

*Table 4-1 Scenarios for unified model for knowledge sharing*

## 4.2 Research method

### 4.2.1 Multiple-case design

In this research 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 is 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). This approach enables both intra-case (by company) and cross-case (overall) analysis. 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, and as this may affect the way knowledge is shared, an additional context analysis was performed to gain insight in the way NWOW was implemented each individual case company.

The selected organizations for the case studies were:

Case 1: ProcessComp, a 22,000 employee multinational with 200 locations in five continents that is active in health, nutrition and materials,

Case 2: EnergyComp, a 4,300 employee Dutch Energy DSO (Power Distribution System Operator) company, and

Case 3: SoftwareComp, a 15,500 employee international software development and IT support company.

Per case company three NWOW workers and three Non-NWOW workers were interviewed. The case companies were asked to provide a list of participants with a comparable IT experience. Apart from the eighteen case research interviews, additional context interviews were conducted.

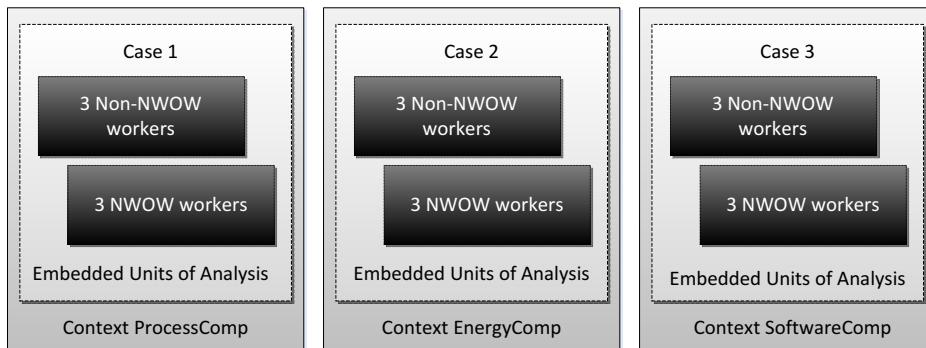


Figure 4-1 Multiple-case design: 3 cases with 18 participants in total

#### 4.2.2 Scenarios and channel choice

To investigate the way in which knowledge was shared, scenarios were developed, based on the unified model for knowledge sharing. The combination of the twelve scenarios in a matrix is shown in table 4-2.

Scenarios Level	General information		Sensitive information	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Organization	1		2	
Project team	3		4	
Superior	5	7	6	8
Colleague	9	11	10	12

Table 4-2 Unified model for knowledge sharing with scenarios

There were no scenarios defined for the unfamiliar organization and project team or sub-unit as these are assumed to be familiar to the participant.

The scenarios represent different (hypothetical) knowledge sharing situations. For example, the participants were asked: 'Imagine you find out that on a regular basis items have been stolen from the stockroom where only you and your project

members have access to. How would you share this knowledge with your project leader?' In this scenario sensitive knowledge needs to be shared between an employee and a familiar superior (the project leader). This question was used for scenario 6. The overview of scenario questions is in the Appendix.

In the interviews with each of the 18 participants the twelve scenarios were discussed. This means 36 scenarios were evaluated for each group of (Non-) NWOW workers, and 72 for each case company. In total 216 scenarios were researched.

For each scenario the participants were asked what channel they would choose. The (seven) channels defined for this research were:

1. Face-to-face
2. Video call
3. E-mail
4. Phone call
5. Chat message
6. Document sharing system
7. Intranet message

The channel list was not exclusive, but appeared to be sufficient for the research. 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. In each scenario the participants were asked whether they would use the channel in a formal or informal way. As discussed, the formal use of a channel indicates a purposive knowledge exchange e.g. a planned meeting to share knowledge. The informal use of a channel indicates relational knowledge sharing e.g. an informal mail or unplanned meeting (Rulke & Zaheer, 2000). Finally, for each scenario the participant was asked why this channel was chosen. The interviews were recorded but not transcribed. From each interview the results were combined in a (216 row, multi column) table from which overviews were derived.

### 4.3 Research results

#### 4.3.1 Context of case companies

The context of how the three case companies approached the implementation of The New Way of working was researched as it may influence the extent to which NWOW affects knowledge sharing.

*Case 1:* ProcessComp had a structured approach for the implementation of NWOW with open office design, supporting IT tools and an organizational culture change program. After the initial successful pilot, ProcessComp plans to expand the NWOW concept to other departments.

- Case 2:** At EnergyComp the Human Resource department started the NWOW project in an attempt to attract new talent, as 700 employees are to retire in the coming 5 years. Other goals were the increase of customer satisfaction and lowering of operational costs. The pilot groups received training on several aspects e.g. work-life balance. Participants received a personal IT kit. The new office locations and design and the clean desk policy also affected employees that still worked in the traditional way, to show them changes are on the way.
- Case 3:** SoftwareComp chose to partially integrate NWOW and only use those elements that were seen as beneficial to them. The reason for implementing NWOW was the attraction of new talent, reduction of housing cost and improvement of competitive advantage. The NWOW implementation was to grow in an evolutionary way, but due to the economic crisis the project started to lack momentum. The result was that much depended on the individual manager whether flexible and result driven work was possible.

The context analysis shows that the implementation in case 3 was less thorough than in the first two cases.

#### 4.3.2 Effect of NWOW on Channel Choice

The channel choice of non-NWOW and NWOW workers for sharing knowledge on *general information* is shown in figure 4-2.

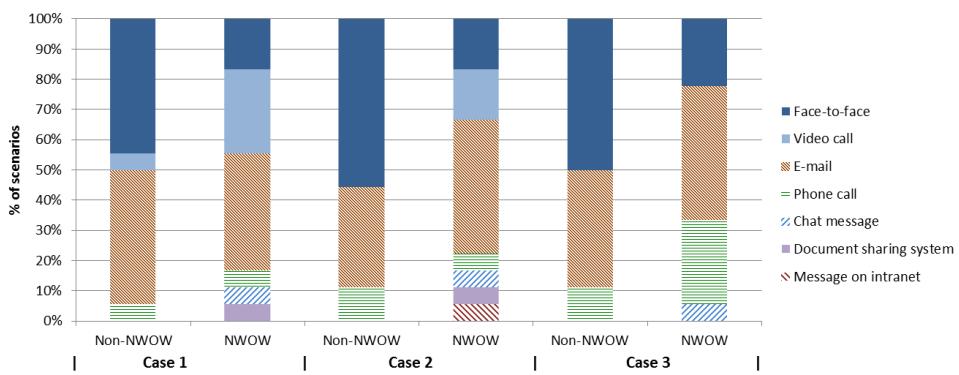


Figure 4-2 Channel choice for sharing knowledge on general information

In all three cases the NWOW workers use more channels than the Non-NWOW workers. The NWOW workers clearly have less preference for face-to-face meetings. In case 1 video calls are even preferred over face-to-face meetings, in case 2 this is about equal. The Non-NWOW workers can also have video calls, as the tool is at their disposal, but they are using it less (case 1) or not at all. The use of e-mail is about equal in all cases for both groups. In case 3 the NWOW workers prefer phone calls over face-to-face meetings and do not make use of video calls.

The channel choice for sharing knowledge on *sensitive information* is shown in figure 4-3.

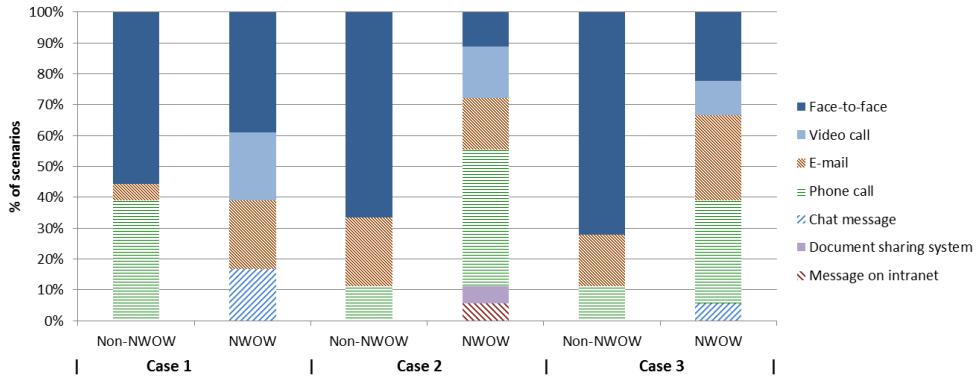


Figure 4-3 Channel choice for sharing knowledge on sensitive information

Similar to the previous figure, also for sharing of knowledge on sensitive information there is a clear difference in channel choice between Non-NWOW and NWOW workers. In all cases the NWOW workers use a broader palette of channels than the Non-NWOW workers. The Non-NWOW workers have a strong preference to meet face-to-face when sharing knowledge on sensitive information. The NWOW workers however choose other channels e.g. a video call, e-mail, chat or a phone call just as well. In case 2 the NWOW workers use almost no face-to-face meetings when sharing knowledge on sensitive information. In all three cases, in contrast to the Non-NWOW workers, the NWOW workers use video calls to share knowledge on sensitive information.

The overall channel choice for sharing knowledge on general and sensitive information across all three cases is shown in figure 4-4.

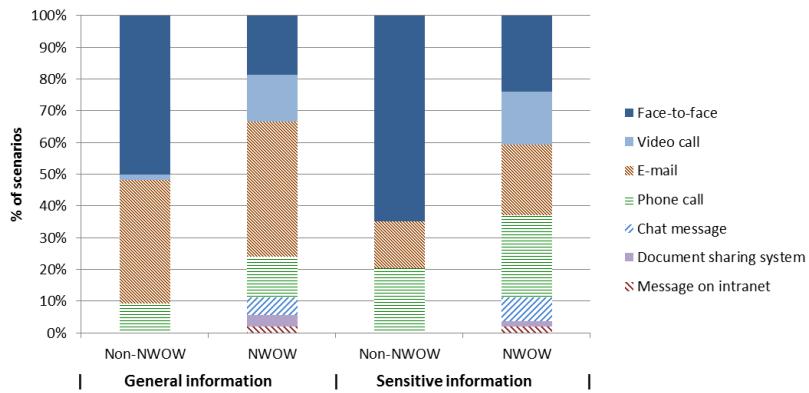
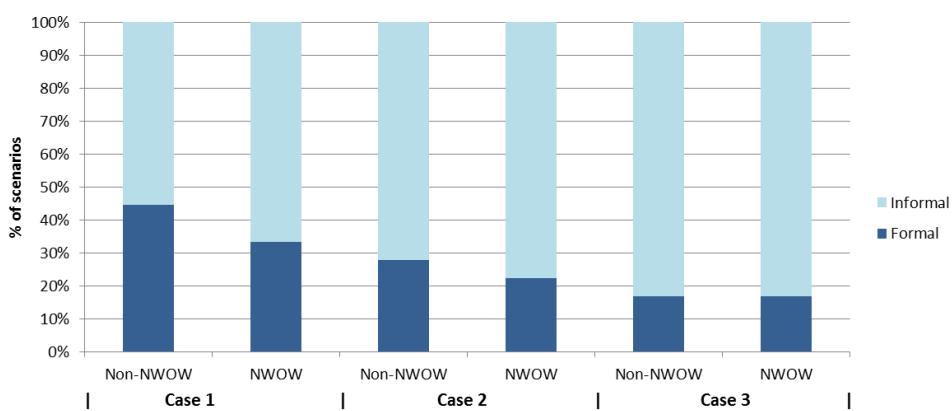


Figure 4-4 Overall channel choice for sharing knowledge on general and sensitive information

Traditional workers choose to meet more often face-to-face or call when sharing knowledge on sensitive information. The NWOW workers use a broad palette of channels in both situations, though e-mail is used less for sharing knowledge on sensitive information. This leads to the conclusion that NWOW workers attribute less value to the sharing of sensitive information; they seem to perceive information as something you can share in multiple ways, no matter what the sensitivity of that information is.

#### 4.3.3 Effect of NWOW on Opportunity to Share

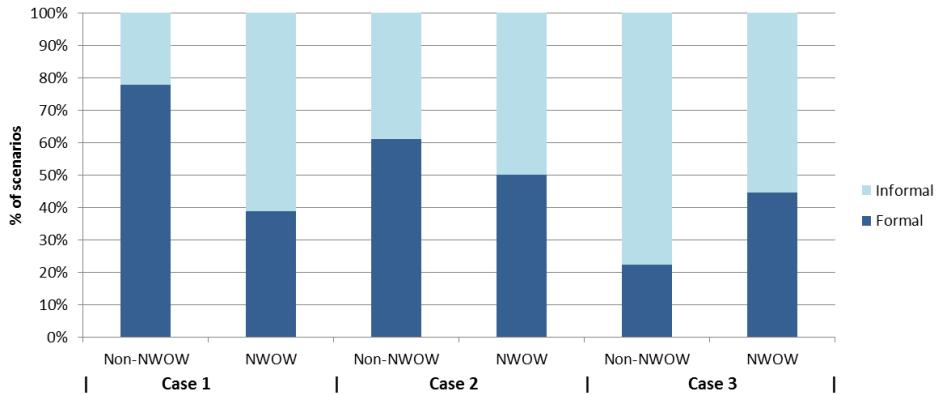
As discussed in section 4.1.2, the Opportunity to Share can be formal or informal (Ipe, 2003). Figure 4-5 shows the preference for formal or informal communication when sharing knowledge on *general information*.



*Figure 4-5 Formal / informal communication for sharing knowledge on general information*

In the first two cases the NWOW workers share knowledge on general information more often in an informal way, in case 3 this is the same. Remark: the down going trend over all cases is coincidental and caused by the participants in case 2 and 3 that use more informal communication than in case 1. The differences per case however do matter.

The preference for formal or informal communication when sharing knowledge on *sensitive information* is shown in figure 4-6.

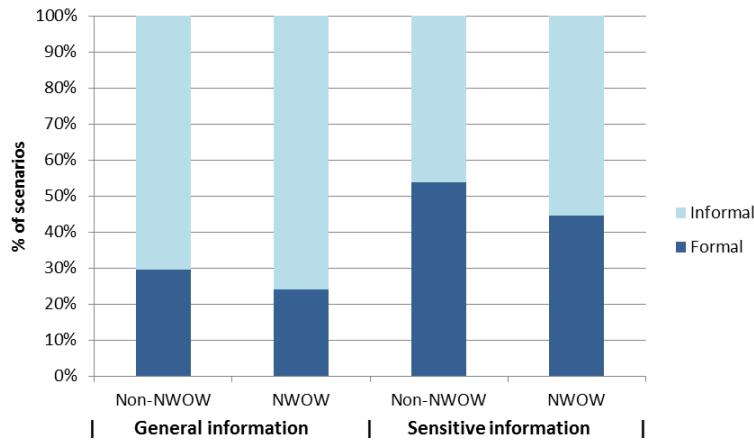


*Figure 4-6 Formal / informal communication for sharing knowledge on sensitive information*

Case 1 shows a clear difference between Non-NWOW and NWOW workers when sharing knowledge on sensitive information. The Non-NWOW workers choose to communicate almost twice as much in a formal way (compared to sharing general information, see figure 5), while the NWOW workers have almost no preference for sharing sensitive information in a more formal way than they would share knowledge on general information. Also in case 2 the NWOW workers choose less formal ways to share knowledge on sensitive information, though they are more formal in their behavior than when sharing general information (figure 5).

In case 3 the Non-NWOW workers are an outlier: they hardly use more formal communication compared to figure 5. Compared to the other cases a larger increase of formal communication was to be expected. The NWOW workers are not an outlier; they use more formal communication compared to figure 5, which is in line with the other cases. The reason why the Non-NWOW workers in case 3 use relatively less formal communication may be found in the setting of the participants. The non-NWOW workers at SoftwareComp were located close to each other and their superior. The easiest way to share either general or sensitive information was to walk directly to each other or the superior.

The formal and informal communication when sharing knowledge on general and sensitive information across all three cases is shown in figure 4-7.

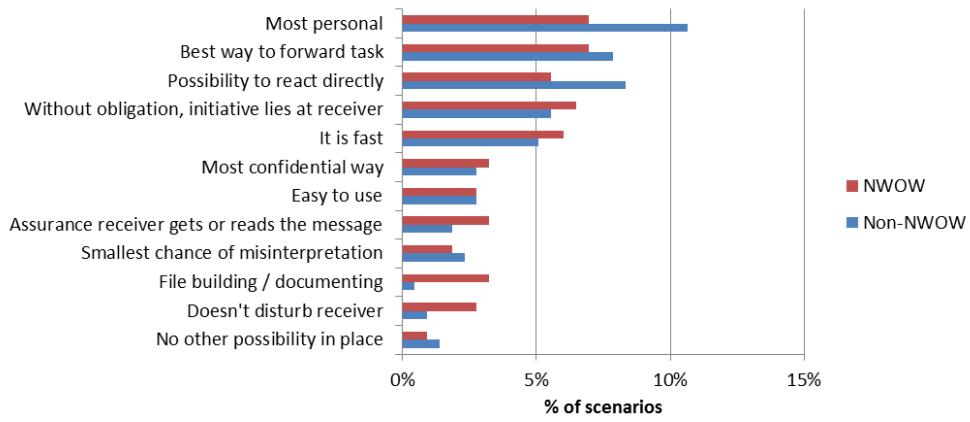


*Figure 4-7 Overall formal / informal communication for general and sensitive information*

For both knowledge sharing situations the NWOW workers use more informal communication than the traditional Non-NWOW workers. The difference is larger when sharing knowledge on sensitive information, despite the discussed opposite effect of the Non-NWOW workers in case 3.

#### 4.3.4 Reasons for channel choice

As mentioned before, the reason for the channel choice is not easy to determine. In this research the question was raised in each scenario for each participant; that is 216 times. The reasons were not pre-defined but evolved from the interviews and were later categorized to a list of twelve reasons. The reasons for channel choice, as mentioned by the Non-NWOW and NWOW workers, in a ranked order, is shown in figure 4-8.



*Figure 4-8 Reasons for channel choice (overall)*

Overall no large differences were found between Non-NWOW and NWOW workers in their reasons for channel choice. The Non-NWOW workers have a slightly higher preference for the top three reasons: most personal, best way to forward task and possibility to react directly. The NWOW workers more often prefer not to disturb the receiver by using asynchronous communication. Most personal is the most often mentioned reason for channel choice. The Non-NWOW workers mention this reason mostly for face-to-face meetings, while NWOW workers mention this reason for both face-to-face meetings and video calls. Apparently NWOW workers perceive video calls as just as personal as face-to-face meetings. Apart from this, patterns in the reasons for channel choice were hard to find.

## 4.4 Discussion, conclusions and future research

### 4.4.1 Discussion

As mentioned in the introduction, research on the New Way of Working is scarce. Comparable literature on the effect of NWOW on knowledge sharing in organizations that are in the process of implementing NWOW cannot be found. The combination of knowledge sharing and the implementation of NWOW make this research a first step in this area. It sheds light on the direction knowledge sharing is heading for in the future, i.e. for those companies that implement NWOW.

The results of the research were reasonably consistent; the only outlier was the informal behavior of the Non-NWOW workers in case 3. This reflected the informal setting of the participants in their office environment. It also showed that when there are only three participants in a Unit of Analysis, the results are sensitive for local variations. This effect could be diminished by creating larger groups of participants, which is always hard as companies voluntarily invest time in this sort of research.

Finally, there is always more information to explore and describe e.g. 'Do traditional workers share knowledge more formally with superiors than NWOW workers?' The choice however was made to focus this paper on the channel choice, as this most impacts knowledge sharing in organizations.

### 4.4.2 Conclusions and future research

The goal of this research was to investigate the effect of the New Way of Working on the sharing of knowledge and channel choice. To do so, a unified model for knowledge sharing was developed that identifies different situations, i.e. scenarios, of knowledge sharing. For each of these knowledge sharing situations it was identified if the implementation of NWOW changed the knowledge sharing behavior in terms of channel choice and opportunity to share (formal vs. informal communication).

Our multi-case research shows that:

- NWOW workers use a broader palette of channels than Non-NWOW workers for sharing knowledge on both general and sensitive information;
- NWOW workers have less preference for the use of a specific channel in a given situation than Non-NWOW workers;
- When sharing knowledge on sensitive information, Non-NWOW workers prefer face-to-face meetings. The NWOW workers use less face-to-face meetings and more video calls. They note that video calls can also be used in a personal way;
- NWOW workers more often share knowledge in an informal compared to Non-NWOW workers, especially when sharing knowledge on sensitive information.

These findings may very well be related to the geographic separation of workers in a NWOW setting. One of the pillars of The New Way of Working is that employees no longer need to be at the office from 9 to 5 and have the freedom of choosing when to work and where to work. Hence formal meetings and those situations requiring physical presence are less likely to happen, causing alternative channels to be chosen.

Research on the reasons for the channel choice did not lead to any clear patterns or findings: there are no dominant reasons by either of the groups to choose a certain channel in a certain setting. In other words, the preference for a certain channel does not change due to the situational circumstances (as described by Carlson & Zmund, 2009).

This research shows that the traditional ways of knowledge sharing change by the implementation of NWOW. The practical implication for organizations is that they will need to realize that, because of the New Way of Working, knowledge is shared more often via multiple channels and in more informal ways. Organizations therefore need to invest in a proper technological infrastructure that supports the different preferences of knowledge sharing in a NWOW context. In making a selection for the infrastructure, organizations should realize that knowledge sharing needs a different approach for general and sensitive information and whether the knowledge is shared in a formal or informal way. The unified model and scenarios presented in this research can be used for assessing the needs in the current situation and help to think about future needs taking into account the particular choices that have been made concerning the implementation of NWOW (total implementation or only partial).

This research is however only a first exploration: the results should be used with care and more research is needed in the future on the effects of NWOW on knowledge sharing and channel choice to support the findings of this research. More research cases will enlarge the insight in the effects of NWOW. Especially more future research is needed in the way in which knowledge is transferred in a NWOW setting: How are which channels used to share knowledge on which information and why are these channels chosen.

## Appendix - Scenario questions

For the multi-case research the following scenario questions were defined (see also table 4-1 and 4-2):

1. Imagine you have discovered a cheaper way of traveling that is applicable to the entire organization. How would you share this knowledge with your organization?
2. Imagine that you have observed an emergency at a client, caused by (a product of) your organization, while you were there. You have an idea on how this could be prevented in the future by your organization. How do you share this sensitive knowledge with your organization?
3. Imagine you know an existing customer has great interest in the project you are currently working in. How will you share this knowledge with your project team?
4. Imagine you discover important project documents, you need as soon as possible for an advice to a client, have gone missing or may have never been produced. How do you share this knowledge with your project team?
5. Imagine you are the first to find out the main stakeholder of the project you are working on intents to withdraw. How do you share this knowledge with your project leader?
6. Imagine you find out that on a regular basis items have been stolen from the stockroom where only you and your project members have access to. How would you share this knowledge with your project leader?
7. Imagine you see a certain development in your field of expertise which may be of importance to a board member of your organization you do not know personally. How do you share this knowledge with him?
8. Imagine you find out that wrongly salary has been withheld from you and several employees of your organization. The HR employee directs you to his or her superior you do not know. How do you share this sensitive knowledge with someone you do not know personally?
9. Imagine you have a hint for a colleague of your project team to carry out a certain task faster. How do you share this knowledge with your colleague?
10. Imagine that an equivalent colleague in your project team does not take his responsibilities and you know what the consequences may be for him. How do you share this knowledge with him?
11. Imagine that you hear about a new colleague you do not personally know, who is working in another project in a similar role to your project role, and you have several useful tips for him. How do you share this knowledge?
12. Imagine that you just read about a colleague you do not know personally, who is working in a kind of equal role to you in another project, but who, according to you by human error, fails to comply with laws and regulations. How do you share this knowledge with him?



## **Chapter 5**

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### **Knowledge sharing in the New World of Work: Effects of the New Way of Working**

*The New Way of Working (NWOW) is 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.<sup>1</sup>.*

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<sup>1</sup> This chapter is based on: Kok, A. de, Esten, R., & Helms, R. W. (2015). Knowledge Sharing in the New World of Work: Effects of the New Way of Working. *Journal of Information Technology Services*, KITS, 14(2), 315-335.

## 5.1 Introduction

Where in the past many authors e.g. Hammer & 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 & 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 IT 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 & 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. Section 5.2 describes the backgrounds knowledge sharing and channel choice. The research method is explained in section 5.3. Section 5.4 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 section 5.5.

## 5.2 The New Way of Working and knowledge sharing

### 5.2.1 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 results-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 IT, 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' (Pyöriä, 2003, 2005; Greene & Myerson, 2011).

### 5.2.2 Types of knowledge workers

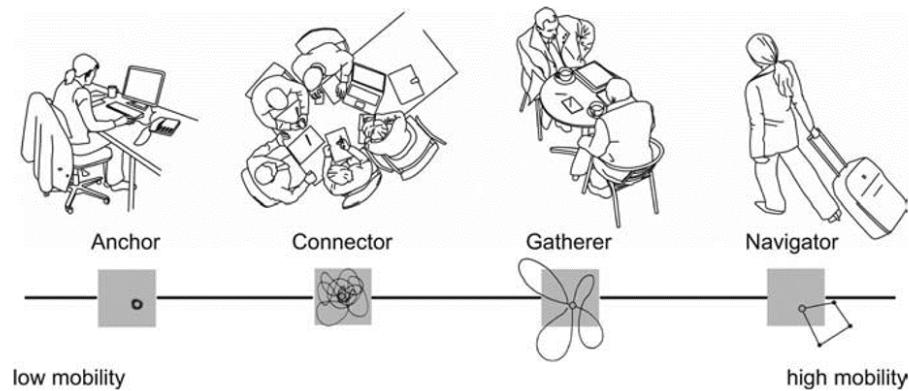
Nowadays, the term knowledge worker often refers to office workers, however, this has not always been the case. The first professions that were identified as 'knowledge workers' were doctors, lawyers, scientists and academics (Green & Myerson, 2011). Later, Peter Drucker extends the term knowledge worker 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 & 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.

The different types of knowledge workers and their mobility are schematically shown in figure 5-1.



*Figure 5-1 Type of knowledge worker and mobility*

### 5.2.3 Knowledge Sharing Framework

Davenport & 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 specific 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 & Leidner (2001) make a further distinction in the following knowledge types:

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

Table 5-1 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 & Leidner (2001), with the types of knowledge as described by Nonaka (1994):

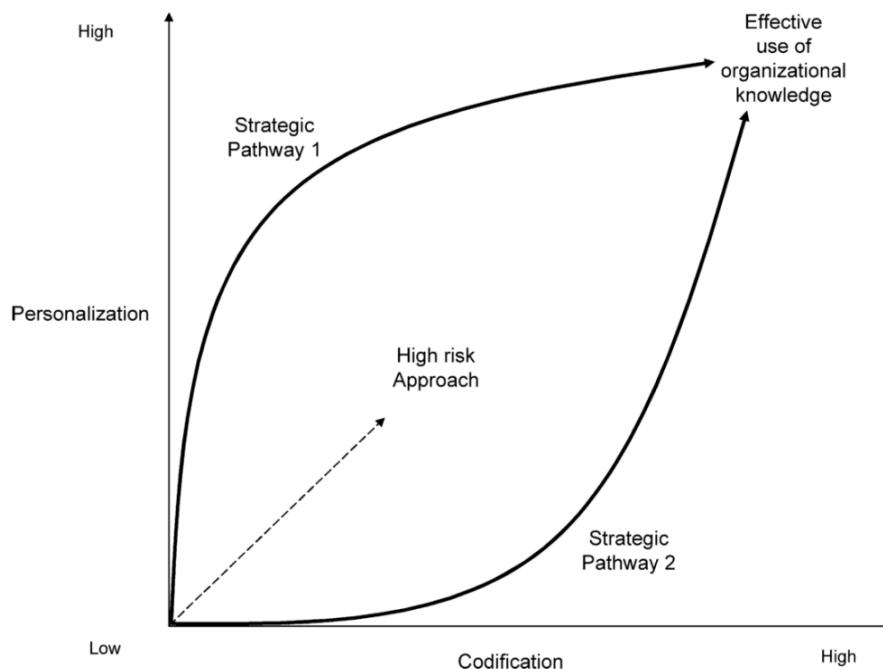
Knowledge type	Mostly Tacit	50/50	Mostly Explicit
<b>Declarative</b>			
<b>Procedural</b>			
<b>Causal</b>			
<b>Conditional</b>			
<b>Relational</b>			
<b>Pragmatic</b>			

Table 5-2 Knowledge Sharing Framework

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 et al. (1999) argue that, in order to enable effective use of knowledge,

organizations should select an 80/20 knowledge strategy mix of codified (explicit) and personalized (tacit) knowledge. Scheepers et al. (2004) do not reject this strategy, but they find organizations may evolve their knowledge strategy mix over time.



*Figure 5-2 Model of organizational knowledge strategy evolution*

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

#### 5.2.4 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 & 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 & 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 & 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 & 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.

### 5.2.5 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 (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:

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

Table 5-3 Dimensions and themes of the NWOW Analysis Monitor

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

### 5.3 Research method

#### 5.3.1 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. The transition from traditional ways of working to new ways of working impacts the level of mobility of the knowledge worker, and may influence the sharing of knowledge. This is schematically shown in figure 5.3.

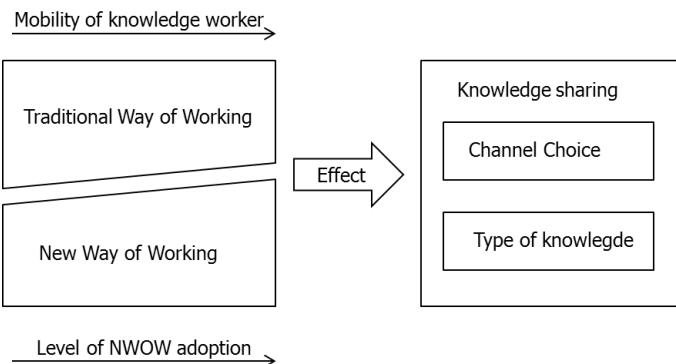


Figure 5-3 Research model

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.

### 5.3.2 Multiple-case study A: Channel choice for knowledge sharing

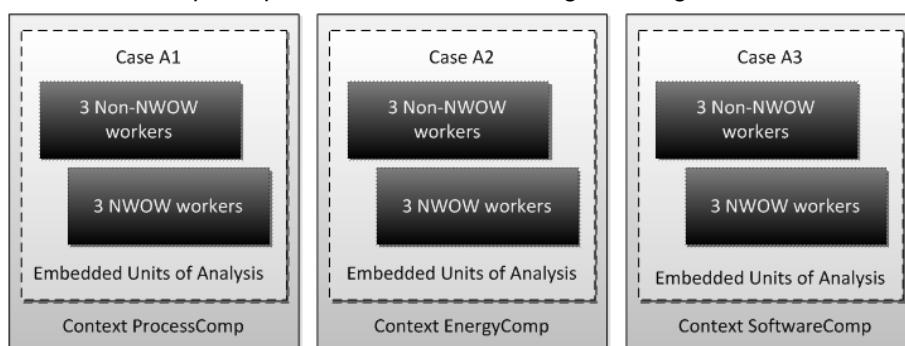
In the first multiple case study (A), three case studies were conducted at large Dutch for-profit organizations that were all in the transformation process towards NWOW. By choosing organizations that were in the process of implementing NWOW it was possible to make a comparison between employees from 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 5-4 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:

1. Face-to-face
2. Video call
3. E-mail
4. Phone call
5. Chat message
6. Document sharing system
7. 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 previously been presented (Kok et al., 2013), but not the effects of the channel choice on the type of knowledge workers.

### 5.3.3 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 IT:

- 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 & IT Auditing company;

Case B5: FinConsult, a 4,500 (globally 210.000) employee Financial consult company.

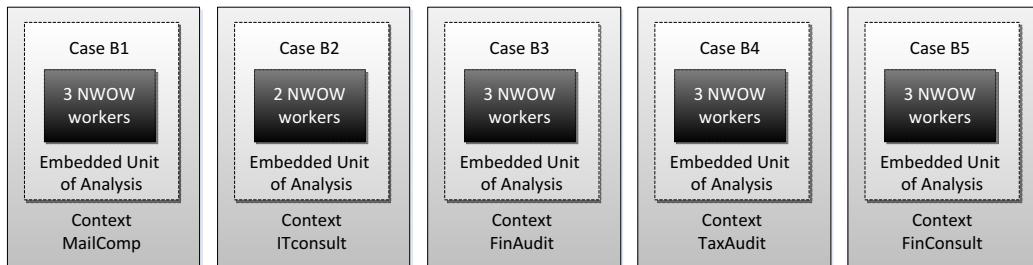


Figure 5-5 Multiple case study B: Type of knowledge shared by NWOW workers

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.

## 5.4 Research results

### 5.4.1 Channel choice and type of knowledge 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 (2011). 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 graph shown in figure 5-6.

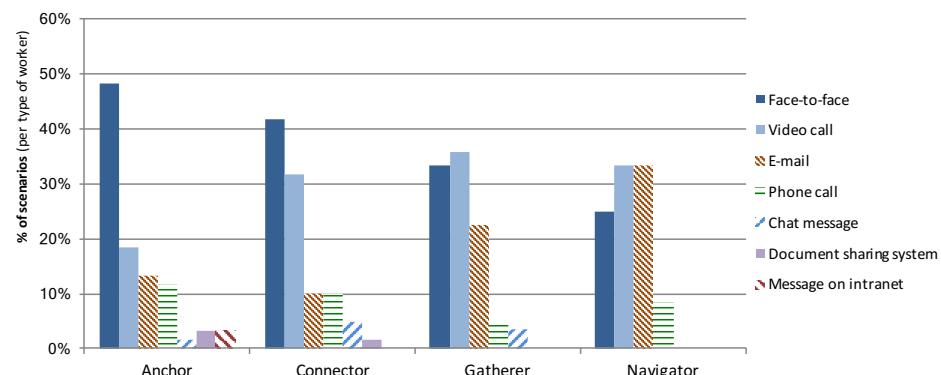


Figure 5-6 Channel choice and type of knowledge worker

Figure 5-6 shows there is 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 all types of knowledge workers. When the mobility increases communicating via the intranet of a document sharing system becomes less popular.

#### 5.4.2 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. The channel choice for sharing knowledge across all three cases for these two groups is shown in figure 5-7.

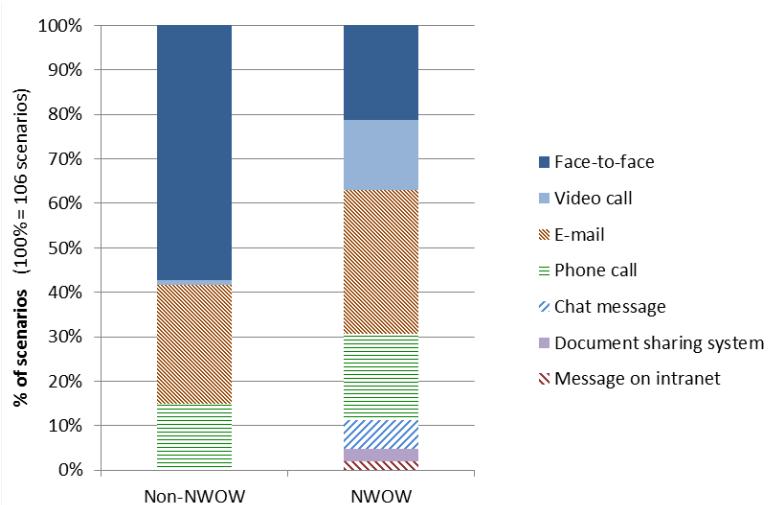


Figure 5-7 Channel choice for non-NWOW and NWOW workers

NWOW workers use more different channels to share knowledge than non-NWOW workers. The NWOW workers clearly have less preference for face-to-face communication. 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 sharing knowledge NWOW workers also choose chat messages, document sharing systems, and intranet messages. Further details on the effect of NWOW on knowledge sharing of general and sensitive information can be found in previously mentioned publication (Kok et al., 2013).

### 5.4.3 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 & Leidner (2001). This resulted in the following ( $6 \times 14 = 84$ ) points in the Knowledge Sharing Framework:

Knowledge type	Research results - non aggregated			aggregated		in %	
	Mostly Tacit	50/50	Mostly Explicit	Tacit	Explicit	Tacit	Explicit
<b>Declarative</b>	2	3	9	3,5	10,5	25%	75%
<b>Procedural</b>	5	4	5	7	7	50%	50%
<b>Causal</b>	8	4	2	10	4	71%	29%
<b>Conditional</b>	6	5	3	8,5	5,5	61%	39%
<b>Relational</b>	4	8	2	8	6	57%	43%
<b>Pragmatic</b>	0	0	14	0	14	0%	100%

Table 5-4 Knowledge Sharing Framework with response of participants  
on type of knowledge shared

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:

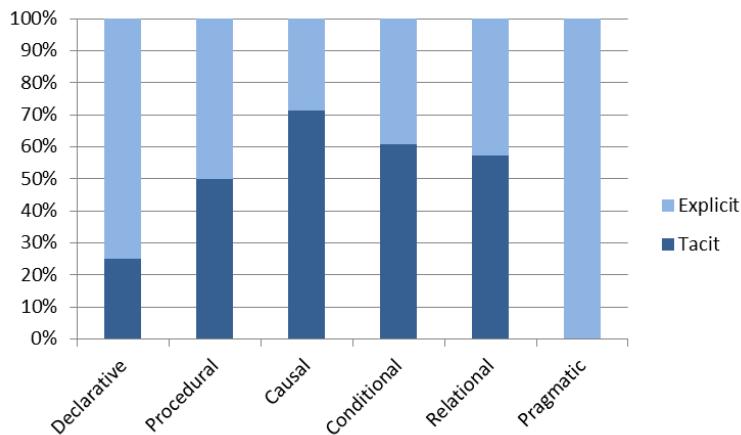


Figure 5-8 Knowledge sharing for the different types of knowledge

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 knowledge. 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.

#### 5.4.4 Knowledge sharing and type of knowledge worker

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

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%

Table 5-5 Knowledge Sharing Framework and type of knowledge worker

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 in the following figure (5-9), showing the types of knowledge workers.

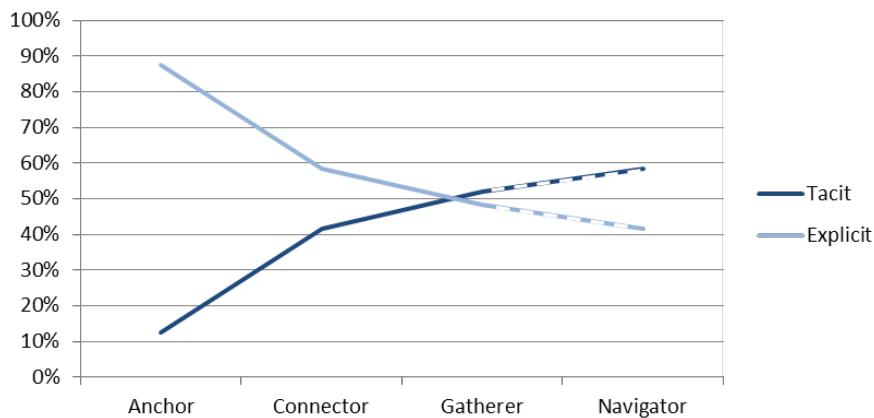


Figure 5-9 Type of knowledge workers and form of knowledge sharing

There is 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).

#### 5.4.5 Knowledge Sharing Framework per case

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

Knowledge type	Research results - non aggregated			aggregated		in %	
	Mostly Tacit	50/50	Mostly Explicit	Tacit	Explicit	Tacit	Explicit
<b>Case B1</b> (Mailcomp)	4	7	7	7,5	10,5	42%	58%
<b>Case B2</b> (ITconsult)	6	3	3	7,5	4,5	63%	38%
<b>Case B3</b> (FinAudit)	2	5	11	4,5	13,5	25%	75%
<b>Case B4</b> (TaxAudit)	8	3	7	9,5	8,5	53%	47%
<b>Case B5</b> (FinConsult)	5	6	7	8	10	44%	56%

Table 5-6 Knowledge Sharing Framework per case

The results in table 5-6 are graphically represented in figure 5-10.

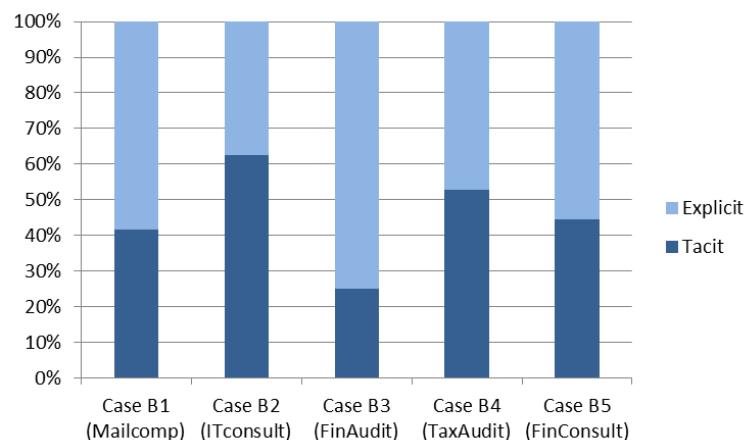


Figure 5-10 Form of knowledge sharing per case

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.

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



Figure 5-11 Level of current NWOW adoption per dimension and case

Overall, case B1 (MailComp), 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 analyses 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. results-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 results-oriented way of working and the employee satisfaction.

#### 5.4.7 Effect of NWOW on Knowledge Sharing Framework

Finally, a comparison can be made of the effect 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 (figure 5-12):

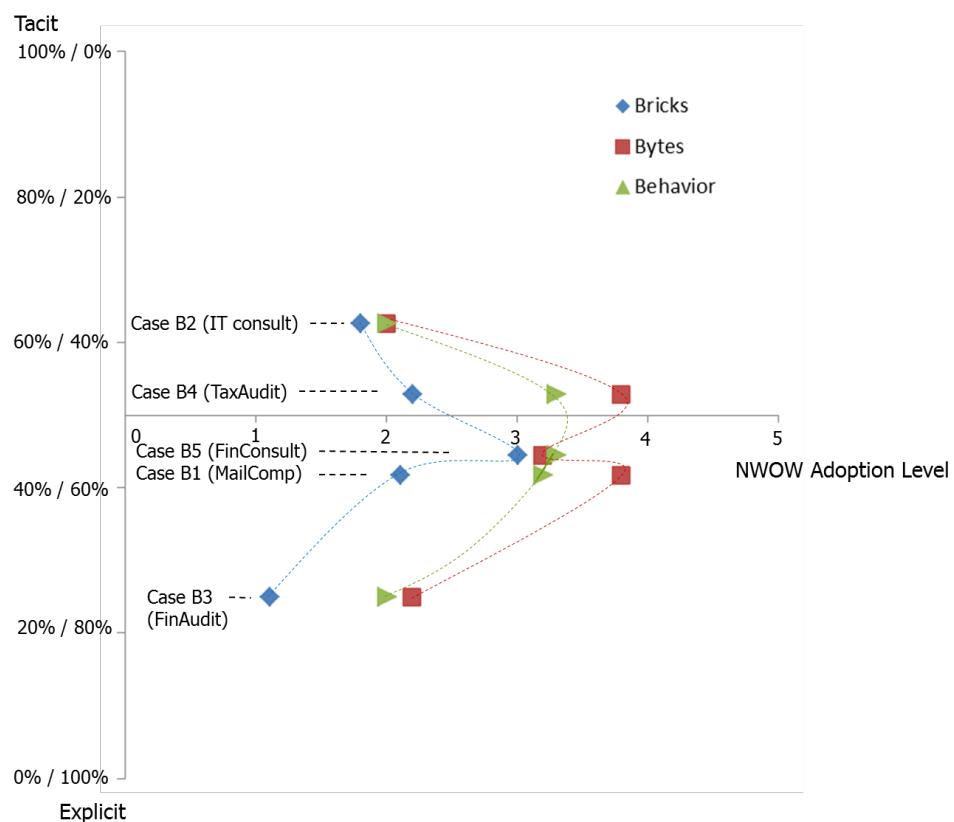
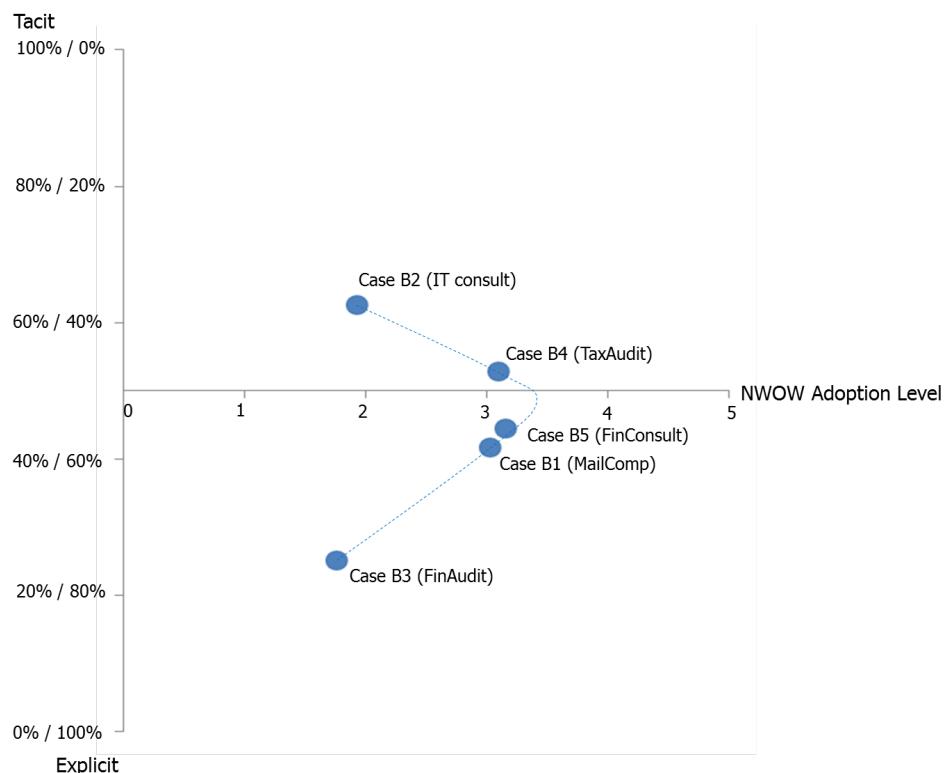


Figure 5-12 Level of NWOW adoption per dimension and type of knowledge sharing

The points for the three individual dimensions are connected in the figure 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.

When the overall score on the NWOW adoption level is plotted against the type of knowledge shared in the Knowledge Sharing Framework, figure 5-13 appears.



*Figure 5-13 Overall level of NWOW adoption and type of knowledge sharing*

The cases are again connected via a dotted curved line. 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 Sheepers 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.

## 5.5 Discussion, conclusions and future research

### 5.5.1 Discussion

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

### 5.5.2 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:

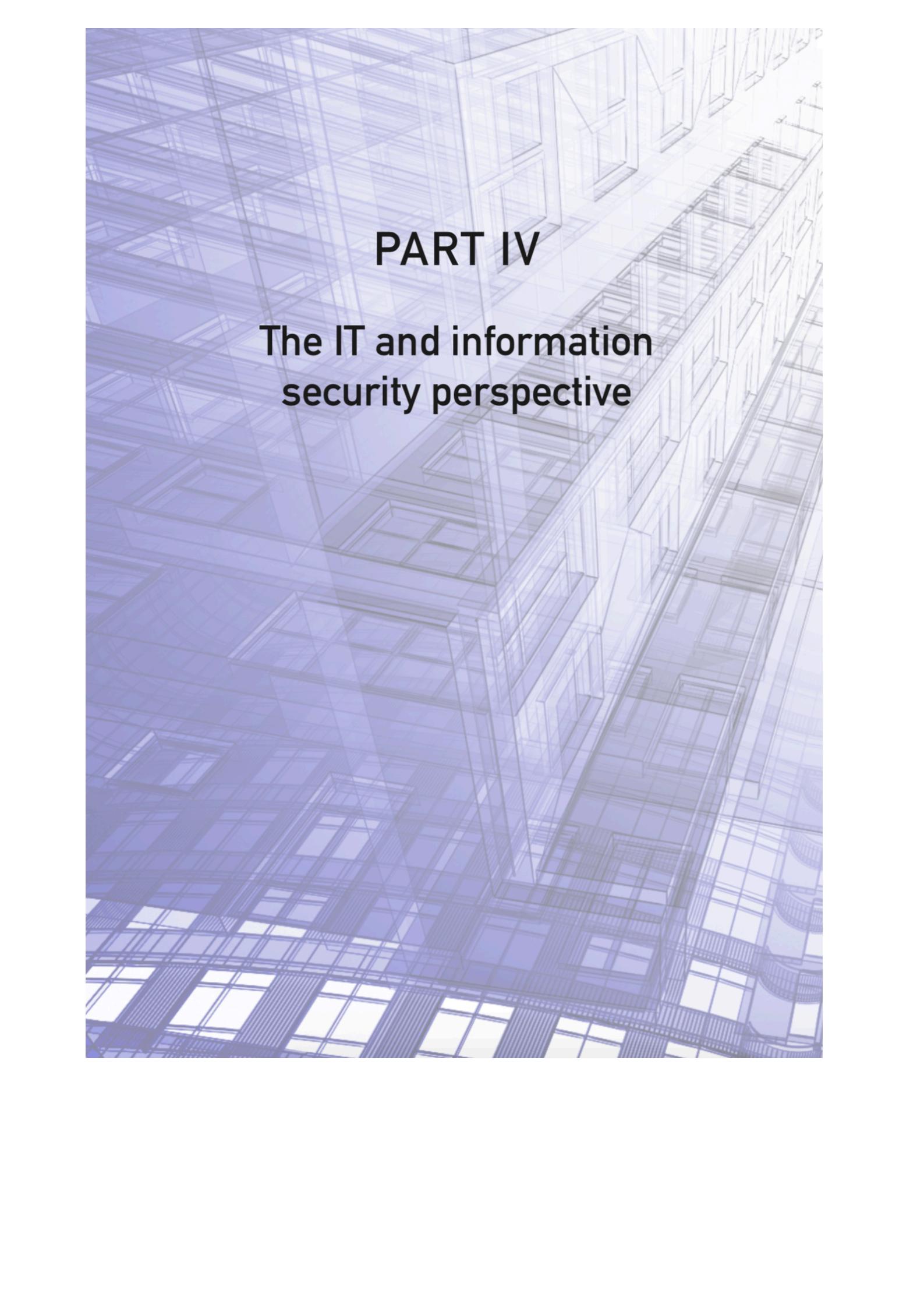
- The type of channels that are used, change when knowledge workers become more mobile; there is a clear decrease in face-to-face communication, while the number of video calls increases, as does the use of e-mail. In the new mobile world of working, knowledge workers seem to choose the most suitable 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.

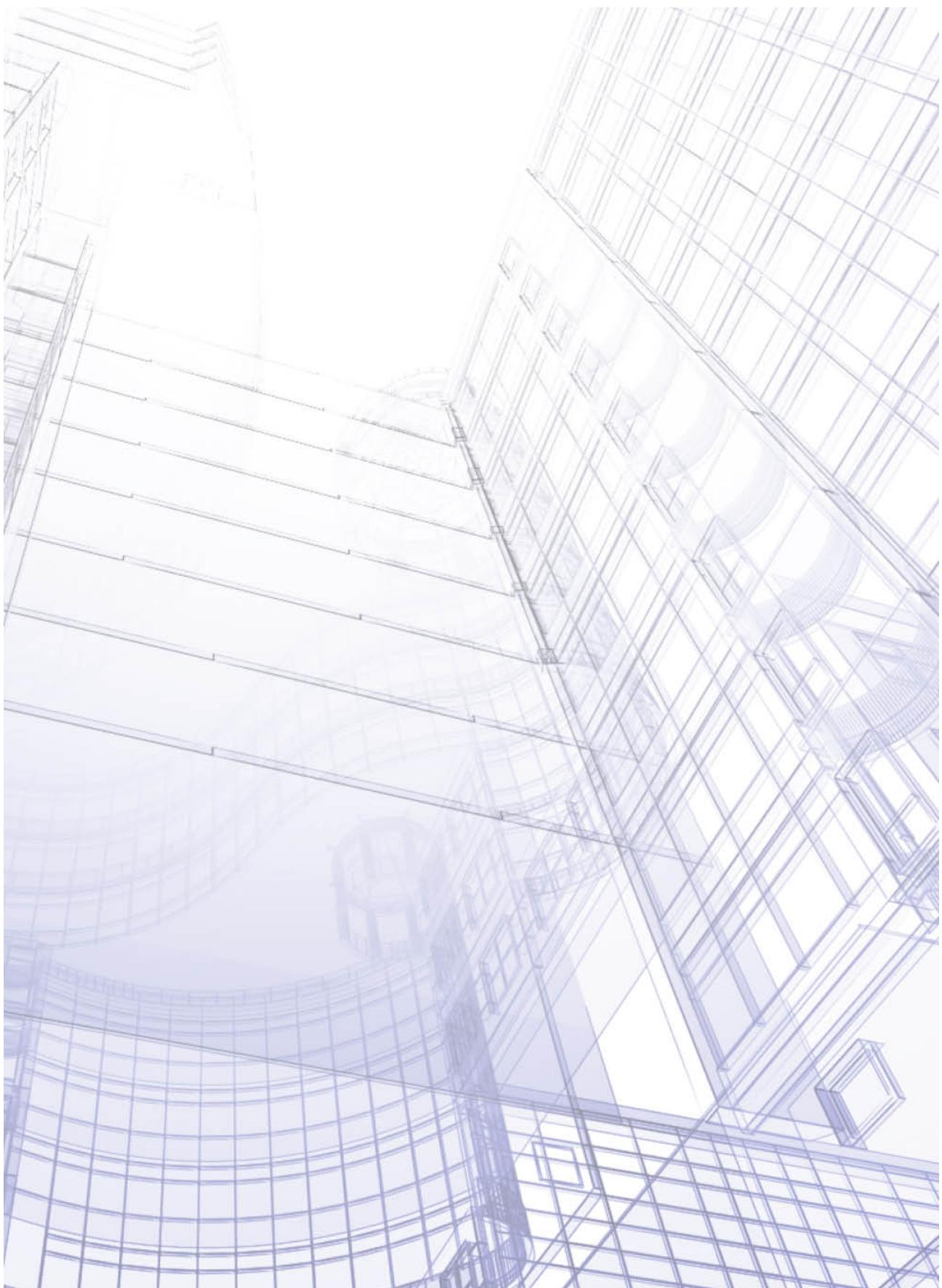
Sharing knowledge is crucial for the continuity of organizations and the effectiveness and productivity of knowledge workers. The way in which organizations are able to cope with the changes that the new world of work brings to their operation, will - to a certain extent - determine their future success. 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 information 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.



## **PART IV**

### **The IT and information security perspective**



## **Chapter 6**

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# Mobility, security and employee satisfaction in a Choose Your Own Device (CYOD) environment

*The consumerization of IT, known as Bring Your Own Device (BYOD), is an inevitable component in the future IT infrastructure of organizations. It is not the question if employees will use consumer IT products for their work, but how and under which conditions. The use of personalized mobile devices may be beneficial for both the employee and organization, but the concern of IT executives, on corporate data residing on uncontrolled mobile devices, is often leading to a restrictive policy. Giving employees the ability to choose from a variety of secure devices, at the expense of the organization, Choose Your Own Device (CYOD), may well bring the best of two worlds. In this research 126 employees at four multinational organizations were assessed on their perception of usability and satisfaction of devices for their knowledge tasks. The outcomes were matched against a Risk Assessment on seven identified IT threats. The results show that a majority (52%) believes their performance would improve, when given the ability to choose a device of their own. The Risk Assessment shows that IT security risks do not need to increase, provided that the proper security policies are in place. This implies that the performance and satisfaction of employee can improve in a secure CYOD environment.<sup>1</sup>.*

### **6.1 Introduction**

In the new world of work the use of consumer IT for business purposes, consumerization or Bring Your Own Device (BYOD), has seen a tremendous flight in the past years (Gillett, 2012; Citrix, 2013). Employees perceive personal devices to be more useful, more powerful, easier to use, and more fun than enterprise IT, and often they are (Harris et al., 2012). Personal devices have become inexpensive and the software apps are low cost or for free. On the other

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<sup>1</sup> This chapter is based on: Kok, A. de, Lubbers, Y., & Helms, R. W. (2015). Mobility and Security in the New Way of Working: Employee Satisfaction in a Choose Your Own Device (CYOD) Environment. *Proceedings of the 9th Mediterranean Conference on Information Systems, MCIS 2015*.

side, IT executives have concerns, mainly about data security, when employees view and use corporate information on their own mobiles, tablets and other personal devices. Also, BYOD confronts IT departments with a wide variety of software platforms that are used to connect to the corporate network, on devices that are renewing at a much faster pace than upgrades that were rolled out in the past. The reaction is often a push towards tight control, imposing restrictive, and often performance-taking, software on employees' devices. The question that is now raised by employees is: "Should I be the one to pay for working more effective and pleasurable, while receiving corporate control over my privately-owned hardware?" This results in a situation that makes both parties feel uncomfortable.

A solution that seeks to find a 'middle-way' in this impasse is Choose Your Own Device (CYOD). Choose Your Own Device enables employees to choose, against no personal costs, the devices that they feel suit them best in the tasks they need to perform, whilst allowing the organization to supply enterprise-controlled technology. Having the benefits of both worlds, CYOD is growing in popularity, especially in larger organizations. Where there is existing research on BYOD, research in the field of CYOD policies, especially in the light of IT security, and in the context of the New Way of Working, is scarce if not at all absent.

The research question is: Can a CYOD policy contribute to a perceived improvement in employee performance and satisfaction, in a secure way?

In this research 126 employees were assessed at four large organizations, that had chosen for a CYOD policy, whilst seeking the optimum of IT security and user satisfaction. The context of this CYOD environment (at least for the Dutch divisions of these companies), was the New Way of Working. The following section (6.2) briefly describes the context of the New Way of Working and CYOD, the tasks of knowledge workers and threats in IT security. The research method is explained in section 6.3 as well as the Technology Acceptance Model that is used for the determination of the device usefulness and user satisfaction. Section 6.4 discusses the research results. This leads to a number of conclusions and recommendations for future research in section 6.5.

## 6.2 Theoretical background

### 6.2.1 The New Way of Working

Where in the past many authors e.g. Hammer & 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 & 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). At the same time employees enter into new working relations in which they have the freedom to decide when and where to work, and become responsible for their results instead of being measured by their 'presenteeism' at the office (Johns & Gratton, 2013).

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 team contribution, rather than their presence. Thus the employees can engage in a working relationship that fits in terms of ambition, skills, lifestyle or stage of life'. 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 IT, 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.

### 6.2.2 Knowledge tasks

The work principles of NWOW are best applied in the work environment of the 'knowledge worker' (Greene & Myerson, 2011). The term knowledge worker is not new: already in 1969 Drucker used the term knowledge worker for the man or woman who applies productive work ideas, concepts and information rather than manual skill or brawn (Drucker, 1969). The question is: which tasks are performed in the work environment of the knowledge worker, and which device would suit the execution of this task well, in the perception of the knowledge worker? Reinhardt et al. (2011) researched the roles and actions knowledge workers perform. In their literature review they analyzed all the knowledge actions described by different authors (e.g. Davenport & Prusak, 1998) and combined them to one coherent list of knowledge actions. These tasks were used in the Technology Assessment in this research. For an overview of the knowledge tasks and their description see Appendix 6-1.

### 6.2.3 Consumerization of IT

Mobility is an important aspect in the vision of the New Way of Working to work anywhere and anytime. For employees it is important to work with the devices that are best suited for their work, adding the 'work with anything' aspect to working anywhere and anytime. Moschella et al. (2004) were probably the first ones to coin the term Consumerization of IT (Ruch & Gregory, 2014). They concluded employees were often so frustrated with the existing IT infrastructure,

that they chose to bring and use their own devices for their work. The work with personal consumer devices for business means is since called IT consumerization or Bring Your Own Device (BYOD). Giddens & Tripp (2014) define BYOD as ‘the use of personal devices at work, on the workplace, to complete work-related activities’. Ingalsbe et al. (2011), Holtsnider et al. (2012), and Harris et al. (2012) use similar definitions for the dual use of devices for private and business purposes. The use of consumer IT devices for business purposes is expected to contribute to work performance and greater autonomy for employees (Niehaves et al., 2012, 2013). Murdoch et al. (2010) and Harris et al. (2012) add that employees using the technology of their own find it easier to use and important for their job satisfaction.

Though many companies struggle with this phenomenon, and often do not have a BYOD program in place, the reality is that employees already bring their personal devices to work (Gillett, 2012; Citrix, 2013). Forrester Research found that 52% of the information workers use three or more devices for work (Gillett, 2012). They predict that by 2016 there will be 760 million tablets in use, most for use both at work and at home (Gillett, 2012). As companies reap the benefits, but employees pay the cost, of the improved work performance, a number of companies decided to sponsor the use of personal devices. Sometimes this sponsoring goes under the condition of allowing company security controls on one’s personal device. In particular the security aspects of protecting business data fragmentation on a broad range of personal devices is challenging to implement. IT managers however realize this trend cannot be stopped, and therefore needs to be managed. Because of the security aspects, a number of organizations consider a Choose Your Own Device (CYOD) policy in which employees are allowed to choose from a range of mobile devices with pre-installed security management software in place, at no personal cost.

A CYOD policy can optionally be combined with a BYOD policy, for instance when users agree to have security software installed on their personal device as well, but often it is restrictive in the form of a Don’t Bring Your Own Device (DBYOD) policy. In this case personal devices are not allowed to connect to the corporate network. In practice this means that employees in a DBYOD environment can only access the restricted guest network from their own device.

#### 6.2.4 IT threats

An IT risk can be defined as the damage or impact an event or threat will cause, against the chance or probability of its occurrence (Baskerville 1993; Peltier, 2005). The chance of occurrence may be both erroneous human actions and attackers who attempt to abuse weaknesses in technical solutions. Mobile devices e.g. notebooks, tablets and smartphones are often used outside the corporate network. Mostly users are able to install software or apps, and connect to multiple public domains. Often users do not realize the potential damage this may cause. Morrow (2012) found that around 40% of the employees admit they do not update their (security)software, while unauthorized access to and information theft from endpoints has increased by malware, key loggers and

cyber-attacks. Even when anti-virus software is present, mobile malware can be effective, and steal user credentials.

Security risks constantly change over time, making research in this area time-bound. Whitman (2003) identified twelve categories of IT security threats of both human and technical ground. In the light of this research some categories were identified as not applicable (e.g. force of nature), or not essentially different for the types of researched devices. The results was the following list of seven IT security threats that were identified for this research:

Threat	Examples
1 Act of Human Error or Failure	Accidents, employee mistakes
2 Compromises to Intellectual Property	Piracy, copyright infringement
3 Deliberate Acts of Espionage or Tresspass	Illegal confiscation of equipment or information
4 Deliberate Acts of Theft	Illegal confiscation of equipment or information
5 Deliberate Software Attacks	Viruses, worms, macros, denial of service
6 Technical Hardware Failures or Errors	Equipment failure
7 Technical Software Failures or Errors	Bugs, code problems, unknown loopholes

Table 6-1 *IT security threats*

There are roughly three mechanisms to cope with IT security risks: (1) authentication, (2) network security and (3) device security. (1) Authentication is the process of determining whether someone or something is, in fact, who or what it is declared to be (Rouse, 2007). When a user is authenticated, identity and access management can be applied. This security discipline enables the right individuals to access the right resources at the right times for the right reasons (Gartner, 2015). (2) Network security is the policy to prevent unauthorized access to the corporate network. Almost all corporate laptops nowadays use a VPN connection to access corporate data from an external connection. Information from a virtual private network is securely transported over a public network by encrypting the data to keep it confidential (Govcrt, 2009). (3) Device security. This can be enforced using software such as a Mobile Device Management (MDM) tool. This software is installed on the mobile device and encrypts the (corporate) data. It enables the employer to monitor the entire device, push software updates, and remotely kill data stored on the device in case of loss or theft (Gajar et al., 2013). Ideally, organizations are able securely deliver corporate data to employees, without interfering with their access to personal apps and data. However, the ability to separate corporate data from personal data on a mobile device has its limits. E.g.: Was the picture taken by the camera a business whiteboard or holiday picture? Information security will therefore always be a balancing act of business interest versus personal freedom.

### 6.3 Research method

#### 6.3.1 User acceptance models for IT

To determine the user acceptance of information technology, multiple models have been developed. In this section two models are discussed: The Person-Artefact-Task (PAT) model from the Flow theory, and the Technology Acceptance Model (TAM).

The Flow theory originates from Psychology. The psychologist Csikszentmihalyi (1975, 1988, 1990) found that people can be so absorbed in an activity, such as chess playing or rock climbing, that they excel in performance and lose track of time, without being aware of it. When personal computers were introduced, the Flow theory was used to address user experiences in computer-mediated environments (CMEs), such as the satisfaction and acceptance of information technology (Ghani, 1991). Based on the Flow theory, Finnigan & Zhang (2002) defined the Person-Artifact-Task (PAT) model, in which activities are broken down into tasks and artifacts (tools), that need to be mastered by the user. The likelihood of an optimal (flow) experience depends on the interplay between the person, the task and the artifact. Kiili (2004) presents a framework of the factors in each stage of flow with the components of the PAT model (figure 6-1).

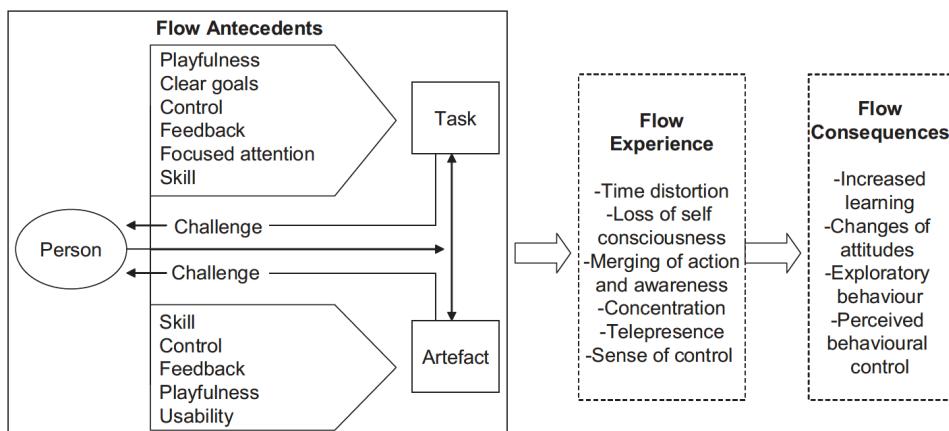


Figure 6-1 Person-Artefact-Task (PAT) model

In this framework the antecedents Speed and Ease of use (Skadberg & Kimmel, 2004), are combined as the Usability factor. Perceived ease of use (PEOU) is an established and validated construct in IS literature (Davis, 1989, 1993; Venkatesh & Davis, 2000).

Based on the Theory of Reasoned Action (TRA) of Ajzen & Fishbein (1980), which suggests that people form intentions to adopt a behavior or technology based on their beliefs about the consequences of adoption, Davis (1989, 1993) builds the Technology Acceptance Model (TAM). In this model two major

variables determine an individuals' information system acceptance; Perceived usefulness and Perceived ease of use. In the Extended Technology Acceptance Model (TAM2), Venkatesh & Davis (2000) incorporate several additional attributes that influence system acceptance, e.g. Output quality. The Extended Technology Acceptance Model is shown in figure 6-2.

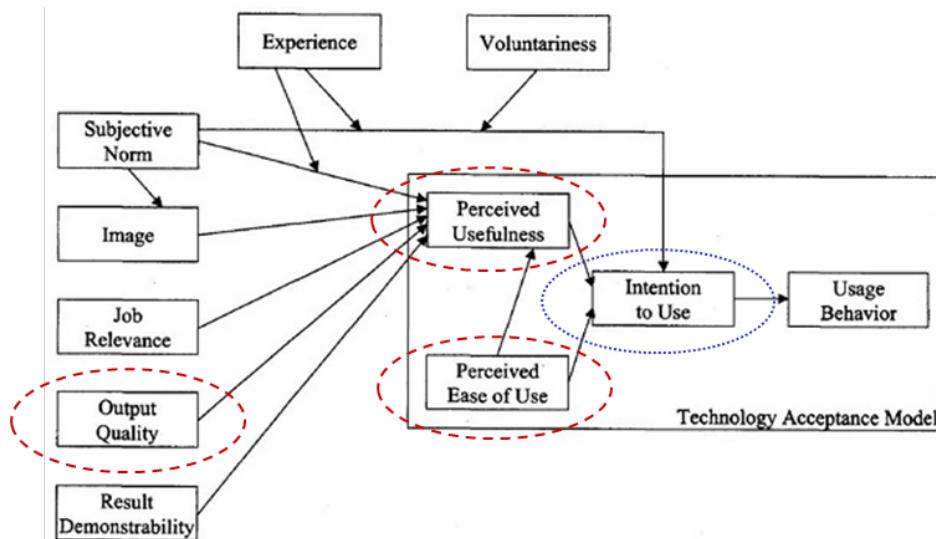


Figure 6-2 Extended Technology Acceptance Model (TAM2)

The first three constructs, that are used in this research, have been marked with a red dashed ellipse. They are defined by Venkatesh & Davis (2000) as follows: Perceived usefulness is the extent to which a person believes that using the system will support or enhance his or her work job performance. Perceived ease of use is the extent to which a person believes that using the system is or will be free of effort. Perceived usefulness is influenced by Perceived ease of use because, other things being equal, the easier the system is to use the more useful it can be. Output quality is the degree to which a person believes the system performs his or her job tasks well.

The fourth construct that is used in this research is (perceived) satisfaction. This construct is not as such in the TAM2 model, but it is related to the Intention to use, which therefore has been circled with a dotted blue ellipse. Wixom & Todd (2005), who tried to combine the attributes from user satisfaction literature with the Technology Acceptance literature, warn that user satisfaction is limited in its ability to predict system usage. The question is therefore what leads to satisfaction and intended system use.

Giddens & Tripp (2014) suggest that device self-efficacy, personal innovativeness and device competence are the reasons for more job performance and satisfaction. They base their view on the Social Cognitive Theory of Bandura (1977), who defines self-efficacy as the extent to which a

person believes in one's own ability to complete a task or reach a goal. In the context of CYOD, device self-efficacy is defined as 'the belief a certain device will enable a person to perform his or her task'. In this research satisfaction is defined as the combination of the perceived satisfaction (device self-efficacy) with the device preference. The device preference is measured by the number of people that would choose a certain CYOD device for a task (device competence). For an overview of the used constructs, see the left side of the Technology Assessment in figure 6-4.

## 6.4 Technology and Risk Assessment

For this research 126 respondents in four multinational organizations were assessed. In order to observe corresponding findings across the companies, an overall study protocol was created (Yin, 2009). Besides the questionnaires on the use of devices and satisfaction, context interviews were held at the participating companies, to determine the (type of) CYOD policies. The four companies were:

*Company 1* – a Dutch-headquartered Financial Accountancy firm, with 155.000 employees in 144 countries worldwide.

*Company 2* – a 20.000 employee Media and learning multinational, headquartered in Finland.

*Company 3* – a US-based multinational with business in Trading, Purchasing, Distributing grain and other Agricultural commodities, with 143.000 employees in 67 countries worldwide.

*Company 4* – a Dutch-headquartered multinational producer of alcoholic beverages, with worldwide over 90.000 employees in 178 countries.

The Technology Assessment consisted of two sections. In the first section, the respondents were asked which knowledge tasks they perform, and how their current device supports this task. Next, they were asked if they felt having a device of their own choice would improve their task performance, and if so, which device they would choose. Finally, they were asked if they were willing to contribute in the device cost (figure 6-3).

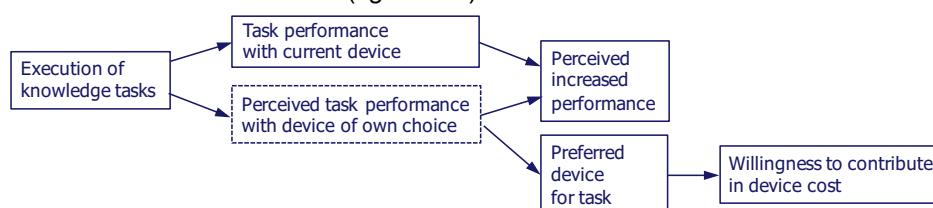


Figure 6-3 Assessment on tasks performance and preferred device

To determine the IT risks associated with the preferred CYOD devices, interactive Risk Assessment sessions were held with the IT Experts / Security Officers of the participating companies. For each device the IT risk was determined and calculated, using two variables: the chance a threat can occur and the damage it

will cause when it occurs. For the 7 before mentioned identified threats, in each participating company the IT expert or Security Officer evaluated the IT threats per type of device. The chance of occurrence and damage were rated on 7-point Likert scale, meaning the highest risk for a specific threat for a device could be 49. The overall IT risk per device was determined by taking the average of all multiplications. The table below shows part of the used Device Risk Assessment sheet.

Device Risk Assessment sheet	Chance of occurrence							Damage								
	Very Low	Neutral	Very high		Very Low	Neutral	Very high		1	2	3	4	5	6	7	N/A
Identified threats	1	2	3	4	5	6	7	N/A	1	2	3	4	5	6	7	N/A
<b>1. Act of Human Error or Failure</b>																
Device X																
Device Y																

Table 6-2 Device Risk Assessment sheet

In the second section of the Technology Assessment, the usefulness and satisfaction were investigated. The usefulness was determined based on the average of the first three constructs: Perceived usefulness, Perceived ease of use, and Quality of output. For the satisfaction, the fourth construct, Perceived satisfaction was combined (multiplied) with the score on preferred devices. The results of the Technology Assessment were then combined with the Risk Assessment. This leads to the following Technology and Risk Assessment model:

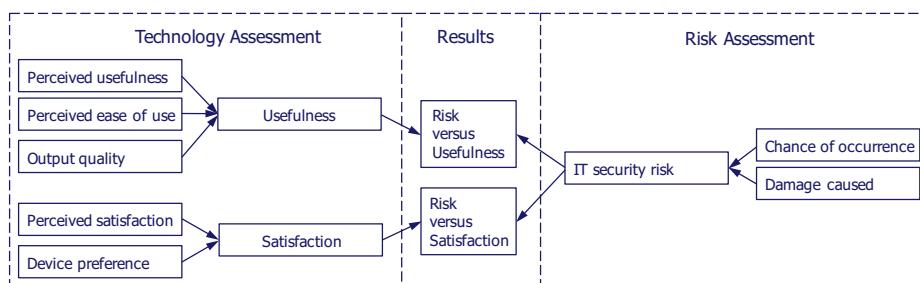


Figure 6-4 Technology and Risk Assessment model

## 6.5 Research results

### 6.5.1 CYOD and related policies

In the context analysis, the CYOD policies were analyzed. All four companies have a CYOD policy in place, but the choices per device type differ. Also the use of own devices brought to the workplace differs per company. In most companies the use of own devices is restricted: Don't Bring Your Own Device (DBYOD), meaning personal devices can only be used on the guest network. Table 6-3

gives an overview of the CYOD policy and related policies at the participating companies.

Notebooks	Policy	CYOD options	BYOD access
Company 1	CYOD : DBYOD	Win	Guest
Company 2	CYOD + BYOD	Win or iOS	Corporate
Company 3	CYOD : DBYOD	Win	Guest
Company 4	CYOD : DBYOD	Win	Guest
Mobile phones	Policy	CYOD options	BYOD access
Company 1	CYOD : DBYOD	iOS +MDM	Guest
Company 2	CYOD + BYOD	iOS (Guest)	Guest
Company 3	CYOD : DBYOD	iOS / Android + MDM	Guest
Company 4	CYOD : DBYOD	Win / iOS / Android + MDM	Guest
Tablets	Policy	CYOD options	BYOD access
Company 1	BYOD	None	Guest / Corp (iOS +MDM)
Company 2	CYOD + BYOD	iOS (Guest)	Guest
Company 3	CYOD + BYOD	Win	Guest / Corp (iOS +MDM)
Company 4	BYOD	None	Guest / Corp (iOS +MDM)

Table 6-3 CYOD and related policies

Table 6-3 shows that companies 1,3, and 4 have a CYOD & DBYOD policy in place for notebooks and mobile phones. For tablets they have a BYOD policy in place, at company 3 combined with the CYOD option. These three companies use a Mobile Device Management, MDM, tool to control the IT security risks. Company 2 has no MDM software in place, but is nevertheless allowing BYOD notebooks on the corporate network. The company has recognized this is an IT risk. For mobile phones and tablets there is both a CYOD and BYOD policy, but all devices are excluded from the corporate network. This makes company provided CYOD devices (as well as BYOD devices) relatively useless to perform business tasks on.

### 6.5.2 Tasks and performance

The overview of the tasks (knowledge actions) the respondents perform is in Appendix 6-1. As knowledge workers often perform more than one task, the total number of tasks is higher than the number (126) of respondents; in total 405 tasks were mentioned, meaning the average respondent performs a bit more than three (3,2) tasks. Analysis, Acquisition and Information search are the most performed knowledge tasks. These observations (multiple tasks per user/role and most frequent tasks/knowledge actions) are in line with the research results of Reinhardt et al. (2011).

When asked if the respondents believed their tasks could be performed well with the device they currently use, 53% of the respondents agree and 18% strongly agree that their current device supports the execution of their tasks well. Yet, when asked if they believe that having a device of their own choice, would increase their task performance, the response is as follows (figure 6-5):

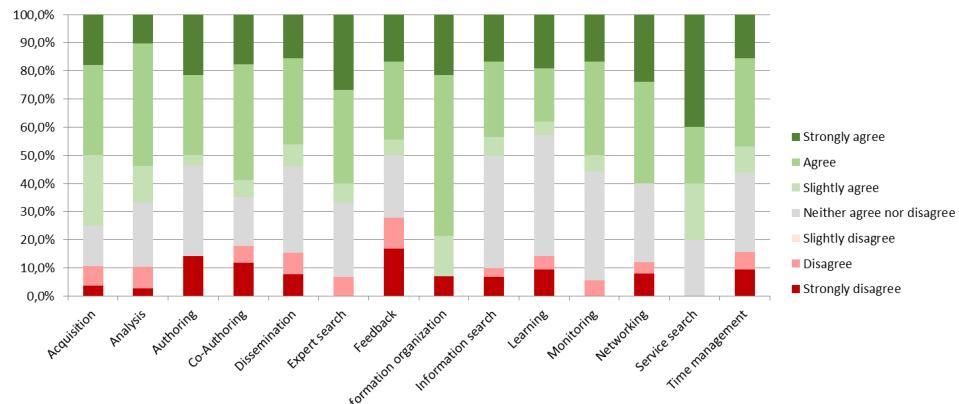


Figure 6-5 Perceived performance improvement per task with CYOD

Figure 6-5 shows that 52% of the respondents agree or strongly agree that having a device of their own choice would improve their task performance. This is an interesting outcome in the light of the first question, where over 70% of the respondents indicated to be able to perform their work well on their current device. The outcome does however fall in line with the research of Harris et al. (2012), who state that if employees were to choose their own hardware and software for work, they (strongly) agree that they would complete more tasks on time (49%), be more innovative (50%), and would be a happier employee (53%). For each task, the respondents were asked whether they would rather use another device than the one they currently use, and if so, which device. The results of this analysis is in Appendix 6-2. The results show that a vast majority of the respondents would prefer another device, if given the choice in a CYOD environment. In general notebooks are preferred over desktops, provided they perform well enough. While only 2 respondents currently use an Apple notebook, Macbooks are preferred by most respondents over Windows notebooks. For the more mobile tasks light (and thin) notebooks or tablets are preferred. Overall, the Apple iPad is the most preferred CYOD device, especially for reading and viewing data.

Appendix 6-3 gives an overview of the current devices in use for the tasks. The table in Appendix 6-3 also contains the sum of the preferred devices that were mentioned. The relative spread of the current device use as well as the spread of the preferred devices in a CYOD environment is shown in figure 6-6.

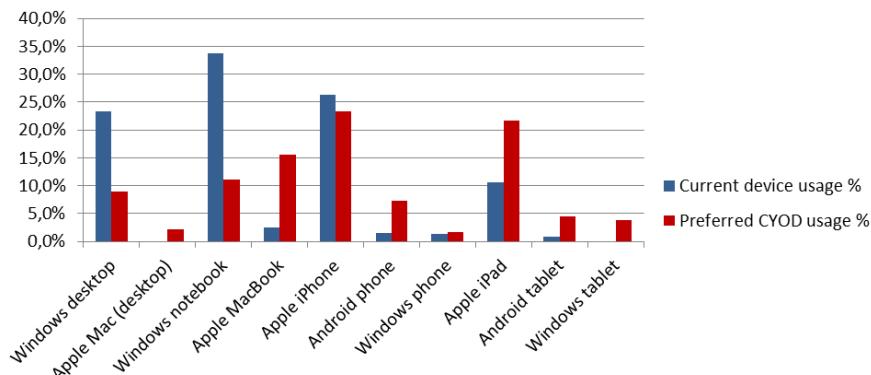


Figure 6-6 Current and preferred device usage

In the preferred CYOD environment, there is less need for Windows desktops and notebooks, and more need for Apple notebooks, and in particular Apple iPad tablets. In general this means that, when implementing a CYOD policy that fits the preferences of the users, the number of operating systems and the number of different sorts of devices the IT department has to manage, will rise.

Finally, the respondents were asked if they were willing to pay fully or partially for the device or their own preference. When it comes to paying, almost 75% (74,8%) of the respondents is not willing to contribute anything for the device of their choice. A group of around 15% is willing to pay up to 50% of the device cost. When the respondents are correct about the perceived improvement of their performance with the device of their choice, this would justify a CYOD policy (above a BYOD policy), as most of the employees are not willing to contribute personally to their improved business performance, but there is a lot of potential to gain.

### 6.5.3 Risk Assessment

The detailed results of the Risk Assessment can be found in Appendix 6-4. Though the Apple Mac desktop is not used in one of the case companies, the device was included in the Risk Assessment as it was one of the preferred CYOD devices. The risks that were determined are the net risks of the devices, meaning that the risk degree already includes a proper security policy with technical controls in place. The overall IT risk of the devices is determined by calculating the average of the outcomes of all participating companies. This result is shown in figure 6-7.

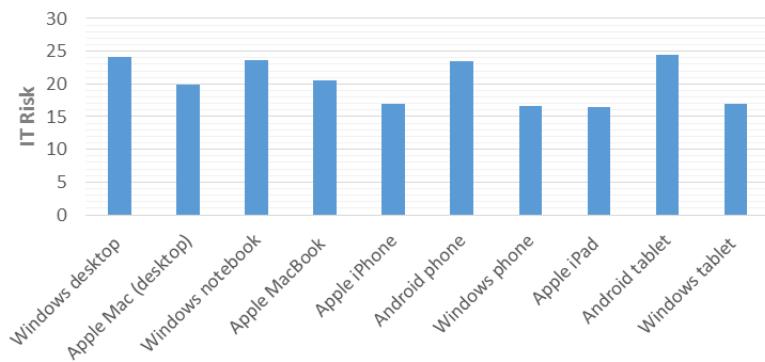
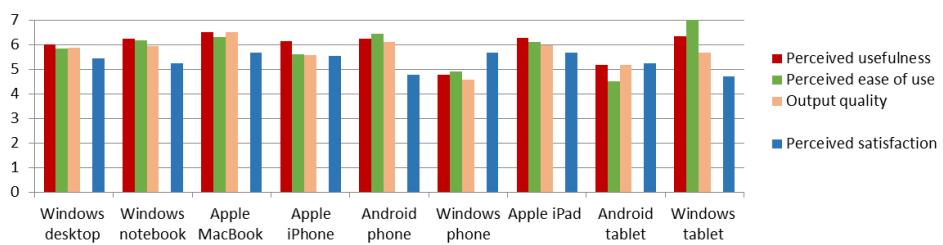


Figure 6-7 IT Risk for devices

Windows desktops and notebooks, and Android phones and tablets, are the devices with the highest IT risks. Windows phones and tablets, and Apple devices in general, are the devices with the lowest IT security risks.

### 6.5.4 Usefulness and satisfaction

In the second section of the Technology Assessment, the respondents were asked to score devices on Perceived usefulness, Perceived ease of use, and Output quality for each knowledge task. The results of this analysis is in Appendix 6-5. Overall, Windows notebooks score well on Perceived usefulness, Perceived ease of use, and Output quality. The iPad is less suitable for tasks e.g. Authoring and Analysis, but more suitable for reading and viewing tasks. Both laptops and tablets are suitable for Information search; tasks where mobile phones (iPhone and Windows phone) score lower. Finally, the respondents were asked to score the device of their own choice on Perceived satisfaction. Figure 6-8 shows the overall results of the Usefulness (Perceived usefulness, Perceived ease of use and Output quality), and Perceived satisfaction outcomes for the different devices.

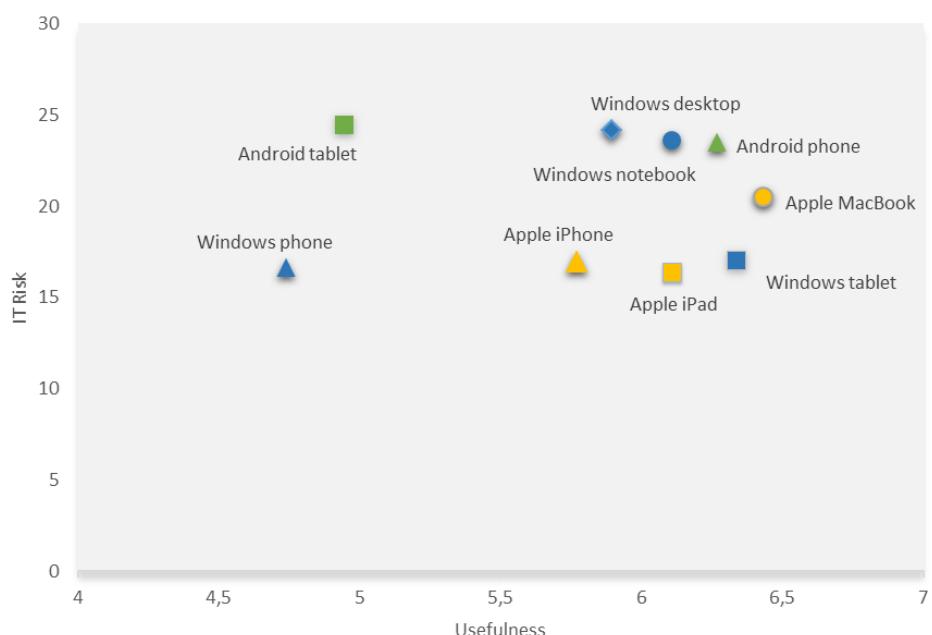


*Figure 6-8 Usefulness and perceived satisfaction per device*

In general, the perceived satisfaction scores lower than usability (the three constructs), except for the Windows phone. Possibly this is because the respondent were cautious of being over-optimistic.

#### 6.5.5 IT Risk versus usefulness and satisfaction

When the Risk Assessment result is plotted against the Usefulness, being the average of the constructs: Perceived usefulness, Perceived ease of use and Output quality, the following picture appears (figure 6-9).



*Figure 6-9 Usefulness versus IT Risk*

The Android tablet and Windows phone score lowest on usefulness, while the Apple MacBook and Windows tablet score highest. From an IT security point of

view, Windows desktops and notebooks and Android tablets and phones score worst.

When the IT Risk is plotted against the Satisfaction, being the combination (multiplication) of the Perceived satisfaction with the number of choosers of a preferred device, a quite different picture appears.

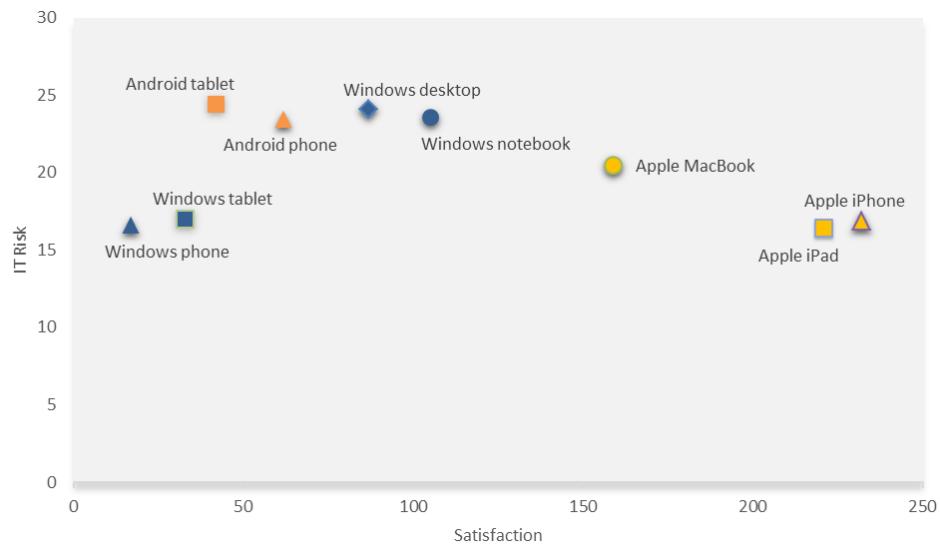


Figure 6-10 Satisfaction versus IT Risk

Apple devices score by far best when it comes to satisfaction (preferred device and perceived satisfaction). Windows desktops and notebooks are somewhere in the middle, while Android and Windows phones and tablets are at the bottom of the preference list. From an IT security point of view the preferred CYOD devices are less vulnerable than the Windows devices, that are often currently in use. This leads to an interesting conclusion: enabling employees to improve their task performance, whilst experiencing a higher job satisfaction, by giving them the opportunity to use a device or their own choice in a CYOD environment, does not increase, but instead reduces, the overall average IT security risks. A precondition for the above situation is that the proper security policies with technical controls are in place. This means that the implementation of a CYOD policy (with more Apple devices) does not raise the IT risk level, but it does mean the management of more platforms and software.

## 6.6 Discussion, conclusions and future research

### 6.6.1 Discussion

As mentioned in the introduction, research on Choose Your Own Device (CYOD) policies in the area of an implementation of the New Way of Working is scarce. Comparable literature on NWOW and CYOD can hardly be found, if any. This research on IT security risks versus usability and device satisfaction, in a NWOW and CYOD environment, is possibly one of the first steps in this area. Some critical notes are however at its place.

Having four companies with 126 respondents is reasonable, but the respondents were not evenly distributed across the organizations. This made intra-company comparisons unreliable if not impossible, and has the risk of over-emphasizing company-related viewpoints.

The perceived satisfaction and number of preferred devices for a task are subjective user-perceptions. It may well be that an Apple iPad is in reality not the best device for the given task, even if respondents believe it is. This effect (likability versus reality) has not been measured, but is realistic in both this research as in daily business practice. This may mean that, though in reality a Windows tablet could be more useful for executing a task than an Apple iPad, most users would still prefer an iPad, when given the choice, to perform their task on.

Having the IT Experts and Security Officers of four multinationals available for the Risk Assessment is good, but estimating risks remains a subjective and human exercise. The results should therefore be seen as a first indication of the possible effects of CYOD on job performance and employee satisfaction.

### 6.6.2 Conclusions and future research

Organizations struggle with the phenomenon of employees using consumer devices for business purposes. In an optimal situation the use of these personalized mobile devices would be beneficial for both the employee and organization, rendering higher employee satisfaction with higher performance on task execution. The question is how this optimum can be reached. Having researched the IT security risks against the effects and possible gains of a CYOD policy, this study shows that:

- Though over 70% of the respondents agree they can perform their tasks well with their current device, a majority (52%) of the respondents (strongly) agrees, having the ability to use a device of their own, will increase their task performance.
- The vast majority of employees, almost 75%, is however not willing to contribute to the costs of personal devices. Combined with the first conclusion, this implies that a CYOD policy is to be preferred over a BYOD policy, and can be beneficial for the organization.

- Introducing a CYOD environment in an organization will lead to a shift in the types of devices used. Desktops are likely to be replaced by (powerful) notebooks, preferably in combination with optional large monitors, and where suitable for the task, tablets will be used instead of notebooks.
- The introduction of the CYOD environment will lead to the mandatory management of more platforms and software. Besides Windows devices, Apple devices and the use of (iOS) apps will need to be fully supported by the corporate IT strategy.
- Under the precondition that the security policies with technical controls are in place, the introduction of a CYOD policy does not necessarily increase the level of IT security risk. The average net IT risk may even decrease when introducing CYOD, e.g. in this research with the preferred Apple devices.

Enabling employees to improve their task performance whilst experiencing a higher job satisfaction, by giving them the opportunity to use a device or their own choice and preference, in a CYOD environment, does not by definition increase the overall average IT security risks. Organizations that know which devices employees need to best perform their tasks, can balance out the business risk requirements and meet the employee expectations to maximize employee satisfaction without giving up on corporate data protection. In doing so, the consequence will be the management of more platforms and operating systems in a controlled CYOD environment.

This research is only a first step towards a future of effective CYOD policies in a NWOW environment. There will always be more information to explore and describe. For instance: the aspect of the usefulness of software in combination with (preferred) hardware was not researched in this study, but is certainly an aspect worth investigating in future studies of CYOD in a NWOW environment. Also, the cost of a CYOD program against the possible business gain could be a field of future study, as well as the actual performance gain from implementing CYOD in real business practice. The results of this study should therefore be used with care, as more future research should support these first findings, and add more insights.

## Appendices

### Appendix 6.1 Knowledge tasks

Typology of knowledge actions / tasks of Reinhardt et al. (2011) and their description. In this research the task 'Time management' was added to the list of Reinhardt, because managing time was identified as an important part of the tasks of a large number of the respondents (e.g. in consulting work).

Knowledge action	Description
<b>Acquisition</b>	The gathering of information with the goal of developing skills or project or obtaining an asset.
<b>Analyze</b>	The examining or thinking about something carefully, in order to understand.
<b>Authoring</b>	The creation of textual and medial content using software systems, for example word processing systems/ presentation systems.
<b>Co-authoring</b>	The collaborative creation of textual and medial content using software applications, for example, word processing systems/ presentation software.
<b>Dissemination</b>	The spreading of information or information objects, often work results.
<b>Expert search</b>	The retrieval of an expert to discuss and solve a specific problem.
<b>Feedback</b>	The assessment of a proposition or an information object.
<b>Information organization</b>	The personal or organizational management of information collection.
<b>Information Search</b>	The looking up of information on a specific topic and in a specific form. Often we search using the folder structure of a file system or we search using an information retrieval service.
<b>Learning</b>	The acquiring process of new knowledge, skills or understanding during the execution of work or based on formalized learning material.
<b>Monitoring</b>	Keeping oneself or the organization up-to date about selected topics, for example, based on different electronic information resources.
<b>Networking</b>	The interaction with other people and organizations to exchange information and develop contacts.
<b>Service search</b>	The retrieval of specialized web services that offer specific functions.
<b>Time management</b>	The planning, recording and invoicing of time spent on work activities.

Table 6-4 Typology of knowledge actions / tasks

Task	#Respondents	%	Task	#Respondents	%
Acquisition	45	11,1%	Information organization	22	5,4%
Analysis	53	13,1%	Information Search	41	10,1%
Authoring	40	9,9%	Learning	24	5,9%
Co-authoring	18	4,4%	Monitoring	23	5,7%
Dissemination	19	4,7%	Networking	27	6,7%
Expert search	23	5,7%	Service search	5	1,2%
Feedback	25	6,2%	Time management	40	9,9%

Table 6-5 Number of tasks (knowledge actions) performed by respondents

## Appendix 6-2 Preferred CYOD devices

- For Acquisition, 28 (out of 35) respondents indicate they would prefer another device for their task. The type of preferred device varies. Respondents with a desktop computer prefer a notebook (Apple or Windows). Some respondents using notebooks or iPhones prefer larger screens than an iPhone, but smaller screens than their notebook. Performing acquisition tasks on an Android phone is perceived by them as useful and easy, though they see the output quality as low. Overall, the device that is perceived as best for Acquisition tasks is an Apple notebook.
- For Analysis, a fast computer (e.g. a desktop) is often preferred over the current devices (Windows notebooks). A thin laptop (Windows or Apple) or a tablet is perceived as useful for traveling and out-of-office work. Performing Analysis on an Apple notebook is questioned as respondents didn't find the device useful and easy to use, and the output quality not high. The Windows notebook scores low on perceived usefulness and perceived ease of use, though the output quality scores high. Overall, the Windows desktop scores best for performing analysis tasks.
- For Authoring and Co-authoring, many respondents consider a laptop as the best device for their task. Also a tablet (iPad with supporting apps) is preferred, because it is easier to carry. Some respondents prefer a thin and light laptop (Windows or MacBook Air). For authoring tasks both Windows notebooks and Apple MacBooks score high. Although mobile devices are also used for authoring, those devices are perceived as less suitable than laptops.
- For Dissemination of information, respondents currently use desktop devices, but prefer an Apple or Windows notebook. Respondents already using a notebook prefer a faster and thinner laptop. Also a tablet (iPad) was indicated as a (more) useful device for this task.
- For Expert search, 20 (out of 23) respondents would rather use another device. Different devices are mentioned, such as Apple and Windows notebooks. Also a newer version of the iPhone device is preferred, with the bigger screen for mobile apps such as LinkedIn.
- For Feedback, 20 (of 25) respondents indicate to prefer another device. Suggestions include a thinner and smaller Windows notebook or Apple MacBook Air. Also iPads and Android tablets were suggested as useful.
- For Information organization a light laptop (e.g. MacBook Air) is preferred, or a notebook instead of a desktop. Also iPads are mentioned several times. One respondent (now using a notebook) replied; "A windows notebook is fine, but I do not have the software to manage disparate flows of data information. A device with such software would be my preferred device."

- For Information search, some respondents emphasized that the devices hardly matters, provided that it has a good way of conveying the information. It is the search software that matters to them. Though the hardware is said to not matter, still 35 out of the 41 respondents prefer other devices than they currently use. All types of other devices are mentioned: Apple MacBooks, Windows notebooks, larger Phones/iPads, Android tablets, and Windows tablets.
- For Learning, all (24) respondents indicate to rather use other devices. They prefer an Apple MacBook or Windows notebook over their current desktop computer. Also a tablet (iOS or Android) is mentioned as a preferred device.
- For Monitoring, 19 (of 23) respondents prefer other devices. They differ from Apple MacBooks to Windows notebooks or tablets instead of mobile phones due to the screen size.
- For Networking, 26 (of 27) respondents rather use another device than they currently use. One respondent rather uses a Blackberry phone, another rather uses an Android (Samsung) smart phone or tablet instead of iPhone. A tablet is mentioned several times, including iPad, Android tab and a Windows tablet.
- For Service search, all (5) respondents preferred another device for searching services. The only mentioned devices are Apple MacBook and Windows notebook.
- For Time management, 37 (of 40) respondents prefer another device. Tablets are in favor (iPad, Android, or Windows).

## Appendix 6-3 – Current and preferred use of devices

	<i>Devices currently in use</i>	<i>Windows desktop</i>	<i>Apple Mac (desktop)</i>	<i>Windows notebook</i>	<i>Apple MacBook</i>	<i>Apple iPhone</i>	<i>Android phone</i>	<i>Windows phone</i>	<i>Apple iPad</i>	<i>Android tablet</i>	<i>Windows tablet</i>
<i>Tasks</i>											
<i>Acquisition</i>		10	0	23	2	29	3	0	5	0	0
<i>Analysis</i>		22	0	24	2	26	0	1	9	3	0
<i>Authoring</i>		13	0	24	2	7	0	1	5	0	0
<i>Co-authoring</i>		8	0	10	1	0	0	1	2	0	0
<i>Dissemination</i>		6	0	12	0	8	0	1	6	0	0
<i>Expert search</i>		9	0	12	2	11	1	0	6	0	0
<i>Feedback</i>		10	0	13	0	10	0	1	2	0	0
<i>Information organization</i>		9	0	10	1	6	0	0	3	0	0
<i>Information Search</i>		16	0	21	1	28	1	1	10	1	0
<i>Learning</i>		10	0	13	1	5	2	1	3	0	0
<i>Monitoring</i>		8	0	13	1	7	1	0	4	0	0
<i>Total current device usage</i>		121	0	175	13	137	8	7	55	4	0
<i>Current device usage %</i>		23,3%	0,0%	33,7%	2,5%	26,3%	15%	1,3%	10,6%	0,8%	0,0%
<i>Preferred CYOD usage</i>		16	4	20	28	42	13	3	39	8	7
<i>Preferred CYOD usage %</i>		8,9%	2,2%	11,1%	15,6%	23,3%	7,2%	1,7%	21,7%	4,4%	3,9%

Table 6-6 Current and preferred device usage

The current device usage % is the relative spread of the current devices in use, in relation to the total number of current devices.

The preferred CYOD usage % is the relative spread of the number of preferred devices, in relation to the total number of preferred devices.

## Chapter 6

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### Appendix 6-4 – Risk Assessment

Risk Assessment	Threat 1			Threat 2			Threat 3			Threat 4			Threat 5			Threat 6			Threat 7			Total Totals	Total average
	Chanc	Damag	Risi																				
<b>Windows desktop</b>																							
Company 1	5	5	25	6	3	18	5	5	25	2	1	2	6	6	36	0	1	0	5	5	25	131	18,7
Company 2	5	5	25	7	6	42	7	7	49	7	7	49	4	4	16	4	4	16	246	35,1			
Company 3	5	6	30	6	5	30	6	5	30	5	5	25	7	7	49	6	5	30	6	6	36	230	32,9
Company 4	5	2	10	2	6	12	3	4	12	3	1	3	5	3	15	4	2	8	4	2	8	68	9,7
Totals	90			102			116			79			149			54			85			675	24,1
<b>Apple Mac (desktop)</b>																							
Company 1	7	5	35	5	3	15	4	5	20	3	2	6	3	6	18	0	2	0	6	5	30	124	17,7
Company 2	5	5	25	6	6	36	6	7	42	6	7	42	6	7	42	4	4	16	4	4	16	219	31,3
Company 3	4	4	16	5	6	30	4	4	16	5	5	25	3	5	15	5	5	25	4	5	20	147	21,0
Company 4	5	2	10	2	6	12	3	4	12	3	1	3	5	3	15	4	2	8	4	2	8	68	9,7
Totals	86			93			90			76			90			49			74			558	19,9
<b>Windows notebook</b>																							
Company 1	5	5	25	6	3	18	5	5	25	6	1	6	6	6	36	0	1	0	5	5	25	135	19,3
Company 2	5	5	25	7	6	42			0	7	7	49	7	7	49	4	4	16	4	4	16	197	28,1
Company 3	5	6	30	6	6	36	6	5	30	6	5	30	7	7	49	7	7	49	6	6	36	260	37,1
Company 4	5	2	10	2	6	12	3	4	12	3	1	3	5	3	15	4	2	8	4	2	8	68	9,7
Totals	90			108			67			88			149			73			85			660	23,6
<b>Apple MacBook</b>																							
Company 1	6	5	30	5	3	15	4	5	20	7	2	14	3	6	18	0	2	0	6	5	30	127	18,1
Company 2	5	5	25	6	6	36	6	7	42	6	7	42	6	7	42	4	4	16	4	4	16	219	31,3
Company 3	4	5	20	5	6	30	4	4	16	7	6	42	3	5	15	4	4	16	4	5	20	159	22,7
Company 4	5	2	10	2	6	12	3	4	12	3	1	3	5	3	15	4	2	8	4	2	8	68	9,7
Totals	85			93			90			101			90			40			74			573	20,5
<b>Apple iPhone</b>																							
Company 1	4	5	20	4	3	12	3	6	18	6	4	24	4	6	24	0	4	0	4	5	20	118	16,9
Company 2	5	5	25	5	5	25	5	7	35	7	7	49	5	7	35	3	4	12	4	4	16	197	28,1
Company 3	3	4	12	3	4	12	3	4	12	4	5	20	3	5	15	3	4	12	3	3	9	92	13,1
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	2	4	8	2	2	4	2	2	4	66	9,4
Totals	65			61			83			105			82			28			49			473	16,9
<b>Android phone</b>																							
Company 1	5	5	25	4	3	12	6	6	36	6	4	24	6	6	36	0	3	0	5	5	25	158	22,6
Company 2	5	5	25	7	5	35	7	7	49	7	7	49	3	4	12	3	4	12	4	4	16	198	28,3
Company 3	6	6	36	6	5	30	6	6	36	5	5	25	6	6	36	5	6	30	6	5	30	223	31,9
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	4	4	16	3	2	6	3	2	6	78	11,1
Totals	94			89			139			110			100			48			77			657	23,5
<b>Windows phone</b>																							
Company 1	4	5	20	4	3	12	4	6	24	4	3	12	5	6	30	0	3	0	4	5	20	118	16,9
Company 2																							
Company 3	4	5	20	5	5	25	5	5	25	5	5	25	4	5	20	4	5	20	6	5	30	165	23,6
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	2	4	8	2	2	4	2	2	4	66	9,4
Totals	48			49			67			49			58			24			54			349	16,6
<b>Apple iPad</b>																							
Company 1	4	5	20	4	3	12	3	6	18	6	5	30	4	6	24	0	4	0	4	5	20	124	17,7
Company 2	5	5	25	5	5	25	5	7	35	7	7	49	5	7	35	3	4	12	4	4	16	197	28,1
Company 3	3	4	12	3	4	12	3	4	12	0	0	0	3	5	15	3	4	12	3	3	9	72	10,3
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	2	4	8	2	2	4	2	2	4	66	9,4
Totals	65			61			83			91			82			28			49			459	16,4
<b>Android tablet</b>																							
Company 1	5	5	25	6	3	18	6	6	36	5	4	20	4	6	24	0	3	0	5	5	25	148	21,1
Company 2	5	5	25	7	5	35	7	7	49	7	7	49	3	4	12	4	4	16	235	33,6			
Company 3	6	6	36	6	5	30	6	6	36	5	5	25	6	6	36	5	6	30	6	5	30	223	31,9
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	4	4	16	3	2	6	3	2	6	78	11,1
Totals	94			95			139			106			125			48			77			684	24,4
<b>Windows tablet</b>																							
Company 1	4	5	20	4	3	12	4	6	24	5	4	20	5	6	30	0	3	0	4	5	20	126	18,0
Company 2																							
Company 3	4	5	20	5	5	25	5	5	25	5	5	25	4	5	20	4	5	20	6	5	30	165	23,6
Company 4	4	2	8	2	6	12	3	6	18	2	6	12	2	4	8	2	2	4	2	2	4	66	9,4
Totals	48			49			67			57			58			24			54			357	17,0

## Appendix 6-5 – Assessment of usefulness of devices

Device in use	Windows desktop	Windows notebook	Apple MacBook	Apple iPhone	Android phone	Windows phone	Apple iPad	Android tablet	Windows tablet
Task									
<b>Acquisition</b>									
Usefulness	6	5,9	6,5	7	5,3	-	5,8	-	-
Ease of use	5,7	5,6	6,5	6,7	5,3	-	5,4	-	-
Output quality	5,8	5,5	7	4,7	5,3	-	6	-	-
<b>Analysis</b>									
Usefulness	6,2	5,7	5	-	5,6	2	5,8	4,3	-
Ease of use	6,2	5,3	4,5	-	5,6	1	5,6	4	-
Output quality	6,1	6,3	4,5	-	5,6	1	5,7	4,3	-
<b>Authoring</b>									
Usefulness	6,2	6,4	6,5	-	5,8	5	5,6	-	-
Ease of use	5,8	6,2	6,5	-	5,6	5	5	-	-
Output quality	5,7	6,2	6,5	-	5,1	4	4,8	-	-
<b>Co-authoring</b>									
Usefulness	6,1	6,5	7	-	-	4	6,5	-	-
Ease of use	5,8	6,4	7	-	-	5	6,5	-	-
Output quality	6	6,2	7	-	-	4	6,5	-	-
<b>Dissemination</b>									
Usefulness	6,2	6,3	-	-	5,3	5	6,2	-	-
Ease of use	6	6,5	-	-	5,8	5	6,2	-	-
Output quality	6	6,3	-	-	5,5	5	6,2	-	-
<b>Expert search</b>									
Usefulness	5,9	6,3	6,5	7	5,5	-	6,2	-	5
Ease of use	6	6,2	6	7	5,2	-	6,2	-	-
Output quality	6	5,8	6	7	4,9	-	5,7	-	3
<b>Feedback</b>									
Usefulness	5,9	6	-	5	5,9	5	6,5	-	-
Ease of use	5,9	6,1	-	6	5,8	6	6,5	-	-
Output quality	6	5,1	-	6	5,8	5	6,5	-	-
<b>Information organization</b>									
Usefulness	5,8	5,9	6	5,5	5,5	-	6	-	-
Ease of use	5,7	5,6	6	6	5,8	-	6	-	-
Output quality	5,7	5,4	6	6	5,5	-	6,7	-	-

Appendix 6-5 - Assessment of usefulness of devices (continued)

Device	Windows desktop	Windows notebook	Apple MacBook	Apple iPhone	Android phone	Windows phone	Apple iPad	Android tablet	Windows tablet
Task									
<b>Information Search</b>									
Usefulness	5,9	6,4	7	5	5,5	5	6	6	7
Ease of use	5,5	6,3	6	6	5,4	5	5,9	5	7
Output quality	5,6	6	7	6	5,7	5	6,2	6	7
<b>Learning</b>									
Usefulness	5,9	6,3	7	5,5	6	5	6,7	-	-
Ease of use	5,8	6,3	6	6	6	5	7	-	-
Output quality	5,8	6,3	7	6	6	5	6	-	-
<b>Monitoring</b>									
Usefulness	6	6,3	7	7	6	-	6,5	-	-
Ease of use	5,8	6,2	7	7	5,9	-	6,3	-	-
Output quality	5,8	6,1	7	7	5,9	-	6	-	-
<b>Networking</b>									
Usefulness	5,8	6,3	7	6	6,2	5	6,5	-	7
Ease of use	5,6	6,3	7	6	6,1	5	6,5	-	7
Output quality	5,8	6,3	7	6	6,1	5	6,3	-	7
<b>Service search</b>									
Usefulness	-	6,5	7	-	5,7	-	7	-	-
Ease of use	-	6,5	7	-	4,7	-	6	-	-
Output quality	-	6,5	7	-	5,3	-	5	-	-
<b>Time management</b>									
Usefulness	6,1	6,3	6	-	6,1	7	6,5	-	-
Ease of use	6	6,3	6	-	5,7	7	6,3	-	-
Output quality	5,8	6,1	6	-	5,7	7	6,2	-	-
<b>Overall</b>									
Usefulness	6,0	6,2	6,5	6,0	5,7	4,8	6,3	5,2	6,3
Ease of use	5,8	6,1	6,3	6,3	5,6	4,9	6,1	4,5	7,0
Output quality	5,9	6,0	6,5	6,1	5,6	4,6	6,0	5,2	5,7

## **Chapter 7**

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# The effects of the New Way of Working and information security policies on employees and organizations

*In order to address the challenges of modern times, organizations are introducing the concept of the New Way of Working (NWOW). This concept changes the way people work by adapting the physical work environment, relying on mobile and network technologies and requiring a different behavior and mind set from employees. An important aspect of NWOW is the ability to work anytime, anywhere which is assumed to lead to higher levels of work-life balance and productivity. There may however also be a downside to the newly gained freedom because employees might not be able to balance work and personal life well, resulting in increased stress levels. Also, organizations have struggled to develop information security policies (ISPs) to accommodate the growing importance of mobile working in a NWOW context. These ISPs may impede employees in their daily work, offsetting the potential gain of productivity. This research investigated the effects of the New Way of Working and information security policies on employee engagement and organizational performance<sup>1</sup>. A research model was developed, that extends the literature, as it presents a single model that connects the NWOW and the employee engagement and organizational performance with information security policies. Over 1,000 responses were gathered and critically reviewed, resulting in a data set of 630 entries. The primary statistical method for the analysis was the Partial Least Squares (PLS) SEM modelling variant. PLS-SEM can handle complex models with multi-order constructs and a mix of reflective and formative relationships. The results show that the implementation of the New Way of Working has a significant positive effect on organizational performance and employee engagement. Information security policies however have a significant negative*

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<sup>1</sup> This chapter is based on: Kok, A. de, Foorthuis, R. M., Thatcher, J. B., & Helms, R. W. (2017). The Effects of the New Way of Working and Information Security Policies on Employee Engagement and Organizational Performance. Submitted for journal publication.

*effect on employee engagement, specifically on employee performance and work-life balance. The conclusions of this research contribute to a better understanding of the importance of ISPs in a NWOW context.*

## 7.1 Introduction

The nature of work is changing and mobile working, enabled by advanced technology, is an important trend in the future of work (Bentley et al., 2016; Lee, 2016). Research indicates that employees appreciate having the option to work when they want and where they want: it leads to higher levels of perceived flexibility, which leads to higher levels of work-life balance, which in turn leads to higher productivity (Van Heck et al., 2012). There may be, however, a downside to the newly gained freedom. Employees who are less able to balance their personal and work life, run increased risk of experiencing stress. Given much of their private time is now open to intrusion by work, employees may report higher perceived stress (Niehaves et al., 2012).

While mobile enabled work has seen a tremendous growth (Gillett, 2012), organizations have struggled to develop Information Security Policies (ISPs) to accommodate their growing importance. Access to information and systems of the organization through personal devices is considered a threat and severe ISPs are put in place to protect the organization. Regrettably, these ISPs are only partially effective because employees often ignore them, circumvent them or even do the opposite of what is desired (Lowry & Moody, 2015). More importantly, ISPs may interfere with mobile enabled work, such that, if an employee complies with the ISP, his or her business work may be impeded since compliance requires the employee to perform or avoid certain activities (Pahnila et al., 2007; West, 2008). Where mobile technologies enable employees to work anywhere, and be more efficient in their use of time, security restrictions may offset the potential gain of productivity.

The New Way of Working (NWOW) literature seeks to extend understanding of the implications of the evolving mobile work environment. Research in the area of NWOW often focuses on the role of technology and the effect of NWOW on job satisfaction, work-life balance, and organizational performance. In literature, it is assumed that mobile technologies are an important enabler for NWOW, leading to positive outcomes such as increased job satisfaction and organizational performance. However, these benefits might not come automatically and ISPs might be an important impediment in achieving these benefits. Currently, the effect of ISPs in a NWOW setting is not well understood. Combined research on the effects of ISPs on the employee and organization in the mobile work environment is scarce, if not absent. Therefore, this paper seeks to understand the role of ISPs in realizing the reported benefits of NWOW in a single study. By doing so, we advance understanding of NWOW, the implications of mobility, and the impact of stricter security practices on employees' beliefs and attitudes.

The research question in this study is twofold: What is the influence of (a) the New Way of Working and (b) information security policies on employee engagement and organizational performance? The following section (7.2) elaborates on the main constructs in this research. The next section (7.3) presents the hypotheses and research model. Section 7.4 describes the method, measures and sample. Section 7.5 describes the results of the analysis, followed by the conclusions.

## 7.2 Theoretical background

This section elaborates on the main constructs in this research. These are: NWOW, employee engagement, organizational performance, and secure system use. For employee engagement and organizational performance, the relationship in existing literature for telework will be highlighted, as an introduction to the later hypotheses on the effects of the New Way of Working.

### 7.2.1 The New Way of Working

The New Way of Working focuses on the broader context of new work environments and corresponding digital work styles enabled by mobile devices. The concept of NWOW arises from the needs of modern organizations to provide flexible work arrangements and more cost efficient and creative office environments, in order to support competitiveness and employee productivity without decreasing job satisfaction (Voordt, 2004; Beauregard & Henry, 2009; Kattenbach et al., 2010). Academics have offered several definitions of NWOW. Bødker & Christiansen (2002) characterize 'new work' by a 'mobile, networked technology, project-managed organization, and new office designs. Such 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.' Gorgievski et al. (2010) describe NWOW as a possibility to work when and where people prefer to work using fast and mobile IT facilities. Ruostela et al. (2015) define new ways of working as 'non-traditional mobile and flexible work practices, settings and locations using sufficient IT tools, as a novel approach to improve the performance of a knowledge-intensive organization.'

NWOW affects three dominant levers of business: Bricks, Bytes and Behavior (Baane et al., 2010). Kok et al. (2014, 2016) defined these NWOW dimensions as follows: (1) Bricks, the physical dimension; all aspects of the physical work environment; (2) Bytes, the technological dimension; all aspects concerning the use and application of IT; and (3) Behavior, the personal dimension, which addresses all aspects concerning the manager-employee relationship and the way the employee experiences his or her work. By respecting all three levers, NWOW is thought to give employees the freedom and trust necessary to carry out their work in ways, times and locations that suit them best.

Although the definitions of NWOW show resemblance with what has been known as teleworking (Baruch 2000), NWOW goes beyond teleworking. Teleworking

focused on replacing work from the office location to the home of the employee or a telework center. One of the goals was to reduce time lost in traffic, which negatively influences employee productivity (Bailey & Kurland, 2002). NWOW extends teleworking as it also includes a more results-oriented way of working. Employees get more responsibility in organizing their work in the way that best fits their personal circumstances, e.g. the care for children. NWOW therefore results in a fundamental change in how work is organized, in which freedom and trust play an important role. Teleworking plays an enabling role in the NWOW, it is used as one of the 'tools' to maximize work flexibility and effectiveness.

Based on a literature study on NWOW and telework, the aspects related to NWOW were researched (Kok et al., 2014). This lead to a so-called analysis monitor, that measures the level of NWOW adoption in an organization. In this study, the level of adoption of NWOW is measured, using this monitor. The details of the NWOW variables will be discussed in the method section.

### 7.2.2 Employee engagement

Engaging employees is the fourth most important management challenge, behind creating customer loyalty, managing mergers and alliances, and reducing costs (Wah, 1999; Avery et al., 2007). Disengagement of employees is estimated to cost organizations billions per year in lost productivity (Fleming et al., 2005). Kahn (1990, p700) defines employee engagement as 'the simultaneous employment and expression of a person's preferred self in task behaviors that promote connections to work and to others, personal presence and active, full performances'. He adds that employees who perceive more supportive conditions tend to be more engaged, which allows for full investment in the work role. Those who perceive less supportive conditions tend to be disengaged, which promotes withholding of effort and, ultimately, withdrawal (Kahn, 1990, 1992). Rothbard (2001) adds that role engagement has two critical components; attention and absorption in a role, both of which are motivational. Harter et al. (2013) state the term employee engagement refers to the individual's involvement and satisfaction with work, as well as enthusiasm for work.

Hackman & Oldham (1975) theorized that job design affects work motivation. They propose that positive personal and work outcomes, such as high internal motivation, high satisfaction and high quality performance, result from employees completing personally meaningful work, have control over the outcomes of work, and knowledge of the results of the work activities. This essential logic has been supported in many studies of the IT workforce (e.g. Joseph et al., 2012). Beyond job design, studies indicate that the availability and use of work flexibility and other work–family policies is associated with higher commitment, job satisfaction, loyalty, and lower intention to turnover (Kossek et al., 2006). It may also lead to improved job satisfaction and decreased work–non-work conflicts if it provides the employee with more flexibility and free time (Voordt, 2004; Origo & Pagani, 2008). Gajendran & Harrison (2007) found positive outcomes for teleworkers, including increased job satisfaction, performance, autonomy and reduced work–family conflict.

Harter et al. (2002, 2013) refer to variables, such as job satisfaction and motivation, as work-group-level measures of employee engagement, to differentiate these facets from the more general theoretical construct. In line with this, in this study, employee engagement is the overarching construct for a number of variables, including motivation, job satisfaction, employee performance and work-life balance.

### 7.2.3 Organizational performance

Organizational performance refers to a multidimensional view to organizational success, including efficiency, effectiveness, quality, productivity, innovations and profitability (Tangen, 2005; Ruostela et al., 2015). Organizational performance can be evaluated in terms of profitability or cost savings, internal processes, customer satisfaction, service quality and employee competence (Kaplan & Norton, 1992, 1996; Neely et al., 2000, 2001). These aspects are also referred to as the four perspectives of the Balanced Scorecard (Kaplan & Norton, 1992, 1996; Hubbard, 2009; Constandache & Chiru, 2016).

Researchers have investigated the effects of telework and flexible work schedules on organizational performance. They found that these work practices positively affect organizational performance by decreasing absenteeism (Baltes et al., 1999), decreasing turnover intentions (McNall et al., 2009), and improved productivity (Gajendran & Harrison, 2007; Ollo-Lopez et al., 2010). Harker Martin & MacDonnell (2012) found positive relationships between telework and organizational outcomes, including perceived productivity, improved retention and organizational commitment, and improved performance within the organization. Generally speaking, when workers have more autonomy and flexibility, they are more satisfied with their job and more committed to the organization (Kelliher & Anderson, 2008).

Not only work flexibility, but also (executive) management can contribute to employee's extra effort, relating to organizational performance. De Luque et al. (2008) found that executives who put forward economic values may be perceived as autocratic leaders, which could be associated with less effort from subordinates and decreased organizational performance. Conversely, executives who advance stakeholder values may be perceived as visionary leaders who thus motivate employees to exert extra effort, which should improve organizational performance. Ghoshal & Moran found a positive relationship between the extra effort of employees and executives who are capable of inspiring this behavior. These organizations are able to generate more innovation and long-term efficiency, with positive effects on organizational performance (Ghoshal & Moran, 1996; De Luque et al., 2008).

### 7.2.4 Secure system use

In today's information intensive society, the secure use of information systems has become critically important (Herath & Rao, 2009). Statistics suggest that between 50%–75% of security incidents originate from within an organization

(D'Arcy et al., 2009). Herath & Rao (2009) found that employees often underestimate the probability of security breaches. The countermeasure is often deterrence by perceived threat of punishment (D'Arcy et al. 2009). The view that individuals are more likely to comply because of a deterrence is consistent with findings in the technology acceptance literature. The Technology Acceptance Model (Venkatesh & Davis, 2000) suggests that employees are more inclined to comply to ISPs if they believe that is expected from them.

The secure use of systems, forced by the mandatory compliance to ISPs, can however lead to emotional reactions of employees when ISPs impede their work. The psychological Reactance Theory predicts that any given person with a behavioral freedom, that is eliminated, or threatened with elimination, will create an adverse state of arousal called reactance (Brehm, 1966, 1972, 1981). Reactance is a negative emotional response caused by threats to, or losses of, behavioral freedom. Reactance involves a highly intuitive explanation of basic human nature: 'People do not appreciate being told how they should behave, and tend to reject many, if not most, authority-based appeals' (Burgoon et al., 2002). Unlike avoidance or apathy, reactance is an active negative response to an external source that tries to influence employees regarding their behavior. Reactance is associated with heated emotional responses over missed opportunities with a sense of anger or frustration directed towards the source of information originally perceived to cause the concern (Dillard & Shen, 2005; Quick & Kim, 2009). In this context, employees may believe their freedom is threatened or controlled by ISPs, causing reactance and disengagement. Since employees perceive work impediments to be annoying, frustrating and costly, organizations should strive to simplify information security procedures so compliance efforts do not compete with daily job-related activities (Bulgurcu et al., 2010).

### 7.3 Hypotheses and research model

This section presents our research model, which describes the hypotheses on the relationships among the main constructs: NWOW, employee engagement, organizational performance, and secure system use and information security policies.

#### 7.3.1 NWOW and Employee engagement

NWOW affords employees the opportunity to decide when, where, and how to work. In doing so, NWOW practices hold employees accountable for results, by providing feedback on the outcomes of their work, while offering them autonomy over how to do work. Based on the findings of Kahn (1990, 1992), the supportive conditions of NWOW should result in more engaged employees. Possenriede (2014) found that the freedom when to work, schedule flexibility, and the freedom where to work, location flexibility, have differing positive effects on work-life balance and job satisfaction. Evidence from the field supports NWOW positively affecting employees' engagement. For example; In the Microsoft NL case, Van

Heck et al. (2012) show that advanced mobile work technologies enable NWOW, which lead to improved levels of employee productivity, a better work-life balance and reduced carbon emissions. The work-life balance of Microsoft NL's employees was measured before, during and after the transformation to new ways of working, and the work-life balance scores increased by 3.4% between 2007 and 2010. As discussed in the background section, teleworking may also lead to improved job satisfaction and employee performance, and reduced work-family conflicts (Voordt, 2004; Halpern, 2005; Kossek et al., 2006; Gajendran & Harrison, 2007; Origo & Pagani, 2008; Hill et al., 2011).

Based on the above, we post that NWOW will have positive effects on motivation, job satisfaction, employee performance and work-life balance. In the interest of parsimony, we offer a global hypothesis about these indicators of the overarching construct employee engagement:

*H1: The New Way of Working is positively (+) related to Employee engagement.*

### 7.3.2 NWOW and Organizational performance

NWOW may help employers attract higher performing employees, because they become a preferred employer (Kelliher & Anderson, 2008), while simultaneously improving productivity and reducing turnover (McNall et al., 2009). In between 2007 and 2012, the number of Microsoft NL employees grew by 40%, from around 700 to 1,000. The company was ranked No.1 in the Netherlands 2010 Great Place to Work Survey. In 2011, for the fourth consecutive year, Microsoft NL received the Best Workplace in Europe Award from the Great Place to Work Institute Europe. Employees reported that NWOW practices, which enabled work-life balance, were a key for Microsoft NL obtaining this award (Van Heck et al., 2012). Also, because of a reduction in the leased floor area in square meters per person, Microsoft NL realized a 30% reduction in real estate costs. Other operating costs, such as mobile telephony, were reduced because of the increased usage of Internet-based communication.

In another case, Interpolis, an insurance company that was one of first organizations to adopt NWOW in the Netherlands, saw its revenue triple between 1996 and 2001. They moved from the 11<sup>th</sup> to the 4<sup>th</sup> position in the ranking of insurance companies, and their customer satisfaction rose from 6.1 in 1996 to 7.4 in 2000 and 8.4 in 2008 (on a scale of 10). The introduction of NWOW's flexible office concept made it unnecessary to expand to a second head office building, a direct cost saving of 55 million Euro. Between 2006 and 2010 Interpolis was chosen five times in a row as the Netherlands' favorite and most trustworthy insurance company (Bijl, 2011). The above positive effects of NWOW practices on organizational performance leads to the following hypothesis:

*H2: The New Way of Working is positively (+) related to Organizational performance.*

### 7.3.3 Employee engagement and Organizational performance

Although individual performance is crucial for overall company performance, improving the performance of individuals is not an easy task. In the transition to NWOW at Microsoft NL the perceived productivity of individual employees was measured by the efficacy, efficiency and quality of the executed work. The total improvement in perceived productivity between 2007 and 2010 was 2.5% (Van Heck et al., 2012). This leads to the conclusion that the positive effect of NWOW on the employees' performance may have a direct positive effect on the organizational performance. As argued in the previous section, employee performance is driven by employee engagement, which leads to the following hypothesis:

*H3: Employee engagement is positively (+) related to Organizational performance.*

### 7.3.4 Secure system use and Employee engagement

The secure use of systems, forced by the mandatory compliance to ISPs, can be counterproductive, as the execution of work is impeded by the security regulations imposed. Not being able to access data needed for one's work, may lead to frustration and ultimately, disengagement. The expected positive effects of being able to work mobile can thus be completely counteracted by security measures. In this study, secure system use is an overarching construct that is a combination of (1) the ability to use a (mobile) device, and (2) the imposed information security policies. Therefore, there will be two levels of hypotheses; one on the main construct secure system use, and two on the underlying variables for system use and ISPs. Our hypothesis for the overall construct secure system use is:

*H4: Secure system use is negatively (-) related to Employee engagement.*

Being able to perform one's tasks on a device with confidence, called computer self-efficacy (Compeau & Higgins, 1995), as well as having the freedom to choose the preferred type of (mobile) device and software (Lowry & Moody, 2015), is considered to positively contribute to the employees' performance and perception of well-being. The counterproductive effect of ISPs is considered to negatively influence employee engagement. This leads to the following subdivision of hypothesis 4:

*H4.1: System use is positively (+) related to Employee engagement.*

*H4.2: Information security policies are negatively (-) related to Employee engagement.*

### 7.3.5 Secure system use and Organizational performance

Since individual performance is crucial for overall organizational performance, the combination of the hypotheses 3 and 4 suggests the effect of security measures to be negative. On the other hand, security breaches can cause organizations a

lot of damage in the form of lost confidence by customers and money. An investigation of the causes of security incidents shows that employee negligence led to breaches costing organizations millions of dollars in losses (Herath & Rao, 2009). Estimates of the yearly worldwide financial impact of compromises to information security range from tens, if not hundreds of billions of dollars to over one trillion dollars (D'Arcy & Herath, 2011). In this study, we assume the effect of the avoidance of the damage from security breaches is bigger than the loss of individual productivity. Therefore, the overall hypothesis on secure system use is:

*H5: Secure system use is positively (+) related to Organizational performance.*

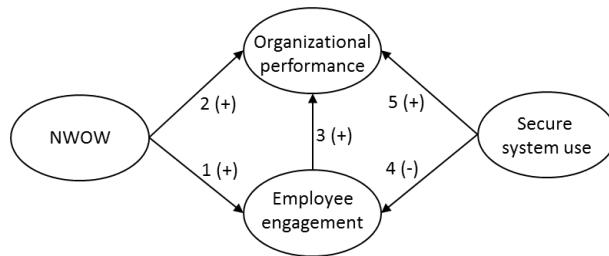
Observing the before mentioned subdivision in system use and ISPs, the positive effect of the freedom of system use on employees' performance is expected to have a positive effect on organizational performance. Because of the discussed cost-avoiding effect of information security policies, ISPs are also expected to affect organizational performance positively. This leads to the following subdivision for hypothesis 5:

*H5.1: System use is positively (+) related to Organizational performance.*

*H5.2: Information security policies are positively (+) related to Organizational performance.*

### 7.3.6 Research model

The above hypotheses lead to the following overall research model.



*Figure 7-1 Overall research model with hypotheses*

The numbers refer to the hypotheses and the positive (+) or negative (-) relationship. As discussed in the previous section, secure system use can be subdivided in the use of (mobile) devices and the imposed ISPs. The research model with the subdivision for system use and information security policies is in figure 7-2.

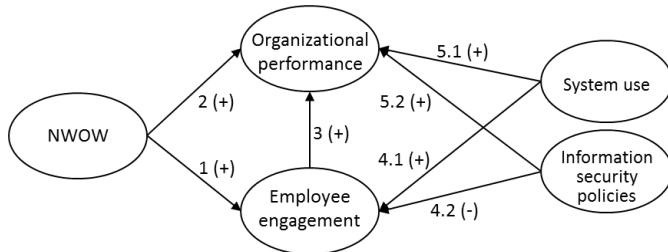


Figure 7-2 Research model with system use and information security policies

The research model extends the literature, as it presents a single model that connects the NWOW and the employee engagement and organization performance with information security policies.

## 7.4 Method

### 7.4.1 Reflective, formative and higher order constructs

When designing a research model, the distinction between formative and reflective constructs is important, because proper specification of a measurement model is necessary to assign meaningful relationships in the structural model (Anderson & Gerbing, 1988). Reflective constructs are used throughout the information systems literature for concepts such as: perceived ease of use, perceived usefulness, and satisfaction (Petter et al., 2007). Such reflective constructs have observed items that are affected by an underlying latent, unobservable construct (MacCallum & Browne 1993). In a reflective measurement model the change in the indicators, or items, reflects the change in the latent construct (Coltman et al., 2008). When the construct, or latent variable, changes, this will affect the measured items, meaning that respondent variations in the latent construct of, for example, perceived ease of use, will cause all of its measures to reflect this change (Petter et al., 2007). The causality flows from the latent construct to the observed item. In a formative relation the causality flows in the opposite direction from the indicator to the construct. A change in an item will affect the (unobserved) construct, but does not necessarily affect the other items.

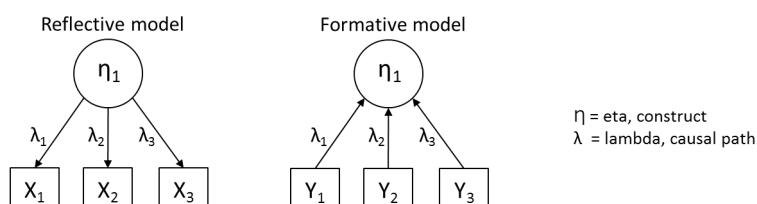


Figure 7-3 Reflective and Formative model

In a reflective model the causal path flows from the construct to the items ( $X_{1,2,3}$ ), in the formative model this direction is reversed (figure 7-3). Figure 7-4 gives an example of a reflective and formative model.

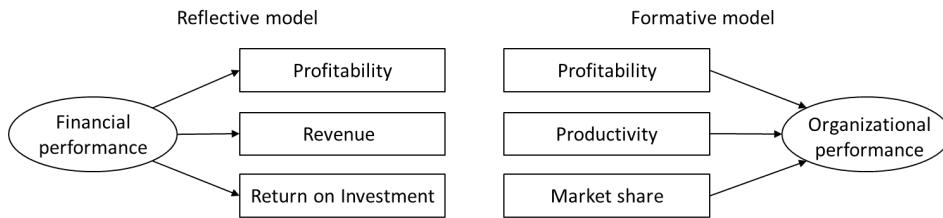


Figure 7-4 Example Reflective and Formative model

The example shows that in a reflective model the items are interchangeable. Looking at financial performance, an organization that has a high profitability is likely to also have a high revenue to generate this profit, as well as a good the Return on Investment. Changes in the financial performance will have its effect on the observed financial measurement items. Petter et al. (2007) give an example of a formative construct, organizational performance, using three measures: profitability, productivity and market share. They state: 'Each measure captures differing aspects of organizational performance, and as a result, this operationalization of the construct is formative' (Petter et al., 2007, p.624). Productivity and Market share represent differing aspects or perspectives of organizational performance, that not necessarily have a high intercorrelation to each other or to profitability, but they do all contribute to organizational performance. Where in reflective measurement models the items, or indicators, can be expected to have high (positive) intercorrelations, in the formative model items can have any pattern of intercorrelation, but should possess the same directional relationship (Diamantopoulos & Siguaw, 2006).

In the New Way of Working differing aspects e.g. workplace design, knowledge management, and result based working are affected by the implementation of NWOW. This is shown in Figure 7-5.

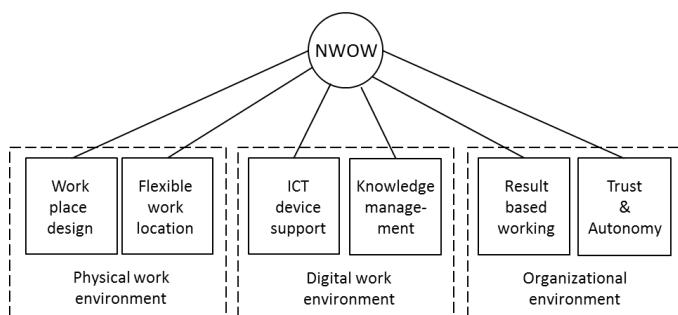


Figure 7-5 NWOW and aspects

The aspects are not necessarily interchangeable. A company may have created an inspiring office environment but not support flexible working from home. On the other hand, working more result based will probably require more trust and autonomy. Figure 7-5 also shows, that the differing aspect can be clustered in three dimensions; the physical work environment, the digital environment and the organizational environment, reflecting the three dimensions: Bricks, Bytes and Behavior. In figure 7-6 these dimensions are modeled as a separate layer in the model.

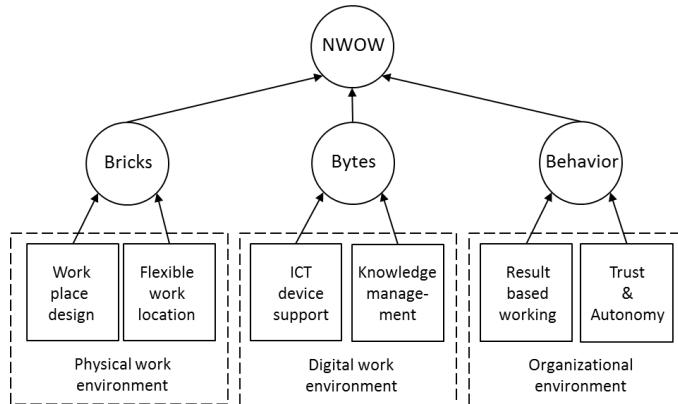


Figure 7-6 NWOW, dimensions and aspects

The three dimensions are not interchangeable, but they do contribute to NWOW, indicating a formative relationship. An organization may change the physical work environment, but take no action on the IT or behavioral side. The shown aspects under the dimensions are also not necessarily interchangeable, indicating formative relationships. At the lowest level the relationship between the aspects and measured or observed items is reflective. This leads to the model that is shown in figure 7-7 in which NWOW is a higher (3<sup>rd</sup>) order formative construct, with three (2<sup>nd</sup> order) formative constructs, consisting of a number of reflective (1<sup>st</sup> order) constructs, each measured by a number of observed items (Jarvis et al., 2003; Petter et al., 2007).

The model with the first, second and third order constructs for NWOW is shown in figure 7-7. The shown model is not complete, as it only shows two aspects for each dimension of NWOW. The aspects are each measured by a number of measured or observed items. The arrows show the causality from the 1<sup>st</sup> order construct to the measured items, indicating the reflective relationship. On the higher levels the arrows run from the lower to the higher level constructs, showing the formative relationships.

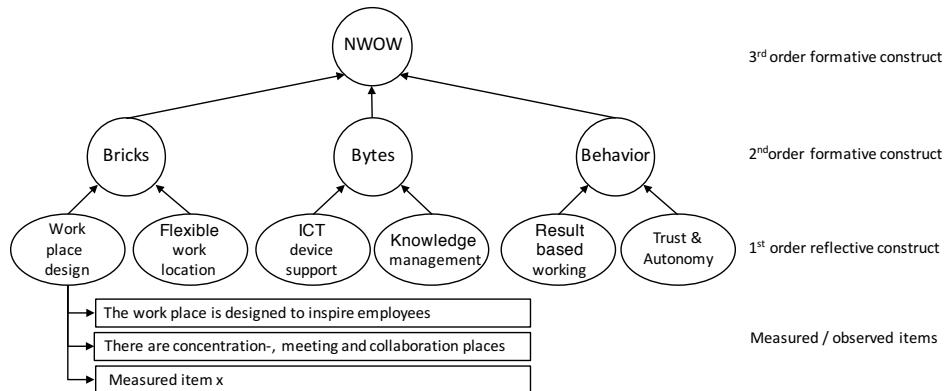


Figure 7-7 Model with higher order constructs and observed items for NWOW

#### 7.4.2 Measures and research model

Measure development began with a review of the literature. When possible, the measurement items of the constructs were developed based on published items that have been proven reliable; otherwise, new measures were developed. The main constructs shown in Figure 7-1 and 7-2 were developed for this study. The constructs and measurement items for measuring the status of NWOW were used from the so-called NWOW Analysis Monitor (Kok et al., 2014). This monitor was developed based on a literature study (148 sources) on NWOW and telework, and measures the level of NWOW adoption in an organization.

We used the balanced scorecard framework to measure Organizational performance (Kaplan & Norton, 1992; Hubbard, 2009). The Balanced Scorecard (BSC) is one of the most internationally applied and used management instruments (Constandache & Chiru, 2016). In their research on measurement frameworks Riratanaphong & Voordt (2015, p787) state: 'Remarkably, apart from the BSC, no performance measurement framework that is presented in the literature is being applied in practice in its original form.' The BSC was developed to adequately measure and monitor the reach of the strategic objectives in both the public and private sector. Kaplan & Norton (1993, 1996) defined four perspectives: (1) Financial perspective, (2) Internal Process perspective, (3) Customer perspective, and (4) Learning & Growth perspective.

Existing literature provides a number of variables on employee engagement. De Jonge & Schaufeli (1998) refer to the Vitamin model of Warr (1987), and define variables such as job autonomy, job satisfaction, and job-related stress. In their 'work and life attitude survey' Warr et al. (1979) define scales for work involvement, intrinsic job motivation and job satisfaction. In this research, the measures of Warr et al. (1979) are used for intrinsic job motivation. For inter-role conflict, or work-life balance, the work of Kopelman et al. (1983) was used. Ply et al. (2012) define measures for job satisfaction. Though in other research a

selection of Ply is used, e.g. Bettencourt et al. (2001) use 8 of the items, in this research all 14 measurement items of Ply et al. (2012) were used, as job satisfaction is seen as a key construct. The constructs for gratification & appreciation and culture & motivation were taken from the NWOW monitor. The adoption of NWOW, referring to the personal use of work flexibility offered by the organization, is one of the variables that was developed for this study. The measures for employee performance were based on a combination of the work of Lam et al. (2002), Seibert et al. (2004), and Ames et al. (2007).

Finally, for system use and information security policies; Compeau & Higgins (1995) was used for computer self-efficacy. Lowry & Moody (2015) was used for the freedom of IT choices. The measures for apathy towards ISPs were taken from Boss et al. (2009). Bulgurcu et al. (2010) was used for the scales on work impediment by ISPs. The measures on mobile reachability and mobility and ISPs were developed. This leads to the following measurement model (figure 7-8).

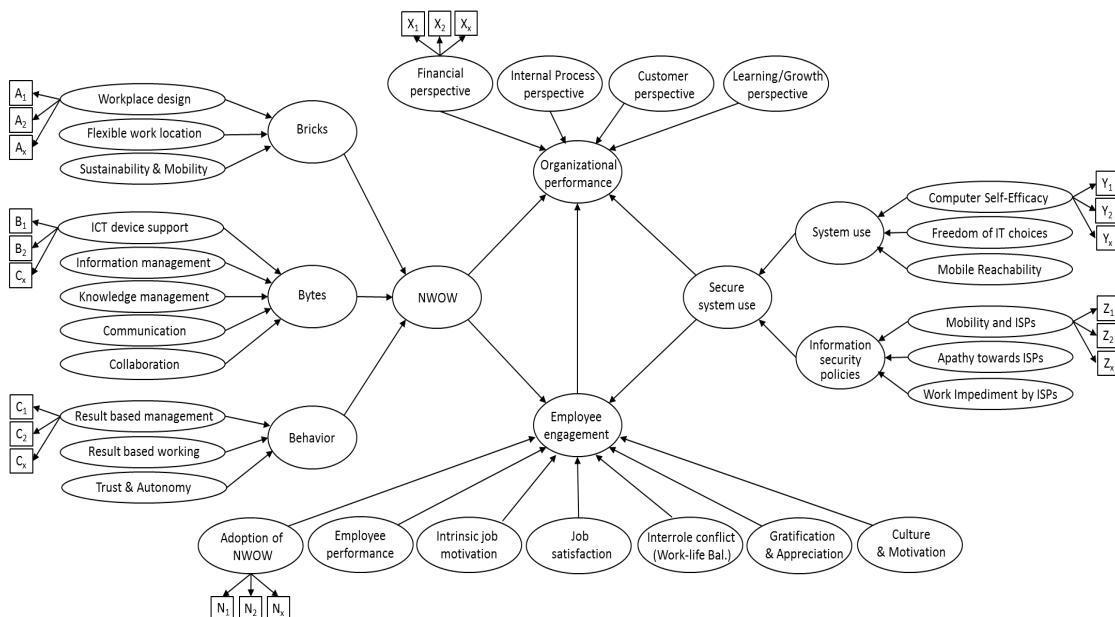


Figure 7-8 Complete measurement model

In total, the model contains 157 measured items under 28 1<sup>st</sup> order constructs, residing under 7 2<sup>nd</sup> order constructs, of which the 3B's fall under the 3<sup>rd</sup> order construct NWOW, and system use and IPS's under the 3<sup>rd</sup> order construct secure system use.

#### 7.4.3 Sample

The unit of observation is the employees' perspective. The target population is defined as 'all people working part- or full time in public or commercial organizations in the Netherlands'. Data collection was conducted using an online survey<sup>2</sup>. The survey contained a number of general questions on the employee and organization, followed by the sections on Employee engagement, Organizational performance, System use and Information security policies, and the NWOW Analysis Monitor. All questions used a 7-point Likert scale. The survey was distributed in two ways. First, via an announcement in the Special interest group for NWOW on LinkedIn. This group has over 25,000 members. In addition to the announcement, 650 members of this group received a personalized e-mail, asking them to participate. Second, a professional market research company provided a sample of their panel members. The research company invited 8,000 of its panel members.

All data entries had to pass a number of checks to be accepted as valid for this research. First, the respondents had to fit the profile: working at least 8h per week, and between 18 and 65 years of age. The market research company used a pre-selection filter to determine this fit. The LinkedIn respondents all met the conditions. Second, the survey had to be fully completed; respondents who only completed the first sections and not the final section with the NWOW Analysis Monitor were omitted. Third, it was verified whether the respondent was not indifferent and/or rushing through the survey. Long surveys increase the probability of boredom and fatigue (Lindell & Whitney 2001). Where possible, the number of items per variable was restricted in the first sections. The number items in the NWOW Analysis monitor had previously already been reduced (Kok et al., 2014). Each entry was critically observed and checked by calculating the results via the NWOW Analysis Monitor. When the results showed signs of indifference or rushing, e.g. identical answers to multiple grid questions, the submission was rejected. In total, 1,033 responses were gathered, 119 via LinkedIn, 914 via the research company. Almost 75% (763 of 1,033) of the respondents fully completed the survey. The checking process lead to the removal of 133 submissions, leaving 630 usable data entries.

#### 7.4.4 Analysis

Our primary statistical method for the data analysis the Partial Least Squares (PLS) SEM modelling variant. PLS-SEM is a structural equation modeling technique that simultaneously assesses the reliability and validity of the measures of theoretical constructs and estimates the relationships among these constructs (Wold, 1982, Wasko & Faraj, 2005). PLS-SEM can be used to analyze measurement and structural models with multi-item constructs, including interaction effects, and is widely used in IS research (Ahuja et al. 2003; Chin &

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<sup>2</sup> <https://nl.surveymonkey.com/r/SurveyNWOW>

Todd, 1995; Sambamurthy & Chin, 1994). In comparison with CB-SEM results, PLS-SEM often provides more robust estimations of the structural model (Hair et al., 2011) and it provides advantages over covariance-based techniques for preliminary theory building (Lowry & Gaskin, 2014). Given PLS-SEM's ability to work efficiently with a much wider range of sample sizes and increased model complexity, including a mix of reflective and formative relationships, it can address a broader range of problems than CB-SEM (Gefen et al., 2000; Haenlein & Kaplan, 2004; Hair et al., 2010; Urbach & Ahleman, 2010; Wetzel et al., 2009). PLS-SEM can handle single-item variables and multi-item and higher-order constructs (Hair et al., 2010). We have used the WarpPLS 5.0 software for the model testing (Kock, 2015). This multivariate analysis tool allows for identifying both linear and nonlinear (warped) relationships. WarpPLS is particularly well-suited for models with formative constructs because, by the PLS regression algorithm, they are calculated without other constructs contaminating their weights. Finally, compared to other PLS software, WarpPLS directly provides the P-values to the path analyses, instead of only the standard errors and T-values.

## 7.5 Results

### 7.5.1 General findings

The division in gender in the sample was about equal: 51% were male, 49% female. Almost 60% of the respondents work full time, 20% work 4 days a week, 20% work 2 or 3 days a week, 2% work 1 day a week. The respondents came from various market sectors (figure 7-9).

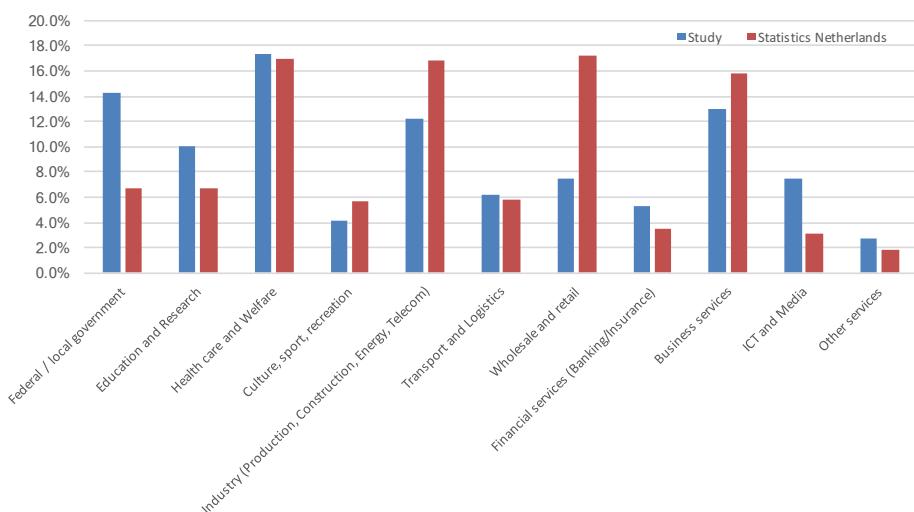


Figure 7-9 Market sectors in study versus Statistics Netherlands

The comparison for the market sectors in this study with the national numbers of Statistics Netherlands (CBS) is shown in figure 7-9. Overall most sectors are comparable. In this study there were more respondents from federal/local government and ICT & media, and less from industry and wholesale & retail. The jobs were heterogeneous, including office workers (48%), operational workers (28%), management (19%) and others (5%).

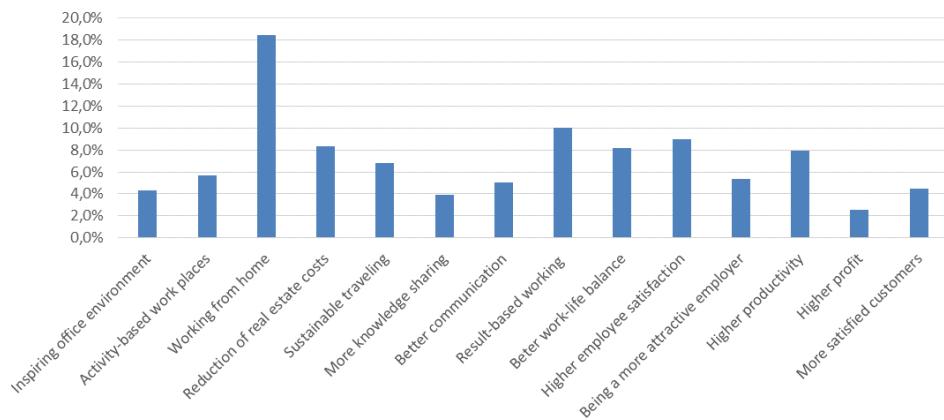


Figure 7-10 Objectives for implementing NWOW

The objectives of organizations for implementing NWOW are shown in figure 7-10. Respondents were able to choose more than one objective for their organization. The most often mentioned objective is being able to work from home, followed by result based working and higher employee satisfaction.

### 7.5.2 Evaluation of inner and outer model

This section presents the evaluation of the inner and outer model. The inner model, also referred to as the structural model, is the part of the model that describes the relationships among the latent variables that make up the structure of the model. The outer model, also referred as the measurement model, is the part of the model that describes the relationships among the latent variables and their measured or observed items (Nehaves & Ortbach, 2016). We started testing the outer model for Common Method Bias. Using SPSS 24.0 we performed the Harman's single factor test on all indicators, revealing that one general, single factor cannot account for the majority of the covariance. The test showed a sum of the squared % of variance of 25,8%, which should be under 50% (Eichhorn, 2014). The Full collinearity test, which can also be used as a test for Common Method Bias, will be discussed at the end of this section. Table 7-3 (in the Appendices) shows the Factor analysis of all indicators or measured items for the latent variables. All items have a factor loading above 0.3 (threshold), most items have a loading of above 0.7. To test the reliability of the variables and observed items the Cronbach's Alpha method was employed. Alpha values should be above 0.7 to be acceptable. Table 7-4 (Appendices) shows all Alpha values are

above this threshold. Where found in literature, the Alpha values were compared against the values in this study. The result is shown in table 7-1.

Variable	# of items in study	Cronbach's Alfa in study	Source in literature	# of items in literature	Cronbach's Alfa in literature
Intrinsic Job Motivation	6	0.804	Warr (1979)	6	0.82
Job Satisfaction	14	0.925	Ply (2012)	14	0.87
Inter-Role Conflict	8	0.926	Kopelman (1983)	8	0.89
Computer Self Efficacy	6	0.828	Boss (2009)	7	0.93
Freedom of IT choices	8	0.833	Lowry (2015)	8	0.84
Apathy towards ISPs	2	0.791	Boss (2009)	2	0.79
Work Impediment by ISPs	3	0.942	Bulgurcu (2010)	4	0.96

Table 7-1 Comparison of Cronbach Alpha's in study to literature

Table 7-1 shows the differences in Cronbach Alpha's are small, which is an indication of the reliability of this study in comparison to previous research. Some of the differences can be explained by the differing number of items per variable in this study, as less measurement items lead to a lower Cronbach Alpha score. Table 7-4 (Appendices) also shows the composite Internal Consistency Reliability (ICR), and the Average Variances Extracted (AVE). The internal consistency of a given block of indicators can be calculated using the composite internal reliability (Werts et al., 1974). Acceptable values of an ICR for measures should exceed 0.70 and should be interpreted like a Cronbach's Alpha coefficient (Fornell & Larcker, 1981). The variables in table 7-4 meet this criterion. The AVE is used in the assessment of discriminant validity. AVE values should be greater than the generally recognized 0.50 threshold, indicating that the majority of the variance is accounted for by the construct (Wasko & Faraj, 2015). Nearly all variables in table 7-4 meet this criterion.

The primary statistic for assessing formative indicators is their weight. Evaluation of indicator weights should include examining their significance (Kock, 2015). Table 7-5 (Appendices) shows that each indicator weight is statistically significant with almost all P-values  $<0.001$ . This means that all indicators have a significant positive relative contribution to their respective construct (Cenfetelli & Bassellier, 2009). Multicollinearity between indicators can be an issue in assessing formative measures because of the potential for unstable indicator weights (Cenfetelli & Bassellier, 2009; Hair et al., 2012). The VIF (Variance Inflation Factor) indicators show how redundant its information is (Urbach & Ahlemann, 2010). The strictness of the interpretation of VIF values differs. Hair et al. state the 'rule of thumb' is that the VIF should be under 5 (Hair et al. 2012, p430). Others state that the VIF should be under 3,3 (Cenfetelli & Bassellier, 2009; Petter et al., 2007). Table 7-5 (Appendices) shows that all indicator-level VIF's have values below 5, most (75%) of the indicators' VIFs are under 3.3. Regarding model-level validity, three model fit and quality indices were calculated; the APC, ARS and AVIF. The APC (Average Path Coefficient) is 0.189, the ARS (Average R-squared) is 0.189. Both values are highly significant, with P-values  $<0.001$ . The AVIF (Average Block VIF) is an indication of the model's overall predictive and explanatory quality (Kock, 2015), assessing if there's an unwarranted amount of (multi)collinearity in the

model. The AVIF should be under 5 and ideally under 3.3. It is 2.176 in this study. Finally, table 7-2 shows the Full collinearity VIFs and  $Q^2$  values for the 2<sup>nd</sup> order constructs.

Measure	Organizational performance	Employee engagement	System use	ISPs	Bricks	Bytes	Behavior
Full collinearity VIF	1.156	2.605	1.189	1.295	2.322	3.185	3.219
Q-squared	0.151	0.624					

Table 7-2 Full collinearity VIFs and  $Q^2$  values

The criterion for  $Q^2$  values is that they are above zero, values well above zero indicate good predictive relevance (Chin, 2010; Kock, 2015). The Full collinearity test enables the identification of not only vertical but also lateral collinearity (Kock & Lynn, 2012). Full collinearity VIFs can also be used for Common Method Bias tests (Kock & Lynn, 2012; cf. Lindell & Whitney, 2001). The rule of thumb is that Full collinearity VIFs are 3.3 or lower. Table 7-2 acknowledges this, indicating the existence of no multicollinearity in the model and no Common Method Bias. The conclusion of the evaluation of the inner and outer model is that both the measurement model and structure model of this study indicate a high reliability and predictive relevance.

### 7.5.3 Hypothesis testing

Based on the overall research model as defined in figure 7-4, we tested the hypotheses as discussed above and shown in figure 7-1. The analysis using PLS-SEM leads to the following result:

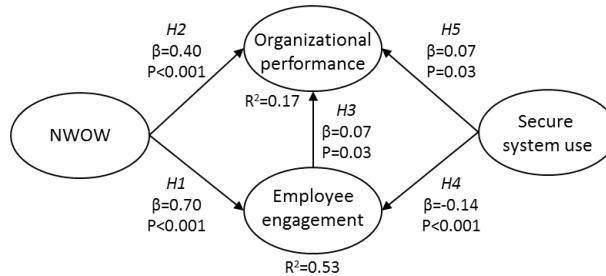


Figure 7-11 Overall research model with analysis results

The analysis result for the overall research model is shown in figure 7-11. The path analysis shows the effects of the constructs on each other. All analyzed paths are statistically significant, the P-values for the hypotheses H1, H2 and H4 are  $<0.001$ , for H3 and H5 the P-values are  $<0.05$ . The path coefficients ( $\beta$ ) shows the positive or negative effect from one construct in relation to the other construct, for instance the relationship between the level of NWOW adoption and employee engagement. Since the results refer to standardized variables, a path coefficient of 0.70 means that 1 standard deviation variation in NWOW leads to a 0.70 standard deviation variation in employee engagement. The path coefficients for hypotheses H1, H2, H3 and H5 are all above zero, indicating positive

relationships. The path coefficient for H4 is negative, meaning that secure system use has a counter-productive effect on employee engagement.

The  $R^2$ -values, presented for organizational performance and employee engagement, represent the percentage of the variance that can be explained from the relationship with the other constructs. For employee engagement this means that 53% of the 'behavior' of the construct can be explained from the effect from NWOW and secure system use, with NWOW having the largest effect of the two. This indicates that NWOW is the primary driver for employee engagement. The other 47% of the variance cannot be explained from the relationships in this model. Possibly variables such as gender, age or not-measured values contribute to a higher  $R^2$ -value. The  $R^2$ -value of organizational performance indicates that the 'behavior' of the variable can only partly (for 17%) be explained.

Table 7-6 (Appendices) shows the correlations between the variables and their significance. Comparing figure 7-11 to table 7-6 shows similarities between the correlation coefficients ( $R$ ), path coefficients ( $\beta$ ) and significance ( $P$ ), but there are also differences. For instance, the relationship between employee engagement and organizational performance has a higher significance and the  $R$ -value is higher than the  $\beta$ -value. Similar to the path analysis, the correlation between NWOW and employee engagement is positive and statistically significant. The above indicates that a higher level of NWOW adoption has a strong positive relationship with employee engagement, and a moderate positive relationship with organizational performance, with both relationships being statistically highly significant. These results lead to the conclusion that all 5 hypotheses are accepted. The statistical significance is high ( $<0.001$ ) for the hypotheses H1, H2 and H2, and weak (0.03) for the hypotheses H3 and H5.

As discussed before, secure system use entails both the system use, and the imposed information security policies (ISPs), which may not have the same effect on employee engagement and organizational performance. Therefore the hypotheses H4 and 5 were subdivided, as shown in figure 7-2. For the testing of these sub-hypotheses the 3<sup>rd</sup> order construct secure system use was removed from the model. This leads to the following analysis result:

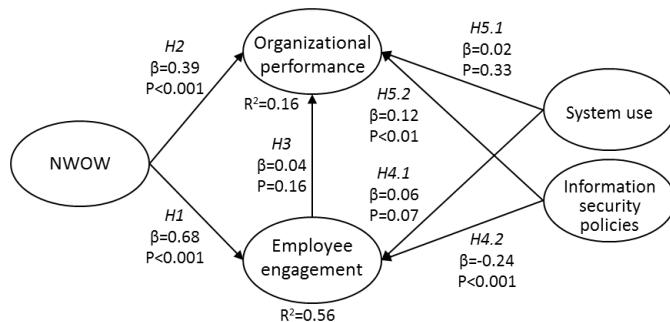


Figure 7-12 Result for model with system use and information security policies

The significance of the relationships may change in the path analysis, when more variables are ‘brought into the equation’. The relationship between employee engagement and organizational performance is no longer significant (at  $P<0.05$  level), also the effect is smaller. The significance between NWOW and employee engagement and organizational performance has not changed, and the path coefficient is almost similar. The effect of information security policies (alone) on employee engagement is more negative than the combined construct secure system use, indicating that the individual effect of ISPs on employee performance is statistical significant negative. The effect on organizational performance is (statistical significant) positive, though small. The association of system use between employee engagement and organizational performance is positive but not significant (at  $P<0.05$  level). Table 7-7 (Appendices) shows the correlations between variables and their significance. In comparison with figure 7-12, table 7-7 shows all relationships between system use, organizational performance and employee engagement are significant. The correlation coefficients ( $R$ ) are higher than the path coefficients ( $\beta$ ). Also in table 7-6, ISPs have a moderate negative significant relationship with employee engagement, indicating that ISPs have a counter-productive effect on employee engagement. The results lead to the conclusion that all sub-hypotheses (H4.1, H4.2, H5.1 and H5.2) are accepted. Depending on the analysis (path or correlation), the relationships are significant.

#### 7.5.4 Model details and control variables

In this section we dig deeper into the model, and analyze the details for NWOW and employee engagement, observe control variables and look at the linearity of relationships. In the previous section, the 3<sup>rd</sup> order construct secure system use was removed from the model to show the relationships of the underlying 2<sup>nd</sup> order constructs. This ‘zooming in’ on formative constructs is not often performed, but is one of the interesting properties of formative measurement (Foorthuis et al., 2016). We can do the same for the other 3<sup>rd</sup> order construct NWOW, showing the relationships for the three dimensions: Bricks, Bytes and Behavior.

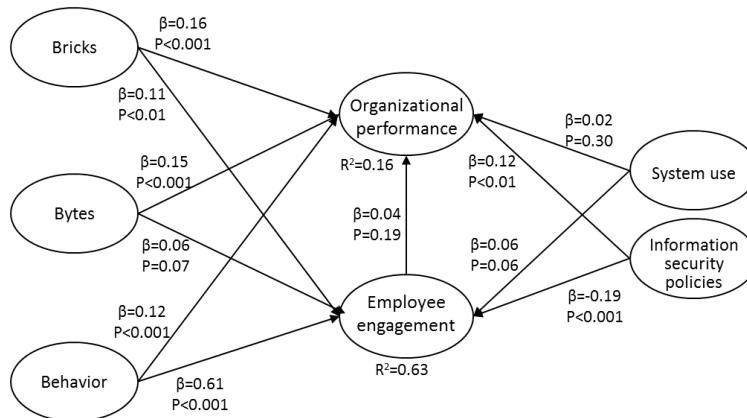


Figure 7-13 Detailed model with 2<sup>nd</sup> order constructs

In the detailed model both 3<sup>rd</sup> order constructs have been removed, leaving all 2<sup>nd</sup> order constructs in one model. The individual effects of Bricks, Bytes and Behavior on organizational performance are about equal. Their effect on employee engagement differs, with Behavior having the biggest effect. The effect of Bytes is the smallest, and not significant (at P<0.05 level). System use also has a small effect on employee engagement. The reason may be that the use of IT is regarded as mandatory but not discriminant for employee engagement. The availability of (mobile) IT services is taken for granted. It also implies that there is room for improvement; better software for flexible working could boost employee engagement and productivity. Information security policies remains having a negative effect on employee engagement. Security policies are not only a concern of IT managers but also employees. Table 7-8 (Appendices) shows the correlations with the details for Bricks, Bytes and Behavior. The R-values are moderate to strong positive and significant (at P values <0.001), and higher than the  $\beta$ -values in figure 7-13. Again, Behavior has the strongest positive relationship. This is an interesting finding, as most organizations that implement NWOW focus on the new office environment and working from home (Bricks), combined with mobile working (Bytes). The biggest positive effect on employee engagement can however be expected from result based working, trust and autonomy (Behavior). A possible explanation for the relative high score for Behavior in both the path and correlation analyses may lie in the fact that employee engagement is measured based on personal aspects, such as job satisfaction and work-life balance. These aspects have more in common with the personal dimension Behavior than with the aspects of Bricks and Bytes.

Because of the importance of the effects of Bricks, Bytes, Behavior, system use and ISPs on employee performance, we analyzed in detail all relationships to the individual variables of employee engagement. There is no path analysis image for this, as it would contain many variables and a multitude of connection lines. The correlation table is in Table 7-9 (Appendices). Table 7-9 shows the personal adoption of NWOW by the individual employee has the strongest correlation to Bricks. This can be explained because flexible working and working from home are important (Bricks) aspects for the employee. The correlations for the three dimensions with the employee engagement variables are all positive, in particular the relationships with job satisfaction, gratification & appreciation, and culture & motivation. This indicates that a higher level of NWOW adoption has significant positive relationships with job satisfaction, gratification and motivation. For system use all relationships are (weakly) positive, but there is a negative relationship with inter-role conflict. Apparently, computer self-efficacy does not have a positive effect on work-life balance. For information security policies all correlations are negative, with the biggest negative effects on employee performance and inter-role conflict. Information security policies are in particular significant negative related to employee performance and work-life balance.

We performed a number of path analyses on control variables in the model. For organizational performance the control variables size of organization and market sector did not lead to any significant findings. For employee engagement we

tested the control variables: gender, age, working hours (part-time/full-time) and care tasks (children). The variables working hours and care tasks were not significant, gender and age were. Figure 7-14 shows the overall model with a number of control variables that are significant.

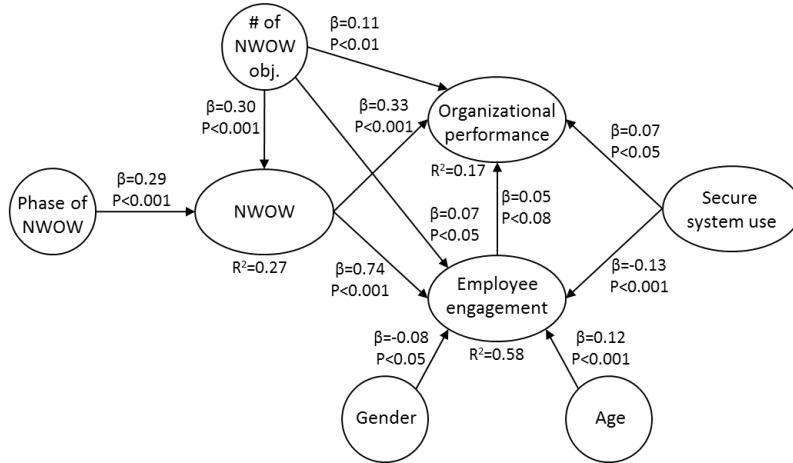


Figure 7-14 Overall research model with control variables

The effect for gender is slightly negative, indicating that female employees are a little bit more engaged than male employees. The variable age shows elder employees are a bit more engaged with their work. We tested the relationship between the phase of the NWOW implementation (from not yet started to optimizing the implementation). The result (significant positive) supports the expectation that implementing the concepts of NWOW leads to higher levels of NWOW adoption in the organization. It also substantiates the consistency of the responses. We also created a control variable based on the number of objectives for implementing NWOW, as shown in figure 7-10. Respondents were able to choose more than one objective for their organization. The number of objectives can be seen as an indication of the ambition of the organization when implementing NWOW. This 'ambition' is positively correlated to the level of NWOW adoption, which was expected, but also to organizational performance and employee engagement. This means that having (multiple) goals has a significant positive effect for both the organization and employees.

Figure 7-15 (Appendices) shows the WarpPLS model. It is a graphical composition of parts, because the shown model cannot be run with reliable results. The WarpPLS model is built up as follows: First, the observed indicators (table 7-3) are loaded to the variables or 1<sup>st</sup> order constructs, shown in red. WarpPLS shows the relationships are defined as reflective, with the number of indicators, e.g.: (R)5i. The result is calculated and stored in the database. Second, the 2<sup>nd</sup> order constructs (shown in black), defined as formative (F) variables are created, based on the stored variables. The 1<sup>st</sup> order variables should now be removed from the (visible) model. Third, when the 2<sup>nd</sup> order

constructs are calculated and stored in the database, the 3<sup>rd</sup> order formative (F) constructs, shown in blue, are created. Though WarpPLS warns that the results of the path analysis (without removing the visible variables) can be unreliable, figure 7-15 shows all relationships between the 1<sup>st</sup> and 2<sup>nd</sup>, and 2<sup>nd</sup> and 3<sup>rd</sup> order constructs are significant, most at  $P<0.001$  (WarpPLS displays  $<0.01$  but provides a table with the full P-values). The spread of the effects is almost equal, indicating that no single variable is dominating a 2<sup>nd</sup> or 3<sup>rd</sup> order construct in the model.

Finally, WarpPLS allows for the analysis of the type of relationships between constructs, i.e. whether they are linear or non-linear (warped). The analysis shows all structural relationships are non-linear, the observation of the graphs shows they are slightly curved. Two examples will be discussed here. Figure 7-16 (Appendices) shows the best-fitting curve and data points for the relationship between NWOW and employee engagement. Note that the axes show the standardized data scales. The curve is slightly curved or warped. This means that initially a small increase of the level of NWOW adoption leads to a relatively somewhat higher rise of employee engagement than 'in the middle', the same applies for the high end of the NWOW scale. The visual observation of the spread of data points clearly indicates that higher levels of NWOW adoption lead to higher employee engagement. Figure 7-17 (Appendices) shows the best-fitting curve for the relationship between ISPs and employee engagement. The curve is more horizontal, indicating a smaller effect than for NWOW. The curve is slightly (U-shape) warped, meaning an increase of ISPs leads to an initial higher decrease of employee engagement. This effect slowly diminishes to zero, and even slightly reverses for the high end of the ISP scale. This does not imply that the highest levels of ISP measures have a positive effect on employee engagement, the overall effect remains negative.

### 7.5.5 Discussion

The aim of this study is to use empirical data to statistically test the effects of NWOW and ISPs on employee engagement and organizational performance. For this reason over 1,000 responses were gathered. As a rule of thumb 'PLS requires a sample size consisting of 10 times the number of predictors' (Wasko & Faraj, 2015, p46). With 28 variables and a data set of 630 entries, this criterion was well met. For participants in a survey on NWOW, (basic) knowledge of the concepts is important. A national investigation (Kluwer, 2011) showed that 96% of the Dutch employees are familiar with the term NWOW, but one can never be too sure. The respondents from the Special interest group for NWOW were expected to be familiar with NWOW, but to the panel members of the research organization an introduction to the concepts of NWOW was provided. As panel members are rewarded for their participation, which may lead to indifference and/or rushing, a strict checking process was engaged. This was a time-consuming process, as every submission had to be individually calculated in the monitor and reviewed. The process did however support the conviction of having

a reliable data set to work with. The result of the evaluation of the inner and outer model supports this conviction.

Though often subject of research, this study had no specific focus on researching the relationship between employee engagement and organizational performance. The hypothesis (H3) test initially showed a significant positive relationship (at a 0.03 level), but when adding more constructs to the equation, the statistical significance was lost (0.16). This indicates there is only a weak relationship. Compared to the high effect ( $\beta$ ) of NWOW on organizational performance (40%), the effect of employee engagement on organizational performance is relatively small (7%). In their (PLS based) analysis, De Luque et al. (2008, p644) found an effect of 12% in the relationship between extra employee effort and firm performance. The effect of 7% in this study may seem small, but where organizations strive for performance improvement, a 7% increase by the positive effect of NWOW on employee engagement can be considerable. The  $R^2$  of organizational performance is relatively low, indicating only 17% of the behavior of the construct is explained. This indicates that not all variables explaining the relationship to organizational performance were part of this study. Table 7-9 (Appendices) shows most correlations between the individual (sub)variables of employee engagement and organizational performance are weak, with a number of them not being significant (at  $P<0.05$  level). It is however interesting to see that the correlation with inter-role conflict is (slightly) negative. This indicates a higher organizational performance is correlated with a worse work-life balance.

The research model is designed to analyze the direct effect of information security policies on employee engagement and organizational performance. We did however also investigate whether a moderating effect of ISPs is present in the relationships NWOW has with employee engagement and organizational performance. Our analysis showed that, in comparison to the direct effects, the interaction of ISPs on these relationships is relatively small and statistically weak (respectively  $\beta=8\%$ ,  $P=0.02$  and  $\beta=7\%$ ,  $P=0.03$ ), leading to the conclusion that ISPs mainly have a direct effect on employee engagement and organizational performance.

Finally, we would like to add some observations about the organizational level of the (main) constructs. As mentioned before, the viewpoint of this survey is the employee that is confronted with the aspects of the New Way of Working. The 'core' of the research model is the construct employee engagement, with which all other constructs interact. The variables of employee engagement, e.g. motivation, job satisfaction and work-life balance, directly reflect the employees' perception of his/her work environment and well-being. The construct NWOW shows the level of adoption of NWOW in the organization the employee works for. The NWOW Analysis Monitor, that is used to measure this adoption level, has tailored questions for both employees and managers, resulting in an indication of the level of support the organization provides for working in the new setting (Kok et al., 2014). This indication is at an organizational level, but it is measured at the level of the individual worker. The constructs system use and information security policies are measured by questions that directly relate to the

employees' perception of the ease of IT use and impact of ISPs. Finally, the main construct organizational performance is measured by the four perspectives of the Balanced Scorecard. The result is an indication at the organizational level, that is derived from a number of questions on financial and customer related indicators. In this study, we did not have the luxury of having the scorecards filled in by the CEOs and executives of the organizations of the participating respondents. Though effort was made to phrase the wording as clear and understandable as possible, respondents had the option to refrain from answering one or more questions. In the analyses, these blank answers were omitted (which WarpPLS allows). The above leads to the conclusion that, though the indicators for NWOW and organizational performance can be positioned at the organizational level, the viewpoint of the survey and the measured items are consistent and on the individual level.

## 7.6 Conclusion

The New Way of Working (NWOW) is increasing in popularity. By implementing NWOW organizations aim to remain attractive for young talent, improve employee engagement and ultimately organizational performance. The downside may however be that employees are not be able to balance work and personal life. Also, organizations have developed information security policies (ISPs) that may impede employees in their daily work, offsetting the potential gain of productivity. The objective of this study is to use empirical data to statistically test the effects of NWOW and ISPs on employee engagement and organizational performance. For this, over 1,000 responses were gathered and critically reviewed, resulting in a usable data set of 630 entries.

A research model was developed, that extends the literature, as it presents a single model that connects NWOW and information security policies to employee engagement and organizational performance. The variables were developed based on literature and published items that were proven reliable in previous research. With relations being statistical significant, the evaluation of the inner (structural) and outer (measurement) model parameters shows a high reliability and predictive relevance, providing confidence that future research will support the findings of this study.

The primary statistical method for the data analysis is the Partial Least Squares variant of Structured Equation Modeling (PLS-SEM). PLS-SEM is able to work effectively with complex models with higher-order constructs, including a mix of reflective and formative relationships. The results of the analyses show that the implementation of the New Way of Working has a statistical significant positive effect on organizational performance and employee engagement. The strongest effect was measured on employee engagement, leading to the conclusion that higher levels of the adoption of NWOW lead to significant higher employee engagement. The correlation for the three dimensions, Bricks, Bytes and Behavior, and employee engagement is strongest for job satisfaction, gratification and motivation. The large effect of these Behavior aspects indicates that the

focus of NWOW implementations should not only be on the work environment (Bricks) and mobile working (Bytes), but also on aspects such as result based working, trust and autonomy. With regard to information security policies, the study showed a significant negative effect on employee engagement. This implies that, though the flexibility of mobile working is perceived as beneficial, imposing information security policies has a counter-productive negative effect, specifically on employee performance and work-life balance.

The research in this study contributes to existing literature in multiple ways.

- (1) First, research in the field of the New Way of Working is still scarce. Existing telework literature only partly covers the range of aspects in NWOW, focusing heavily on home working, and employee productivity in that setting. This NWOW research extends (telework) literature with the understanding of the implications of the evolving mobile work environment.
- (2) Second, existing literature on information security policies often focusses on the need for security policies and the acceptance or avoidance of ISP measures by employees. This study adds additional insight on the counter-productive effect of ISPs in a mobile work setting, combining multiple variables in one single model.
- (3) Third, the research model design with lower and higher level constructs, combined with the Partial Least Squares SEM path analyses, generates results on multiple levels, enabling both high level insight on the effects of NWOW and ISPs on employee engagement and organizational performance, as well as detailed insight on e.g. the effect of ISPs on employee performance and work-life balance. This makes this study valuable, enabling not only conclusions on a more global level, but also on more detailed levels.

The conclusions of this research contribute to a better understanding of the importance of ISPs in a NWOW context. They show that organizations need to find the right intricate balance between information security policies and mobile flexibility. The potential is big; an organization that implements new ways of working with a supportive digital working environment, will have more engaged employees and ultimately perform better. Future research should support the findings of this study.

## Appendices

Organizational performance				System use			Employee engagement						
	FIN	IPP	CP	CSE	IoF	MR	AoN	EP	IJM	JS	IRC	GA	CM
FIN1	0.928			CSE1	0.717		AoN1	0.576					
FIN3	0.938			CSE2	0.750		AoN2	0.607					
FIN3	0.934			CSE3	0.815		AoN3	0.705					
FIN4	0.613			CSE4	0.748		AoN4	0.705					
IPP1		0.826		CSE5	0.598		AoN5	0.636					
IPP2		0.829		CSE6	0.769		AoN6	0.737					
IPP3		0.864		FIC1		0.774	AoN7	0.330					
CP1			0.797	FIC2		0.365	AoN8	0.505					
CP2			0.876	FIC3		0.775	AoN9	0.615					
CP3			0.910	FIC4		0.635	EP1		0.834				
CP4			0.856	FIC5		0.615	EP2		0.876				
LGP1			0.855	FIC6		0.736	EP3		0.848				
LGP2			0.878	FIC7		0.711	EP4		0.861				
LGP3			0.799	FIC8		0.800	EP5		0.788				
Information security policies				MR1		1.000	EP6		0.828				
Information security policies				Bricks			JM1		0.777				
	MS	AIS	WI	FWL1	0.697		JM2		0.507				
MS1	0.900			FWL2	0.831		JM3		0.806				
MS2	0.900			FWL3	0.829		JM4		0.603				
AIS1		0.909		FWL4	0.815		JM5		0.797				
AIS2		0.909		WPD1		0.782	JM6		0.754				
WI1			0.940	WPD2		0.752	JS1			0.765			
WI2			0.950	WPD3		0.456	JS2			0.817			
WI3			0.950	WPD4		0.683	JS3			0.763			
Bytes					WPD5	0.650	JS4			0.764			
	IDS	IM	MK	COM	WPD6	0.799	JS5			0.662			
IDS1	0.720				SM1		JS6			0.667			
IDS2	0.533				SM2		JS7			0.541			
IDS3	0.769				SM3		JS8			0.639			
IDS4	0.854				SM4		JS9			0.706			
IDS5	0.846				SM5		JS10			0.687			
IDS6	0.823				0.745		JS11			0.622			
IM1		0.767			0.538		JS12			0.776			
IM2		0.728			0.653		JS13			0.769			
IM3		0.750			0.639		JS14			0.766			
IM4		0.759			0.784								
IM5		0.828					Behavior						
	KM1			RBM1	0.777		IRC1			0.718			
KM1		0.832		RBM2	0.792		IRC2			0.785			
KM2		0.831		RBM3	0.812		IRC3			0.800			
KM3		0.852		RBM4	0.830		IRC4			0.747			
KM4		0.745		RBM5	0.755		IRC5			0.830			
KM5		0.790		RBM6	0.822		IRC6			0.880			
KM6		0.772		RBM7	0.802		IRC7			0.877			
KM7		0.813		RBW1		0.802	IRC8			0.855			
COM1			0.668	RBW2		0.611	GA1				0.827		
COM2			0.753	RBW3		0.771	GA2				0.828		
COM3			0.778	RBW4		0.846	GA3				0.518		
COM4			0.781	RBW5		0.682	GA4				0.856		
COM5			0.808	RBW6		0.803	GA5				0.749		
COL1			0.796	RBW7		0.806	GA6				0.815		
COL2			0.791	TA1		0.852	CM1					0.834	
COL3			0.779	TA2		0.790	CM2					0.828	
COL4			0.709	TA3		0.803	CM3					0.834	
COL5			0.666	TA4		0.858	CM4					0.813	
COL6			0.770	TA5		0.823	CM5					0.885	
COL7			0.773	TA6		0.861	CM6					0.815	
				CM7			CM7					0.812	

*Table 7-3 Factor loadings for measured items (SPSS 24.0)*

2nd order construct	Variable - 1st order construct	# of items	Cronbach's Alfa	Composite reliability	Aver. Var. Extr. (AVE)
Organizational performance	Financial Perspective (Fin)	4	0.839	0.896	0.692
	Internal Process Perspective (IPP)	3	0.735	0.850	0.654
	Customer Perspective (CP)	4	0.853	0.901	0.696
	Learning / Growth Perspective (LGP)	3	0.749	0.857	0.667
Employee engagement	Adoption of NWOW (AoN)	9	0.784	0.839	0.376
	Employee Performance (EP)	6	0.916	0.935	0.705
	Intrinsic Job Motivation (IJM)	6	0.804	0.860	0.513
	Job Satisfaction (JS)	14	0.925	0.935	0.510
	Inter-Role Conflict (IRC)	8	0.926	0.940	0.661
	Gratification & Appreciation (GA)	6	0.860	0.898	0.599
	Culture & Motivation (CM)	7	0.926	0.940	0.693
System use	Computer Self Efficacy (CSE)	6	0.828	0.875	0.541
	Freedom of IT choices (FIC)	8	0.833	0.875	0.475
	Mobile reachability (MR)	1	1.000	1.000	1.000
Information security policies	Mobility and ISPs (MS)	2	0.765	0.895	0.809
	Apathy towards ISPs (AIS)	2	0.791	0.905	0.827
	Work Impediment by ISPs (WI)	3	0.942	0.963	0.896
Bricks	Flexible Work Location (FWL)	4	0.804	0.873	0.633
	Work place design (WPD)	6	0.779	0.845	0.485
	Sustainability and Mobility (SM)	5	0.699	0.807	0.459
Bytes	ICT Device Support (IDS)	6	0.853	0.893	0.586
	Information management (IM)	5	0.825	0.877	0.589
	Knowledge management (KM)	7	0.910	0.928	0.649
	Communication (COM)	5	0.815	0.871	0.576
	Collaboration (COL)	7	0.874	0.903	0.572
Behavior	Result Based management (RBM)	7	0.906	0.925	0.639
	Result Based working (RBW)	7	0.879	0.907	0.584
	Trust & Autonomy (TA)	6	0.911	0.931	0.692

Table 7-4 Cronbach Alpha's, Composite reliability and AVEs (WarpPLS 5.0)

Variable	Organizational performance	Employee engagement	System use	ISPs	Bricks	Bytes	Behavior	S.E.	P-value	VIF
Financial Perspective	(0.278)	0.000	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	2.256
Internal Process Perspective	(0.271)	0.000	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	2.026
Customer Perspective	(0.303)	0.000	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	3.914
Learning / Growth Perspective	(0.290)	0.000	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	2.990
Adoption of NWOW	0.000	(0.184)	0.000	0.000	0.000	0.000	0.000	0.038	<0.001	1.699
Employee Performance	0.000	(0.172)	0.000	0.000	0.000	0.000	0.000	0.037	<0.001	1.805
Intrinsic Job Motivation	0.000	(0.192)	0.000	0.000	0.000	0.000	0.000	0.038	<0.001	2.105
Job Satisfaction	0.000	(0.226)	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	2.951
Inter-Role Conflict	0.000	(0.095)	0.000	0.000	0.000	0.000	0.000	0.039	0.008	1.188
Gratification & Appreciation	0.000	(0.223)	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	4.578
Culture & Motivation	0.000	(0.219)	0.000	0.000	0.000	0.000	0.000	0.039	<0.001	4.168
Computer Self Efficacy	0.000	0.000	(0.469)	0.000	0.000	0.000	0.000	0.039	<0.001	1.032
Freedom of IT choices	0.000	0.000	(0.624)	0.000	0.000	0.000	0.000	0.039	<0.001	1.059
Mobile reachability	0.000	0.000	(0.440)	0.000	0.000	0.000	0.000	0.039	<0.001	1.027
Mobility and ISPs	0.000	0.000	(0.366)	0.000	0.000	0.000	0.000	0.038	<0.001	1.336
Apathy towards ISPs	0.000	0.000	(0.426)	0.000	0.000	0.000	0.000	0.038	<0.001	1.889
Work Impediment by ISPs	0.000	0.000	(0.417)	0.000	0.000	0.000	0.000	0.038	<0.001	1.798
Flexible Work Location	0.000	0.000	0.000	(0.376)	0.000	0.000	0.000	0.039	<0.001	1.411
Work place design	0.000	0.000	0.000	(0.415)	0.000	0.000	0.000	0.039	<0.001	1.798
Sustainability and Mobility	0.000	0.000	0.000	(0.412)	0.000	0.000	0.000	0.039	<0.001	1.765
ICT Device Support	0.000	0.000	0.000	0.000	(0.209)	0.000	0.000	0.039	<0.001	1.747
Information management	0.000	0.000	0.000	0.000	(0.250)	0.000	0.000	0.039	<0.001	3.902
Knowledge management	0.000	0.000	0.000	0.000	(0.231)	0.000	0.000	0.038	<0.001	2.807
Communication	0.000	0.000	0.000	0.000	(0.242)	0.000	0.000	0.038	<0.001	3.063
Collaboration	0.000	0.000	0.000	0.000	(0.241)	0.000	0.000	0.038	<0.001	2.995
Result Based management	0.000	0.000	0.000	0.000	0.000	(0.354)	0.038	<0.001	3.636	
Result Based working	0.000	0.000	0.000	0.000	0.000	0.000	(0.361)	0.038	<0.001	4.592
Trust & Autonomy	0.000	0.000	0.000	0.000	0.000	0.000	(0.353)	0.038	<0.001	3.490

Table 7-5 Construct weights, Standard errors, P-values and VIFs (WarpPLS 5.0)

	Organizational performance	Employee engagement	NWOW	Secure system use
Organizational performance	1.000			
Employee engagement	0.189***	1.000		
NWOW	0.350***	0.707***	1.000	
Secure system use	0.129**	-0.092*	0.110	1.000

P-value: \* $<0.05$  \*\* $<0.01$  \*\*\* $<0.001$

Table 7-6 Correlations overall research model

	Organizational performance	Employee engagement	NWOW	System use	ISPs
Organizational performance	1.000				
Employee engagement	0.189***	1.000			
NWOW	0.350***	0.707***	1.000		
System use	0.130**	0.126**	0.223***	1.000	
ISPs	0.079*	-0.274***	-0.045	0.310***	1.000

P-value: \* $<0.05$  \*\* $<0.01$  \*\*\* $<0.001$

Table 7-7 Correlations detailed model with system use and information security policies

## The effects of NWOW and ISPs on employees and organizations

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	Organizational performance	Employee engagement	Bricks	Bytes	Behavior	System use	ISPs
Organizational performance	1.000						
Employee engagement	0.189***	1.000					
Bricks	0.325***	0.522***	1.000				
Bytes	0.321***	0.618***	0.735***	1.000			
Behavior	0.288***	0.750***	0.594***	0.738***	1.000		
System use	0.130**	0.126**	0.218***	0.214***	0.163***	1.000	
ISPs	0.079*	-0.274***	0.054	-0.042	-0.132***	0.310***	1.000

P-value: \* $<0.05$  \*\* $<0.01$  \*\*\* $<0.001$

*Table 7-8 Correlations with details for Bricks, Bytes and Behavior*

	OP	AoN	EP	IJM	JS	IRC	GA	CM	Bricks	Bytes	Behav	SU	ISPs
Organizational performance (OP)	1.000												
Adoption of NWOW (AoN)	0.227	1.000											
Employee Performance (EP)	0.067	0.371	1.000										
Intrinsic Job Motivation (IJM)	0.030	0.440	0.623	1.000									
Job Satisfaction (JS)	0.121	0.566	0.468	0.599	1.000								
Inter-Role Conflict (IRC)	-0.062	0.113	0.323	0.177	0.277	1.000							
Gratification & Appreciation (GA)	0.254	0.586	0.386	0.462	0.735	0.258	1.000						
Culture & Motivation (CM)	0.238	0.506	0.391	0.501	0.728	0.199	0.855	1.000					
Bricks	0.325	0.636	0.175	0.210	0.431	0.040	0.569	0.485	1.000				
Bytes	0.321	0.578	0.275	0.308	0.495	0.081	0.669	0.621	0.735	1.000			
Behavior	0.288	0.557	0.325	0.378	0.664	0.154	0.828	0.779	0.594	0.738	1.000		
System use (SU)	0.130	0.268	0.043	0.153	0.126	-0.371	0.094	0.118	0.218	0.214	0.163	1.000	
Information security policies (ISPs)	0.079	-0.103	-0.254	-0.197	-0.226	-0.486	-0.167	-0.177	0.054	-0.042	-0.132	0.310	1.000

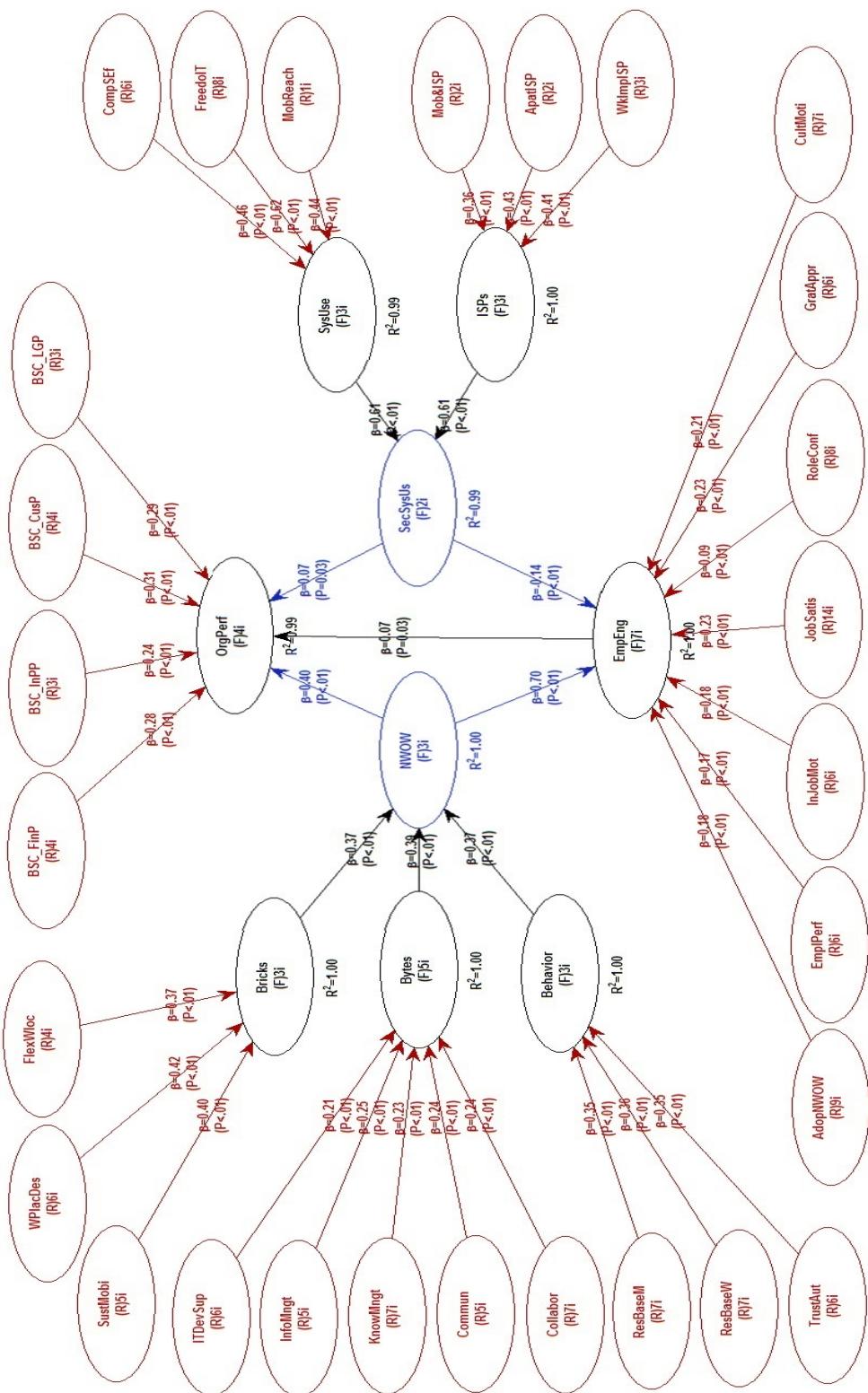
P-values (grey): >0.05

*Table 7-9 Correlations with details for employee engagement*

Figure on next page:

*Figure 7-15 WarpPLS model with 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> order variables or constructs*

Note: Figure 7-15 is a graphically composed image containing the complete measurement model. The shown model cannot be run (in WarpPLS) with reliable results.



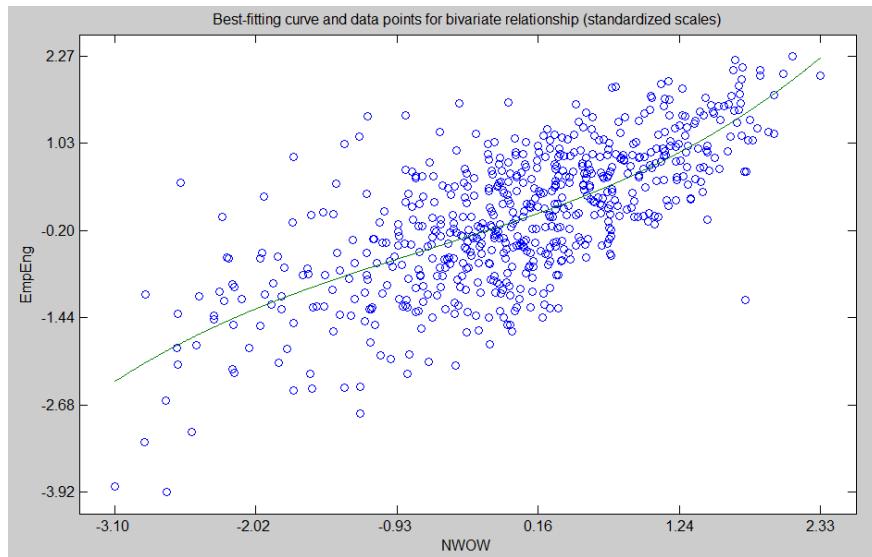


Figure 7-16 Best-fitting curve and data points for relationship between NWOW and employee engagement (EmpEng)

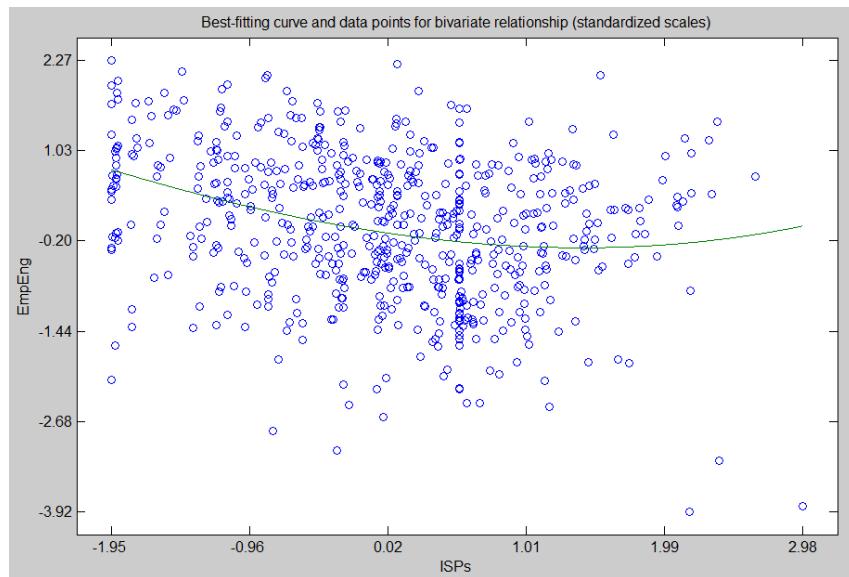
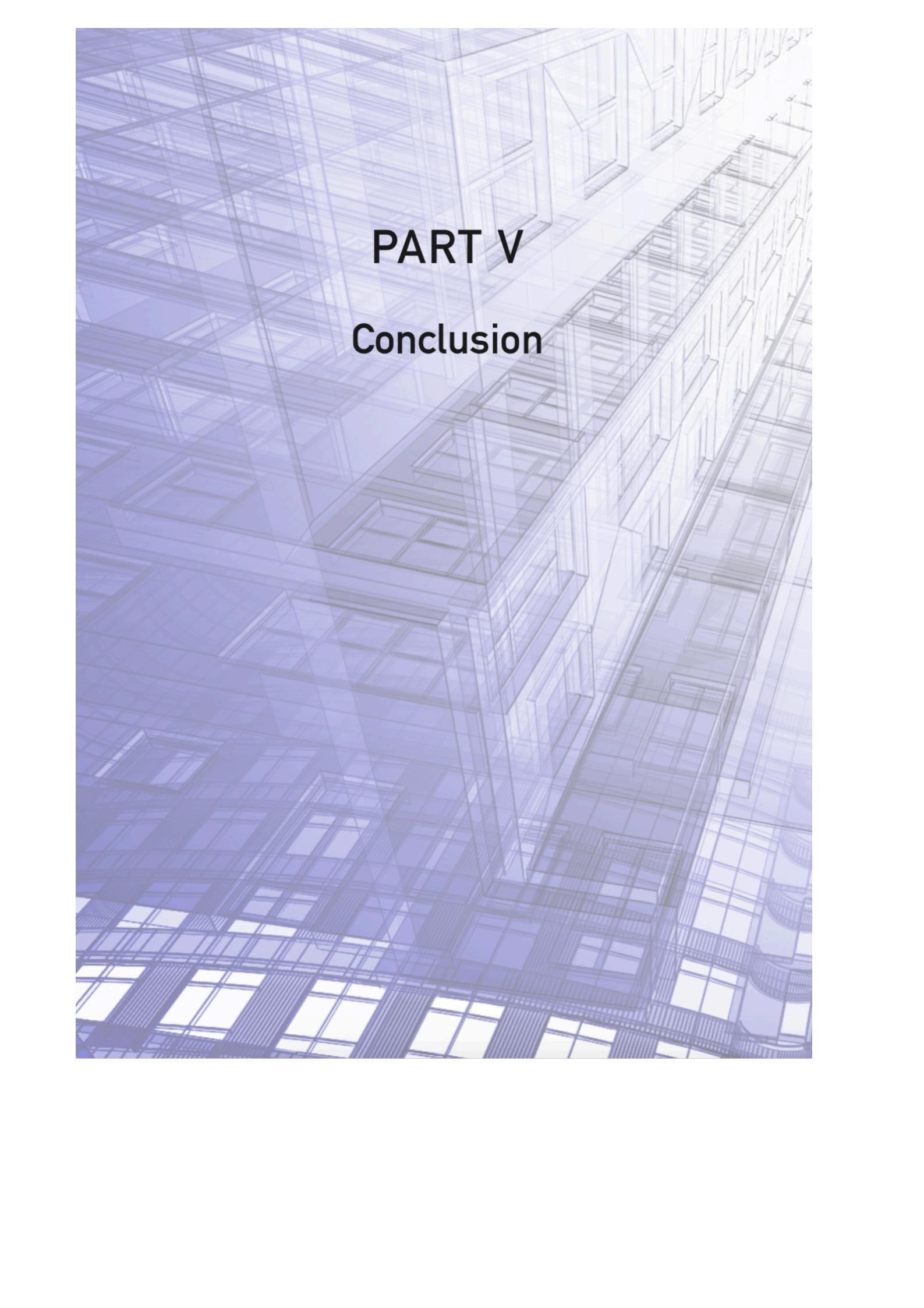


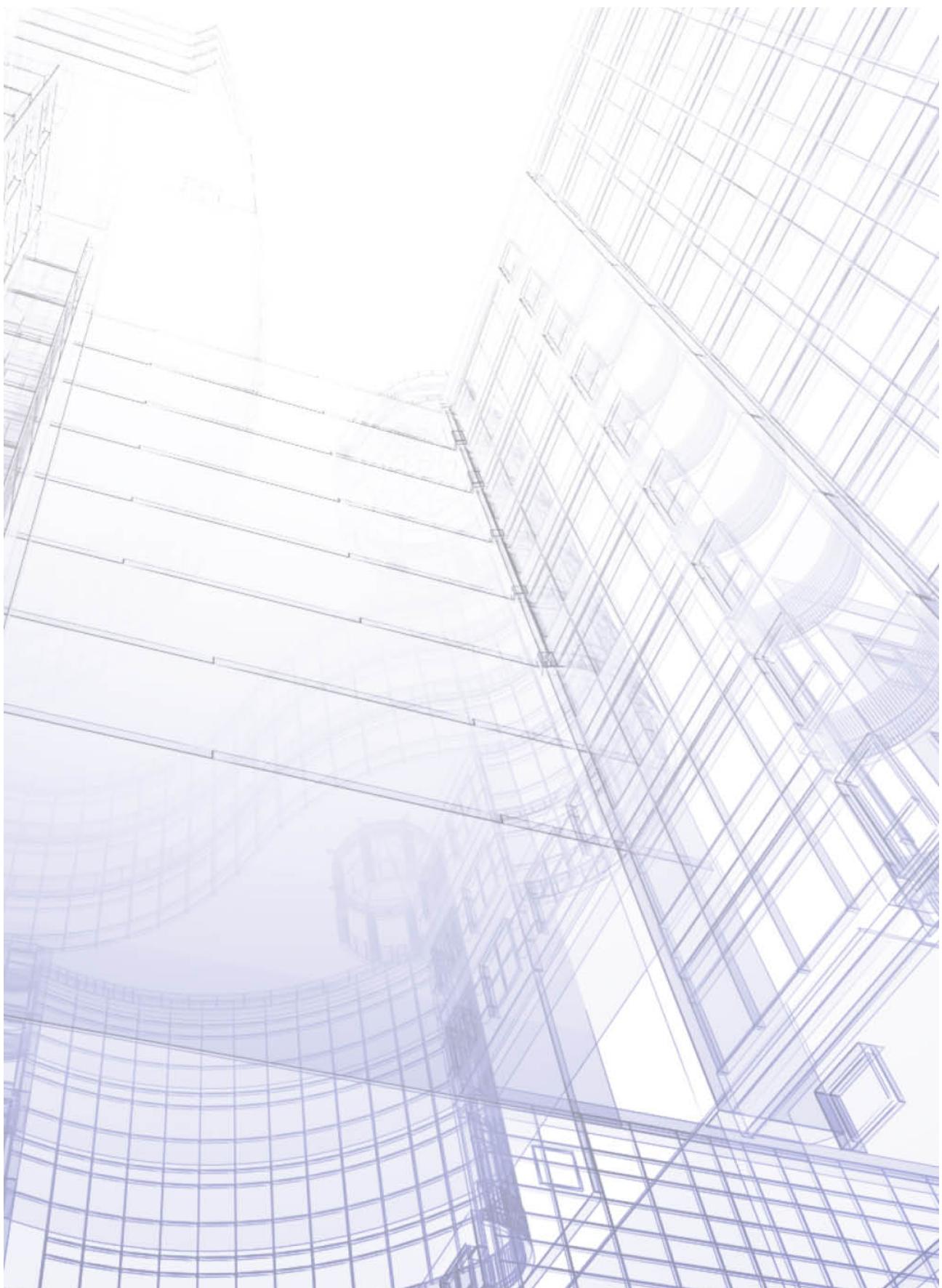
Figure 7-17 Best-fitting curve and data points for relationship between ISPs and employee engagement (EmpEng)



The background of the page features a complex, abstract architectural design. It consists of numerous thin, light-colored lines forming a three-dimensional perspective grid and several wireframe cube structures. Some of these cubes have internal grid patterns, suggesting windows or structural elements. The overall effect is a sense of depth and geometric complexity.

## PART V

# Conclusion



# Chapter 8

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## Conclusion

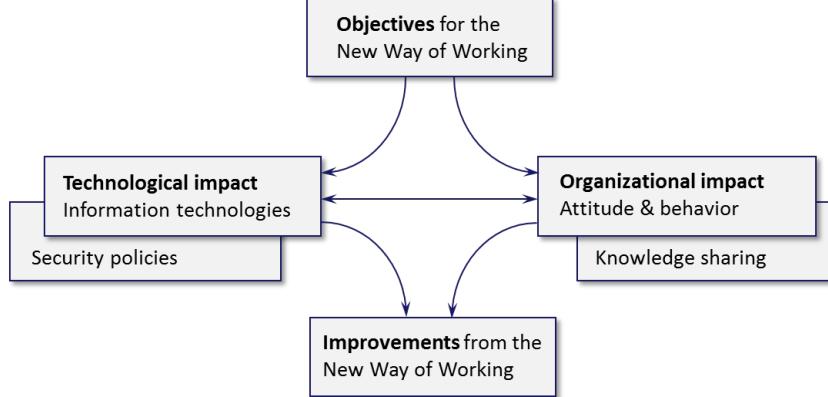
This final chapter reviews the research questions that form the foundation of this dissertation, and summarizes the main findings throughout the chapters of this work. Furthermore, the contribution and practical implications are discussed, limitations are examined, and personal reflections and opportunities for future research are considered.

### 8.1 Research questions and conclusions

The main research question of this dissertation is:

*MRQ: What are the organizational and technological effects of the New Way of Working on employees and organizations?*

The main research question has been addressed in three parts, each with its own perspective and research sub-question. These perspectives are (1) the transformational perspective; (2) the knowledge management perspective; and (3) the IT and information security perspective. The three perspectives are reflected in the Assessment model for the New Way of Working that was discussed in the Introduction.



*Figure 8-1 Assessment model for the New Way of Working*

The organizational and technological impact has been assessed by theoretical and empirical research, in most cases using a mixed method approach. The research on the transformational perspective 'set the stage' for the research in the other areas. Figure 8-1 shows it is the successful combination of addressing these perspectives that will generate the projected improvements.

Since the main research question is a composite of the three underlying research questions, the three research questions are first reviewed separately. This section will conclude by providing with the answer to the main research question.

### 8.1.1 The transformational perspective

The first research question addressed the transformational perspective.

*RQ1: How does the attitude change during the transformation process towards the New Ways of Working?*

To answer this question, a methodology had to be developed to assess the attitude towards the New Way of Working. Using this methodology it was possible to assess changes in the attitude in the transformation process towards the New Ways of Working.

In chapter 2 an analysis tool was developed for the assessment of the attitude towards the implementation of the New Way of Working. Based on the Design Science Research approach the NWOW Analysis Monitor was designed and developed. The monitor enables organizations to determine the current and desired future level of NWOW adoption in the organization. The analysis of the future situation can provide guidance to organizations for initiatives in adopting NWOW practices. The analysis can be performed for the whole organization, but also from the manager's and employees' point of view, as they may have a different perceptions and expectations regarding NWOW. The analysis monitor was evaluated in two cases, forming two iterations in the Design Science Research cycle. Throughout the research in this dissertation the analysis monitor was used to analyze the level of NWOW adoption in the participating organizations. In total, almost 1,200 managers and employees filled in the analysis monitor. The recurrent use of the monitor in all research formed a consistent base against which the specific analysis results were plotted. In a number of cases the monitor results were presented and discussed with the management of the participating organizations. This gave rise to new insights, especially on the differences between the expectations of managers and employees. Also, individual employees were able to request a report with the results of their own response in the monitor. This report gave them an indication of their perception of the current and future situation and the gap analysis. Over 100 individual reports have been requested and distributed throughout this study. The analysis monitor has proven to be a very useful assessment tool for both individuals and organizations in the transformation process of implementing

NWOW. The results helped employees and management to gain more insight in the current situation and expectations for the future. This enabled organizations to better focus on specific aspects in the implementation of NWOW, resulting in a better acceptance and more successful transition towards NWOW.

In chapter 3, based on the analysis monitor, a longitudinal study on the attitude towards the New Way of Working was performed. The case study was performed over a one-year timeframe. The case showed that the majority (75%) of the respondents had a positive attitude towards NWOW before the implementation, and they remained positive during the transition and afterwards. About one-third of the respondents indicated they became more positive, against 7% who had become more negative. Respondents with a negative attitude towards NWOW mostly work full-time at the office. The loss of their 'own desk' in the new flexible open office environment, and having to search for a work place in the morning, were mentioned as reasons contributing to their negative attitude. The majority (75%) indicated they can perform their work well in the new environment, against a small group (15%), who indicated they cannot perform well in the new work environment. Being less productive because of not having one's own desk or quiet working place, may be a misperception (see section 8.3.3), but it is a signal of dissatisfaction. The vast majority (85%) of the respondents indicate they can work well anywhere anytime with the IT they use. The usability of IT is an important aspect for younger workers; the Net Generation, who are technologically savvy with the latest electronic gadgets and platforms (Burke & Ng, 2006). Almost half of the respondents indicate they can work more flexible, but almost half of them also indicate they do not work more results-oriented nor do they experience more coaching from their management. About one-third of the respondents mention an improvement of their work-life balance. These results indicate that the manager-employee relationship and the personal dimension (Behavior) received insufficient attention in this implementation of NWOW. The focus on the physical work environment (Bricks) and use of mobile IT (Bytes), does not mean the implementation of NWOW has failed, it rather means that there is still room for additional improvement, by focusing on personal aspects (Behavior) in a next step or phase in the transition towards new ways of working.

The survey on personality traits showed a statistically significant positive relationship between conscientiousness, i.e. being self-disciplined, and satisfaction with the New Way of Working. The analysis showed a weak negative relationship for neuroticism, or sensitive employees. This leads to the conclusion that the New Way of Working is not beneficial to all. Where self-disciplined employees may thrive well in the new work environment, high neuroticism (sensitive) persons may have problems to adapt to the newly gained freedom. This puts an extra load on management, having to recognize those in need of more guidelines and structure, while at the same time coaching those who are able to better perform in the new environment.

The answer to the research question is that the implementation of the New Way of Working has a positive effect on the performance and satisfaction of employees. The majority indicates they can work well in the new flexible work

environment. The group that became more positive in their attitude towards NWOW is three times larger than the group that became more negative. Negative signals should however not be ignored. The motivations for negativity show that implementing NWOW is a complex endeavor, and often a battle against mind-sets, such as the industrial mind-set (see section 8.3.3). The research shows that the process of the transition towards the new ways of working should be regularly assessed and closely monitored. Timely action should be taken to improve results.

### 8.1.2 The knowledge management perspective

The second research question addressed the knowledge management perspective.

*RQ2: How is knowledge sharing behavior of knowledge workers affected by the New Way of Working?*

To answer this research questions two multi-case research studies were conducted. The first study focused on the change in channels that are used to share knowledge. The second study focused on the changes in the mix of tacit and explicit knowledge i.e. knowledge based on personal experience that is shared, and knowledge that is codified and stored. The effects were reviewed in relation to the level of NWOW adoption in organizations, and in relation to the mobility of the knowledge worker.

In chapter 4 the changes in channel choice of knowledge workers for sharing knowledge on general and sensitive information were researched. Using three cases at different organizations in different sectors, a comparison was made 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). Because the individual cases were performed within the same organization, a good comparison could be made between the traditional and new ways of working. The results show that, though all workers had access to the same channels, in all cases NWOW workers used a broader palette of channels to share knowledge than Non-NWOW workers. The differences are most clear when sharing knowledge on sensitive information; NWOW workers use multiple channels, while traditional non-NWOW workers use less channels, e.g. face-to-face communication, in a more formal (planned) way. Overall, NWOW workers more often share knowledge in an informal way. When knowledge workers become more mobile, the type of channels they use changes; there is a decrease in face-to-face communication, while the number of video calls (skype) and the use of e-mail increases. Knowledge workers seem to choose the most suitable and comparable communication channels that are at hand. This observation is in line with Orlowski (1992), who stated that employee's selection and use of technologies emerge from situated practices.

The research in chapter 5 focused on the type of knowledge that is shared in organizations. The results show that the mix of tacit and explicit knowledge changes in the transformation process towards NWOW. 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 falls in line with 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. When knowledge workers become more mobile, knowledge will be shared less in explicit and more in tacit form. In a NWOW setting 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' by the implementation of the New Way of Working.

The above shows that traditional ways of knowledge sharing behavior change by the implementation of NWOW. Because of NWOW, knowledge is shared more often via multiple channels, less face-to-face, and in more informal ways. When knowledge workers become more mobile, knowledge is shared less in explicit (codified) and more in tacit (personalized) form. Proper technological infrastructures are needed, that support the differing preferences of knowledge sharing in a NWOW context. When this is not realized and supported, the result may be the loss of knowledge that may be crucial for the organizations' operation.

### 8.1.3 The IT and information security perspective

The third research question addressed the IT and information security perspective.

*RQ3: What is the effect of NWOW and security policies  
on the employee and organization?*

To answer this research question, two research studies were performed. The first study focused on the Choose Your Own Device (CYOD) environment, and the satisfaction with a preferred device versus the IT security threats. The second study focused on the effect of NWOW and information security policies on employee engagement and organizational performance.

The result of the research on the CYOD environment in chapter 6 shows that over 50% of the respondents agree that having a device of their own choice would improve their task performance. This observation falls in line with Harris et al. (2012), who found that if employees were to choose their own hardware and software, they would complete more tasks on time (49%), be more innovative (50%), and be a happier (53%). When given the choice in a CYOD environment, a vast majority of the respondents would prefer another device than the one with which they currently work. In general, notebooks are preferred over desktops, and in particular Apple notebooks (MacBooks) are preferred over Windows

notebooks. For the more mobile tasks light (and thin) notebooks or tablets are preferred. Overall, the Apple iPad is the most preferred CYOD device, especially for reading and viewing data.

When it comes to satisfaction (preferred device combined with perceived satisfaction), Apple devices score the highest, far better than Windows or Android devices. The Risk Assessment on IT threats showed the IT security risks do not necessarily need to increase. Provided that the proper security policies are in place, the preferred CYOD devices (Apple) are even less vulnerable than the Windows devices that are currently in use. This implies that the task performance and satisfaction of employees can improve in a secure way in a CYOD environment. It will however lead to the management of more IT platforms and software.

In chapter 7 a large survey, with over 1,000 respondents and over 600 usable data entries, was executed to assess the effect of NWOW and security policies on employee engagement and organizational performance. The results show that the implementation of the New Way of Working has a statistically significant positive effect on organizational performance and employee engagement, with the strongest effect on the latter relationship. The correlation for the three dimensions (Bricks, Bytes and Behavior) with employee engagement is strongest for job satisfaction, gratification and motivation. The relatively large effect of Behavior in comparison to Bricks and Bytes indicates that the focus of NWOW implementations should not only be on the work environment (Bricks) and mobile working (Bytes), but also on aspects such as result based working, trust and autonomy (Behavior).

With regard to information security policies, the study showed a significant negative effect on employee engagement. The effect on organization performance was slightly positive. This implies that, though the flexibility of mobile working is perceived as beneficial, imposing information security policies has a counter-productive negative effect on employee engagement, specifically on employee performance and work-life balance.

#### 8.1.4 Main research question

The combination of the findings of the three perspectives allow for an answer to the main research question.

Implementing the New Way of Working has a large effect on both the employee and organization. Organizations go through a transformation process, even when telework arrangements are already in place (Kok et al., 2014). This observation shows that NWOW is different from teleworking; it goes beyond teleworking and affects employees and organizations on multiple levels.

This research has shown the implementation of the New Way of Working has a positive effect on the performance and satisfaction of employees. Managers and employees have a positive attitude towards NWOW and even become more positive after the transition. This indicates that, though their work is impacted,

overall the scale tips to the positive side. Negative feelings of displacement and alienation should however not be ignored as they may lead to a downward spiral.

With regard to knowledge sharing, this research has shown that the knowledge sharing behavior changes by the implementation of NWOW. Overall, a broader palette of communication channels is used, and knowledge is communicated in a more informal way. The more mobile the knowledge worker becomes; the less face-to-face communication is used. The mix of tacit and explicit knowledge sharing seems to balance to an equal (50/50) mix. The more mobile the knowledge worker becomes; the less knowledge is shared in explicit form. By the implementation of the New Way of Working, knowledge sharing becomes more 'fluid'.

Enabling employees to improve their task performance whilst experiencing a higher job satisfaction, by giving them the opportunity to use a device or their own choice (BYOD/CYOD), does not by definition increase the IT security risks. Organizations therefore have the ability to maximize employee satisfaction without giving up on corporate data protection. It does however necessitate the management of multiple IT platforms.

The potential for the implementation of the New Way of Working is large. Research indicates a moderate significant positive effect (40%) on organizational performance and a strong significant positive effect (70%) on employee engagement. Of the three dimensions (3B's), Behavior has the strongest positive effect on employee engagement. Organizations should not only focus on the new work environment (Bricks) and enabling mobile working (Bytes), but also address the personal aspects such as result based working, trust and autonomy (Behavior), where the highest potential gain is. Information security policies however have a weak significant negative effect (25%), especially on employee performance and work-life balance, potentially offsetting the gain in productivity and employee satisfaction. This implies organizations need to find the intricate balance between enabling mobile work versus information security policies.

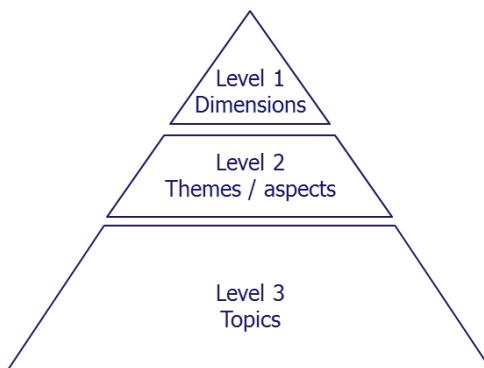
The New Way of Working is an exciting new phenomenon, but it is not a cure for all organizational illnesses. It is a first step for organizations in their journey towards a new future of work. The ability of organizations to cope with the ever-changing world of work, will to a large extent determine their future success. When organizations realize that the world in which we work is rapidly changing, they will realize they need to find new ways of working.

## 8.2 Contribution and implications

This research has several implications for both the practical application of, and research on, the effects of the implementation of the New Way of Working. First, the contribution to existing academic research will be discussed, followed by a contemplation on the practical contribution and implications.

### 8.2.1 Contribution to existing research

At the outset of this research it became clear that the New Way of Working is a relative new phenomenon in scientific literature. The number of publications on NWOW is limited, implying that this research is an addition to existing literature in this field. It also became clear there is little conformity in used definitions, in particular on the themes or aspects that are affected by the New Way of Working. In chapter 2, based on a structured literature research of NWOW and telework literature, a multi-level analysis model with dimensions, themes or aspects, and topics was developed (Kok, Koops & Helms, 2014).



*Figure 8-2 Multi-level analysis model for the New Way of Working*

The main structure of the analysis model is shown in figure 8-2, the details of the model are in this research. The model extends existing literature as it provides a structured multi-level classification for NWOW related dimensions, aspects and topics. Existing literature often focusses on one aspect with one or more topics. For example: the new work environment and disturbances, or working from home and childcare. The classification of multiple aspects and topics, and the clustering and positioning under the three dimensions (Bricks, Bytes, Behavior), forms an overarching taxonomy or 'umbrella' that can both pin point and combine existing and future research in its larger context.

The model was used for the development of the NWOW Analysis Monitor (Chapter 2). Besides the practical contribution as a useful assessment tool for organizations, there is also a scientific contribution; the monitor can serve as a reliable measuring instrument for quantitative research on the effects of the implementation of NWOW in various fields. The monitor was used in chapter 3 for the assessment of the (change in) attitude towards NWOW, and it has been used throughout most of the research in this dissertation. The tool provides the opportunity to plot case study results against the level of NWOW adoption in an organization, providing additional insight in the case outcomes. In chapter 7 the reliability of the variables of the monitor was evaluated (section 7.5.2). With, among other values, Factor loadings of over 0.6 (table 7-3, threshold 0.3) and

Cronbach's Alpha values of over 0.7 (table 7-4), the conclusion of the evaluation of the inner (structure) and outer (measurement) model is that both indicate a high reliability and predictive relevance.

In chapter 4, a unified model for knowledge sharing, that identifies different situations of knowledge sharing, was developed (Kok, Bellefroid & Helms, 2013).

Scenarios	General information		Sensitive information	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Level				
Organization	1		2	
Project team	3		4	
Superior	5	7	6	8
Colleague	9	11	10	12

Figure 8-3 Unified model for knowledge sharing with scenarios

The model with 12 knowledge sharing scenarios, shown in figure 8-3, was used to perform case research in organizations in the transformation process towards the New Way of Working. The model is an addition to literature as it combines the work of Snyder & Lee-Partridge (2009) on knowledge sharing of general and sensitive information, the work of De Long & Fahey (2000) on knowledge sharing on multiple organizational levels, and the work of Ipe (2003) on the role of familiarity, in one single unified model, using knowledge sharing scenarios. The model can be used to assess organizations and address issues with respect to knowledge sharing in the transition towards NWOW at an early stage.

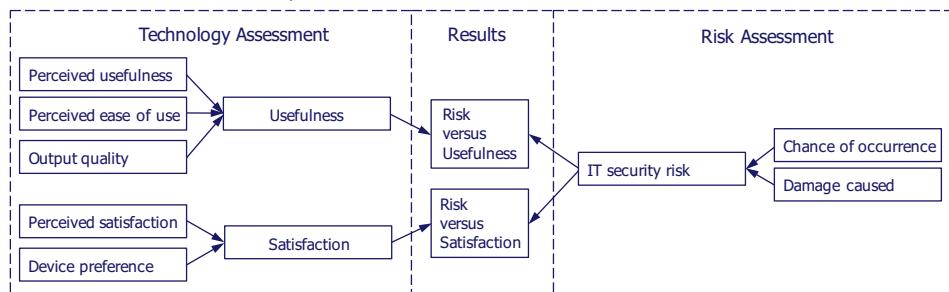
In chapter 5, a Knowledge Sharing Framework that combines various types of knowledge sharing was defined (Kok, Esten & Helms, 2015). The Knowledge Sharing Framework can be used to assess the types of knowledge and way of knowledge sharing in organizations, giving insight in the most effective knowledge sharing strategy.

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

Figure 8-4 Knowledge Sharing Framework

The Knowledge Sharing Framework was used to research the knowledge sharing in a multi-case study in five organizations in the Distribution, IT-, Finance- & Tax advisory sectors. One of the findings indicated that the most effective knowledge sharing strategy not necessarily needs to be based on a 80/20 mix of codified (explicit) and personalized (tacit) knowledge, but evolves to a balanced (50/50) mix over time.

In chapter 6, based on the Extended Technology Acceptance Model (Venkatesh & Davis, 2000), a Technology and Risk Assessment model was developed (Kok, Lubbers & Helms, 2015).



*Figure 8-5 Technology and Risk Assessment model*

The research in chapter 6 extends the existing scarce literature on Choose Your Own Device (CYOD); most existing literature is on (personal) IT consumerization or Bring Your Own Device (BYOD). This research investigates what organizations can do to provide freedom of choice in a containable secure IT environment by providing corporate CYOD devices. This best-of-two-worlds approach has hardly been researched. The Technology and Risk Assessment model is an addition to the existing literature on the (extended) Technology Acceptance Model (TAM), as it combines the aspects of IT security risks with the perceived usefulness and device satisfaction of the Technology Acceptance Model in one combined analysis model, placed in the context of a NWOW environment.

Finally, in chapter 7, an overall research model was developed to analyze the effects of the New Way of Working and Information security policies on Employee engagement and Organizational performance (Kok, Foorthuis, Thatcher & Helms, 2017).



*Figure 8-6 Overall research model*

Often the effects of security policies are researched separately from the effects of the new work environment. The research model in figure 8-6 shows the overall (path analysis) model with the higher order constructs for the analysis of the new work environment versus information security policies. The complete research model is in chapter 7. The research model extends the literature, as it presents a single model that connects NWOW, employee engagement and organizational

performance with system use and information security policies. With a usable sample size of over 600 submissions, this research has indicated the New Way of Working has a significant positive effect on employee engagement and performance of organizations, with the strongest effect being on employee engagement. Information security policies have a negative effect on employee engagement, in particular on employee performance and work-life balance. The research in chapter 7 also shows the usability and strength of second generation data analysis techniques, such as the Partial Least Squares variant of Structured Equation Modeling (PLS-SEM). PLS-SEM offers the opportunity to analyze complex models with higher order reflective and formative constructs, without which this extensive research would not have been possible.

The above summarized overview is a brief indication of the contribution of this study to existing research. As mentioned in the introduction (section 1.6.2), the focus of this study is not on the development of an overarching theory or theoretical model, but on the development and empirical assessment of models and frameworks. Alter (2016) reframes the discussion on theory building in IS literature, stating that privileging theory building over other types of conceptual artifacts, such as models and frameworks, may not be beneficial in pursuing the research questions that the IS discipline needs to study. This study extends on decades of literature on telework and adjacent research, and sheds a new light on the ever-evolving work environment, in which teleworking is no longer a stand-alone aspect; a new work environment that is characterized as the New Way of Working.

### 8.2.2 Practical contribution and implications

Besides the theoretical contribution, there are also practical contributions and implications from this research. These will be discussed by the three perspectives on transformation, knowledge management, and IT and information security.

First, from a transformational perspective, organizations struggle to find the right strategy to cope with the developments that change the work environment. The case studies in this research show that pre-implementation research generates a lot of extra insight, as to where organizations currently stand and what to focus on. Having insight in the current situation and the desired future situation enables organizations to focus their approach in the transformation towards the New Way of Working. The NWOW Analysis Monitor helps management to better focus the implementation, needs and expectations. The comparison between the current and future situation, from the perspective of management and employees, has proven its practical usefulness for the involved organizations. The NWOW Analysis Monitor fills a void in lacking knowledge for organizations on how to position themselves in the current adoption level of NWOW and how to approach future expectations and develop the right strategy to cope with the changes that lie ahead. Pre-implementation research generates a lot of insight, enabling organizations to cope with the changes that the implementation of NWOW brings to their operation. To a certain extent, it may also determine the satisfaction of employees, and future success.

With regard to the attitude towards NWOW, the case studies show managers and employees overall are and remain positive, but negative signals should not be ignored. The practical implication is that all possible should be done to monitor and coach employees during and after the transition to NWOW, especially those who work full time at the office. The research on personality traits shows the New Way of Working is not beneficial to all. Conscientious (self-disciplined) employees are better able to cope with the new work environment than (sensitive) high neuroticism employees. This implies that management should give attention to the individual employee and his or her perception of the new work environment.

Second, from a knowledge management perspective, organizations are confronted with a more mobile workforce that interacts and shares knowledge in new ways. In the new work environment, knowledge workers use a broader palette of communication channels, communicate less face-to-face, and choose the most suitable communication channels that are at hand. The practical implication is that, as knowledge is shared more often via multiple channels and in more informal ways, organizations need to invest in a proper technological infrastructure that supports the different preferences of knowledge sharing in a NWOW context. Knowledge is mostly shared in a mix of tacit and explicit forms, implying that, in order to capture all knowledge shared, mechanisms and technologies need to be in place to capture both tacit (personalized) and explicit (codified) knowledge sharing.

Third, from a IT and information security perspective, organizations struggle to develop information security policies to accommodate mobile working on multiple devices. The practical implication of giving employees more freedom of IT choice (BYOD/CYOD), is that more platforms and software will need to be supported and managed, placing an extra strain on IT departments. Provided the proper security policies with technical controls are in place, mobile working does not necessarily increase the level of IT security risk. This research however also shows information security policies may have a counter-productive negative effect on employee performance and work-life balance. Enabling employees to improve their task performance, whilst at the same time not giving up on corporate data protection, requires a balancing act with an intricate mix of freedom versus safety.

### **8.3 Limitations, reflections and future research**

This section contains the reflection on this dissertation. First, the limitations of the presented research are considered. Second, a number of general and personal reflections are given. Third, the directions of future research are explored.

#### **8.3.1 Limitations**

Performing research always has its limitations. It is often hard to find the right organizations and (number of) respondents that are willing to participate and contribute to research cases. A larger population often leads to statistically more significant relationships and smaller differences in findings between cases. Also,

non-measured factors may be the cause of differences between cases that cannot be subscribed to the implementation of the New Way of Working. For this reason, the research in chapter 4 is interesting, because all case organizations are in the process of implementing NWOW and have both traditional and new work settings, ruling out organizational differences in the individual case findings.

Time is often the most important limitation of participants. It was surprising to see that in a number of cases the management and employees of the organizations were so enthused by the New Way of Working, that their willingness to participate exceeded expectations. Sometimes, pressure on results and time constraints lead to the denial of participation or the refusal to perform additional research.

At the start of this dissertation research, it was still possible to find organizations that had not yet implemented the concepts of the New Way of Working, being able to measure their status quo and 'starting position'. However, as time continued most organizations were either in process of implementing NWOW or had already implemented NWOW. The NWOW Analysis Monitor proved its use in this situation, as it does not measure the difference between having - or not having – implemented NWOW. The monitor measures the (current) level of NWOW adoption and the future desired situation. This gave a uniform measurement baseline in all case studies for the research, whether the organization was still to implement NWOW, was in the transformation process towards NWOW, had finished the implementation, or was in an optimization phase. For instance, in the study in chapter 5 on the optimal mix of knowledge sharing, but also in the analysis of the effects of implementing NWOW in chapter 7, this baseline measurement of the level of NWOW adoption was extremely helpful.

All studies are conducted in the Netherlands, which can be seen as a limitation. Differences in nationalities and cultures could possibly provide different findings (Hofstede et al. 2010; Kok, 2016). It should be noted in this respect, that implementing the concepts of the New Way of Working has a particular large spread in the Netherlands and in a number of Scandinavian countries. In countries like Germany or France the phenomenon of NWOW is less known or spread. For example, the Microsoft Netherlands office is a worldwide showcase for the 'New World of Work'. From around the globe e.g. from South Korea, Microsoft and its (local) clients visit the Dutch office and are lectured on the principles of NWOW. From that perspective, besides tulips and Delft blue pottery, NWOW could be a Dutch export product. A positioning paper on NWOW was rejected by a UK-based journal, commenting that 'the New Way of Working was probably a local hype in the Netherlands'. Nonetheless, research on new ways of working can be found also under the denominator of Future of Work or New World of Work, though not extensively. Companies like Google have adopted the idea of inspiring office designs to boost creativity. The question is whether these developments should be seen as an occurrence completely outside the realm of what can be defined as new ways of working, or as part of an international growing understanding that the work environment is changing.

### 8.3.2 Possible drawbacks of the New Way of Working

Though this research and other research (e.g. Van Heck et al., 2012) indicates there are positive effects of the New Way of Working, there may also be drawbacks that should not be overseen. Apart from the benefits in schedule freedom and time saved in commuting, the New Way of Working could lead to social and professional isolation of the employee. Research in telework literature suggests that not all telework arrangements are effective and that negative outcomes are also observed under some conditions (Pyöriä, 2011; Mahler, 2012; Sardeshmukh et al., 2012; Tremblay & Thomsin, 2012), including social isolation (Golden et al. 2005, 2008), co-worker dissatisfaction (Golden, 2006, 2007), and the so-called ‘telework divide’, where negative impacts have been observed for those barred from telework (Mahler, 2012). There seems to be a tipping point at around 50% working remote from the office (Konradt et al., 2003, Gajendran & Harrison, 2007). Those who work more than 50% remote have more negative relationships with co-workers and maintain different communication patterns. The risk of social and professional isolation by being ‘invisible’ at the office, missing out on what is going on and gossip, or worse: being forgotten, is however unlikely when the actual absence is infrequent or less than 50% of the working time.

One of the other possible downsides of the New Way of Working is: not knowing when to stop working. When workers put in more hours of work they may become more productive, but their efficiency is not going up. Always being connected and constantly having the opportunity to perform small or bigger tasks, puts a strain on the employee’s discipline to draw the line between working and not-working. Because they are always connected, remote workers also need to manage the expectations of managers and coworkers who expect immediate responses. This makes it difficult for them to devote any block of time solely to non-work activities, threatening the very reason they chose to work remote in the first place (Hislop & Axtell, 2007; Leonardi et al., 2010).

Being able to work in a results-oriented way and carrying out tasks autonomously, instead of being managed in a controlling way, brings great freedom to the worker. In 1966 Herzberg already defined job autonomy as one of the most important motivators. Koenen et al., (2010) found that after the implementation of the New Way of Working 74% of the employees experience more job autonomy, higher levels of job satisfaction (56%), decreased level of stress (39%), and a more peaceful family life (38%). Though most employees enjoy this freedom, not all benefit from it. Slijkhuis (2012) found that there are employees who have difficulties coping effectively with the uncertainty and ambiguity of the newly gained freedom. These individuals with a ‘high personal need for structure’ (high-PNS) flourish in well-organized jobs in a hierarchical organization, whereas ‘low-PNS’ individuals would pine away in these jobs. The uncertainty of what is expected from them has a counterproductive effect on their work and motivation. This puts an extra load on the manager, who not only needs to be the ‘coach’ for most of his ‘independent’ employees, but also needs to recognize those individuals in need of more structure and guidance in the new work environment.

### 8.3.3 Perception of work: the industrial mind-set

The number 1 objection employees have against the implementation of the New Way of Working, and the new flexible office design, is the fear of losing their own desk and work space. Davenport (2005) found employees are often skeptical of open office arrangements, suspecting that the primary benefit is the lower space costs, achieved by ‘packing’ more people into the same physical space.

Employees are often of the opinion that their work requires a concentrated workplace, which the new office does not provide. This opinion may not be 100% legitimate. Research by the Danish Center for New Ways of Working has shown there is often a difference in the way people perceive their work, and the reality of the work they actually do (Bjerrum & Aaløkke, 2005). The reason for this misperception may lie in the ‘industrial mind-set’ of employees and managers: One has to produce visible results; hence individual and concentrated work is essential. In that mind-set informal meetings, telephone calls and other ‘disturbances’, are not seen as ‘real’ work and tend to be ‘forgotten’ or eliminated from the perceived work activities. In their research Bjerrum & Aaløkke (2005) found that there can be major differences between the perception and the actual observation of work. In an IT company, where workers claimed to be working concentrated on their workplaces all day, the actual presence in workplaces, over an observed period of 14 days, was only 45%. These numbers falls in line with McCue (1978), who found that only about 30% of the individual programmer’s time is spent working alone, about 50% is spent in groups of two or three. In an Australian desk utilization study the perceived time spent at desks was 81%, in reality it was only 40% (Laing & Wittenoom, 2013). Whatever the fraction of time is, it is important the new work environment supports concentrated work when needed. Cost savings of one-size-fits-all approaches may backfire when the kind of work being done is not supported (Davenport, 2005). When all ‘quiet places’ are constantly occupied for meetings, the office should be re-arranged, but not to return to the old situation but to improve on the new one.

The (industrial) misperception of the actual work performed may lead to frustration and complaints to the management, e.g.: ‘I cannot work in this environment’. It may even impact the work satisfaction outside the office: at home or in a third workplace. When the employee works outside the office, in order to avoid interruptions, all perceived ‘not-real-work’ activities may cause irritation and lead to stress for the worker and his or her environment and/or family (Tams et al., 2017). This may result in a lower satisfaction of the employee and a worse work-life balance, whilst a large part of the dissatisfaction is caused by a misperception of work activities, because of an imprinted industrial mind-set. Awareness at the management and workers for the effects of the industrial mind-set and misperception of work, and proper action to change this mind-set, may lead to greater work satisfaction and success in implementing the New Way of Working. Possibly, the opposition against a new work environment and new working methods is not only fed by a misperception of work or an industrial mind-set, but simply by the tendency of people to resist change.

### 8.3.4 Personal reflections

Performing research for the past six years in organizations made me realize the magnitude of the change we are going through in this era. Companies struggle to face competition, attracting and maintaining talent, and adopting and facilitating new ways of working, in spite of the threats of security breaches, hacks and loss of vital corporate data. At the start of this study one question came up immediately: What is ‘new’ about the New Way of Working? Our work is continually subject to change, so where to draw a line between old and new? I decided that this study would need to stand on the shoulders of decades of research on telework, with telework being the mature theory and NWOW the intermediate or even nascent theory (Edmondson & McManus, 2007). The extensive literature study in both fields gave rise to a number of observations that are contained in the introduction of this dissertation. It also led to the insight that a ‘scale’, indicating the level of adoption of the concepts of NWOW, would be needed to position the research against. Without this ‘scale’ the results would be a dot in an undefined space. The first step was therefore to develop the so-called NWOW Analysis Monitor, and use this measurement instrument in all subsequent research. This implied that, besides the time needed for the ‘actual’ research topic, respondents had to spend an additional portion of their time on the analysis monitor. Though some declined, most were more than willing to go this extra mile.

With most research being performed in a case study setting at various organizations, using a variety of research approaches, it was my desire to perform a broad market research on the effects of NWOW, and use statistical analysis techniques on the outcomes. The set-up, execution and processing of this research (in chapter 7) took over a year, and resulted in over 1,000 respondents from almost 9,000 invitations. Having used SPSS in previous research, the complexity of the research model introduced me to the second generation data analysis technique of PLS-SEM, an experience I would not have wanted to miss.

Being a part-time external PhD graduate influenced the duration of my efforts, allowing me to stay involved in science for an extended period of time, professionalizing my scientific skills in multiple ways. I greatly value the insights and experience I was able to gain, that eventually led to this work, laying the fundament for my future scientific and career development.

### 8.3.5 Future research

In the introduction it was mentioned that existing research on the new work environment is still scarce. There are decades of research on telework, but this research often does not cover the specific combination of elements in the New Way of Working. This research partly fills this void, but more future research is needed to support and extend on the research in this study.

The research in this dissertation is often performed in organizations facing an implementation of the New Way of Working, or being in the process of it, and in

some cases, having made the transition toward NWOW. This means many observations as based on a future or recent implementation of NWOW. As in time organizations become more mature in their adoption levels of new ways of working, future research could discover more of the long-lasting effects of the implementation of the New Way of Working. This could be

- (1) on the attitude towards NWOW: has it remained positive and what are the long-lasting effects?
- (2) on knowledge sharing: as mobility increases, has knowledge sharing become ever more fluid, and which measures were effective in capturing this knowledge?
- (3) on information mobile working and information securities: has the balance between freedom and safety been found, in order to reap the benefits of working anyplace anytime? And finally
- (4) on the effects of NWOW on the employee and organization: have job satisfaction, work-life balance and productivity actually improved and sustained over time?

As the research in dissertation is solely conducted in the Netherlands, international research should support the findings of this study. The research in the Scandinavian countries points in the same direction, but a broader international research base is needed to support these studies.

This dissertation research adds to the existing research, but it only provides a first glance of the future that lies ahead. A future in which our work environment has even more radically changed, as the changes will continue in the decades to come. The results of this dissertation study should therefore be used with caution, as more future research should support these first findings that only point in a possible direction, whilst the reality is multifaceted.



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## References

- Aaløkke, S., Bjerrum, E., Bødker, S., & Bechmann Petersen, A. (2005). *Gate Keeping or Bridge Building? – Cooperation, Learning and Boundary Working in a Cross-media Workplace*. Alexandra Institute. Center for New Ways of Working. Aarhus University.
- Ahuja, M. K., Galletta, D. F., & Carley, K. M. (2003). Individual centrality and performance in virtual R&D groups: An empirical study. *Management science*, 49(1), 21-38.
- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS quarterly*, 107-136.
- Allen, T. J. (1977). *Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information within the R&D Organization*. Cambridge, MA. USA. MIT Press.
- Allen, T. J. (2007). Architecture and communication among product development engineers. *California Management Review*, 49(2), 23-41.
- Alter, S. (1999). A general, yet useful theory of information systems. *Communications of the AIS*, 1(3es), 3.
- Alter, S. (2017). Nothing is more practical than a good conceptual artifact... which may be a theory, framework, model, metaphor, paradigm or perhaps some other abstraction. *Information Systems Journal*, 27(5), 671-693.
- Alvesson, M. (2004). *Knowledge work and knowledge-intensive firms*. Oxford University Press. Oxford.
- Ames, Daniel R., and Francis J. Flynn (2007). What Breaks a Leader: The Curvilinear Relation Between Assertiveness and Leadership. *Journal of Personality and Social Psychology*, 92, 307-324.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.

## References

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- Avery, D. R., McKay, P. F., & Wilson, D. C. (2007). Engaging the aging workforce: the relationship between perceived age similarity, satisfaction with coworkers, and employee engagement. *Journal of Applied Psychology*, 92(6), 1542.
- Baane R., Houtkamp P., & Knotter M. (2010). *The new world of work unraveled. Het nieuwe werken ontrafeld – over Bricks, Bytes & Behavior*. 1-168. Koninklijke Van Gorcum. ISBN 792778274.
- Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions, and lessons for the study of modern work. *Journal of organizational behavior*, 23(4), 383-400.
- Baltes, B. B., Briggs, T. E., Huff, J. W., Wright, J. A., & Neuman, G. A. (1999). Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology*, Vol 84, No 4, 496-513.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* (84:2), 191–215.
- Barley, S. R., & Kunda, G. (2001). Bringing work back in. *Organization science*, 12(1), 76-95.
- Barrick, M. R. & Mount, M. K. (1991) The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Personnel Psychology*; 44, 1.
- Baruch, Y. (2000). Teleworking: Benefits and pitfalls as perceived by professionals and managers. *New Technology, Work and Employment*, 15(1), 34-49.
- Baruch, Y. (2001). The status of research on teleworking and an agenda for future research. *International Journal of Management Reviews*, 3(2), 113–129.
- Baskerville, R. (1993). Information systems security design methods: implications for information systems development. *ACM Computing Surveys*, 25(4), 375–414.
- Bass, B. M., & Bass, R. (2009). *The Bass handbook of leadership: Theory, research, and managerial applications*. Simon and Schuster.
- Beauregard, T. A., & Henry, L. C. (2009). Making the link between work-life balance practices and organizational performance. *Human Resource Management Review*, 19(1), 9-22.
- Bellefroid, B. (2012). *The new way of knowledge sharing. A thesis research about the effects of NWOW on knowledge sharing*. Utrecht University.
- Bentley, T. A., Teo, S. T. T., McLeod, L., Tan, F., Bosua, R., & Gloet, M. (2016). The role of organisational support in teleworker wellbeing: A socio-technical systems approach. *Applied Ergonomics*, 52, 207-215.

- Bettencourt, L. A., Gwinner, K. P., & Meuter, M. L. (2001). A comparison of attitude, personality, and knowledge predictors of service-oriented organizational citizenship behaviors. *Journal of applied psychology*, 86(1), 29.
- Bijl, D. W. (2011). *Journey towards the New Way of Working - creating sustainable performance and joy at work*. Par CC. ISBN 9789490528003.
- Bjerrum, E., & Aaløkke, S. (2005). Working together: Work space, organization and conception of work. *The International Telework Conference 2005*, 1-13.
- Bødker, S., & Christiansen, E. (2002). Lost and Found in Flexibility. *Proceedings of the 25th Information Systems Research Seminar in Scandinavia, IRIS 2002*. Human-Computer Interaction Resource Network.
- Boss, S.R., Kirsch, L.J., Angermeier, I., Shingler, R.A. & Boss, R.W. (2009). If someone is watching, I'll do what I'masked: mandatoriness, control, and information security. *European Journal of Information Systems*, 18, 151–164.
- Brehm, J.W. (1966). *A Theory of Psychological Reactance*. Academic Press, Inc., London, U.K.
- Brehm, J.W. (1972). *Response to Loss of Freedom: A Theory of Psychological Reactance*. General Learning Press, Morristown, NJ.
- Brehm, J.W. & Brehm, S.S. (1981). *Psychological Reactance: A Theory of Freedom and Control*. Academic Press, San Diego, CA.
- Bulgurcu, B., Cavusoglu, H. & Benbasat, I. (2010). Information security policy compliance: an empirical study of rationality-based beliefs and information security awareness. *MIS Quarterly*, 34, 523–548.
- Burgoon, M., Alvaro, E., Grandpre, J. & Voulodakis, M. (2002). Revisting the theory of psychological reactance. In: Dillard, J.P. & Pfau, M. (Eds.). *The Persuasion Handbook: Developments in Theory and Practice*, 213–233. Sage, Thousand Oaks, CA.
- Burke, R. J., & Ng, E. (2006). The changing nature of work and organizations: Implications for human resource management. *Human Resource Management Review*, 16(2), 86-94.
- Bryan, L.L. & Joyce, C.I. (2007). *Mobilizing Minds: Creating Wealth from Talent in the 21st-Century Organization*. New Jersey, USA: McGraw-Hill Education.
- Carlson, J.R., & Zmud, R.W. (1999). Channel expansion theory and the experiential nature of media richness perceptions. *Academy of Management*, 42(2), 153–170.
- Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of formative measurement in information systems research. *MIS Quarterly*, 689-707.

- Child, J. & McGrath, R.G. (2001). Organizations Unfettered: Organizational Form in an Information-intensive Economy. *Academy of Management Journal*. 44(6), 1135-1148.
- Citrix. (2013). *Best practices to make BYOD simple and secure. A guide to selecting technologies and developing policies for BYOD*. Citrix Systems.
- Citrix. (2017). *Best Practices to make BYOD, CYOD and COPE simple and secure. Mobile productivity for your business. Freedom of choice for employees. Full security and control for IT*. Citrix Systems.
- Clark, L. A., Karau, S.J., & Michalisin M. D. (2012). Telecommuting Attitudes and the 'Big Five' Personality Dimensions. *Journal of Management Policy and Practice*. 13(3), 31-46.
- Chin, W. W., & Todd, P. A. (1995). On the use, usefulness, and ease of use of Structural Equation Modeling in MIS research: A note of caution. *MIS Quarterly*, 237-246.
- Chin, W.W. (2010). How to write up and report PLS analyses. In Vinzi, V.E., Chin, W. W., Henseler, J., & Wang, H. (Eds.). *Handbook of Partial Least Squares. Concepts, methods and applications*. 655–690. Springer Science & Business Media. New York.
- Coltman, T. R., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of erroneous measurement. *Journal of Business Research*, 23(12)
- Compeau, D.R., & Higgins, C.A. (1995). Computer Self-Efficacy: Development of a Measure and Initial Test. *MIS Quarterly* 19(2), 189–211.
- Constandache, N., & Chiru, G. (2016). Balanced Scorecard: Organizational performance management instrument. *EuroEconomica*, 34(2).
- Cornelissen, M. & Kok, A. de. (1993). *Product Data Management: A selection method for supporting software packages. Produktgegevensbeheer: een selectiemethode voor ondersteunende softwarepakketten*. NGI, Dutch Computer Society. Samsom Bedrijfsinformatie. ISBN 90-14-04985-4.
- Cornelissen, M., Kok, A. de, & Mandemaker, D. (1995). *PDM Selection Guide: From needs to selection: A business solution: Guide for the selection of Product Data Management systems*. Delft University Press. NGI, Dutch Computer Society. ISBN 9040711429
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Csikszentmihalyi, M. (1988). The flow experience and human psychology. In Csikszentmihalyi, M., & Csikszentmihalyi, I. S., (Eds.). *Optimal Experience: Psychological studies of flow in consciousness*. 15-35. New York: Cambridge University Press.

- Csikszentmihalyi, M. (1990). *Flow: the psychology of optimal experience*. New York: Harpers Perennial.
- Daft, R.L., & Lengel, R.H. (1984). Information richness: A new approach to managerial behavior and organization design. In: L.L. Cummings & B. Staw (Eds.). *Research in organizational behavior* (Vol. 6), 191 – 233. Greenwich, CT: JAI Press.
- Daniëls, K., Lamond, D., & Standen, P. (2000). *Managing telework: perspectives from human resource management and work psychology*. Learning Business Press; London.
- D'Arcy, J., Hovav, A., & Galletta, D. (2009). User awareness of security countermeasures and its impact on information systems misuse: a deterrence approach. *Information Systems Research*, 20(1), 79-98.
- D'Arcy, J., & Herath, T. (2011). A review and analysis of deterrence theory in the IS security literature: making sense of the disparate findings. *European Journal of Information Systems*, 20(6), 643-658.
- Davenport, T.H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
- Davenport, T. H. (2005). *Thinking for a living: how to get better performances and results from knowledge workers*. Harvard Business Press.
- Davis, R. V., England, G. W., & Lofquist, L. H. (1964). A theory of work measurement. *Minnesota Studies in Vocational Rehabilitation*, 38, 15-27.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*, 38(3), 475-487.
- De Jonge, J., & Schaufeli, W. B. (1998). Job characteristics and employee well-being: A test of Warr's Vitamin Model in health care workers using structural equation modelling. *Journal of organizational behavior*, 387-407.
- De Long, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *The Academy of Management Executive*, 14(4), pp. 113-127.
- De Luque, M. S., Washburn, N. T., Waldman, D. A., & House, R. J. (2008). Unrequited profit: How stakeholder and economic values relate to subordinates' perceptions of leadership and firm performance. *Administrative Science Quarterly*, 53(4), 626-654.
- Depickere, A. (1999). Managing Virtual Working. Between Commitment and Control?, in Jackson, P. (ed.), *Virtual Working: Social and Organisational Dynamics*, Routledge, London.

## References

---

- Descartes, R. (1644). *Principia philosophiae*, Amsterdam Pt, 2, 57-59.
- Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, 17(4), 263-282.
- Digman, J.M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*. 41: 417–440.
- Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication Monographs*, 72(2), 144-168.
- DiMartino V. & Wirth L. (1990). Telework: a new way of working and living. *International Labour Review*. 129: 529– 554.
- Dries, H. van den, Fiddelaar, J., & Westeinde, J. J. van 't. (2013). *Satisfaction with the New Way of Working, a conscious choice? – Tevredenheid met Het Nieuwe Werken, een bewuste keuze?* Utrecht University.
- Drucker, P. F. (1969). *The Age of Discontinuity: Guidelines to Our Changing Society*, Heinemann, London.
- Drucker, P. F. (1999). Knowledge worker productivity: The biggest challenge. *California Management Review*. 41(2), 79-94.
- Duffy, F. (2000). Design and facilities management in a time of change. *Facilities*. 18, 371-375.
- Duxbury, L. E., & Neufeld, D. (1999). An empirical evaluation of the impacts of telecommuting on intra-organizational communication. *Journal of Engineering and Technology Management*. 16(1), 1–28.
- Edmondson, A., & McManus, S. (2007). Methodological fit in management field research. *Academy of management review*. 32(4), 1155–1179.
- Eichhorn, B. R. (2014). *Common Method Variance Techniques*. Cleveland State University, Department of Operations & Supply Chain Management. Cleveland, OH: SAS Institute Inc.
- Ellinger, A. D., Beattie, R., Hamlin, R., Wang, Y., & Trolan, O. (2006). The manager as coach: A review of empirical literature and the development of a tentative model of managerial coaching. In *European HRD Conference*.
- Ellinger, A. D., Beattie, R. S., & Hamlin, R. G. (2010). *The manager as coach. The complete handbook of coaching*, 257-270.
- Ellison, N. B., Gibbs, J. L., & Weber, M. S. (2015). The use of enterprise social network sites for knowledge sharing in distributed organizations: The role of organizational affordances. *American Behavioral Scientist*, 59(1), 103-123.

- Emmerik van, I. J. H., Jawahar, I. M., & Stone, T. H. (2004). The relationship between personality and discretionary helping behaviours. *Psychological Reports*, 95(1), 355-365.
- Evered, R. D., & Selman, J. C. (1989). Coaching and the art of management. *Organizational Dynamics*, 18, 16-32.
- Eysenck, H. J. (1967). *The biological basis of personality*. Springfield, IL: Thomas.
- Finneran, C., & Zhang, P. (2002). The challenges of studying flow within a computer-mediated environment. *AMCIS 2002 Proceedings*, 146.
- Fleming, J. H., Coffman, C., & Harter, J. K. (2005). Manage your human sigma. *Harvard business review*, 83(7), 106-14.
- Foertsch, C., & Dullroy, J. (2012). *2nd Annual Global Coworking Survey*. Deskmag.
- Foorthuis, R., Steenbergen, M., Brinkkemper, S., & Bruls, W. A. (2016). A theory building study of enterprise architecture practices and benefits. *Information Systems Frontiers*, 18(3), 541-564.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 39-50.
- Friedman, T. L. (2005). *The World is Flat - A Brief History of the Twenty-First Century*. Farrar, Straus and Giroux New York. ISBN 0-374-29288-1.
- Gainey T.H., & Clenney B., F. (2006). *Flextime and Telecommuting: Examining Individual Perceptions*, Southern Business Review, 32,1, 13-27.
- Gajar, P. K., Ghosh, A., & Rai, S. (2013). Bring Your Own Device (BYOD): Security risks and mitigating strategies. *Journal of Global Research in Computer Science*, 4(4), 62-70.
- Gajendran, R.S., & Harrison, D.A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, 92(6), 1524-1541
- Gates, B. (2005). *The New World of Work*. Microsoft Executive Briefing, Retrieved from <http://www.microsoft.com/mscorp/execmail/2005/05-19newworldofwork.mspx>
- Gartner. (2015). *Identity and Access management (IAM)*. Retrieved from <http://www.gartner.com/it-glossary/identity-and-access-management-iam/>
- Gefen, D., & Keil, M. (1998). The Impact of Developer Responsiveness on Perceptions of Usefulness and Ease of Use: an Extension of the Technology Acceptance Model. ACM Sigmis. *The Data Base for Advances in Information Systems*. 29(2), 35-49.

## References

---

- Gefen, D., Straub, D. W., & Boudreau, M. (2000). Structural equation modeling techniques and regression: guidelines for research practice. *Communications of the AIS*, 7(7), 1–78.
- Giddens, L., & Tripp, J. (2014). It's My Tool, I Know How to Use It: A Theory of the Impact of BYOD on Device Competence and Job Satisfaction. *Twentieth Americas Conference on Information Systems*, 1–8.
- Ghani, J. (1991). Flow in human computer interactions: test of a model. In J. Carey (Ed.), *Human Factors in Information Systems: Emerging Theoretical Bases*. New Jersey: Ablex Publishing Corp.
- Ghoshal, S., & Moran, P. (1996). Bad for practice: A critique of the transaction cost theory. *Academy of management Review*, 21(1), 13-47.
- Ghoshal, S., & Bartlett, C.A. (1997). *The individualized corporation. A fundamentally new approach to management*. New York, USA: Harper Collins. ISBN 0-88730-806-6.
- Gillen, N., & Jeffery, H. (2014). *The pursuit of happiness: how does the workplace influence productivity?* See Further, The next generation occupier issue, Issue 01, Aecom.
- Gillett, F. E. (2012). *Tablets Will Rule The Future Personal Computing Landscape*. Forrester Research.
- Goffee, R., & Jones, G. (2013) Creating the Best Workplace on Earth: What employees really require to be most productive. *Harvard Business Review*, 91, pp. 98-106.
- Goldberg, L. R. (1990). An alternative description of personality: The big five factor structure. *Journal of Personality and Social Psychology*, 59, 1216-1229.
- Golden, T. D., & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: resolving inconsistent findings. *Journal of Management*, 31(2), 301-318.
- Golden, T. D. (2006). The role of relationships in understanding telecommuter satisfaction. *Journal of Organizational Behavior*, 27(3), 319-340.
- Golden, T. (2007). Co-workers who telework and the impact on those in the office: Understanding the implications of virtual work for co-worker satisfaction and turnover intentions. *Human Relations*, 60(11), 1641-1667.
- Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworkers job performance and turnover interventions: Does time spent teleworking, interacting face-to-face time, or having access to communication-enhancing technology matter? *Journal of Applied Psychology*, 93, 1412-1421.

- Gorgievski, M. J., Voordt, T. J. van der, van Herpen, S. G., & van Akkeren, S. (2010). After the fire: new ways of working in an academic setting. *Facilities*, 28(3/4), 206-224.
- Govcert. National Cyber Security Centrum. (2009). *Security of mobile devices and data carriers. Beveiliging van mobiele apparatuur en datadragers*. Retrieved from <https://www.ncsc.nl/actueel/whitepapers/whitepaper-beveiliging-van-mobiele-apparatuur-en-datadragers.html>
- GovernmentNL. Rijksoverheid, Government of the Netherlands. (2011). *The New Way of Working and labour legislation – Het nieuwe werken en de arbeidsrechtelijke regelgeving*. Retrieved from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2011/10/10/aanbiedingsbrief-van-staatssecretaris-de-krom-szw-bij-het-rapport-het-nieuwe-werken-en-de-arbeidsrechtelijke-regelgeving>
- Greene, C., & Myerson, J. (2011). Space for thought: designing for knowledge workers. *Facilities*, 29(1/2), 19-30.
- Groves, K., Knicht, W., & Denison, E. (2010). *I Wish I Worked There! A Look Inside the Most Creative Spaces in Business*. Wiley. ISBN 978-0-470-71383-9.
- Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied psychology*, 60(2), 159.
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16(2), 250-279.
- Haddon, L. & Lewis, A. (1994). The experience of teleworking: An annotated review. *International Journal of Human Resource Management*, 5(1), 193-223.
- Haenlein, M., & Kaplan, A. M. (2004). A beginner's guide to partial least squares analysis. *Understanding Statistics*, 3(4), 283–297.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River: Pearson Prentice Hall.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, 40(3), 414-433.
- Halpern, D. F. (2005). How time-flexible work policies can reduce stress, improve health, and save money. *Stress and Health*, 21(3), 157–168. doi:10.1002/smj.1049.

## References

---

- Hammer, M., & Champy, J.A. (1993). *Reengineering the Corporation: A Manifesto for Business Revolution*. Ch. 4 & 5. HarperCollins Publishers Inc. ISBN 0-06-662112-7.
- Hansen, M. T., Nohria, N., & Tierney, T. (1999). What's your strategy for managing knowledge. *The knowledge management yearbook 2000–2001*, 1-10.
- Hardjono, T.W. & Bakker, R.J.M. (2002). *Management of processes: identify, control, manage and innovate. Management van processen: identificeren, besturen, beheersen en vernieuwen*. INK-managementmodel. ISBN 9014096070. Kluwer.
- Harker Martin, B., & MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Management Research Review*, 35(7), 602-616.
- Harman, H. H. (1976). *Modern Factor Analysis*. University of Chicago Press. Chicago, IL.
- Harris, J., Ives, B., & Junglas, I. (2012). IT Consumerization: When gadgets turn into enterprise IT tools. *MIS Quarterly Executive*, 11(3), 99–112.
- Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology*. 87 (2), 268-279.
- Harter, J. K., Schmidt, F. L., Agrawal, S., & Plowman, S. K. (2013). *The relationship between engagement at work and organizational outcomes*. Gallup Poll Consulting University Press, Washington.
- Heerdt, J., & Bondarouk, T. (2009). Information Overload in the New World of Work: Qualitative Study into the Reasons. *Handbook of Research on E-Transformation and Human Resources Management Technologies: Organizational Outcomes and Challenges*, 396.
- Herath, T., & Rao, H. R. (2009). Protection motivation and deterrence: a framework for security policy compliance in organisations. *European Journal of Information Systems*, 18(2), 106-125.
- Herzberg, F. I. (1966). *Work and nature of man*. Cleveland, OH: World.
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), 75-105.
- Hill, E. J., Hawkins, A. J., Ferris, M., & Weitzman, M., (2001). Finding an extra day a week : The positive influence of perceived job flexibility on work and family life balance. *National Council on Family Relations*, Vol.50, No.1, pp. 49–58. Jstor.

- Hislop, D. (2005). *Knowledge management in organizations: A critical introduction*. Oxford University Press.
- Hislop, D., & Axtell, C. (2007). The neglect of spatial mobility in contemporary studies of work: the case of telework. *New Technology, Work and Employment*, 22(1), 34-51.
- Hofstede, G. (1980). Motivation, leadership, and organization: do American theories apply abroad? *Organizational dynamics*, 9(1), 42-63.
- Hofstede, G., Hofstede, G.J., & Minkov, M. (2010). *Cultures and Organizations - Software of the mind*. McGraw-Hill. New York. ISBN 978-0-07-166418-9.
- Holtsnider, B., & Jaffe, B. D. (2012). *IT Manager's Handbook: Getting Your New Job Done*. Morgan Kaufmann.
- House, R., Javidan, M., Hanges, P., & Dorfman, P. (2002). Understanding cultures and implicit leadership theories across the globe: an introduction to project GLOBE. *Journal of world business*, 37(1), 3-10.
- Hua, Y., Loftness, V., Kraut, R., & Powell, K. M. (2010). Workplace collaborative space layout typology and occupant perception of collaboration environment. *Environment and Planning B: Planning and Design*, 37(3), 429-448.
- Hubbard, G. (2009). Measuring Organizational Performance: Beyond the Triple Bottom Line. *Business Strategy and the Environment* 19, 177–191
- Ingalsbe, J. a, Shoemaker, D., & Mead, N. R. (2011). Threat Modeling the Cloud Computing, Mobile Device Toting, Consumerized Enterprise – an overview of considerations. *AMCIS 2011 Proceedings*, 1–6.
- Ipe, M. (2003). Knowledge Sharing in Organizations: A Conceptual Framework. *Human Resource Development Review*, 2(4), 337–359.
- Isaacson, W. (2011). *Steve jobs*. JC Lattès.
- Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of consumer research*, 30(2), 199-218.
- Johns, T., & Gratton, L. (2013). The third wave of virtual work. *Harvard Business Review*, 91(1), 66-73.
- Jones, P., & Jordan, J. (1998). Knowledge orientations and team effectiveness. *International Journal of Technology Management*, 16(1-3), 152-161.
- Joo, B. K. B., Sushko, J. S., & McLean, G. N. (2012). Multiple faces of coaching: Manager-as-coach, executive coaching, and formal mentoring. *Organization Development Journal*, 30(1), 19.

## References

---

- Joseph, D., Boh, W. F., Ang, S., & Slaughter, S. (2012). The career paths less (or more) traveled: a sequence analysis of IT career histories, mobility patterns, and career success. *MIS Quarterly*, 36(2), 427-452.
- Judge, T. A., & Cable, D. M. (1997). Applicant personality, organizational culture, and organization attraction. *Personnel psychology*, 50(2), 359-394.
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of management journal*, 33(4), 692-724.
- Kahn, W. A. (1992). To be fully there: Psychological presence at work. *Human Relations*, 45, 321–349.
- Kaplan, R.S. & Norton, D.P. (1992). The Balanced Scorecard – Measures that Drive Performance, *Harvard Business Review*, 70(1), 71-79.
- Kaplan, R. S., & Norton, D. P. (1993). Putting the Balanced Scorecard to work. *Harvard Business Review*, 71(5), 134-140.
- Kaplan, R. S., & Norton, D. P. (1996). Using the Balanced Scorecard as a Strategic Management System. *Harvard Business Review*, January-February 1996.
- Kaplan, R. S., & Norton, D. P. (1996). *The Balanced Scorecard: Translating strategy into action*. Boston: Harvard Business School Press.
- Kastelein, J.P. (2014), *Space meets knowledge. The impact of workplace design on knowledge sharing*. Doctoral dissertation. Nijenrode Business School. ISBN 978-90-8980-065-7.
- Kattenbach, R., Demerouti, E., & Nachreiner, F. (2010). Flexible working times: Effects on employees' exhaustion, work-nonwork conflict and job performance. *Career Development International*, 15(3), 279-295.
- Kelliher, C., & Anderson, D. (2008). For better or for worse? An analysis of how flexible working practices influence employees' perceptions of job quality. *International Journal of Human Resource Management*, 19(3), 419–431.
- Khalfan, M. M., Anumba, C. J., Siemieniuch, C. E., & Sinclair, M. A. (2001). Readiness Assessment of the construction supply chain for concurrent engineering. *European Journal of Purchasing & Supply Management*, 7(2), 141-153.
- Kiili, K. (2005). Digital game-based learning: Towards an experiential gaming model. *Internet and Higher Education*, 8(1), 13–24.
- King, W.R. (2006). Knowledge sharing. In: Schwartz, D.G. (Eds.). *Encyclopedia of Knowledge Management*. IGI Global. Idea Group Publishers; p. 493–8.
- Kirsch, S. (1995). The incredible shrinking world? Technology and the production of space. *Environment and Planning D: Society and Space*, 13(5), 529-555.

- Kluwer. (2011). *National Investigation on the New Way of Working - Nationaal Onderzoek Over Het Nieuwe Werken* (pp. 1-81). Kluwer Publishing.
- Kock, N., & Lynn, G. S. (2012). Lateral collinearity and misleading results in variance-based SEM: an illustration and recommendations. *Journal of the Association for Information Systems*, 13(7), 546–580.
- Kock, N. (2015). *WarpPLS 5.0. User Manual*. ScriptWarp Systems. Laredo, Texas USA.
- Koenen, B., Vieira, V., & Verhue, D. (2010). *The Netherlands ready for the New Way of Working - Nederland klaar voor het nieuwe werken: Onderzoek in het kader van de week van het nieuwe werken*. TNS NIPO Publication No. 5475.
- Kok, A. de, & Helms, R. W. (2012). *The New Way of Working versus telework: Definition and positioning*. Research paper on 148 literature sources. Center for Organization and Information, Utrecht University.
- Kok, A. de, Bellefroid, B., & Helms, R. W. (2013). Knowledge Sharing and Channel Choice: Effects of the New Way of Working. *Proceedings of the 14th European Conference on Knowledge Management, ECKM 2013*.
- Kok, A. de, Koops, J., & Helms, R. W. (2014). Assessing the New Way of Working: Bricks, Bytes and Behavior. *Proceedings of the 18th Pacific Asia Conference on Information Systems, PACIS 2014*.
- Kok, A. de, Esten, R., & Helms, R. W. (2015). Knowledge Sharing in the New World of Work: Effects of the New Way of Working. *Journal of Information Technology Services, KITS*, 14(2), 315-335.
- Kok, A. de, Lubbers, Y., & Helms, R. W. (2015). Mobility and Security in the New Way of Working: Employee Satisfaction in a Choose Your Own Device (CYOD) Environment. *Proceedings of the 9th Mediterranean Conference on Information Systems, MCIS 2015*.
- Kok, A. de. (2016). The New Way of Working: Bricks, Bytes and Behavior. In: Lee, J. (Eds.). *The Impact of ICT on Work*. Springer Science & Business Media. 9-40.
- Kok, A. de, Zwieten, J. van, & Helms, R.W. (2016). Attitude towards NWOW and Activity Based Working: Activity Patterns and Change Perspectives. *Proceedings of the 17th European Conference on Knowledge Management, ECKM 2016*.
- Kok, A. de, Foorthuis, R. M., Thatcher, J. B., & Helms, R. W. (2017). The Effects of the New Way of Working and Information Security Policies on Employee Engagement and Organizational Performance. *Submitted for journal publication*.

## References

---

- Konradt, U., Hertel, G., & Schmook, R. (2003). Quality of management by objectives, task-related stressors, and non-task related stressors as predictors of stress and job satisfaction among teleworkers. *European Journal of Work and Organizational Psychology*, 12(1), 61-79.
- Kopelman, R. E., Greenhaus, J. H., & Connolly, T. F. (1983). A model of work, family, and interrole conflict: A construct validation study. *Organizational behavior and human performance*, 32(2), 198-215.
- Kornberger, M., & Clegg, S. R. (2004). Bringing space back in: Organizing the generative building. *Organization Studies*, 25(7), 1095-1114.
- Kossek, E. E., Lautsch, B. A., & Eaton, S. C. (2006). Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work-family effectiveness. *Journal of Vocational Behavior*, 68(2), 347-367.
- Kwapil, T. R., Wrobel, M. J., & Pope, C. A. (2002). The five-factor personality structure of dissociative experiences. *Personality and Individual Differences*, 32(3), 431-443.
- Laing, A., Craig, D. & White, A. (2011). Vision statement: High-Performance Office Space. *Harvard Business Review*, September 2011, 32-33.
- Laing, A. (2013). *Work and workplaces in the digital city*. Center for Urban Real Estate. Columbia University.
- Laing, A., & Wittenoom, S. (2013). *The Emerging City Workscape : Propositions for Sydney*. Strategy+ Aecom.
- Lam, S. S., Chen, X. P., & Schaubroeck, J. (2002). Participative decision making and employee performance in different cultures: The moderating effects of allocentrism/idiocentrism and efficacy. *Academy of Management Journal*, 45(5), 905-914.
- Lee, J. (Eds.). (2016). *The impact of ICT on work*. Springer Science & Business Media. ISBN 9789812876119.
- Leonardi, P. M., Treem, J. W., & Jackson, M. H. (2010). The connectivity paradox: Using technology to both decrease and increase perceptions of distance in distributed work arrangements. *Journal of Applied Communication Research*, 38(1), 85-105.
- Lindell, M. K., & Whitney, D.J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86(1), 114–121.
- Lonkhuyzen, P. van (2009). *Microsoft looks boundaries of 'new work'- Microsoft zoekt grenzen 'nieuw werken' - Rinsema wil méér*. MT Management. November 2009.

- Lorentzen, A. (2008). Knowledge networks in local and global space. *Entrepreneurship and Regional Development*, 20(6), 533-545.
- Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, 57(2), 123–146.
- Lowry, P. B., & Moody, G. D. (2015). Proposing the control-reactance compliance model (CRCM) to explain opposing motivations to comply with organisational information security policies. *Information Systems Journal*, 25(5), 433-463.
- MacCallum, R. C., & Browne, M. W. (1993). The use of causal indicators in covariance structure models: some practical issues. *Psychological bulletin*, 114(3), 533.
- Mahler, J. (2012). The telework divide: Managerial and personnel challenges of telework. *Review of Public Personnel Administration*, 32(4), 407-418.
- McCrae, R. R. & Costa, P. T. (1991). Adding liebe und arbeit: The full five-factor model and wellbeing. *Personality and Social Psychology Bulletin*, 17, 227-232.
- McCrae, R. R. & Costa, P. T. (2003). *Personality in Adulthood: A Five-Factor Theory Perspective*. New York: Guilford Press.
- McCue, G. M. (1978). IBM's Santa Teresa Laboratory—Architectural design for program development. *IBM Systems Journal*, 17(1), 4-25.
- McCusker, J.A. (2002). *Individuals and open space office design: The relationship between personality and satisfaction in an open space work environment*. Alliant International University, Los Angeles.
- McNall, L. A., Masuda, A. D., & Nicklin, J. M. (2009). Flexible work arrangements, job satisfaction, and turnover intentions: The mediating role of work-to-family enrichment. *Journal of Psychology*, 144(1), 61–81.
- Meel, J. van. (2011). The origins of new ways of working: Office concepts in the 1970s. *Facilities*, 29(9-10), 357-367.
- Mettler, T., & Rohner, P. (2009). Situational maturity models as instrumental artifacts for organizational design. *Proceedings of the 4th International Conference on Design Science Research in Information Systems and Technology* (p. 22). ACM.
- Meulen, N. van der (2014). *Status of the New Way of Working: Results of the National NWOW Barometer 2013 - De staat van Het Nieuwe Werken: Resultaten van de Nationale HNW Barometer 2013*. Rotterdam School of Management. Erasmus University Rotterdam.

## References

---

- Microsoft. (2005). *Digital Workstyle: The New World of Work*. A Microsoft White Paper.
- MicrosoftNL. (2005). *Digital Workstyle: The New Way of Working. Digitale werkstijl: het nieuwe werken*. Een Microsoft white paper.
- Mintzberg, H. (1978). *The Structuring of Organizations – A Synthesis of Research*. Pearson Education. ISBN-13 978-0138552701.
- Morrow, B. (2012). BYOD security challenges: Control and protect your most sensitive data. *Network Security*, 2012(12), 5–8.
- Moschella, D., Neal, D., Opperman, P., & Taylor, J. (2004). *The "Consumerization" of Information Technology*. El Segundo, California, USA. Leading Edge Forum, CSC Research and Advisory Series.
- Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-Factor model of personality and performance in jobs involving interpersonal interactions. *Human Performance*, 11, 145-166.
- Mowen, J.C., (2000). *The 3M model of motivation and personality: Theory and empirical applications to consumer behavior*. Norwell, Massachusetts, USA. Springer Science & Business Media.
- Murdoch, R., Harris, J. G., & Devore, G. (2010). Can enterprise IT survive the meteor of consumer technology? *Accenture Institute for High Performance*, 1-8.
- Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., & Kennerley, M. (2000). Performance measurement system design: developing and testing a process-based approach. *International journal of operations & production management*, 20(10), 1119-1145.
- Neely, A., Adams, C., & Crowe, P. (2001). The performance prism in practice. *Measuring business excellence, The Journal of Business Performance Management*, Vol. 5 No. 2, pp. 6-12.
- Niehaves, B., Köffer, S., & Ortbach, K. (2012). IT consumerization—a theory and practice review. *Proceedings of the Eighteenth Americas Conference on Information Systems, AMCIS 2012*.
- Niehaves, B., Köffer, S., & Ortbach, K. (2013) The Effect of Private IT Use on Work Performance - Towards an IT Consumerization Theory. International Conference on Wirtschaftsinformatik: Leipzig.
- Niehaves, B., & Ortbach, K. (2016). The inner and the outer model in explanatory design theory: the case of designing electronic feedback systems. *European Journal of Information Systems*, 25(4), 303-316.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization science*, 5(1), 14–37.

- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press.
- Okhuysen, G.A., & Eisenhardt, K. M. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science*, 13(4), 370-386.
- Ollo-Lopez, A., Bayo-Moriones, A., & Larraza-Kintana, M. (2010). The relationship between new work practices and employee effort. *Journal of Industrial Relations*, 52(2), 219–235.
- Origo, F., & Pagani, L. (2008). Workplace flexibility and job satisfaction: some evidence from Europe. *International Journal of Manpower*, 29(6), 539-566.
- Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science*, 3, 398-427.
- Orth, C. D., Wilkinson, H. E., & Benfari, R. C. (1987). The manager's role as coach and mentor. *Organizational Dynamics*, 15(4), 66-74.
- Pahnila, S., Siponen, M., & Mahmood, A. (2007). Employees' behavior towards IS security policy compliance. In System sciences, 2007. HICSS 2007. 40th Hawaii International Conference on System Sciences, Los Alamitos, CA: IEEE Computer Society Press, pp. 156-166.
- Pan, S.L., & Scarbrough, H. (1999). Knowledge management in practice: An exploratory case study. *Technology Analysis and Strategic Management*, 11(3), 359-374.
- Peltier, T. R. (2005). *Information Security Risk Analysis*. Auerbach Publications, CRC Press, Taylor & Francis Group. ISBN 0-8493-3346-6.
- Pentland, A. (2012). The New Science of Building Great Teams. *Harvard Business Review*, 90(4), 60-69.
- Peterson, J.B. (2017). *Biblical Series II: Genesis 1: Chaos & Order*. Lecture II in the Psychological Significance of the Biblical Stories. YouTube. <https://youtu.be/hdrLQ7DpiWs> Min. 52:44 - 1:01:12.
- Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, 623-656.
- Ply, J. K., Moore, J. E., Williams, C. K., & Thatcher, J. B. (2012). IS employee attitudes and perceptions at varying levels of software process maturity. *MIS Quarterly*, 36(2), 601-624.
- Possenriede, D.S. (2014). *The economics of temporal and locational flexibility of work*. Utrecht University School of Economics. Doctoral dissertation. Ridderprint. ISBN 9789491870071.

## References

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- Pous, Mr. V. de, & Wielen, J.M.M., van der. (2010). *Visions from the practice on The New Way of Working - Praktijkvisies op Het Nieuwe Werken*. Telewerkforum. Ten Brink. ISBN 9789079272167.
- Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the horizon*, 9(5), 1-6.
- PwC. (2011). *A macro-economic survey for the effects of The New Way of Working - Een verkenning van macro-economische effecten van Het Nieuwe Werken*. PricewaterhouseCoopers Accountants.
- PwC. (2013). *PwC's Next Gen: A global general study - Evolving talent strategy to match the new workforce reality*. PricewaterhouseCoopers.
- Pyöriä, P. (2003). Knowledge work in distributed environments: issues and illusions. *New Technology, Work and Employment*, 18(3), 166-180.
- Pyöriä, P. (2005). The concept of knowledge work revisited. *Journal of Knowledge Management*, 9(3), 116-127.
- Pyöriä, P. (2009). Virtual collaboration in knowledge work: from vision to reality. *Team Performance Management: An International Journal*, 15(7/8), 366-381.
- Pyöriä, P. (2011). Managing telework: risks, fears and rules. *Management Research Review*, 34(4), 386-399.
- Quick, B. L., & Kim, D. K. (2009). Examining reactance and reactance restoration with South Korean adolescents: A test of psychological reactance within a collectivist culture. *Communication Research*, 36(6), 765-782.
- Reagans, R., & Zuckerman, E. W. (2001). Networks, Diversity, and Productivity: The Social Capital of Corporate R&D Teams. *Organization Science*, 12(4), pp. 502-517.
- Reinhardt, W., Schmidt, B., & Sloep, P. (2011). Knowledge worker roles and actions - Results of two empirical studies. *Knowledge and Process Management*, 18(3), 150-174.
- Riratanaphong, C., & Voordt, T.J. van der. (2015). Measuring the added value of workplace change: Performance measurement in theory and practice. *Facilities*, 33(11/12), 773-792.
- Rothbard, N. P. (2001). Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative Science Quarterly*, 46(4), 655-684.
- Rouse, M. (2007). *Authentication. Essential guide to business continuity and disaster recovery plans*. TechTarget. Retrieved from: <http://searchsecurity.techtarget.com/definition/authentication>

- Ruch, T., & Gregory, R. (2014). Consumerization of It – Where Is the Theory? *Proceedings of the 18th Pacific Asia Conference on Information Systems, PACIS 2014*.
- Rulke, D.L., & Zaheer, S. (2000). Shared and unshared transactive knowledge in complex organizations: An exploratory study. In: Shapira, Z., & Lant, T., (Eds.). *Organizational cognition: Computation and interpretation*. Mahwah, NJ: Lawrence Erlbaum.
- Ruostela, J., Lönnqvist, A., Palvalin, M., Vuolle, M., Patjas, M., & Raij, A. L. (2015). 'New Ways of Working' as a tool for improving the performance of a knowledge-intensive company. *Knowledge management research & practice*, 13(4), 382-390.
- Sambamurthy, V., & Chin, W. W. (1994). The effects of group attitudes toward alternative GDSS designs on the decision-making performance of computer-supported groups. *Decision Sciences*, 25(2), 215-241.
- Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment*, 27(3), 193-207.
- Skadberg, Y.X. & Kimmel, J.R. (2004). Visitors' Flow Experience while Browsing a Web Site: Its Measurement, Contributing Factors and Consequences. *Computers in Human Behavior*, 20(3), 403-422.
- Scheepers, R., Venkitachalam, K., & Gibbs, M. R. (2004). Knowledge strategy in organizations: refining the model of Hansen, Nohria and Tierney. *The Journal of Strategic Information Systems*, 13(3), 201-222.
- Seibert, S. E., Silver, S. R., & Randolph, W. A. (2004). Taking empowerment to the next level: A multiple-level model of empowerment, performance, and satisfaction. *Academy of management Journal*, 47(3), 332-349.
- Semler, R. (1989). Managing without managers. *Harvard business review*, 67(5), 76-84.
- Semler, R. (2001). *Maverick!: the success story behind the world's most unusual workplace. (Dutch) Semco-stijl: Het inspirerende verhaal van de meest opzienbarende werkplek ter wereld*. Random House.
- Semler, R. (2004). *The seven-day weekend: Changing the way work works*. Penguin Books. ISBN 1591840260.
- Shin, B., El Sawy, O.A., Liu Sheng, O.R. and Higa, K. (2000). Telework: Existing Research and Future Directions. *Journal of Organizational Computing and Electronic Commerce*, Vol. 10, No. 2, pp. 85-101.
- Slijkhuis, M. (2012). *A Structured Approach to Need for Structure at Work*. Doctoral dissertation. University Library Groningen. ISBN 9789036753876.

## References

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- Snyder, J.L., & Lee-Partridge, J. (2009). Understanding choice of information and communication channels in knowledge sharing. *Proceedings of the International Conference on Information Systems*. Phoenix, USA, pp. 1-9.
- Steenbergen E.F. & Ellemers N. (2009). Is managing the work-family interface worthwhile? Benefits for employee health and performance. *Journal of Organizational Behavior*, 30, (5), 617-642.
- Sullivan, C. (2003). What's in a name? Definitions and conceptualisations of teleworking and homeworking. *New Technology Work and Employment*, 18(3), 158-165.
- Tams, S., Grover, V., Thatcher, J.B., & Ahuja, M. (2017). When Modern Technologies Meet Ageing Workforces: Older Workers are more affected by Demands from Mobile Interruptions than their Younger Counterparts. *Proceedings of the 50th Hawaii International Conference on System Sciences*.
- Tangen, S. (2005). Demystifying productivity and performance. *International Journal of Productivity and performance management*, 54(1), 34-46.
- Tapscott, D. (1998). *Growing up digital: The rise of the net generation* (Vol. 352). New York: McGraw-Hill.
- Taylor, F. (1911) *The Principles of Scientific Management*. New York and London, Harper & brothers.
- Teece, D. J. (2000). Strategies for managing knowledge assets: the role of firm structure and industrial context. *Long Range Planning*, 33(1), 35-54.
- Treem, J. W., & Leonardi, P. M. (2013). Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Annals of the International Communication Association*, 36(1), 143-189.
- Tremblay, D. G., & Thomsin, L. (2012). Telework and mobile working: analysis of its benefits and drawbacks. *International Journal of Work Innovation*, 1(1), 100-113.
- Truran, W.R. (1998). Pathways for knowledge: How companies learn through people. *Engineering Management Journal*, 10(4), 15-20.
- Tupes, E. C., & Christal, R. E. (1961). *Recurrent personality factors based on trait ratings*. US Air Force ASD Tech. Rep. No. 61-97, Personnel Research Lab Lackland, Airforce Base, TX, USA.
- UnionFNV (2013) *The New Way of Working for everyone? Het Nieuwe Werken voor iedereen? Handboek met tips, ervaringen uit de praktijk*. Retrieved from <https://www.arbobondgenoten.nl/nieuwsbrieven/nb2013juli/Handboek.%20Het%20Nieuwe%20Werken%20voor%20iedereen.%20FNV%20BG%202013.pdf>

- Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *JITTA: Journal of Information Technology Theory and Application*, 11(2), 5.
- Urquhart, C. (2001). *An Encounter with Grounded Theory : Tackling the Practical and Philosophical Issues*. University of the Sunshine Coast, Queensland, Australia.
- Vaishnavi, V., & Keuchler, W. (2004). *Design Research in Information Systems*. Retrieved 25 November 2011, from Association for Information Systems: <http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=279>
- Van Heck, E., van Baalen, P., van der Meulen, N., & van Oosterhout, M. (2011). *Sustainable Work Innovation - Measuring the impact of the New Way of Working at Microsoft Netherlands*. Rotterdam School of Management. Erasmus University.
- Van Heck, E., van Baalen, P., van der Meulen, N., & van Oosterhout, M. (2012). Achieving High Performance in a Mobile and Green Workplace: Lessons from Microsoft Netherlands. *MIS Quarterly Executive*, 11(4).
- Veldhoen, E. (1995). *Offices don't exist anymore - Kantoren bestaan niet meer*. 010 Publishers. ISBN 9064502722.
- Venkatesh, V., & Davis, F. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.
- Vidyarthi, P., Chaudhry, A., Anand, S., & C. Liden, R. (2014). Flexibility i-deals: how much is ideal? *Journal of Managerial Psychology*, 29(3), 246-265.
- Voordt, T. J. (2004). Productivity and employee satisfaction in flexible workplaces. *Journal of Corporate Real Estate*, 6(2), 133-148.
- Waber, B., Magnolfi, J., & Lindsay, G. (2014). Workspaces that move people. *Harvard Business Review*, 92(10), 68–77.
- Wah, L. (1999). Engaging employees: a big challenge. *Management Review*, 88(9), 10.
- Warr, P. (1987). *Work, Unemployment, and Mental Health*. Oxford University Press, Clarendon, New York, USA.
- Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology*, 52, 129–148.
- Wasko, M.M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 35-57.

## References

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- Werts, C. E., Linn, R. L., & Jöreskog, K. G. (1974). Intraclass Reliability Estimates: Testing Structural Assumptions. *Educational and Psychological measurement*, 34(1), 25-33.
- West, R. (2008). The Psychology of Security. *Communications of the ACM* (51:4), 34-40.
- Wetzel, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS Quarterly*, 177-195.
- Whitman, M. E. (2003). Enemy at the Gate: Threats to Information Security. *Communications of the ACM*, 46(8), 91-95.
- Wickström, G., & Bendix, T. (2000). The Hawthorne effect - what did the original Hawthorne studies actually show? *Scandinavian Journal of Work, Environment & Health*, 363-367.
- Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, 16, 85–102.
- Wold, H. (1982) Systems Under Indirect Observation Using PLS. In: Fornell, C. (1982). *A Second Generation of Multivariate Analysis. Measurement and evaluation* (Vol. 2). Praeger Publishers. New York, 325-347.
- Workman, M., Kahnweiler, W. & Bommer, W. (2003). The effects of cognitive style and media richness on commitment to telework and virtual teams. *Journal of Vocational Behavior*, 63, 199-219.
- Yarnall, J. (1998). Line managers as career developers: Rhetoric or reality? *Personnel Review*, 27(5), 378-395.
- Yin, R.K. (2009). *Case Study Research*. Thousand Oaks , California, USA, Sage Publications.

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## Publication List

*This dissertation is based on the following publications:*

- Kok, A. de, Bellefroid, B., & Helms, R. W. (2013). Knowledge Sharing and Channel Choice: Effects of the New Way of Working. *Proceedings of the 14th European Conference on Knowledge Management, ECKM 2013.*
- Kok, A. de, Koops, J., & Helms, R. W. (2014). Assessing the New Way of Working: Bricks, Bytes and Behavior. *Proceedings of the 18th Pacific Asia Conference on Information Systems, PACIS 2014.*
- Kok, A. de, Esten, R., & Helms, R. W. (2015). Knowledge Sharing in the New World of Work: Effects of the New Way of Working. *Journal of Information Technology Services, KITS, 14(2),* 315-335.
- Kok, A. de, Lubbers, Y., & Helms, R. W. (2015). Mobility and Security in the New Way of Working: Employee Satisfaction in a Choose Your Own Device (CYOD) Environment. *Proceedings of the 9th Mediterranean Conference on Information Systems, MCIS 2015.*
- Kok, A. de. (2016). The New Way of Working: Bricks, Bytes and Behavior. In: Lee, J. (Eds.). *The Impact of ICT on Work.* Springer Science & Business Media. 9-40.
- Kok, A. de, & Helms, R. W. (2016). Attitude towards the New Way of Working - A Longitudinal Study. *Proceedings of the 24th European Conference of Information Systems, ECIS 2016.*
- Kok, A. de, Foorthuis, R. M., Thatcher, J. B., & Helms, R. W. (2017). The Effects of the New Way of Working and Information Security Policies on Employee Engagement and Organizational Performance. *Submitted for journal publication.*

*Other publications (referenced, but not included in this dissertation):*

Cornelissen, M., Kok, A. de, & Mandemaker, D. (1995). *PDM Selection Guide: From needs to selection: A business solution. Guide for the selection of Product Data Management systems.* NGI, Dutch Computer Society. Delft University Press. ISBN 9040711429.

Kok, A. de, & Helms, R. W. (2012). *The New Way of Working versus Telework: Definition and positioning.* Research paper on 148 literature sources. Center for Organization and Information, Utrecht University.

Kok, A. de, Zwieten, J. van, & Helms, R.W. (2016). Attitude towards NWOW and Activity Based Working: Activity Patterns and Change Perspectives. *Proceedings of the 17th European Conference on Knowledge Management, ECKM 2016.*

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## Summary

The advancement of information technologies is changing the work environment, forcing organizations to adapt more flexible work arrangements for their employees. The New Way of Working is a relative new phenomenon that provides the context for these developments. It consists of three distinct pillars or dimensions that are referred to as: Bricks, Bytes and Behavior. Bricks, the physical dimension, addresses the aspects of the work environment; the work location and the redesign of offices with activity-based workplaces. Organizations often choose the re-design or opening of the new office space as the starting point for the implementation of the New Way of Working. Bytes, the technological dimension, addresses the use of information technology that enables the virtual work environment. Behavior, the personal dimension, deals with all aspects concerning the manager-employee relationship; result based working, trust and autonomy, job satisfaction and work-life balance.

This PhD dissertation aims to uncover the organizational and technological effects of the implementation of the New Way of Working. This is done by a number of assessments from three interrelated perspectives: (1) the transformational perspective, (2) the knowledge management perspective, and (3) the IT and information security perspective.

The first part focusses on the transformational perspective of the organization and the individual employee, that is confronted with the New Way of Working (NWOW). Based on the three dimensions of NWOW, an analysis tool or monitor was developed, that assesses the current and desired level of adoption of NWOW in an organization. The monitor provides insight in the gaps between the current and future situation, and the expectations when implementing NWOW. This enables organizations to focus more on specific aspects, in order for the transition to be more successful. In a longitudinal study, covering the timeframe before and after the implementation, an assessment of the attitude of employees towards NWOW was performed. The results show that the implementation of the New Way of Working has a positive effect on the performance and satisfaction of employees. The majority indicates they can work well in the new flexible work environment. Most employees were and remain positive towards NWOW, though negative signals are there and should not be ignored. The biggest obstacle is the loss of one's own workplace, and having to be 'productive' in a flexible office setting. The New Way of Working may not be beneficial to all. From the viewpoint of personality traits, it appears that conscientious (self-disciplined) employees are better able to cope with the new work environment than (sensitive) high neuroticism employees, who seem to be less satisfied with the new flexible work setting.

The second part focusses on the knowledge management perspective, and the interaction between workers in the new work environment. Working more mobile and geographically separated has its effects on the way knowledge is shared. These effects were investigated in a number of multi-case studies. The studies show that the channels that are used to share knowledge change when workers move from a traditional work setting to a ‘new’ work setting. Compared to traditional workers, ‘NWOW workers’ use more channels to share knowledge, and they share knowledge in a less formal (or planned) way. They also differentiate less in their channel choice, when sharing knowledge on sensitive information, whereas traditional workers prefer face-to-face communication, when it comes to a sensitive subject. When workers become more mobile, knowledge is shared less in explicit and more in tacit form, meaning that in a NWOW setting knowledge is likely to be shared less in a documented, and more in a personalized form. On an organizational level, the implementation of the New Ways of Working seems to have a balancing effect on the mix of explicit and tacit knowledge that is shared.

In the third part, the focus is on the role of IT and information security policies. As work becomes more flexible in time and location, mobility and IT support of mobile working becomes more crucial. In this part of the dissertation, the effect of the new digital work environment is assessed from the viewpoint of personal freedom of device use and information security policies. The consumerization of IT, known as Bring Your Own Device (BYOD), has its advantages in flexibility but also its dangers with regard to the security of corporate data. A survey in a Choose Your Own Device (CYOD) environment, assessed the effects of having more freedom of device choice versus the security risks involved. The conclusion is that more freedom of device choice is possible without loss of corporate security, unless the right technical controls are in place. The results indicate that this freedom would lead to a higher perceived satisfaction of employees. The final study in this dissertation is an assessment on the effects of NWOW and information security on organizational performance and employee engagement. A survey with over 1,000 respondents, and over 600 usable data entries, was performed to assess these effects. The results show the New Way of Working has a (statistically significant) positive effect on employee engagement and performance of organizations, with the strongest effect being on employee engagement. Of the three dimensions, Behavior has the strongest positive effect on employee engagement. This indicates organizations should not only focus on the new work environment (Bricks) and enabling mobile working (Bytes), but also address the personal aspects such as result based working, trust and autonomy (Behavior), where the highest potential gain is. The results also show information security policies have a (statistically significant) negative effect, especially on employee performance and work-life balance, potentially offsetting the gain in productivity and employee satisfaction. This implies organizations need to find the intricate balance between enabling mobile work versus information security policies.

This dissertation study shows there is still a lot to be researched in the field of the new work environment. Future research should support the findings of this study, and possibly focus on the positive effects of better IT support in the form of device freedom and applications for remote and flexible work, without giving up on counterproductive security measures. This study only provides a first glance of the future that lies ahead. A future in which our work environment will have even more radically changed.

## Summary

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## Nederlandse samenvatting

Door de vooruitgang van de informatietechnologie is de werkomgeving aan het veranderen en worden organisaties ertoe gedwongen hun medewerkers meer flexibele werkvormen te bieden. Het Nieuwe Werken is een relatief nieuw fenomeen dat de context biedt voor deze ontwikkelingen. Zij bestaat uit die verschillende pijlers of dimensies, die worden aangeduid als: Bricks, Bytes en Behavior. Bricks, de fysieke dimensie, houdt zich bezig met de aspecten van de werkomgeving; de werklocatie en het herontwerp van kantoren met activiteit gebaseerde werkplekken. Organisaties kiezen vaak de herinrichting of opening van de nieuwe kantooromgeving als startpunt voor de implementatie van Het Nieuwe Werken. Bytes, de technologische dimensie, houdt zich bezig met het gebruik van de informatietechnologie die de virtuele werkomgeving mogelijk maakt. Behavior, de persoonlijke dimensie, houdt zich bezig met alle aspecten van de manager-medewerker relatie; resultaatgericht werken, vertrouwen en autonomie, tevredenheid en work-life balance.

Het doel van dit proefschrift is de organisatorische en technologische effecten van de implementatie van Het Nieuwe Werken te ontdekken. Dit gebeurt door een aantal evaluaties op drie onderling verwante perspectieven: (1) het transformatie perspectief, (2) het kennismanagement perspectief, en (3) het IT- en informatieveiligings-perspectief.

Het eerste deel richt zich op het transformatieperspectief van de organisatie en de individuele medewerker, die geconfronteerd wordt met Het Nieuwe Werken (HNW). Op basis van de drie dimensies van HNW is een analyse tool of monitor ontwikkeld, die het huidige en gewenste niveau van adoptie van HNW in een organisatie in kaart kan brengen. De monitor biedt inzicht in de verschillen tussen de huidige en gewenste situatie, en de verwachtingen van de implementatie van HNW. Hierdoor kunnen organisaties meer focus leggen op specifieke aspecten teneinde de overgang naar HNW succesvoller te maken. In een langlopende studie, die de periode van voor tot na de implementatie bestreekt, werd de houding van werknemers ten aanzien van HNW geëvalueerd. Uit de resultaten blijkt dat de invoering van HNW een positief effect heeft op de prestatie en tevredenheid van medewerkers. De meerderheid geeft aan goed te kunnen werken in de nieuwe flexibele werkomgeving. De meesten waren en blijven positief ten aanzien van HNW, hoewel er ook negatieve signalen zijn, die niet moeten worden genegeerd. Het grootste obstakel is het verlies van de eigen werkplek en het 'productief' moeten zijn in de flexibele kantooromgeving. Het Nieuwe Werken pakt misschien ook niet voor iedereen voordelig uit. Vanuit het oogpunt van persoonlijkheidskenmerken, blijkt dat zelf-gedisciplineerde werknemers beter in staat zijn om met de nieuwe werkomgeving om te gaan dan

gevoelige werknemers, die minder tevreden zijn met de nieuwe flexibele werkomgeving.

Het tweede deel richt zich op het kennismangement perspectief, en de interactie tussen werknemers in de nieuwe werkomgeving. Het meer mobiel en geografisch gescheiden werken heeft gevolgen voor de manier waarop kennis wordt gedeeld. Deze effecten werden onderzocht in een aantal casestudies. Uit deze studies blijkt dat de communicatiekanalen, die gebruikt worden om kennis te delen, veranderen wanneer werknemers overgaan van een traditionele werk setting naar de 'nieuwe' werkomgeving. In vergelijking met traditioneel werkende werknemers gebruiken 'HNW-werknemers' meer communicatiekanalen om kennis te delen, en delen ze kennis op een minder formele (geplande) manier. Zij maken ook minder onderscheid in hun keuzes, wanneer zij kennis delen over gevoelige informatie, daar waar 'traditionele' werknemers liever fysiek een-op-een communiceren wanneer het een gevoelig onderwerp betreft. Wanneer werknemers meer mobiel worden in hun werk, wordt kennis minder vaak vastgelegd en meer op persoonlijke wijze gedeeld. Hierdoor zal kennis in een HNW-omgeving waarschijnlijk minder vaak in een gedocumenteerde vorm, en vaker in een gepersonaliseerde vorm worden overgedragen. Op organisatorisch niveau lijkt de implementatie van Het Nieuwe Werken een balancerend effect te hebben op de mix van gedocumenteerde en gepersonaliseerde kennisdeling.

In het derde deel ligt de nadruk op de rol van IT- en informatiebeveiliging. Aangezien het werk steeds flexibeler wordt in zowel tijd als locatie, wordt mobiliteit en IT-ondersteuning van mobiel werken steeds cruciaal. In dit deel van het proefschrift wordt het effect van de nieuwe digitale werkomgeving onderzocht vanuit het oogpunt van de persoonlijke vrijheid van IT-keuze en bijbehorende informatiebeveiliging. Het gebruik van eigen apparatuur, bekend als Bring Your Own Device (BYOD), heeft zijn voordelen in flexibiliteit, maar ook gevaren ten aanzien van de beveiling van bedrijfsgegevens. In een studie in een omgeving waarin men door de organisatie aangeboden apparaten mocht kiezen, zijn de effecten onderzocht van meer keuzevrijheid van apparaat versus de veiligheidsrisico's. De conclusie is dat meer keuzevrijheid in apparatuur mogelijk is zonder verlies van bedrijfsveiligheid, mits de juiste technische maatregelen zijn getroffen. Uit de resultaten blijkt dat deze vrijheid zou leiden tot een hogere tevredenheid van werknemers. De laatste studie in dit proefschrift is een onderzoek naar de effecten van HNW en informatiebeveiliging op de prestaties van een organisatie en de betrokkenheid van medewerkers. Hiervoor is een survey met meer dan 1.000 respondenten en meer dan 600 bruikbare invullingen uitgevoerd om deze effecten te analyseren. De resultaten laten zien dat Het Nieuwe Werken een (statistisch significant) positief effect heeft op medewerkersbetrokkenheid en de prestaties van een organisatie, waarbij het effect het grootst is op medewerkersbetrokkenheid. Van de drie dimensies heeft Behavior het sterkste positieve effect op werknemersbetrokkenheid. Organisaties moeten zich daarom niet alleen richten op de nieuwe werkomgeving (Bricks) en mobiel werken (Bytes), maar ook op de persoonlijke aspecten zoals resultaatgericht werken, vertrouwen en autonomie (Behavior), waar potentieel de

meeste winst te behalen is. De resultaten laten ook zien dat het informatiebeveiligingsbeleid een (statistisch significant) negatief effect heeft, in het bijzonder op werknemersproductiviteit en work-life balance, hetgeen ten koste kan gaan van de winst in productiviteit en werknemerstevredenheid. Dit houdt in dat organisaties de complexe balans moeten zien te vinden tussen enerzijds het mogelijk maken van mobiel werken versus anderzijds de belangen van informatiebeveiliging.

Dit proefschrift laat zien dat er nog veel te onderzoeken valt op het gebied van de nieuwe werkomgeving. Toekomstig onderzoek zou de bevindingen van deze studie moeten ondersteunen, en zich zo mogelijk kunnen richten op de positieve effecten van een betere IT-ondersteuning in de vorm van IT-vrijheid en applicaties voor flexibel werk, zonder daarbij last te hebben van contraproductieve beveiligingsmaatregelen. Deze studie biedt slechts een eerste blik op de toekomst die voor ons ligt. Een toekomst waarin onze werkomgeving nog meer radicaal zal veranderen.



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## Epilogue

When I embarked on the journey of a PhD research, I realized the destination was in a far distant future. As always, the journey is more important than the destination. These past six years have changed the way I look at opinions and beliefs. In the past, the truth was simple: it coincided with the things I already knew and sometimes briefly extended on that knowledge. Doing research, and getting feedback from reviewers, made me more critical: 'Is this a fact or an opinion? Why is this statement presented? What is the source? What are the sources behind this source?'

On a more philosophical level: In the past, the world as we knew it was simple, with a plausible explanation for everything, so our mind could be at ease. More than ever during this PhD research, I realized science is never at ease. Science is restless and truth-seeking. Where others have stopped, the (scientific) explorer goes beyond the domain he can understand, peering out into the unknown, crossing frontiers. With one foot in what he understands and one foot in the unknown (Peterson, 2017). In science, everything is questionable and a subject of interrogation, or better: doubt. Like Descartes (1644) once concluded after having erased all that exists in our perceivable world: 'I think, therefore I am (*Cogito ergo sum*)'. All other observations could be questioned.

I dare to say science has become my belief. Does this imply I lost faith in God, who seems to have been in a tense relationship with science for many centuries? Not at all. In fact, God may be the ultimate scientist, the ultimate physician, sweeping the floor with all existing certainties. Like it once was said: 'The truth will set you free' (John 8:32). This (scientific) freedom is not easily obtained. It requires a paradigm shift of the mind-set. The same goes for the New Way of Working. Where the mind-set of the Industrial Revolution may have conditioned many with the certainty that visible productive work is the essence of true work, the New Way of Working profoundly questions this, sweeping the floor with all existing certainties, revealing the truth of how things actually are.

While this journey now ends, it is also a new beginning, a fresh start.



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## Curriculum Vitae

Arjan de Kok was born on August 20, 1962 in Woerden, The Netherlands. He is married and has three children. He obtained his bachelor degree in Mechanical Engineering at the University of Applied Sciences Utrecht in 1985, and his bachelor degree of Business Administration at the University of Applied Sciences Amsterdam in 1986. In 2007, he obtained his Master of Business Administration degree at Liverpool University.

Arjan started his professional career in 1986 at Amsterdam Airport Schiphol as (internal) business consultant. One year later he became the project leader for the implementation of the computer graphics design (CAD) system, and head of the technical information management group. In 1991 he became CAD project manager at Ballast Nedam International, where he was responsible for the design team in Amstelveen and the coordination of design data with five engineering companies in the United Kingdom. From 1992 to 1994 he worked at TNO (Netherlands Organization for Applied Scientific Research) on research projects in the area of data exchange (STEP) and Product Data Management (PDM). He founded a working group on Product Data Management, and with the NGI (Dutch Computer Society) he co-authored a (Dutch) book on Product Data Management (Cornelissen & Kok, 1993). From 1994 to 2001 he was business consultant and managing partner at M.I.S. organisatie-ingenieurs. In these years he advised many organizations, was a speaker at PDM conferences, trainer in workshops, and co-authored the English version of the book on Product Data Management (Cornelissen et al., 1995). From 2002 to date he works at HQ-consult as an independent business consultant at organizations on the improvement of business processes and the implementation of information systems. From 2015 to 2017 he was partner at Ordina Business Consulting & Solutions for the sector industry, building and leading a team of business consultants and project leaders in various industry sectors.

In 2012 he started his doctoral research as an external researcher at the Department of Information and Computing Sciences of Utrecht University, on the subject of the New Way of Working. He became a (guest) lecturer at Utrecht University for the modules 'Organizations and ICT' and 'ICT Advisory'. From 2014 to 2015 he was a guest lecturer at the Department of Business Management & Economics of the University of Applied Sciences Windesheim, for the modules 'Management Accounting' and 'Investment and Project Analysis'. In 2017 he became a tutor at the Open University for the module 'Data Governance'.



