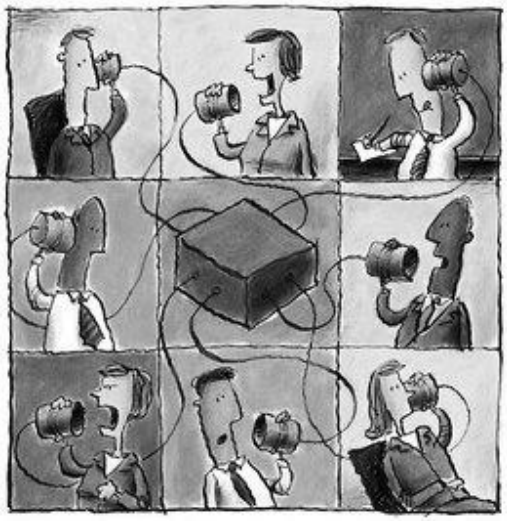
# How do you like IT?

Employees' channel behaviour in a multinational environment



March 2011

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Preface

If there is one thing that I have learned during the writing of this thesis, it is that things do not come naturally. A lot of hard work, dedication and most of all perseverance is needed. However, I could not have done this alone therefore I would like to thank a few people without whom I would not have been able to succeed. First, I would like to thank my supervisor Willem Pieterson for his professional guidance and inspiration. Another person who deserves a special thank you is my manager at DSM; Mariken Koppen, for giving me the opportunity to carry out my research at DSM, for her support and her faith in me! All the respondents at DSM also deserve a thank you! Without them, I would not have been able to gather my data. I would also like to thank my parents for their financial as well as moral support. Thank you for always believing in me! Last but certainly not least I would like to thank Guyomard for coping with all the (ups and) downs, his positive words when I thought I was not going to make it and his everlasting support, TQM!

For all the people that I have not mentioned personally but who have delivered a contribution however small: thank you!

Anouk Breuls
March 2011

Dedicated to Jasmijn Hoffman

* 4 August 1984 - † 20 September 2009

Abstract (English version)
Effective communication is only possible when the intended audience receives the message. Therefore, insight into people's channel choices and ultimately their usage of these channels is crucial in order to decide which channel to employ when sending a message. So far, theoretical and empirical research has (mainly) focused on the determinants (factors) that affect the choices for and usage of communication channels. Little to no attention has been given to the specific *types* of messages or the effectiveness of different channels in conveying those messages. This thesis was written to get a better insight into the most effective communication channels within DSM, and to determine whether the content of a message should be considered when choosing a communication channel.

Next to the evaluation of different theories by means of a literature study, an attempt has been made to revalidating previous research by carrying out both quantitative and qualitative research. Both questionnaires and interviews have been conducted to gather data. In total 213 respondents have filled out the questionnaire, 22 interviewees have been conducted.

De overarching research question that was formulated for this thesis is
"Which communication channels are most effective for communicating a message?"

Research results show that during the weekend most people prefer either NO communication or communication via phone. Respondents indicate that receiving a text message or phone call is the only way to ensure (correct) action. This makes the telephone the most effective channel for communication during the weekend. During the week, respondent indicate that the best way to contact them is via email. However, this is not necessarily also the most effective channel because receiving an email does not automatically imply that the message will also be read. Respondents indicated that the decision to read an email is linked to the email address the message comes from, the subject line and the format (template) of the message.

Based on the research results, several recommendations can be given in order to improve the current communication strategy.

- Remove communication templates
- Limit email communication to urgent messages
- Make sure that the subject line provides the reader with an insight into the content in a glance.
- Create distribution lists that can be used for one-to-many text messages
- Open up YouTube[1]
- Organise knowledge sessions/better positioning of DICT portfolio (manuals, quick reference cards, E-learnings and contact details helpdesk)

If these recommendations are taken into consideration, the DICT Communication Office can improve the readability of their communication. For DSM in general, application of the above mentioned recommendations can lead to a higher employee satisfaction rate in 2011.

[1] As of January 2011, YouTube is accessible within DSM

Abstract (Dutch version)
Effectieve communicatie is alleen mogelijk wanneer de ontvangers het bericht ook daadwerkelijk ontvangen en lezen. Inzicht in kanaalkeuze en –gebruik is daarom cruciaal om vast te stellen welk kanaal gekozen moet worden voor een boodschap. Tot op heden heeft wetenschappelijk onderzoek zich hoofdzakelijk gericht op de determinanten (factoren) die van invloed zijn op de keuze voor of het gebruik van een bepaald kanaal. Beperkt onderzoek heeft zich gericht op de verschillende communicatieboodschappen en de effectiviteit van bepaalde kanalen om bepaalde boodschappen over te brengen. Dit proefschrift is geschreven met de intentie om beter inzicht te krijgen in de meest effectieve communicatiekanalen en om vast te stellen of de inhoud van een boodschap al dan niet overwogen moet worden bij de keuze van een kanaal.

Naast het evalueren van verschillende theorieën door middel van een literatuurstudie, is er getracht, door middel van zowel kwantitatief als kwalitatief onderzoek, eerdere onderzoeksresultaten te hervalideren. Er is voor het onderzoek gebruik gemaakt van vragenlijsten en interviews. In totaal hebben 213 mensen de vragenlijst ingevuld en zijn er 22 mensen geïnterviewd.

De centrale onderzoeksvraag die voor deze studie is geformuleerd, luidt:
“Wat zijn de meest effectieve communicatiekanalen voor het overbrengen van een boodschap?”

Uit de resultaten blijkt dat in het weekend de meeste mensen ofwel GEEN communicatie wensen te ontvangen ofwel via telefoon (sms bericht of oproep). Respondenten geven aan dat contact via telefoon de enige manier is om (correcte) actie te garanderen. Daarmee is, voor de huidige doelgroep, de telefoon in het weekend het meest effectieve communicatiekanaal. Door de week geven respondenten aan dat ze het best bereikbaar zijn via email. Hiermee is email overigens niet automatisch het meest efficiënte kanaal, omdat mensen aangeven niet alle emails te lezen. Met name op basis van het adres (algemene inbox), het onderwerp van de email en het format waarin het bericht gepresenteerd wordt (template) besluiten mensen de communicatie vaak niet te lezen.

Op basis van de onderzoeksresultaten zijn verschillende aanbevelingen gedaan die de organisatie kan gebruiken ten behoeve van het verbeteren van het huidige beleid ten aanzien van communicatie.

- Verwijderen communicatie templates
- Beperken van email communicatie tot urgente boodschappen
- Zorgdragen voor een onderwerp dat de lezer in één oogopslag laat zien waar de communicatie over gaat (indien email communicatie noodzakelijk is)
- Distributielijsten creëren die het mogelijk maken om smsjes naar grote groepen mensen te sturen.
- Openstellen van YouTube[2]
- Organiseren van *knowledge sessions*/betere positionering van het DICT portfolio (handleidingen, *quick reference cards*, *E-learnings* and contactgegevens helpdesk)

Indien deze aanbevelingen ter harte worden genomen, kan het DICT Communication Office de leesbaarheid van haar communicatie vergroten. In het algemeen kan een betere communicatie leiden tot een hogere tevredenheid van werknemers (ten aanzien van de communicatie).

[2] As of January 2011, YouTube is accessible within DSM

Table of content

# 1. Introduction

Effective communication is essential for every organisation. Mintzberg (1973) studied the extent to which managers communicate within organisations and found that they dedicate 78% of their time to communication. In order to communicate effectively, it is necessary that the intended audience receives the message. Therefore, insight into people's channel choices and ultimately their usage of these channels is crucial to decide which channel to employ when sending a message. For communication to be effective, organisations need to provide appropriate channels and support for the effective use of them (Webster & Trevino, 1995). So far, theoretical and empirical research has mainly focused on the determinants that affect the choices for and usage of communication channels within organisations (See, for example, Pieterson, 2009; Pieterson & Van Dijk, 2007; Venkatesh, 2006; Trevino, Webster, & Stein, 2000; Fulk, Schmitz, & Steinfield, 1990; Daft, Lengel, & Trevino, 1987). Only little research has focused on determining the effectiveness of a particular communication channel in transmitting a specific type of message, while this insight is crucial for organisations in order to be able to communicate effectively both internally as well as externally. According to Kupritz and Cowell (2011, p.57) there is an "urgent organizational need to identify the most effective communication channels with which messages are conveyed along with the specific types of messages to be conveyed." This is exactly what this paper aims to clarify. By doing so, this research should shed (new) light on the available theories and models. According to Venkatesh (2006), more (qualitative) research is needed to get a full understanding on channel use. Because of the evolvement of communication channels, it is necessary for theories to be reevaluated. This does not mean that theories developed in the past cannot be used for current research however; we should not be blinded by the context of prior communication and evaluation research, according to Johnson (1984).

Pieterson (2009) carried out one of the latest researches about channel use out. The distinction between Pieterson's research and the current research is that Pieterson (2009) focused on channels used by external customers to get in touch with a service organisation whereas this research is more focused on internal communication; employees contacting their ICT service department (pull information) and the ICT service department contacting its end user community (push information). It is interesting to see to which extent the research results correspond to each other in order to validate Pieterson's research.

## 1.1 Problem statement and research questions

The problem that is being addressed in this thesis is the limited knowledge with regard to the effectiveness of communication channels. By expanding the knowledge about this subject this thesis provides a starting point for future research(ers). Furthermore, this thesis is of practical relevance as it will provide DSM with better insights that can be used to fully utilize its communication channels and communicate more effectively.

The research questions that form the basis of the current research are:

1. Which determinants affect channel use?
2. How are these determinants related to each other?

Based on the knowledge gained by answering these two questions, the overarching research question is formulated as follows;
"Which communication channels are most effective for communicating a message?"

## 1.2 Content report

The following chapters of this report will further elaborate on the subject as described in paragraph 1.1. In the theoretical framework, a few theories will be discussed to help get a better insight into the available literature on channel choice as well as on channel use. Both are important as choice precedes usage. Chapter 4 will describe the methods used to carry out this research. Chapter 5 discusses the quantitative as well as the qualitative research results. In chapter 6, the answer to the overarching research question is given next to an overall conclusion. Chapter 7 will provide you with a discussion to see how further research can contribute to the research subject and the recommendations for DSM.

## 1.3 The organisation

Royal DSM N.V. [DSM] creates innovative products and services in Life Sciences and Materials Sciences that contribute to the quality of life. DSM's products and services are used globally in a wide range of markets and applications. End markets include human and animal nutrition and health, personal care, pharmaceuticals, automotive, coatings and paint, electrical and electronics, life protection and housing.

DSM has twenty-three business groups, which are divided over eight clusters. The cluster Shared Services has four business groups, one of which is ICT. In the organisational chart on the next page, you can find an overview of the clusters and the business groups that are part of it.


Figure 1.1: Organisational chart DSM[3]

[3] http://www.dsm.com/en_US/html/about/organigram.htm

## 1.4 The department

This research will be carried out on behalf of the DICT department. DICT is considered to be the ICT service department of DSM and delivers IT-systems, -services, and -advice to all DSM businesses and its employees (end user community). DICT is an international organisation with its headquarters in the Netherlands (Sittard) and locations in Switzerland, America, Brazil, Singapore and China. DICT develops norms for interconnectivity, systems and services. Its goal is to support DSM businesses by providing professional IT-solutions and services. With this research, DICT hopes to utilize its communication channels as effective and efficient as possible in order to meet the expectations of its end user and, in the end, improve its image by doing so.

## 2. The channel and its importance in the communication process.

This thesis focuses on the role of the communication channel in the communication process. Therefore, this chapter will provide you with a short introduction to communication before elaborating further on different theories about channel choice and usage.

According to Waardenburg (2009), sign language was one of the first forms of communication and originated some two and a half million years ago. People used sign language to express their most elemental feelings. The nonverbal part of sending a message still plays an important role in communication today. According to several scientists, 60 to 65% of all meaning is derived from nonverbal communication (Knapp & Hall, 2007; Philippot, Feldman & Coats, 1999). However, the extent of the influence of nonverbal communication depends on people's gender, age, and culture. Research results show that women, for example, use nonverbal communication more often than men and that they are also more skilled in interpreting other people's nonverbal communication (Knapp & Hall, 2007). Furthermore, it is easier to interpret nonverbal communication when people are more familiar with each other (Koerner & Fitzpatrick, 2002) for example when they have the same cultural background.

Of course, there is more to communication than the nonverbal aspect. In literature numerous definitions of communication can be found. Most describe, in more or less elaborate words, the basic principle of getting the intended message across to the intended audience. In 1948, Shannon and Weaver developed one of the first communication models, which still is, be it in its original form, be it with additional components, a frequently used model. Woods and Hollnagel (2005, p.11) even refer to it as "the mother of all models".

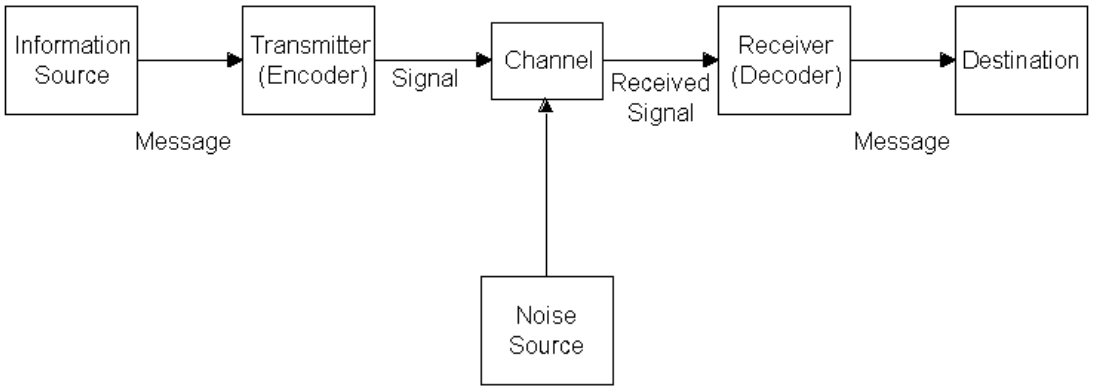



Figure 2.1: Communication model (Shannon & Weaver, 1948)[4]

In their communication model Shanon and Weaver (1948) present a channel as a hatch between the sender (transmitter) and the receiver. In this thesis, however, a channel's hatch status is being questioned. Especially for the purposes of this research, the importance of a channel in the communication process is stressed because without it, communication seems to be impossible. Therefore, a channel is considered the linking pin in the communication process.

[4] For an elaboration on the different factors in the communication model please consult §9.3.1

Research has shown that a channel has certain characteristics that can affect people's choices and usage (Daft & Lengel, 1986; Pieterson & Van Dijk, 2007). This means that a channel itself is not as fixed as stated by Shanon and Weaver (1948). The characteristics, or capacities as Van Dijk (2006) calls them, differ per channel. In the table as displayed below, Van Dijk (2006) distinguishes nine capacities that both old and new communication channels possess and that cannot be removed or enhanced.

Table 1

*Communication Capacities of Old and New Media*

| | Old media | | | | New media | |
|---|---|---|---|---|---|---|
| Communication capacity | Face-to-face | Print | Broadcasting | Telephone | Computer networks | Multimedia |
| Speed | low | Low / medium | High | High | High | High |
| Reach (geographical) | low | Medium | High* | High* | High* | Low |
| Reach (social) | low | Medium | High* | High* | Low | Low |
| Storage capacity | low | Medium | Medium | Low | High | High |
| Accuracy | low | High | Low / medium | Low | High | High |
| Selectivity | low | Low | Low | High | High | High |
| Interactivity | high | Low | Low | Medium | Medium | Medium |
| Stimuli richness | high | Low | Medium | Low | Low | Medium |
| Complexity | high | High | Medium | Medium | Low | Medium |
| Privacy protection | high | Medium | High | Medium | Low | Medium |

* In developed countries only

Roughly all communication channels can be divided into two categories; old and new media. New media can be defined as all computer mediated communication technologies (Gephart, 2004). Examples of new media are, amongst others, videoconferencing and chat but also more interactive channels such as Twitter. Johnston (1984, p.55) states that the term *new* should be seen as relative as "all communication channels have been seen as new when they were introduced." The newness is reflected, amongst others, in the new communication functions and the new technological design that is incorporated in the channel (Johnston, 1984).

The older and more traditional media are all channels that are not computer mediated and include channels such as the telephone and written documents like memos.

In this thesis, the focus is on the channels that are available within DSM, with a particular focus on new media. First of all, because of the important role that new media (start to) play in organisations and secondly because DSM management has presented the presumption that new media channels are underutilised.

The rise of the Internet has provided people with even more channels to communicate to and with each other. Culnan and Markus (1987) described these so-called new media as interactive, computer-mediated technologies that facilitate two-way interpersonal communication among several individuals. It can be argued however, that new media might have been designed to facilitate two-way interpersonal communication, but that this does not (always) apply in practice. Two possible explanations might be that people are either unwilling or unable to make use of new media. The unwillingness might not even be intentional; the habit to use other channels could already influence the use of new media. Pieterson and Van Dijk (2007) found that habit is one of the most influential characteristics of channel use. In some cases people are unable to use channels because of a lack of equipment (the channel is not available) or missing technical skills that are needed to understand and use the channel. Venkatesh, Morris, Davis and Davis (2003) refer to this aspect as the facilitation conditions. These conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p.453).

## 3. Theoretical framework

In chapter 2 the importance of a channel in the communication process has been discussed. Furthermore, chapter 2 briefly touched upon the fact that channels have certain characteristics that can affect people's channel preferences and usage. In paragraph 3.2, a further elaboration on this is given but first you can find a discussion on when and how initial channel choice and use research came into existence.

### 3.1 Why we need information

According to Pieterson (2009), the earliest work on channel choice can be found in the 1960's. The research then focused on reasons for organisations to process information. The search for information seemed based on the fact that people wanted to reduce the feeling of uncertainty that derives from a lack of information. Uncertainty Reduction Theory [URT] seeks to explain and predict when, why, and how individuals use communication to minimize their doubts. According to the theory, experiencing uncertainty is uncomfortable. In order to diminish or avoid uncertainty, people apply communication strategies that can be categorised into three groups, passive, active or interactive. Within the first strategy, people observe their surroundings and determine which behaviour is appropriate. They adjust their behaviour based on their observations. People that apply the second strategy take a more active stand and go to a third party to collect information and make sure that their behaviour is in line with that information. The final strategy is based on people that "go straight to the source in question and ask for as much information as possible" (Dainton & Zelley, 2005, p.40). All communication strategies thus involve some sort of information collection whether passive, active or interactive.

The Anxiety/Uncertainty Management Theory [AUM] is an extension of the URT and assumes that effective communication requires accurate management of uncertainty and anxiety (Stephan, Stephan & Gudykunst, 1999). As stated previously, there are three strategies that can help people in managing uncertainty and anxiety. AUM states that members of the same group experience less uncertainty when communicating with each other than when they communicate with people from different groups. However, there is always a certain extent of uncertainty in any group interaction. The same applies to anxiety which is defined by Turner (1988, p.61) as "a generalized or unspecified sense of disequilibrium" (cited from Stephan et al., 1999). There is a maximum as well as a minimum threshold for anxiety and uncertainty in a group interaction. Effective communication will decrease when either one is below or above the threshold. This entails that anxiety/uncertainty management is necessary to communicate effectively.

Several research results have shown that people search for information in order to decrease or prevent uncertainty and/or anxiety (Dainton & Zelley, 2005; Stephan, Stephan & Gudykunst, 1999). In the next paragraph, you will find theories on *how* people search for information and which channel characteristics they consider when deciding what channel to use. According to Webster and Trevino (1995), channel selection depends on the characteristics that people ascribe to a medium. Knowing *how* people select a channel can help the information source to determine what channel to employ when communicating a certain message.

## 3.2 Media Richness Theory

One of the most prominent media use theories, that can help get insight into how people choose a communication channel, is the Media Richness Theory [MRT] (El-Shinnawy & Markus, 1997; Spoor, 2006; Pieterson, 2009; Teerling & Pieterson, 2009). In 1986, Daft and Lengel founded the MRT. Their research results show that when people collect information to reduce the level of uncertainty, they rationally select a channel. The MRT is based on the presumption that communication channels possess characteristics that determine the capacity of that channel to carry so called rich information (El-Shinnawy & Markus, 1998). The richness is based on four classification criteria that were formulated by Daft and Lengel (1986) as follows:

1. Immediacy of feedback: the speed with which feedback can be provided.
2. Multiple cues: the extent to which non-verbal communication can be used.
3. Language variety: the extent to which different words can be used to increase understanding.
4. Personalization: the extent to which feelings can be transmitted.

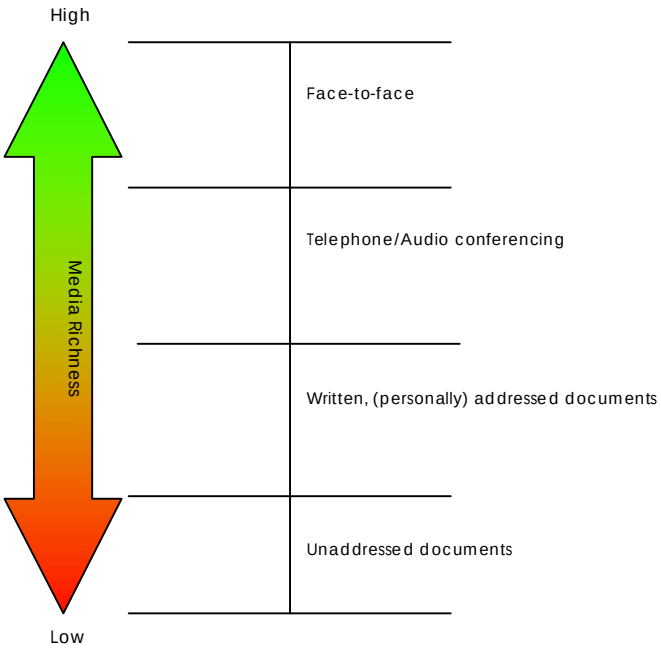



Figure 3.1: Hierarchy of Media Richness (Daft, Lengel & Trevino, 1987)

Channels that score high on the classification criteria scale are better suited for communicating ambiguous messages. Ambiguous messages might be misinterpreted, therefore two-way interaction is needed. In these forms of interaction, the sender can explain the message in more detail by using verbal and non-verbal communication (Webster & Trevino, 1995). On the other hand, so-called lean media (the opposite of rich media) should be used for unambiguous messages. In such situations, there is already consensus on the meaning of the message by all parties involved. According to the MRT, face-to-face meetings are considered to carry the richest information because of all the extra resources a person can use. At the other side of the continuum are the written documents that carry lean information. In between are telephone conversations and e-mail exchange. This hierarchy of media richness is visualised in the model as displayed in figure 3.1.

Despite the fact that some supportive results have been found for the MRT (Kahai & Cooper, 2003; Pieterson & Van Dijk, 2007) "overall empirical tests to date have not provided strong and convincing support" (Valacich, Mennecke, Wachter & Wheeler, 1994; p. 12). The MRT has mainly been criticised for being too rational (Webster & Trevino, 1995; Dennis & Kinney, 1998; Rowe & Struck, 1999; Trevino, Webster & Stein, 2000). Hindess (1988) claims that action is not always rational. "Individual's beliefs concerning the appropriate use of a channel as well as perceptions of a channel's richness (perceived media richness) are, in part, socially constructed and therefore subject to social influence" (Carlson & Zmud, 1999). Fulk, Schmitz and Steinfield (1990) presented a social influence model that takes into account more socially oriented aspects. In the following paragraph, you can find a further elaboration on this.

### 3.3 Social Influence Model

The Social Influence Model [SIM] is a useful framework for explaining perceptions and usage of communication channels in organisational settings (Campbell & Russo, 2003). The SIM describes how social influence affects individuals' attitudes toward communication channels and the usage of these channels. SIM is based on two assumptions. The first one posits that channel use is determined by rational choices such as evaluating the range of channels that are available and selecting an appropriate one to match the communication requirements of the task. In that respect the SIM supports the MRT. However, SIM also assumes that attitudes, statements, and behaviours of others in close contact influence how someone views and uses communication channels (Fulk, Steinfield, Schmitz & Power, 1987).

According to Kelman (1961), social influence occurs when other people affect an individual's thoughts or actions. This can be done either intentionally or unintentionally. Kelman (1958) researched social influence to understand the extent to which a change lasted when derived from social influence. He found that "the underlying processes in which an individual engages when he adopts the behaviour may be different even when the visible behaviour may appear the same" (Malhotra & Galletta, 1999, p.3). Kelman (1958) distinguished three processes; compliance, identification and internalisation.

1. Compliance occurs when an individual adopts the induced behaviour because of the expectation of gaining rewards or avoiding punishment and not because he or she believes in the content.
2. Identification occurs when an individual accepts social influence because he wants to establish or maintain a satisfying self-defining relationship to another person or group.
3. Internalization occurs when an individual accepts the influence because it is congruent with his value system

Finding out the underlying process is important to determine the "weight" of social influence. For this research, the focus is to determine whether social influence plays a role in channel use, whatever the underlying process is. If the research results show that social influence plays an important role, it would be valuable to carry out further research in which the underlying processes would be investigated to determine how effective social influence is.

What can be concluded from this is that both rational and social theories can help clarify which factors are of influence when people select a channel. Webster and Trevino (1995) also found that both rational and social influence perspectives should be seen as complementary as opposed to competing. However, there are also situations in which a person selects a channel based neither on rational thoughts nor on social norms. For the situations in between there is no existing model or theory.

Therefore, it is necessary to look at previous researches about channel choice and usage to find out which additional determinants other scientists have come up with.

### 3.4 Additional determinants

In 2007, Pieterson and Van Dijk explored citizens' motives for channel selection in certain situations. Their main findings were that people base their choice for a certain channel either on habits or, in case of more complex and ambiguous tasks, on an evaluation of task and channel characteristics. In total, the researchers found six groups of determinants e.g. habit, channel characteristics, task characteristics, situational constraints, experiences and personal characteristics that can affect channel selection. The latter determinant is closely related to other influential components. "What makes the personal characteristics important is the finding that they affect nearly every other determinant. Who you are affects how you perceive channels, how you perceive tasks and how rational you are in your decision making" (Pieterson and Van Dijk, 2007, p.179). A person's frame of reference is based on the norms and values of the environment he or she grew up with. In that respect, culture also plays an important role.

According to Fulk (1993, p.921), advocates of the Social Influence Theory [SIT] believe that members of a group, such as a project team for example, "share identifiable patterns of meaning and action concerning communication technology", suggesting that within a group people tend to choose similar channels for specific actions because they refer to a similar set of norms. This finding supports the assumption that organisational culture might also be of influence. The next two paragraphs will further elaborate on the cultural aspects.

### 3.5 Adaptive Structuration Theory

DeSanctis and Poole (1994) have used the Adaptive Structuration Theory [AST] to study the interaction of groups and organisations with information technology. The AST was inspired by Gidden's Structuration Theory [ST]. According to the ST social life is not based solely on random individual acts. Social forces influence people's acts. When a group of people repeat the acts of an individual, a structure is born. This means that there is a social structure, traditions, institutions, moral codes and established ways of doing things but it also means that these can be changed when people start to ignore them, replace them, or reproduce them differently (Gauntlett, 2002). DeSanctis and Poole (1994) researched social structures that can be found in organisations "such as reporting hierarchies, organisational knowledge and standard operating procedures" (DeSanctis & Poole, 1994, p.125). These social structures are embedded in the communication channel[5].

AST can be applied to explain why similar communication channels can have varying outcomes when used in different companies with differing social interaction patterns. In other words, using a channel successfully in company A does not necessarily imply that it will have the same structural outcomes in company B. "When structures become shared, then successful organisational change is achieved" (DeSanctis & Poole, 1994, p.128). Beside social and technological structures, DeSanctis and Poole (1994) present other structures such as structures of a task and the organisational environment. Structures arise from social interaction. One aspect that influences social interaction, especially in an international organisation such as DSM, is culture. In the following paragraph, you will find a more elaborate description of the role that culture can play within channel use.

[5] The AST is based on research on technological systems. However, in the context of the current research I will use the term (communication) channel in order to align this part with the rest of the theory.

### 3.6 Cultural influences

According to Richardson and Smith (2007, p.480), channel use is influenced by "convenience, the ease of a particular medium's use, and the immediacy that medium creates". However, all these determinants can be influenced by the culture of the user (Schwartz, 1994).

Schwartz was not the only one who studied the influence of culture on the channel selection process. Webster and Trevino (1995) found a significant influence of departmental culture on a person's channel use, which means that members of a certain group, in this case a department, tend to use the same channels. Hall (1976) also found proof for behaviour influenced by people's culture. He distinguishes two types of cultures; high and low context.

A high context culture is characterised by less verbally explicit communication and a more internalised understanding of what is being communicated due to long-term relationships. In other words, people are more familiar with each other and each other's history, which makes it less necessary to communicate explicitly. Asian countries, such as China and Japan are often characterised as high context cultures. A low context culture is more rule oriented and task centered. Western cultures such as America are often regarded as having a low context culture (Richardson & Smith, 2007). Both low and high context communication exists within a culture but one tends to prevail (Gudykunst & Nishida, 1986).

Other important work on culture comes from Hofstede (2001). On his personal website Hofstede states that people assume that everybody is the same. As stated previously a structure arises when a group of people repeat the acts of an individual. This means that there is a social structure - traditions, institutions, moral codes, and established ways of doing things. In this sense, a culture can also be seen as a structure and within that culture people display similar behaviour. However, not everybody is the same. Not every person grew up with the same traditions, institutions, moral codes etc. Trompenaars (1994, p.22) put it strikingly "A fish only discovers its need for water when it is no longer in it. Our own culture is like water to a fish. It sustains us. We live and breathe through it". Because of people's ignorance toward other cultures, misconception can arise when doing business with people in other cultures. Hofstede (2001) developed a model that incorporated five dimensions that affect the behaviour in organisations. With the model (as displayed on the next page), Hofstede (2001) wanted to make people aware of the cultural differences in order to improve international business.

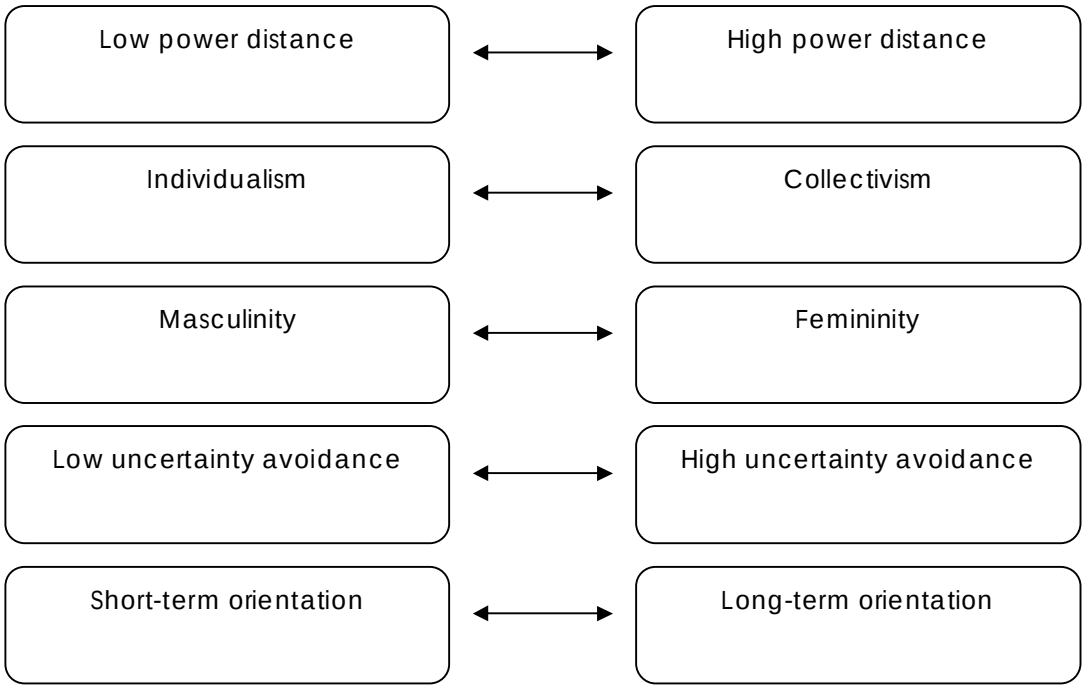



Figure 3.2: Cultural dimensions (Hofstede, 2001)

Cultural awareness can help you to communicate more effectively. Adjust your high context communication when communicating with someone from a low context culture and consciously select a communication channel that is commonly accepted within a certain culture.

### 3.7 What can be concluded from the theoretical framework

The earliest work on channel use can be found in the 1960's (Pieterson, 2009). Back then, the research focused on reasons for organisations to process information. Results show that collecting information was a strategy that people applied in order to reduce a feeling of uncertainty that derives from a lack of information. The URT and the AUM were the first theories that explored this concept. Later on researchers began to develop an interest in the "how"; how do people search for information and what influences their selection? According to the MRT, the selection is based on rational decision making. For several years, the MRT predominated. However, despite its dominant place in the scientific research literature, the theory has been criticised for being too rational and simple (Webster & Trevino, 1995; Dennis & Kinney, 1998; Rowe & Struck, 1999; Trevino, Webster & Stein, 2000). Furthermore, for the purposes of the current research, it was not suffice to solely use the MRT to explain channel choice. People do not always rationally select a channel and so a social component needed to be added. Yet again, the study of literature made it clear that the rational and social theories complement each other but that there still is a gap of situations that can be explained by neither. It was necessary to review additional researches that provided additional determinants. Pieterson and Van Dijk (2007) found six more factors that are of influence on channel selection. One of these six factors turned out to be closely related to culture. This determinant was given extra attention in paragraph 3.6.

In order to visualize the findings of the theoretical framework, the following figure will provide you with a schematic overview of the theories that can help explain channel selection and the corresponding determinants.

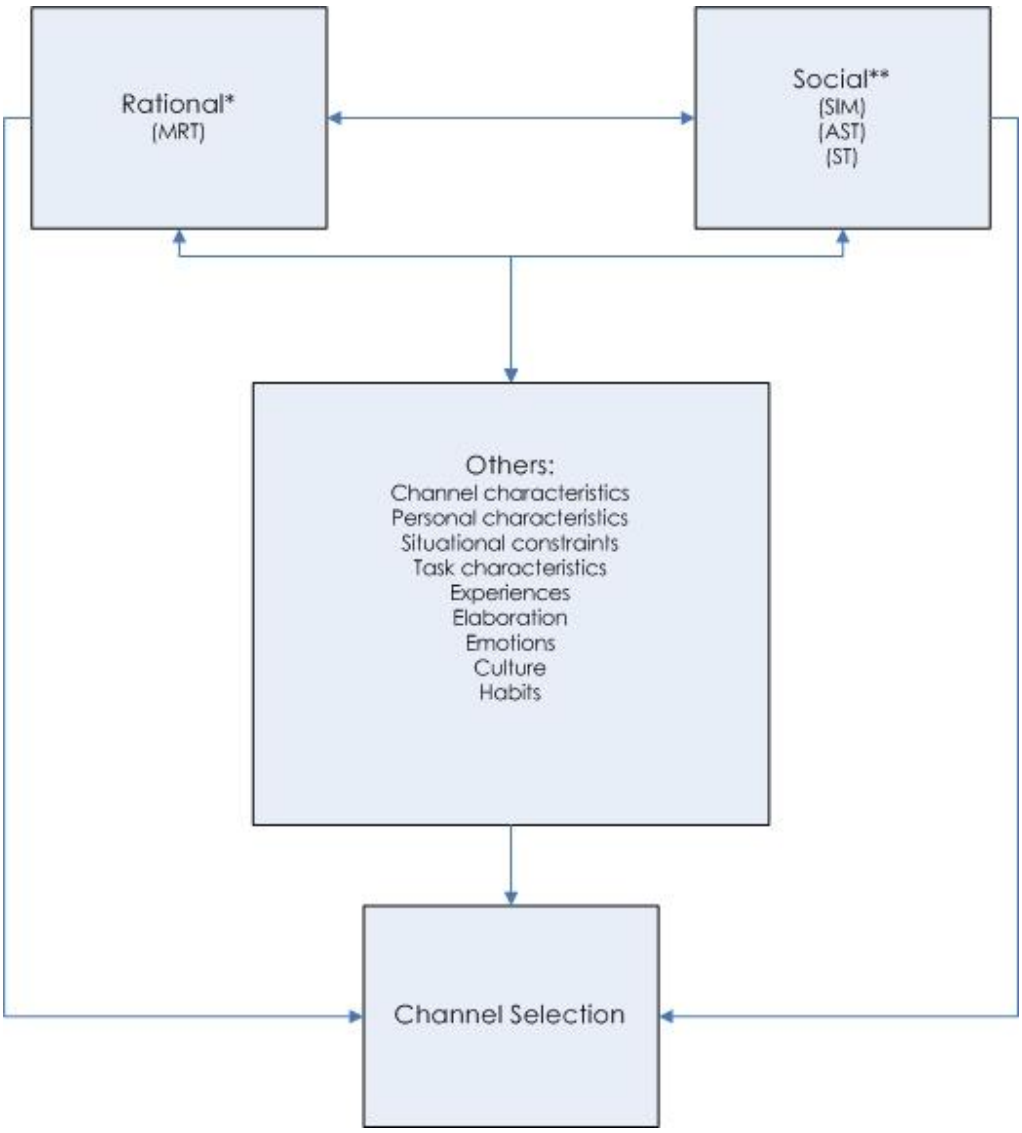



Figure 3.3: Visualisation of Channel Use Determinants

* Rational assessment of the task- and channel characteristics before selecting a channel
**All influences that are determined by social aspects (e.g. social pressure)

Based on the study of literature it can be concluded that both rational and social determinants are of influence on channel selection. Furthermore, additional components that are related to either both rational and social aspects or neither should be taken into account to elucidate the complete picture. The following chapters will report on the empirical research that has been conducted to see which factors are in fact of influence and how this determines which channels are most effective for communicating. Furthermore, an attempt is made to clarify how and to what extent the content of a message should be taken into consideration when choosing a channel (for either sending or receiving communication).

## 4. Method

The quantitative research had a descriptive character. The study, carried out by means of a questionnaire, was designed to determine the "what". For example, "What kind of communication channel would you choose for receiving information?"

The qualitative research had an explanatory character. The insights gained by the interviews were focused on answering the "why". For example "Why do you prefer channel X over channel Y". Furthermore, this study was used to find out whether different (communication) channels should be used for distributing different forms of communication (in this case: communication that was solely informative, communication in which an action was requested, communication in which feedback was requested).

Based on the knowledge gained from literature review, a questionnaire was formulated and distributed. Questionnaires are considered to be a typical method for conducting media use studies (Webster & Trevino, 1995). They are useful in the research for opinions and factual information. "A major advantage of a questionnaire is that a certain amount of anonymity can be assured, so sensitive information can be obtained from people who might not risk disclosing it in another way" (Downs & Adrian, 2004; 106). Other primary advantages of a questionnaire are efficiency, large sample size, low costs, the possibility to sample many topics, and permanent copies of the responses. However, these advantages vary according to the method to which the questionnaire is compared (Downs & Adrian, 2004). As with every method, the questionnaire also has disadvantages. The most frequently mentioned disadvantage of a questionnaire in scientific literature is that the answers are based on self-reports which make them less reliable. According to Valenzi and Andrews (1973), individuals do not posses insight into their own decision-making processes and tend to over- or underestimate themselves. Another point of criticism related to self-reporting is the fact that people might offer socially desirable answers (Arnold & Feldman, 1981; Brookhouse, Guion & Doherty, 1986) or biased answering (Downs & Adrian, 2004). The use of multiple methods for researching a particular subject narrows down these disadvantages as several results can be compared. Methodological triangulation, which is the scientific term for using multiple methods for research, is generally likely to give a more complete picture of the organisation (Downs & Adrian, 2004). That is why interviews have also been conducted.

Venkatesh (2006) argues that more qualitative research is needed to get a full understanding on channel use. Based on the analysis of the questionnaires interview schema's were developed. The interviews were used to obtain additional and more elaborate information. Like Johnson stated "the insights provided by open-ended interviews and construction of the adoption process have significant implications for improving efficiency, effectiveness, and employee satisfaction" (Johnston, 1984, p.57). Aspects that were not covered in the quantitative research, such as the effect of social influence on channel selection, became the focal point of the qualitative research. The question that should be answered with the help of the qualitative research is "Should different channels be used for different messages?"

4.1 Respondents

The total research population consisted of some 22.000 employees worldwide (Workforce DSM globally). The sample (research population) consisted of 738 respondents. All DICT employees were actively “recruited”; they received an email with a link to the questionnaire. All other employees could access the questionnaire via the intranet. They were informed about this via Netpresenter.

To get a better insight into how representative the sample was; two graphs are included below. In the annual report of DSM NL, different age categories were used compared to the annual report of DSM globally. Therefore, these latter figures are not included in the second graph. However, they can be found in the appendix (§9.1.1).

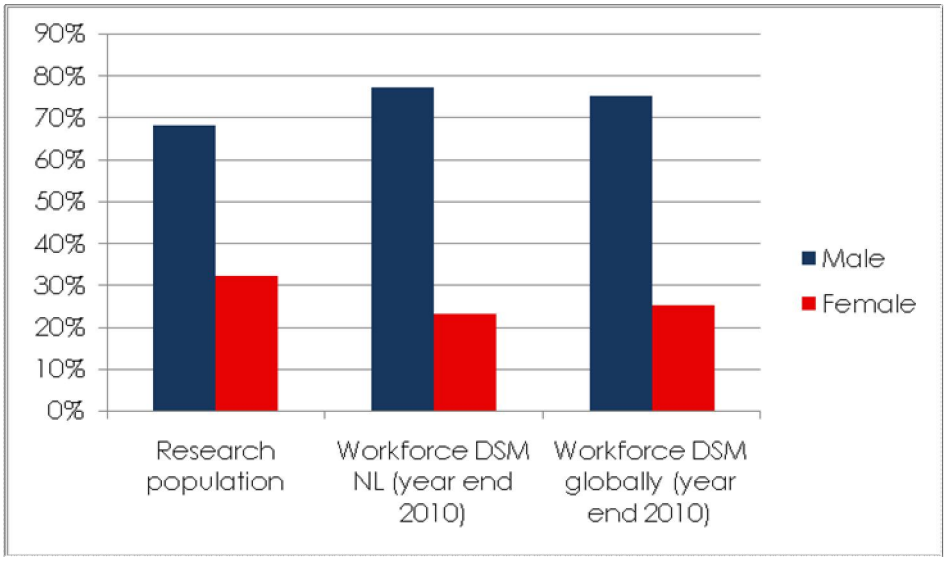



Figure 4.1.1: Gender distribution research population vs DSM workforce


Figure 4.1.2: Age distribution research population vs workforce DMS NL

The total number of respondents for the quantitative study was n=213, a percentage of 28.9%. The people that work for the DICT department were overrepresented; of the 153 people that indicated for which business group they are working, 78 people (51%) stated they are employed by DICT. This can be explained by the fact that these people were specifically targeted.

The fact that more than half of the research population work for the DICT department can explain the majority of men (68, 1%) represented in the sample, as the DICT-population is predominantly male. The respondents are relatively highly educated; 74, 8% have either a bachelor or a master degree. The age representation within the sample is in line with the information in the annual report of 2008 concerning the age of DSM employees within DSM Netherlands BV[6]. According to this report 72.34% of the employee population is older than 40. Current research results also display an outlier (34%) of people that are between 40 and 49 years of age.

In order to compensate the overrepresentation of the DICT employees in the quantitative sample, one employee from each business group within DSM was selected for the interviews. This resulted in 22 participants (n=22), all working for a different business group, staff or service department. Fourteen respondents were men whereas eight were female. As with the quantitative research, the level of education was relatively high. From the 22 interviewees, 18 completed a bachelor, master or higher form of education. In this sample, there also is an overrepresentation of people between the age of 40 and 49. In total, 16 of the 22 interviewees were over 40.

### 4.2 Procedure

Despite the fact that the intended research population consisted of some 22.000 employees worldwide, no permission was given to send out a collective email to all. However, an announcement was published on the corporate Netpresenter channel. This channel can be compared to a digital memo board or, as the digital communication officer put it; “as an online application used to distribute news messages”. Corporate Netpresenter is installed as a screensaver on all personal computers of DSM-employees. Furthermore, an (departmental) email was sent to all DICT employees worldwide consisting of 738[7] people. The email contained background information on the research, the link to the questionnaire and the request to fill out the questionnaire.

Tuesday May 11th 2010 the questionnaire was published on the intranet site of DICT. At the same time a corporate as well as a DICT Netpresenter message was released. Besides functioning as a screensaver on personal computers these news messages are also shown on television screens throughout DSM buildings. Furthermore, an online banner was published on the DICT intranet site. All data gathered by means of the questionnaire were automatically transported to an Excel spreadsheet and later manually transferred to SPSS.

[6] Holding concerned with all operational activities of DSM in the Netherlands
[7] Obtained via HR Support Officer DSM ICT

4.3 Instrument

The most important section of the questionnaire consisted of a number of 26 statements. These statements were based on valid constructs formulated by Pieterson (2009) for previous research purposes. Respondents were asked to indicate to which extent they agreed or disagreed with the statements based on a 5-point scale. The response categories varied from totally agree to totally disagree. The statements were spread over seven constructs; channel characteristics, habits, experiences, task characteristics, emotions, situation (time and distance) and elaboration. Each construct was measured by a minimum of 3 and a maximum of 4 items. For an overview of all statements please consult paragraph 9.1.3.

Another important section of the questionnaire included 12 questions about the channel people preferred for receiving three different types of information. The three types of information were defined as solely informative messages, communication in which people were asked to undertake action and communication in which people were asked to provide feedback. The answer categories included all communication channels that were available within DSM at the time of the research. An overview of these channels can be found in the appendix (§9.2.2). These questions were especially important for the DICT Communication Office in order to determine which channels should be employed for which kind of messages.

For the interviews, a semi-structured interview approach was used. This made it possible to deviate from the predefined questions when interesting issues arisen. The interviews lasted approximately 45 minutes and were audio recorded. Besides questions about demographical data, the interview consisted of questions that were formulated to collect more in depth information about channel selection. A few of the actual questions posed in the interview are listed below[8]

1. Which communication channel do you use most frequently for work related communication?
2. Why do you use this specific communication channel most often?
3. Which characteristics do you find important in a communication channel?
4. Why do you find these characteristics important?
5. What is the most important reason for you to not use certain channels?

Other themes that were discussed comprised social media, cultural differences and task characteristics.

First, the interviews were transcribed in full length and later the data was cross-referenced in Excel by two encoders. Based on the answers provided in the interviews, several categories were formulated by the researcher. After that, the two encoders divided the answers over the existing categories. The answers that were divided over differing categories were discussed and "re-categorised".

[8] For an overview of all predefined interview questions, please consult § 9.2.1.

5. Research results
The following paragraphs present the most important findings of the research.

5.1 Quantitative results

5.1.1 Preferences for (communication) channels
The following two figures visualize employees' preferences for a certain communication channel when receiving information during the week and the weekend.

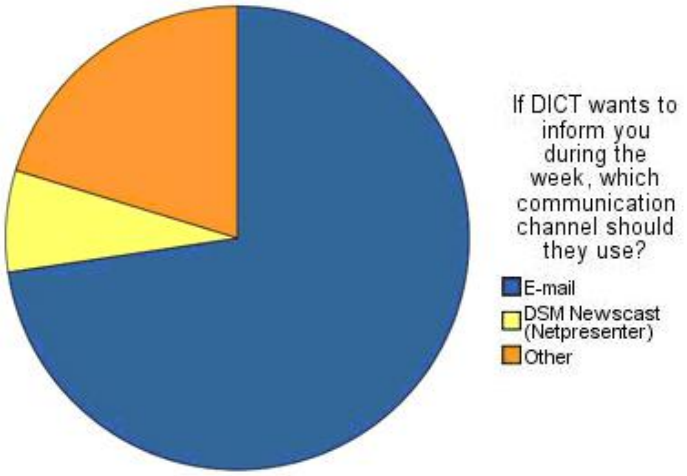



Figure 5.1: Channel preferences for receiving information during the week (N=212)

Figure 5.1 shows that nearly 75% of all respondents prefer receiving information via email during the week. DSM Newscast (Netpresenter) is selected as the preferred channel by a mere 5%. The remaining 20% represent the other communication channels; however, there is no channel with a relatively high frequency within this category.

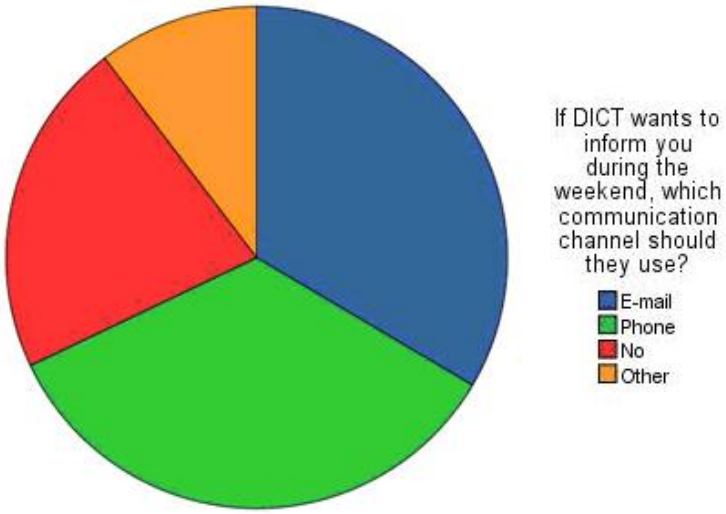



Figure 5.2: Channel preferences for receiving information during the weekend (N=212)

Notable is that during the weekend the distribution changes completely (see Figure 5.2). The preferences for email drop to 35%. What you can also see is that during the weekend the respondents show a similar preference for telephone as for email. As opposed to receiving information during the week, some respondents indicate that, during the weekend, they do not wish to receive ANY communication.

The following two figures visualize employees' preferences for a certain communication channel when they have to undertake action during the week and the weekend.

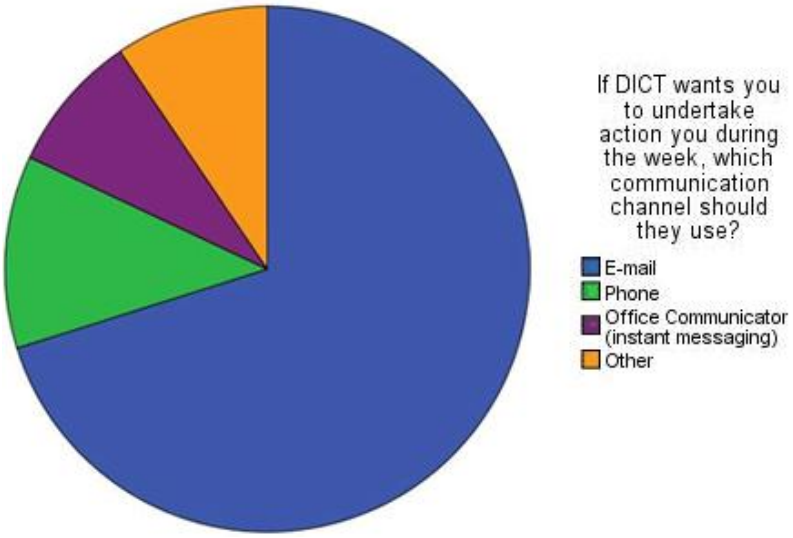



Figure 5.3: Channel preferences for receiving a notification to undertake action during the week (N=211)

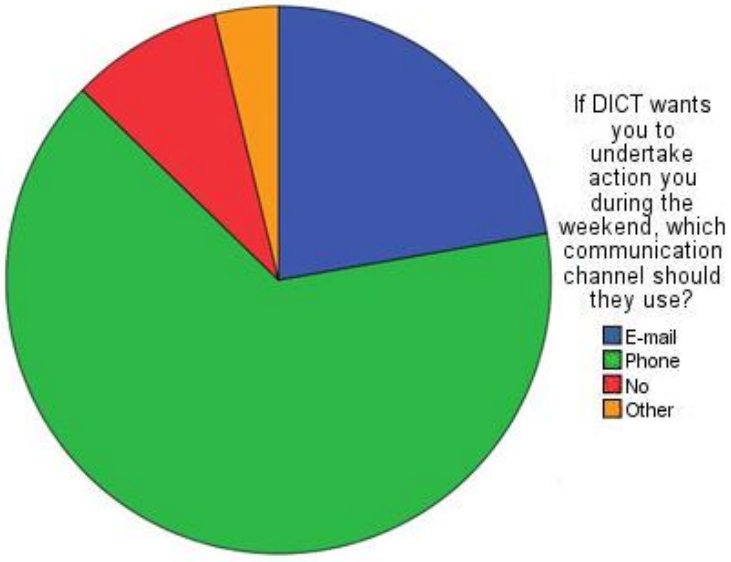



Figure 5.4: Channel preferences for receiving a notification to undertake action during the weekend (N=211)

An interesting conclusion that can be drawn from Figures 5.3 and 5.4 is that the respondents switch to communication channels that are more direct when they are required to undertake action. During the week, email remains the preferred communication channel for 70% of the respondents (see Figure 5.3). People also indicate their preferences for a phone call, text message or a notification via Office Communicator (similar to MSN), but this is only a mere 25%.

During the weekend, respondents prefer being contacted by phone (call or text message) when they are requested to undertake action (see Figure 5.4). This outcome is supported by the qualitative research. Respondents indicate that a phone call or text message is the only way to ensure (correct) action in the weekend. Respondents indicate that oftentimes they only have access to a phone during the weekend. Especially if something is urgent, they prefer to be contacted via phone (call or text message).

The following two figures visualize employees' preferences for a certain communication channel when they are asked to provide feedback during the week and the weekend.

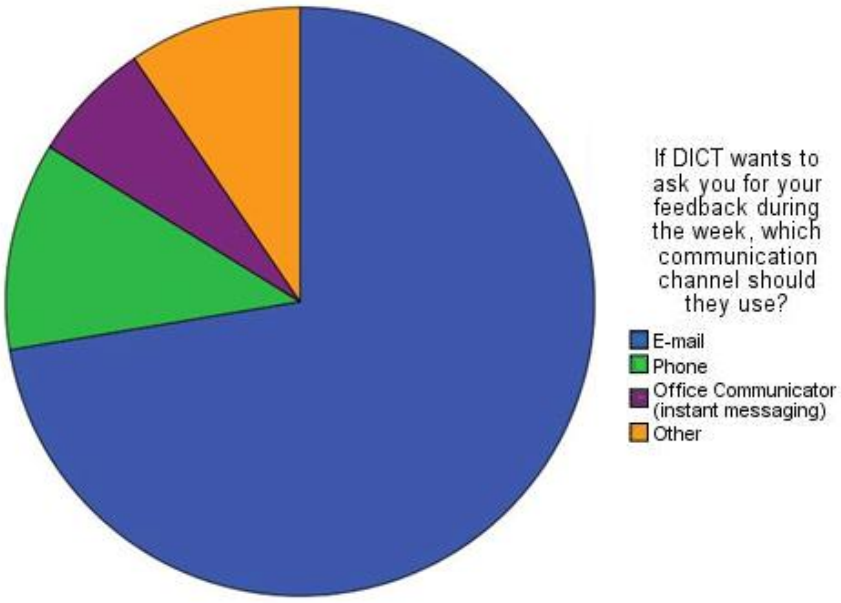



Figure 5.5: Channel preferences for receiving a notification to provide feedback during the week (N=210)

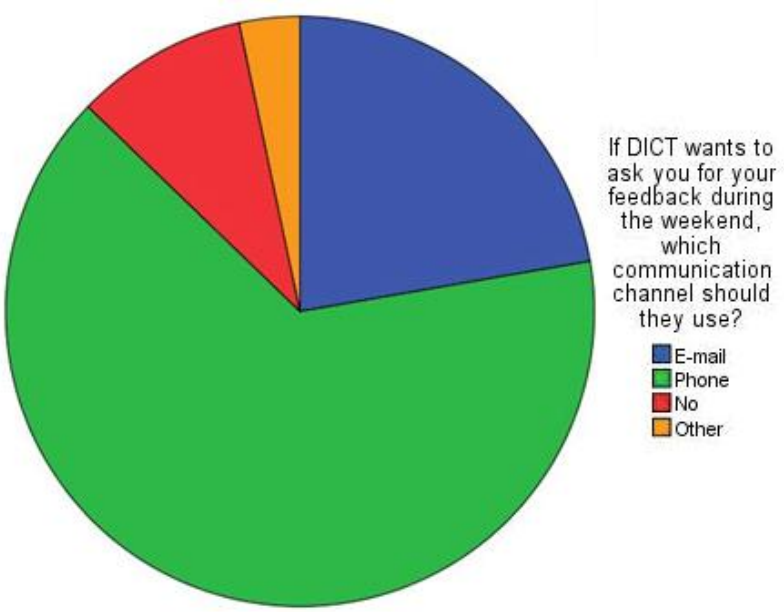



Figure 5.6: Channel preferences for receiving a notification to provide feedback during the weekend (N=211)

The figures that visualize the channel preferences for the task " feedback" are nearly identical to the figures for the task "undertake action". This is logical as both require the receiver to actually act upon the communication received.

What is interesting about the figures in general is that, despite the fact that employees indicate they prefer receiving communication via a different channel than email, 75% of all respondents indicate that, during the week, DICT should use email to communicate with them. During weekends this distribution is completely different. Notable is that, as opposed to communication during the week, part of the respondents indicate that they do not wish to receive communication during weekends regardless of the message. However, especially when the message is just informative, 22% of all respondents indicate they do not wish to receive any information during the weekend (see Figure 5.2). Another natable observation that can be drawn is that respondents prefer to be contacted by phone during weekends. Whereas approximately 75% of the respondents prefer email communication during the week, a similar percentage of respondents indicate to prefer a phonecall during weekends, especially when they are required to undertake action or give feedback.

In order to clarify things, the pie graphs on the previous pages have been combined into one stacked graph (see Figure 5.7).

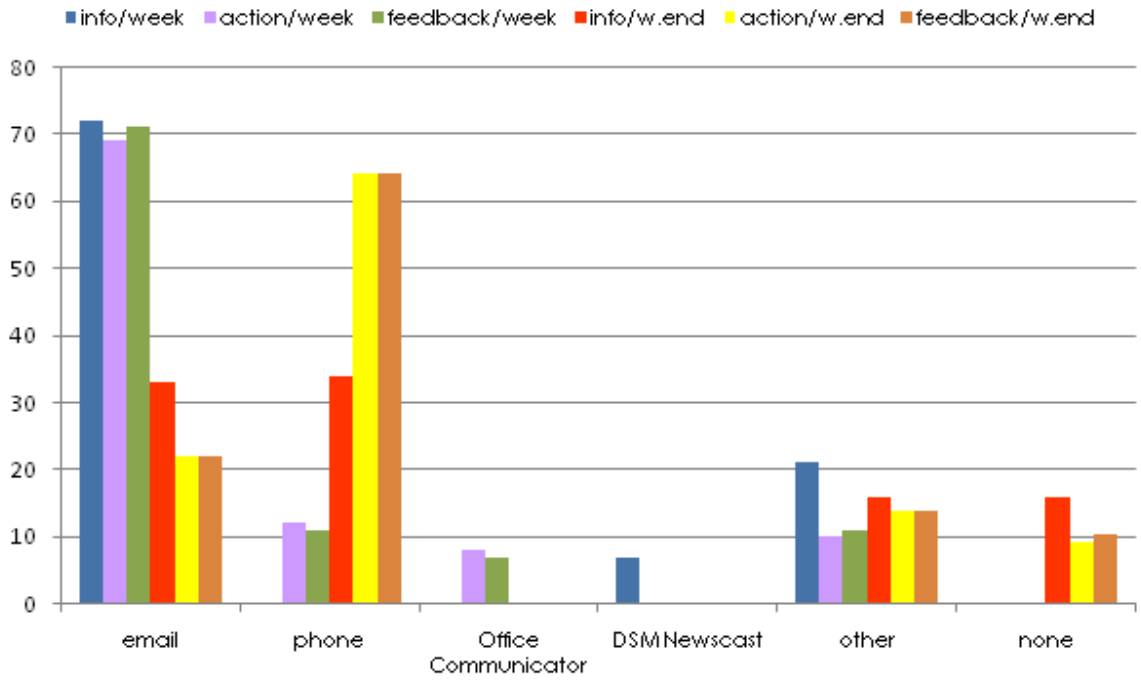



Figure 5.7: Channel preferences for three tasks (receive information, undertake action, provide feedback) during the week and the weekend

### 5.1.2 Use of social media within DSM

The use of social media within organisations is not yet broadly accepted. However, many organisations start to see the benefits of using social media for business purposes. As of 2011, DSM allows access to (more) social media. In order to determine whether social media could be used as a communication channel for push information, this following paragraph will clarify whether and how often social media[9] are used.

[9] Available social media at time of research: LinkedIn, Yammer and Facebook.

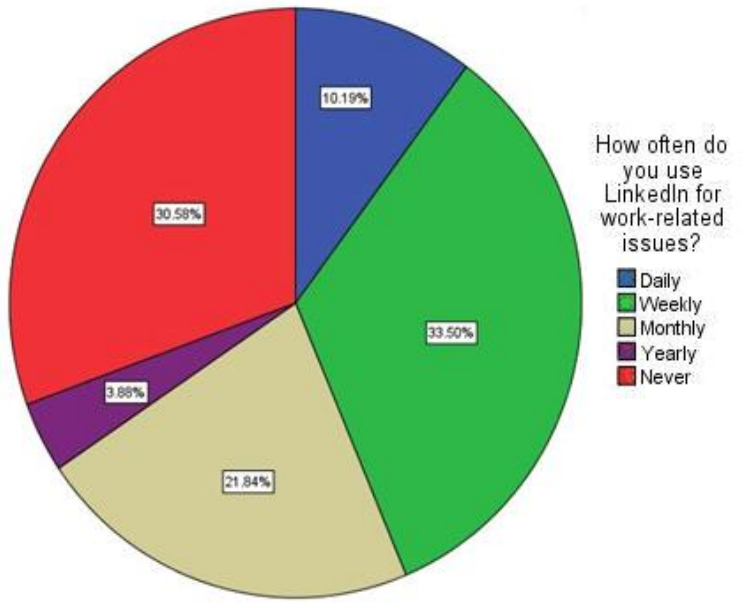



Figure 5.8: Use of LinkedIn for work related issues (N=206)

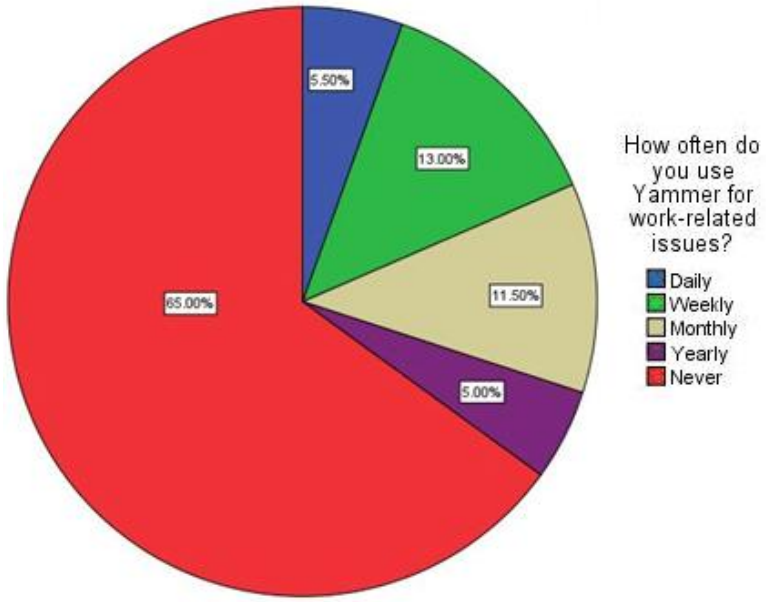



Figure 5.9: Use of Yammer for work related issues (N=200)

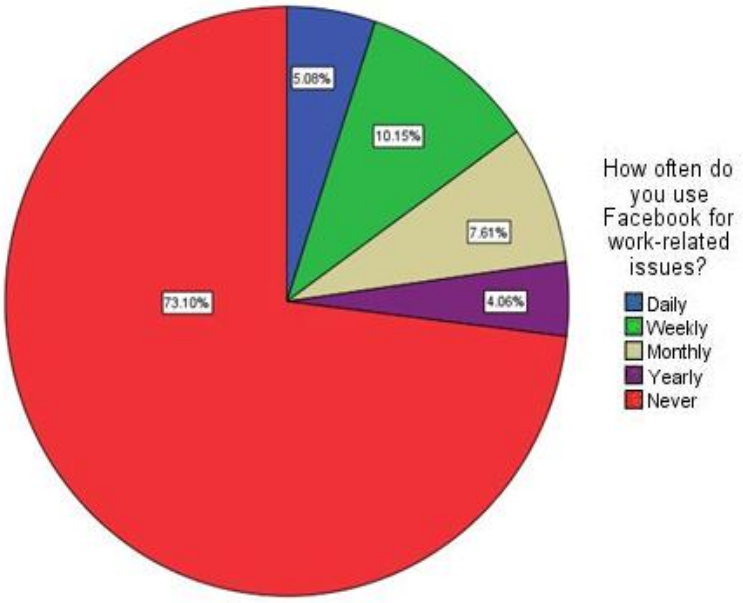



Figure 5.10: Use of Facebook for work related issues (N=197)

Of the three social media that are accessible within DSM, LinkedIn is used most frequently within DSM; 69% of the respondents indicate that they use this medium at least once a year. The opposite is true for Yammer and Facebook. Yammer is never used by 65% of the respondents. Facebook is never used by 73% of the respondents. The qualitative research (§5.2.4) supports these findings.

### 5.1.3 Channel selection within groups (business group and culture)

The theoretical framework indicated that within groups people tend to use similar (communication) channels. To test whether this also applies to the current research population a non parametric test is used. Nonparametric tests are often used to test assumptions about a population. The Wilcoxon Mann-Whitney Test is said to be one of the most powerful of the nonparametric tests for comparing two populations. It is used to test whether two populations have an identical distribution or not. Furthermore, this test does not require a normal distribution. The grouping variables used for this analysis are DSM ICT (employees) and non DSM ICT (employees). The outcome of the test can be found in the table below

Table 2

*The relationship between Business Group and Channel Selection Determinants*

| | BG | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Channel | DICT | 38 | 64.38 | 2446.50 |
| | Non DICT | 68 | 47.42 | 3224.50 |
| | Total | 106 | | |
| Habits | DICT | 38 | 53.82 | 2045.00 |
| | Non DICT | 69 | 54.10 | 3733.00 |
| | Total | 107 | | |
| Experience | DICT | 38 | 51.63 | 1962.00 |
| | Non DICT | 69 | 55.30 | 3816.00 |
| | Total | 107 | | |
| Task Characteristics | DICT | 38 | 46.99 | 1785.50 |
| | Non DICT | 69 | 57.86 | 3992.50 |
| | Total | 107 | | |
| Emotion | DICT | 38 | 56.91 | 2162.50 |
| | Non DICT | 69 | 52.40 | 3615.50 |
| | Total | 107 | | |
| Time_Distance | DICT | 38 | 48.93 | 1859.50 |
| | Non DICT | 69 | 56.79 | 3918.50 |
| | Total | 107 | | |
| Elaboration | DICT | 38 | 49.79 | 1892.00 |
| | Non DICT | 69 | 56.32 | 3886.00 |
| | Total | 107 | | |

| | Channel | Habits | Experience | Task Characteristics | Emotion | Time_Distance | Elaboration |
|---|---|---|---|---|---|---|---|
| Mann-Whitney U | 878.500 | 1.304.000 | 1.221.000 | 1.044.500 | 1.200.500 | 1.118.500 | 1.151.000 |
| Wilcoxon W | 3.224.500 | 2.045.000 | 1.962.000 | 1.785.500 | 3.615.500 | 1.859.500 | 1.892.000 |
| Z | -2.813 | -.047 | -.633 | -1.752 | -.752 | -1.300 | -1.077 |
| Asymp. Sig. (2-tailed) | .005 | .963 | .527 | .080 | .452 | .194 | .281 |

Compared to other business groups, DICT employees score higher on channel characteristics ($Z=-2.8$, $p<.01$). This indicates that channel characteristics play a more important role in the channel selection process for people employed by DICT.

Despite the fact that this research was not focused on determining cultural differences, one paragraph was dedicated to the subject as the theoretical framework indicated that culture does influence the channel selection process. According to the AUM, people from different countries prefer different channels. This aspect is related to nationality and therefore the recoded variables Dutch and Non-Dutch were used to test whether this statement also holds for the current sample. In table 3, you can find the outcomes of this test.

Table 3

*The Influence of Nationality on Channel Selection Determinants*

| | Nationality | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Channel | Dutch | 77 | 51,36 | 3954,5 |
| | Non Dutch | 20 | 39,92 | 798,5 |
| | Total | 97 | | |
| Habits | Dutch | 77 | 52,4 | 4035 |
| | Non Dutch | 21 | 38,86 | 816 |
| | Total | 98 | | |
| Experience | Dutch | 77 | 48,16 | 3708,5 |
| | Non Dutch | 21 | 54,4 | 1142,5 |
| | Total | 98 | | |
| Task Characteristics | Dutch | 77 | 53,18 | 4094,5 |
| | Non Dutch | 21 | 36,02 | 756,5 |
| | Total | 98 | | |
| Emotion | Dutch | 77 | 52,7 | 4058 |
| | Non Dutch | 21 | 37,76 | 793 |
| | Total | 98 | | |
| Time_Distance | Dutch | 77 | 50,94 | 3922,5 |
| | Non Dutch | 21 | 44,21 | 928,5 |
| | Total | 98 | | |
| Elaboration | Dutch | 77 | 46,87 | 3609 |
| | Non Dutch | 21 | 59,14 | 1242 |
| | Total | 98 | | |

| | Channel | Habits | Experience | Task Characteristics | Emotion | Time_Distance | Elaboration |
|---|---|---|---|---|---|---|---|
| Mann-Whitney U | 588,5 | 585 | 705,5 | 525,5 | 562 | 697,5 | 606 |
| Wilcoxon W | 798,5 | 816 | 3708,5 | 756,5 | 793 | 928,5 | 3609 |
| Z | -1,675 | -1,985 | -0,958 | -2,474 | -2,226 | -0,995 | -1,818 |
| Asymp. Sig. (2-tailed) | 0,094 | 0,047 | 0,338 | 0,013 | 0,026 | 0,32 | 0,069 |

The results of the Wilcoxon Mann-Whitney Test show that the test is not significant (Sig > .05; 2-tailed) for the variables *Channel, Experience, Time Distance* and *Elaboration*. The test is significant for the variables *Habits* (p<.05), *Task Characteristics* (p<.05) and *Emotion* (p<.05). With regard to habits, the Dutch have a higher mean rank (Mean rank = 52, 40) than people with a different nationality (Mean rank = 38, 86). This means that habits are of more influence on channel selection for the Dutch employees compared to those from other countries. With regard to *Task Characteristics*, the Dutch have a higher mean rank (Mean rank = 53, 18) than people with a different nationality (Mean rank = 36, 02). This means that channel characteristics are of more influence on channel selection for the Dutch employees compared to those from other countries. With regard to *Emotion*, the Dutch have a higher mean rank (Mean rank = 52, 70) than people with a different nationality (Mean rank = 37, 76). This means that the emotional state of mind plays a larger role in the channel selection process of Dutch employees compared to that of people from other countries.

The fact that the Dutch have an overall higher mean rank than people from different countries could be related to the fact that the research population was predominantly Dutch. In the non-Dutch category fourteen other countries were represented, however, most of them included two or fewer respondents.[10]

5.1.4 Influence determinants Pieterson & Van Dijk

Part of the questionnaire consisted of 26 statements based on valid items formulated by Pieterson (2009) for previous research purposes. The initial 26 statements were divided over 7 constructs. This means that every set of three or four questions should measure one construct. To determine whether this was the case, a factor analysis was conducted. The matrix as displayed below presents the variables and the factor to which they belong. The black factor loadings belong to the right factor. The red factor loadings are loadings that do not belong to any factor. The results indicate that there are five factors that are apparent: *Channel, Habits, Experience, Task Characteristics* and *Emotion*. Three factors are doubtful. The first doubtful factors are *Need for Closure* and *Elaboration*. Both variables appear to load in the same factor, however both are different variables with a different background and so these two components will be used separately. Secondly, two variables of factor *Distance* and *Time* are loading in the same factor. Because distance and time can theoretically be explained as the same construct, both items will be used as one variable: *Situation*.

[10] For more information on the distribution of nationalities please consult the SPSS output in §9.1.4

Table 4

*Channel Selection Determinants and Their Factors (before reliability analysis)*

| | Component | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| ChannelCharacteristic1 | | 0,75 | | | | | | | |
| ChannelCharacteristic2 | | 0,87 | | | | | | | |
| ChannelCharacteristic3 | | 0,81 | | | | | | | |
| ChannelCharacteristic4 | | | | | | 0,5 | | | |
| Habits6 | | | | | | | | | 0,85 |
| Habits7 | | | | | | | | | 0,63 |
| NeedforClosure8 | | | | 0,5 | | | | | |
| NeedforClosure 9 | | | | 0,71 | | | | | |
| Experience10 | | | 0,81 | | | | | | |
| Experience11 | | | 0,75 | | | | | | |
| Experience12 | | | 0,8 | | | | | | |
| TaskCharacteristic13 | 0,83 | | | | | | | | |
| TaskCharacteristic14 | 0,88 | | | | | | | | |
| TaskCharacteristic15 | 0,86 | | | | | | | | |
| Emotion16 | | | | | 0,87 | | | | |
| Emotion17 | | | | | 0,87 | | | | |
| Emotion18 | | | | | | | 0,74 | | |
| Distance19 | | | | | | 0,69 | | | |
| Distance20 | | | | | | | | 0,64 | |
| Time21 | | | | | | | 0,61 | | |
| Time22 | | | | | | | | 0,84 | |
| Elaboration23 | | | | | | 0,74 | | | |
| Elaboration24 | | | | 0,4 | | | | | |
| Elaboration25 | | | | 0,77 | | | | | |
| Elaboration26 | | | | 0,77 | | | | | |

In order to determine the reliability of the different factors, reliability analyses were conducted (see table 4.1).

Table 4.1

*Reliability Analysis for all Factors as Determined in Table 4*

| | Factor | Cronbach's Alpha |
|---|---|---|
| 1 | Some channels are suited better to solve problems than other channels. | 0.794 |
| 2 | Not every channel is suitable to answer certain questions. | |
| 3 | The available communication channels have different characteristics. | |
| 4 | I usually deploy the same channels. | 0.435 |
| 5 | Habits determine largely the channel I choose. | |
| 6 | I do not like uncertain situations. | 0.618 |
| 7 | I always use the channel that gives me the most certainty. | |
| 8 | In my channel choice, I am guided by my previous experiences. | 0.738 |
| 9 | When I need to choose a channel, I take my experiences with that channel into account. | |
| 10 | Experiences give me grip when I need to make a new channel choice. | |
| 11 | DICT information is often difficult to understand. | 0.856 |
| 12 | I have many questions regarding DICT information that I do not understand. | |
| 13 | Very often DICT information is incomprehensible, which leads to questions. | |
| 14 | Emotions influence my channel choice behaviour strongly. | 0.821 |
| 15 | When choosing a channel I am sometimes guided by my emotional state of mind. | |
| 16 | When I need to get in touch with someone, I use the channel that is closest to where I am at that point. | 0.412 |
| 17 | When I need to contact someone, it should take as little time as possible. | |

Continuation table 4.1

*Reliability Analysis for all Factors as Determined in Table 4*

| | Factor | Cronbach's Alpha |
|---|---|---|
| 18 | I do not usually choose a channel on autopilot. | |
| 19 | When I choose a channel, I usually think thoroughly before choosing. | 0.666 |
| 20 | I always first consider the problem I have, before choosing a channel to solve it. | |

A Cronbach's Alpha of at least .60 but preferably exceeding .70 is considered reliable (Bagozzi & Yi, 1988; Hulland, 1999). The fact that some Alpha scores are lower in some constructs is related to the smaller number of items. According to Peterson (1994), Cronbach's Alpha is easily affected by this. A Cronbach's Alpha higher than .60 means that the questions grouped together measure the same construct. These questions are all included in the further analysis. Items for which the Cronbach's Alpha is lower than .60 do not provide a consistent image of the data. Therefore, these questions are not included in the further analysis. In the table, these questions are marked in red.

In total six (obvious) components can be distinguished; channel characteristics (questions 1,2 and 3), habit (questions 6 and 7), experiences (questions 8,9 and 10), task characteristics (question 11, 12 and 13), emotion (questions 14 and 15), and elaboration (questions 18,19 and 20). The items belonging to the same factor were recoded and translated into five new variables.

To determine whether there is a correlation between different variables, a correlation analysis was conducted. A correlation analysis provides information about the strength and direction (positive or negative) of the relationship. In the output as displayed on the next page, you can find an overview of the significance level per variable.

Table 5

*Correlation Analysis Channel Selection Determinants*

| | | Channel | Habits | Experience | Task characteristics | Emotion | Elaboration |
|---|---|---|---|---|---|---|---|
| Channel | Corr. | 1 | | | | | |
| | Sig. | . | | | | | |
| | N | 106 | | | | | |
| Habits | Corr. | 0,067 | 1 | | | | |
| | Sig. | 0,494 | . | | | | |
| | N | 106 | 107 | | | | |
| Experience | Corr. | 0,149 | 0,127 | 1 | | | |
| | Sig. | 0,128 | 0,192 | . | | | |
| | N | 106 | 107 | 107 | | | |
| Task Characteristics | Corr. | ,225* | -0,022 | 0,056 | 1 | | |
| | Sig. | 0,021 | 0,823 | 0,565 | . | | |
| | N | 106 | 107 | 107 | 107 | | |
| Emotion | Corr. | 0,095 | 0,08 | 0,123 | ,249** | 1 | |
| | Sig. | 0,335 | 0,415 | 0,207 | 0,01 | . | |
| | N | 106 | 107 | 107 | 107 | 107 | |
| Elaboration | Corr. | 0,172 | -0,095 | 0,185 | -0,106 | -0,048 | 1 |
| | Sig. | 0,078 | 0,329 | 0,057 | 0,279 | 0,624 | . |
| | N | 106 | 107 | 107 | 107 | 107 | 107 |

*Task Characteristics* are positive significantly correlating with *Channel* (p<.05). This means that respondents who indicate they find DICT information difficult to understand (high score on task characteristics) also feel that not every channel is suited to answer certain questions (high score on channel characteristics). *Emotion* is positive significantly correlating with *Task Characteristics* (p>.01). This means that respondents who indicated that they are oftentimes guided by their emotions in choosing a channel (high score on emotions) also feel that DICT information is difficult to understand (high score on task characteristics).

Multinomial Logistic Regression

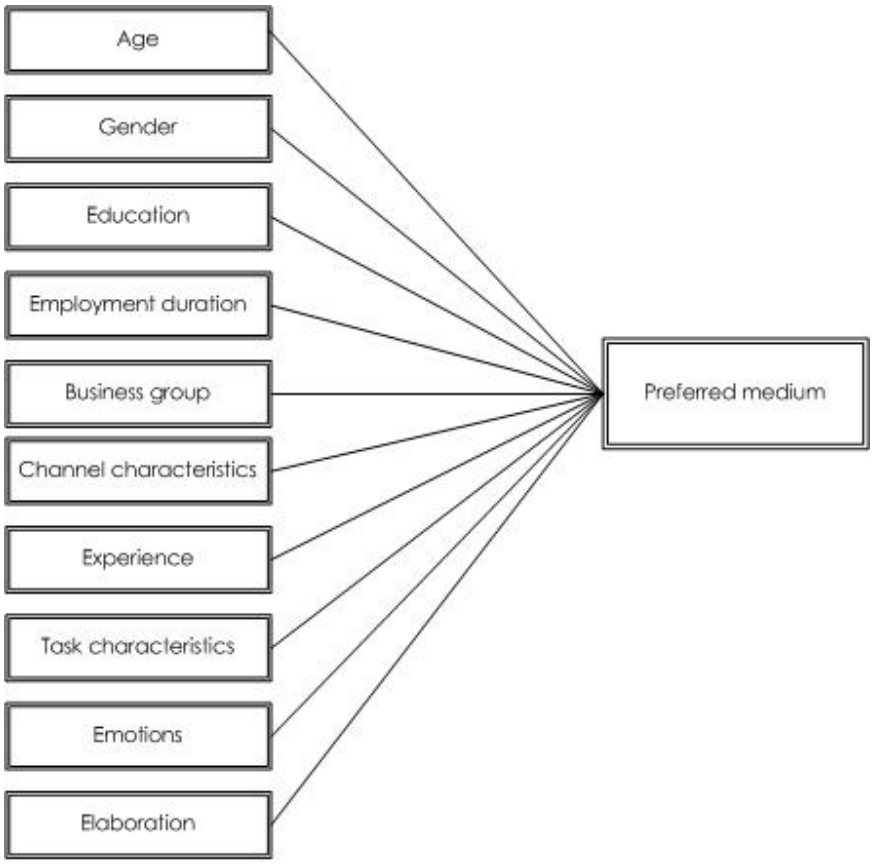
Multinomial logistic regression is used when the dependent variable is nominal (a set of categories which cannot be ordered in a meaningful way, also known as categorical) and consists of more than two categories. This type of regression analysis is used to analyse the correlation between dependent variables and an independent variable (or variables).

The multinomial logit model assumes that:

- Data are case specific; that is, each independent variable has a single value for each case. *This assumption is met: each respondent could choose one preferred communication channel per situation.*
- Co linearity is assumed to be relatively low (but no need for the independent variables to be statistically independent). *Table 5 (p.41) shows there are no high correlations between the predictors, so this assumption is also met.*

Only respondents who answered questions 18-28 in the questionnaire (n=106) are included in this analyses, because the scores on the variables Channel Characteristics, Experience, Task Characteristics, Emotions and Elaboration are based on answer patterns from this part of the questionnaire.

On the following pages, the model as displayed below is tested for six situations.



The six situations are information during the week, information during the weekend, action during the week, action during the weekend, feedback during the week, feedback during the weekend.

Gender, and business group (DSM ICT vs. non DSM ICT) are dichotomous nominal variables and are defined as factors in the model. Employment duration is an ordinal variable with few (3) categories and is defined as a factor as well.

Age, Channel Characteristics, Experience, Task Characteristics, Emotions and Elaboration are continuous variables and are defined as covariates in the model. Education is an ordinal variable with many (11) categories and is defined as a covariate.

Information during the week
A large majority (72%) of the respondents choose email as their preferred communication channel to be informed on weekdays. DSM newscast and Intranet alerts are each preferred by 7% of the respondents, 14% of the respondents prefer one of the other channels (see Table 6.1).

Table 6.1

*Preferred Communication Channels for Information During the Week*

| | *N* | *Percentage* |
|---|---|---|
| Email | 76 | 72.4% |
| Other | 15 | 14.3% |
| Intranet - Alerts | 7 | 6.7% |
| DSM Newscast | 7 | 6.7% |
| | 105 | 100.0% |

The model fitting information tests whether the set of independent variables has significant predictive power, compared to the 'intercept only' model. In this case, the model is not significant: $Chi^2$ (33) =24.6, ns

Information during the weekend
The statistics for the preferred communication channel for receiving DICT information during the weekend show more variety than for receiving information on weekdays: 41% of the respondents prefer receiving information by phone, 31% by email, 16% prefer 'other' and 16% prefers not to receive any information during the weekend (see Table 6.2).

Table 6.2

*Preferred Communication Channels for Information During the Weekend*

| | *N* | *Percentage* |
|---|---|---|
| Phone | 43 | 41.0% |
| Email | 33 | 31.4% |
| None | 17 | 16.2% |
| Other | 12 | 11.4% |
| | 105 | 100.0% |

The predictors have a significant relationship with the preferred communication channel for information during the weekend: $Chi^2$ (33) =52.5, p<.05

Table 6.3 shows the summary of all parameter estimates in the model with a significance of p<.10 (for a complete overview, see Appendix §9.1.4).

Table 6.3

*Parameter Estimates for Information During the Weekend*

| | | *B* | *Std. Error* | *Wald* | *df* | *Sig.* |
|---|---|---|---|---|---|---|
| INF_E | | | | | | |
| Phone | Intercept | 6.935 | 3.904 | 3.156 | 1 | .076 |
| | EMOTIONS | -.359 | .172 | 4.329 | 1 | .037 |
| | [GENDER=1] | -1.880 | .637 | 8.721 | 1 | .003 |
| Other | Intercept | -1.936 | 5.942 | .106 | 1 | .745 |
| | [BG=1.00] | 2.143 | 1.101 | 3.788 | 1 | .052 |
| | [EMPLOYED=1] | 2.403 | 1.304 | 3.395 | 1 | .065 |
| None | Intercept | 9.582 | 4.754 | 4.062 | 1 | .044 |
| | EDUCATIO | -.389 | .182 | 4.564 | 1 | .033 |
| | [GENDER=1] | -1.794 | .842 | 4.537 | 1 | .033 |
| | [BG=1.00] | -2.311 | 1.057 | 4.784 | 1 | .029 |

Table 6.3 shows that respondents with high scores on 'emotions' show less preference for 'phone' (B=-.26, p<.05). The Figure below shows the negative relationship between the percentage of respondents that prefer information during the weekend, and the degree to which emotions influence their channel choice. Respondents that are strongly influenced by emotions prefer not to be contacted by phone to receive information during the weekend.

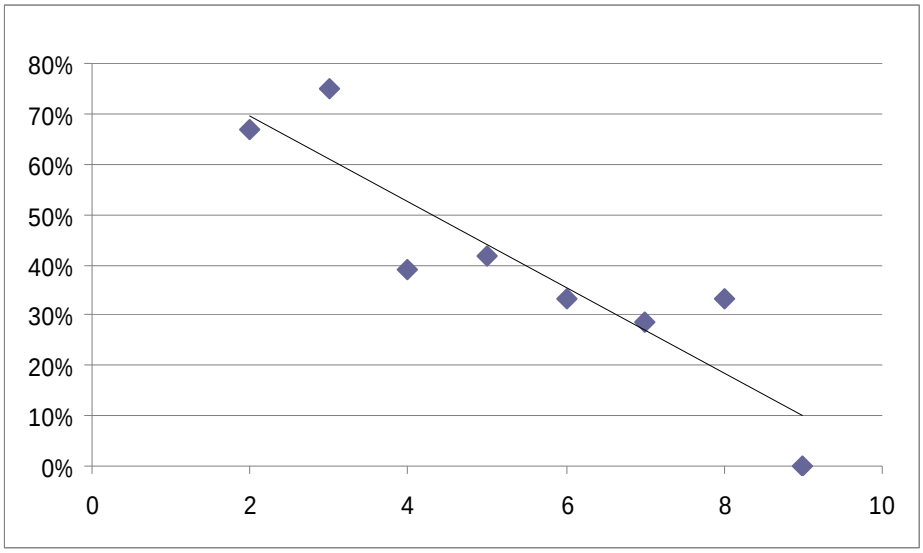



*Figure 5.11: Influence of Emotions on Channel Selection Process*[11]

Women (GENDER = 1) show less preference for 'phone' and less preference for 'none' (B=-1.9, p<.01 and B=-1.8, p<.05). This means that women have a relatively strong preference for receiving 'email', while men are more likely to prefer to be contacted by phone, or not at all.

Low educated respondents and 'non DSM ICT' employees have a relatively strong preference not to receive information during the weekend. The relationship between level of education and the percentage of respondents that prefer not to be contacted with information during the weekend is displayed in Figure 5.12.

[11] Task: receiving DICT information during the weekend

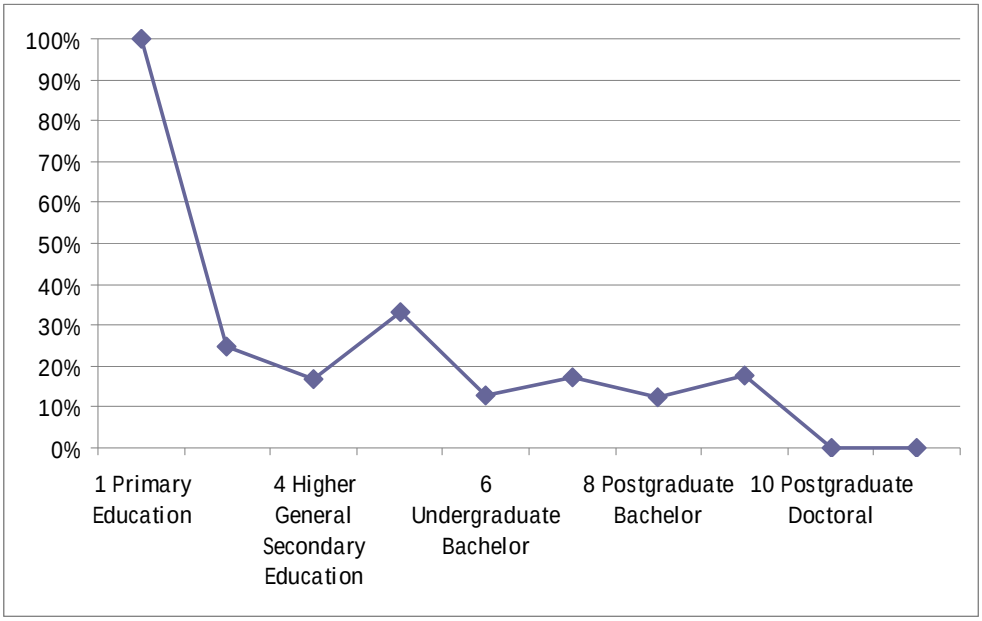



*Figure 5.12: Influence of Education on Not Wanting To Receive Information During the Weekend*

There is also a weak tendency that DSM ICT (BG=1) and employees that have been working at DSM for less than 3 years have more preference for 'other communication channels' than other business groups (B=2.1, p=.05 and B=2.4, p=.07). 16% of DSM ICT and 10% of other business group employees, 19% of shortly employed employees and 9% of longer employed employees prefer to be contacted by other channels than email, phone, or none to receive information during the weekend; these differences are only just not significant.

Action during the week
A large majority (69%) of our respondents choose email as their preferred communication channel when it comes to being contacted for undertaking action during the week. The phone (11%) and Office Communicator (8%) are second and third.

Table 6.4

*Preferred Communication Channels for Action During the Week*

| | *N* | *Percentage* |
|---|---|---|
| Phone | 11 | 10.5% |
| Office Communicator | 8 | 7.6% |
| Other | 14 | 13.3% |
| Email | 72 | 68.6% |
| Valid | 105 | 100.0% |

The model fitting information tests if the set of independent variables has significant predictive power, compared to the 'intercept only' model. In this case, the model is not significant: $Chi^2$ (33) =31.9, ns

Action during the weekend

The statistics for the preferred communication channel when it comes to being contacted for undertaking action during the weekend show more variety than for information on weekdays: 68% prefer to be contacted by phone, 20% by email and 12% 'other'.

Table 6.5

*Preferred Communication Channels for Action During the Weekend*

| | *N* | *Percentage* |
|---|---|---|
| Phone | 71 | 67.6% |
| Email | 21 | 20.0% |
| Other | 13 | 12.4% |
| Valid | 105 | 100.0% |

The predictors have a significant relationship with the preferred communication channel for information during the weekend: $Chi^2$ (22) =49.8, p<.01

Table 6.6

*Parameter Estimates Preferred Communication Channels for Action During the Weekend*

| | | *B* | *Std. Error* | *Wald* | *df* | *Sig.* |
|---|---|---|---|---|---|---|
| Phone | Intercept | 7.966 | 4.485 | 3.155 | 1 | .076 |
| | AGE | -1.067 | .366 | 8.513 | 1 | .004 |
| | [GENDER=1] | -1.464 | .697 | 4.415 | 1 | .036 |
| Other | Intercept | -.515 | 5.811 | .008 | 1 | .929 |
| | EDUCATIO | -.538 | .246 | 4.775 | 1 | .029 |
| | [EMPLOYED=2] | 2.703 | 1.234 | 4.803 | 1 | .028 |

Table 6.6 shows that older respondents and women show less preference for 'phone' (B= -1.1, p<.01 and B=-1.5, p<.05). The negative relationship between age and phone preferences is displayed in Figure 5.13.

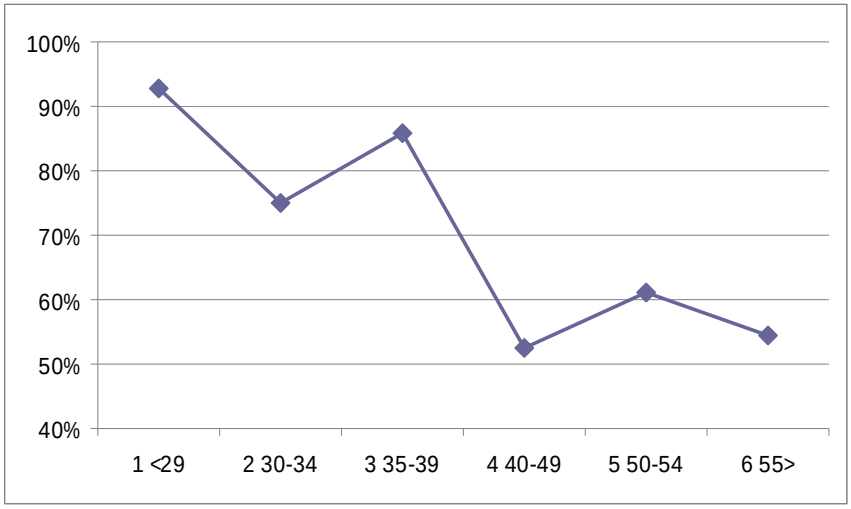



Figure 5.13: Influence of Age on Wanting to be Contacted by Phone during the weekend

Asking for feedback during the week
A large majority (72%) of the respondents choose email as their preferred communication channel when it comes to being contacted for providing feedback during the week. The phone (10%) and office communicator (7%) are second and third.

Table 6.7

*Preferred Communication Channels for Feedback During the Week*

| | *N* | *Percentage* |
|---|---|---|
| Email | 76 | 72.4% |
| Other | 12 | 11.4% |
| Phone | 10 | 9.5% |
| Office Communicator | 7 | 6.7% |
| Valid | 105 | 100.0% |

The model fitting information tests whether the set of independent variables has significant predictive power, compared to the 'intercept only' model. In this case, the model is not significant: $Chi^2$ (33) =32.8, ns

Asking for feedback during the weekend
The preferred communication channels when it comes to being contacted for providing feedback during the weekend show more variety than for feedback on weekdays: 66% prefer information by phone, 25% by email and 10% 'other'.

Table 6.8

*Preferred Communication Channels for Feedback During the Weekend*

| | *N* | *Percentage* |
|---|---|---|
| Phone | 69 | 65.7% |
| Other | 10 | 9.5% |
| Email | 26 | 24.8% |
| Valid | 105 | 100.0% |

The predictors have a significant relationship with the preferred communication channel for information during the weekend: Chi² (22) =46.3, p<.01

Table 6.9

*Preferred Communication Channels for Feedback During the Weekend*

| | | B | Std. Error | Wald | df | Sig. |
|---|---|---|---|---|---|---|
| Phone | Intercept | 7.504 | 3.882 | 3.737 | 1 | .053 |
| | Age | -.585 | .292 | 4.012 | 1 | .045 |
| | Task Characteristics | -.264 | .120 | 4.840 | 1 | .028 |
| | [Gender=1] | -1.261 | .598 | 4.441 | 1 | .035 |
| Other | Intercept | 2.939 | 6.282 | .219 | 1 | .640 |
| | Education | -1.011 | .384 | 6.917 | 1 | .009 |
| | [Employed Since=2] | 4.787 | 1.793 | 7.123 | 1 | .008 |

Table 6.9 shows that older respondents and women show less preference for 'phone', B=-.6, p<.05 and B=-1.3, p<.05

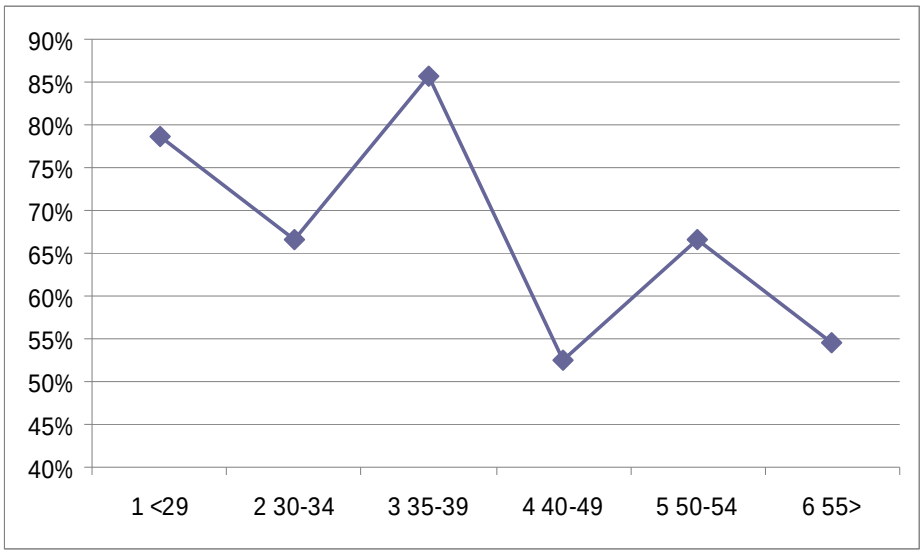



*Figure 5.14: Influence of Age on Wanting to be Contacted by Phone to Provide Feedback During the Weekend*

Respondents with high scores on 'task characteristics' have less preference to be contacted by phone during the weekend (B=-1.3, p<.05). High scores on 'task characteristics' indicate that the respondent has difficulty understanding DICT information. More difficulties with understanding DICT information are associated with lower preferences for communication via phone when it comes to providing feedback during the weekend (see Figure 5.15).

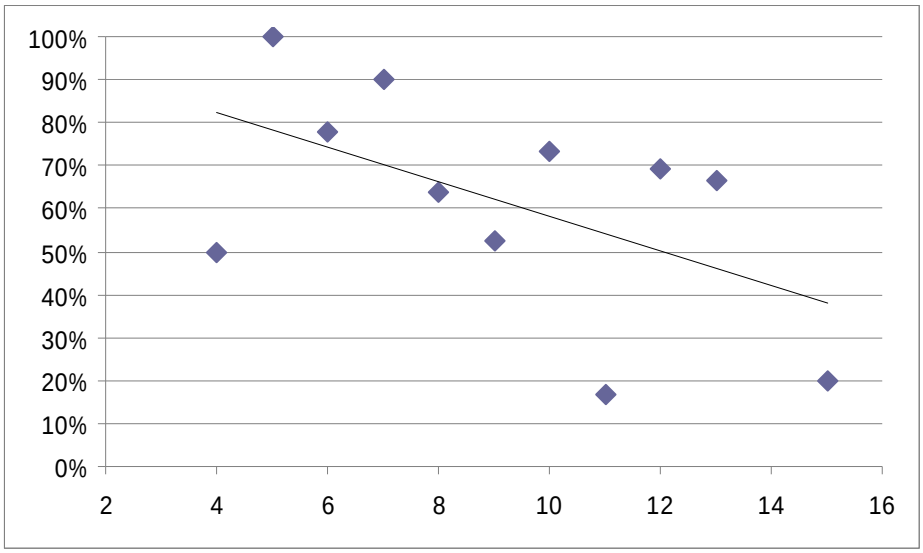



*Figure 5.15: Percentage of Respondents That Prefers to be Contacted by Phone to Give Feedback During the Weekend, by Score on 'Task Characteristics'*

Higher educated respondents show less preference for 'other' (B=-1.0, p<.01). Figure 5.16 shows the negative relationship between level of education and preference for 'other'.

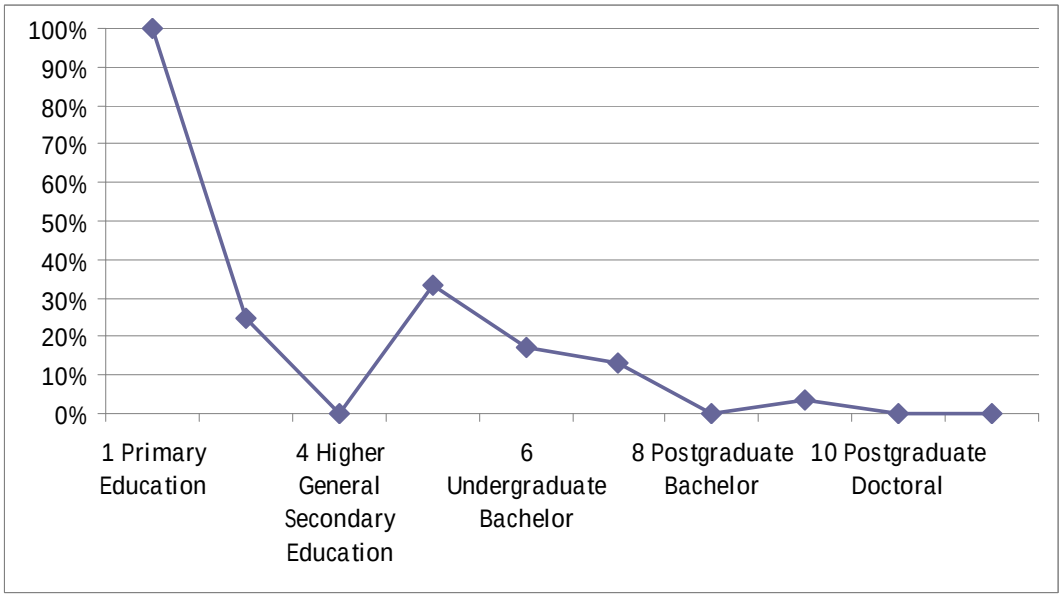



*Figure 5.16: Percentage of Respondents That Prefers to be Contacted by 'Other' to Give Feedback During the Weekend, by Level of Education*

Employees that have been working at DSM for three to ten years show a higher preference for ‘other communication channels’ (B=4.8, p=.01).

One of the most notable results is that, during the week, respondents clearly prefer email for any type of communication. There are no significant relationships between the predictors and communication channel preferences during the week. This can be explained by the fact that the sample was relatively small and not very diverse on certain aspects; most respondents were Dutch, and worked for DSM ICT. Furthermore, it is difficult to collect quantitative data because there is not much information about this subject (yet). Qualitative research is therefore very important; insights gained by qualitative research can be used as input for quantitative research.

During the weekend, the preference for a certain communication channel is related to both respondents’ characteristics and message characteristics:

- Compared to women, men have a stronger preference for communication by phone (for information, calls for action and for feedback). Furthermore, men indicate more frequently that they do not want to receive any communication that is solely informative during the weekend.
- Compared to older employees, young employees have a stronger preference for communication by phone (phone calls for action and for feedback)
- Compared to higher educated employees, lower educated employees have a stronger preference not to receive information, and to receive communication via 'other' channels (phone calls for action and for feedback).
- DSM ICT employees rarely indicate not to wanting to receive information during the weekend, compared to other business groups.

Respondents that are strongly influenced by emotions and respondents who have difficulties understanding DICT information prefer not to be contacted by phone with information or for feedback.

## 5.2 Qualitative results

The following paragraph presents the most important findings of the qualitative study. Quotes, abstracted from the interviews, are included to make some statements more tangible.

### 5.2.1 Number of channels

All interviewees indicated that they experience an information overload in their daily work. Five of the 22 interviewees state that there are too many (communication) channels within DSM. Only four interviewees state they know all channels that are available within DSM, which leaves 18 interviewees that do not know certain channels. The primary channels that are not being used are the intranet (functionalities) and social media. The main reasons provided for not using these channels are time limitations (with regard to finding out how things work) and missing added value (social media are considered not to be of added value for work related issues according to the interviewees).

> "Finding out how a new channel works, takes too much time, time I don't have in the first place" (Respondent 20)
>
> "Time constraints often limit me in using other channels" (Respondent 4)
>
> "Especially new channels require some time investments" (Respondent 14)
>
> "Time is money! Getting to know how a channel works, while you can save money by using an 'old' channel is just not appealing" (Respondent 18)

A channel that is of great benefit according to 12 interviewees is YouTube. At the time of this study, this channel was only accessible for a limited group of employees within DSM.

> "I notice there is a big drive for the use of video in communications, so YouTube is a source for video. It's the biggest database in the world. I spend quite some time at home to find video material that I can use in my work that is ridiculous" (Respondent 10)
>
> "Well of course for my work there are websites that I can't access that I would certainly use, that includes YouTube" (Respondent 2)
>
> "I would like YouTube to be available because I think we can do much more with video messages" (Respondent 5)
>
> "I think it would be good to have some distraction at times and reload yourself for the rest of the day for example by watching a funny video on YouTube" (Respondent 17)
>
> "I miss YouTube. Not because I am such a fan of YouTube but you also see the use of videos in training sessions. There are some very nice movies on it that you could use for a meeting and I think that it is a pity that we don't have access to it now" (Respondent 15)

Furthermore, interviewees indicate that other channels might be used more frequently if they would have the (right) equipment for using them (e.g. webcams).

> "We are in touch with the affiliate managers on a regular basis but we don't use LiveMeeting because they are not equipped with webcams yet" (Respondent 15)
>
> "Not all locations have been provided with the same equipment, which makes it difficult to make use of new channels sometimes" (Respondent 4)

> "At DICT we are very lucky that we are equipped with all the necessary tools in order to optimally make use of new channels. This does not apply to all locations around the world" (Respondent 15)

### 5.2.2 Preferences for (communication) channels

As opposed to the quantitative research results, interviewees state they prefer not to receive email communication (from DICT). However, when they were forced to choose a channel for receiving DICT related messages, 11 out of 22 interviewees (50%) indicated they prefer email. The most important reasons for preferring email communication during the week are the fact that emails are read daily, they can be archived and that Outlook is easy to use. Five interviewees stated that the channel they prefer depends on the urgency of the message. This is in line with the findings of the quantitative research results, where people indicated that they preferred to be contacted directly when they were required to undertake action on a short notice. Twenty interviewees stated that the content of the message is of influence on their channel selection. Only one interviewee said that channel selection depends solely on the urgency of the message and another one stated that the content might play a role in selecting the right channel but that this is not done consciously.

> "I can't say there is one channel that is suited for all communication. It depends on the content of the message" (Respondent 1)

> "If I have a short and urgent message I prefer to use the phone because I'm certain that the person receives my message. When I have a long and complicated message I send an e-mail because you can add numbers in a clear overview and pictures so that the person can visualize the information" (Respondent 12)

> "I think that as soon as there are emotional aspects involved; subjects that are more sensitive I would always go for a personal approach, so the verbal approach but preferably face-to-face" (Respondent 14)

> "If there is an escalation or you think that somebody needs a compliment or a correction then I would not use e-mail" (Respondent 16)

> "If it is a difficult message I will try to do it in person or have a LiveMeeting with the webcam. If it is strictly business or something I need to know than usually e-mail is better suited especially if you want to keep track of things" (Respondent 17)

> "It all depends on the content of your message" (Respondent 2)

The relationship a person has with the receiver is of influence on channel selection according to 21 interviewees.

> "Yes, if I'm honest it does, I always find it easier to contact people that I know" (Respondent 17)

> "I think that with people you know very well, you use Office Communicator more easily than people with whom you have less contact" (Respondent 18)

> "With people in a higher position you often take the fact that you don't want to intrude them even more into account" (Respondent 19)

> "When the relationship is really good I know his or her preference and then I adopt a little bit more to their preferences" (Respondent 16)

Next to the relationship with the receiver, interviewees indicated that the position of the person they communicate with (hierarchy) plays a role. Other determinants mentioned were time zones/location and whether or not the receiver was travelling a lot.

### 5.2.3 Ease of use

Some new media channels that were rolled out within DSM are used extensively by employees while others don't seem to get of the ground. When asking the interviewees what determines their adoption of new channels just under 50% of the respondents indicate that the ease of use is especially important.

> "My channel preference is closely related to the ease of use of the channel" (Respondent 8)

> "I don't use certain channels because they are not easily accessible; you need to put in some effort" (Respondent 13)

> "The ease of use of the communication channel is very important. There are colleagues that don't understand how to use the Office Communicator so I still call them by regular phone" (Respondent 21)

This information correlates with the answers given to the question "Would you attend a training for the use of (new) channels". Ten interviewees say they would not attend a training because a (new) channel should be self explanatory. One interviewee put it strikingly:

> "If it is easy to use, you will use the channel, if not, than you won't use it. Regardless of any training that might be provided. If DSM introduces a complex tool for which you have to follow all sorts of trainings, chances are that I most probably won't use it" (Respondent 14)

If the channel is not easy to use, it is unlikely that the adoption process will take place. Three other interviewees indicate that attending a training for the use of a (new) channel depends on the costs involved and the total amount of time of the training. Seven interviewees indicated that trainings are often too time consuming and therefore unappealing.

### 5.2.4 Use of social media within DSM

As stated previously, the use of social media within organisations is not yet broadly accepted. However, many organisations start to see the benefits of using social media for business purposes. As of 2011, DSM allows access to (more) social media. Therefore, this paragraph pays attention to the usage of social media. The interviewees indicate that they use social media primarily to expand their network and tap into other peoples' knowledge. All interviewees use LinkedIn for professional purposes, whereas they consider Facebook as a more private social medium (not suitable for work-related issues). Yammer is not frequently used because the interviewees are still exploring how this medium works and what messages to post. The disadvantages of social media according to the interviewees are privacy and security issues.

### 5.2.5 Influence of age

An overall interesting result is the fact that nearly half of the interviewees state that age/generation plays a role in the acceptance and usage of new channels. However, of all interviewees that are aged 40 or older and that indicate that there is an obvious generation gap, 100% say this does not apply to them even though they count others in the same age group to the older generation.

### 5.2.6 Social influences

The quantitative research results have not highlighted the effect of social influence on channel selection. Therefore, this has been one of the focal points in the qualitative research. People are hesitant to state that they are influenced by others when they are asked directly. However, based on answers to other questions, the important role of social influence becomes clear.

> "The project leader says what channels should be used" (Respondent 12)

> "I would make use of new channels if they would be promoted more by the management" (Respondent 3)

> "The meeting organizer selects the communication channel" (Respondent 7)

> "I watched others use it and that influences me to start using it myself" (Respondent 19)

> "It is the same in the GMT meetings. Everybody is an IT expert and I try to pick up something from them" (Respondent 15)

> "If I hear people talking about a new tool, I probably start using it if I think it's useful" (Respondent 14)

## 6. Conclusion

The model in paragraph 3.7.1 incorporates all factors that are of influence according to the literature study as described in chapter three. Furthermore, the model demonstrates how these determinants relate to each other. Despite the fact that several studies have provided proof for the influence of the factors mentioned in chapter 3 (Pieterson, 2009; Pieterson & Van Dijk, 2007; McQuail, 2004) not all factors appeared to be of (equal) influence in the current study. There are however, some conclusions that can be drawn.

Research results show that when deciding which communication channel to use for receiving or sending a message the content plays a role. Especially when people are in dispute, when they want to have a discussion or when personal or emotional messages are involved, channel selection is dependant on the content. However, the situation (day of the week) or the urgency of a message plays a more important role as these factors are considered for all communication messages.

Quantitative results show that during the week, email is by far, the most used communication channel. Respondents indicated that email communication is the one form of communication that they will always see. However, this does not automatically imply that email is also the most effective communication channel. This can only be the case if the communication is also (actively) read which is not the case for DICT communication messages. Oftentimes, these emails are not even opened (because the subject line is not triggering enough) or read (too technical information and unappealing template).

A striking difference comes to the surface when quantitative and qualitative research results are compared. All interviewees state that they do NOT want to receive email communication. However, when they are asked via which channel they would most probably notice a communication message, their answer was: email.

During weekends, respondents indicate that they prefer receiving communication via phone (text message or phone call) because that is the only way to ensure correct action. This would make the phone the most effective channel during weekends, however, content plays an important role here. If the message is solely informative, respondents indicate they do not wish to receive any communication.

After having considering all research results, a few recommendations can be given to DICT in order to help them to communicate more effectively to its employees. The following paragraph will provide a short summary of these recommendations

## 6.1 Recommendations for DSM

This research may not have defined the most effective communication channel for all messages, however, some practical adjustments can be made to further improve the current way of communicating.

- Remove communication templates

An important insight gained by the qualitative research was that respondents (including DICT employees) do not like the communication template. Communication in a DICT template is often deleted from the inbox without being read.

- Limit email communication to urgent messages

Respondents indicated that they do not appreciate receiving solely informative communication via (especially not during weekends). DICT should critically assess the communication before sending it out (to a large group of people). The DSM user portal (which is currently being built) could help DICT to communicate less and more effectively. People can install alerts on communication they want to receive and therefore less communication is pushed to them by email. The user portal will go live in Q2 or Q3 of 2011. More information about the user portal can be requested via Stephanie Erkens (stephanie.erkens@dsm.com).

In case email communication is necessary,

- Make sure that the subject line provides the reader with an insight into the content in a glance.

- Create distribution lists that can be used for one-to-many text messages

A majority of the respondents has indicated to prefer receiving communication via phone during weekends to ensure (correct) action.

- Open up YouTube[12]

YouTube was the one channel that people would like to use for work related topics more than any other social medium. Many respondents already use this channel but have to browse through it from home because access was prohibited.

- Organise knowledge sessions/better positioning of DICT portfolio (manuals, quick reference cards, E-learnings and contact details helpdesk)

"Wat de boer niet kent, dat eet ie niet" is a Dutch saying. Roughly translated it means "A farmer won't eat something he doesn't know". The same can be said about communication channels. People do not use a channel they do not know. Within DICT, people presume that the whole of DSM knows the (new) communication channels (and its characteristics). This is not the case!

[12] As of January 2011, YouTube is accessible within DSM

Another, more specific recommendation, which came forward from the interviews, was the one below. Because of its relation to the DSM culture change program (MOTION), this quote is shared with you.

> Customer orientation:
> "It would be nice to have one place where customers and vendors can go to and post tweets but then only within the DSM network. I think it would help us to receive feedback from our partners in the business" (Respondent 21)

## 7. Discussion

The current results partially confirm previous research carried out by Pieterson and Van Dijk (2007) and Pieterson (2009). Despite the theoretical support found for the influence and effect of several determinants, the quantitative research results were not very supportive. This could be explained by the fact that there still is little knowledge about the subject and that the field of study needs to be further explored by qualitative research first. Venkatesh (2006) already acknowledged this.

Notable is that habit is not defined as an influential characteristic in the quantitative study, whereas it has been the most influential factor in previous studies (Pieterson & Van Dijk, 2007; Pieterson, 2009,). There are a few possible explanations for this. The first one is the difference between the two research populations. In the study of Pieterson and Van Dijk (2007) the focus was on channels used by external customers to get in touch with a service organisation whereas the current study focused on internal customers (employees) getting in touch with their service department. Another explanation is the way the sample has been gathered. The questionnaire was posted online and thus respondents were self-selected. This could have lead to a more homogenous group of people.

In the qualitative research, there were some signs that indicated that habit might be of influence. Despite the fact that people indicated there is an information overload because of emails, this remains their preferred communication channel. When the respondents were asked why, they responded by stating things like “It is broadly accepted” and “email remains the common practice for exchanging information”. Both answers can be categorized as habits however, results are not overt.

Pieterson and Van Dijk (2007) found that, in case of more complex and ambiguous tasks, channel selection is strongly influenced by task- and channel characteristics. Current findings partially support these results. Task characteristics are considered important when there is an urgent issue. In that case, people prefer more direct communication channels. However, results also show that channel selection is more situation dependant than task dependant. A possible explanation for the difference between Pieterson’s (2009) research and the current research could be that the tasks/information in Pieterson’s research is more personal. In this research, the focus is on sending or receiving more organisationally oriented communication but that is only an assumption.

Another interesting result is related to the influence of channel characteristics. Current research results show that channel characteristics play a more significant role in the channel selection process of DICT employees. This could be explained by the fact that these people or more aware of the characteristics from their professional point of view. Next to that, most (new) communication channels are introduced at the DICT department which means that DICT employees are more experienced using these channels and more aware of the functionalities.

According to the literature study, culture influences the channel selection process. Current research results show that culture influences three factors (habit, task characteristics, and emotion) that can determine channel selection. However, it should be taken into consideration that there was little variation among cultures. Because of this, the values were recoded into Dutch vs. non-Dutch. Because of the assembly of the other cultures, it is not possible to determine the influence per culture. We can only say something about the Dutch culture.

Possibly, results would differ if the distribution between for example Dutch and Chinese employees was equally distributed. For future research, it is recommendable to equally select people with differing cultural backgrounds.

The qualitative research indicated that social influence does affect people's channel selection. Therefore, it is recommendable that future researchers find out what the underlying process is to determine the weight of social influence. As stated in the theoretical framework (§3.3) "the underlying processes in which an individual engages when he adopts the behaviour may be different even when the visible behaviour may appear the same" (Malhotra & Galletta, 1999, p.3). In order to understand the extent to which a change will last when derived from social influence, it is important to identify which of the three processes (compliance, identification and internalization) occur (Kelman, 1958).

Though an attempt was made to prevent biased answering by using methodological triangulation, it is possible that there has been some sort of bias. When presenting the statements to the respondents for example, all items were grouped per construct. No items were differently grouped to check the answers given in previous sections.

Kupritz and Cowell (2011) stated that there is an "urgent organisational need to identify the most effective communication channels with which messages are conveyed along with the specific types of messages to be conveyed." Although the current research attempted to identify the most effective channels, it cannot be assumed that the research results are applicable to other organisations. As stated in the theoretical framework, organisational or even departmental cultures can influence people's channel selection. Using a channel successfully in company A does not necessarily imply that it will have the same structural outcomes in company B. Though the intention of the research was to make use of a large sample including business groups from all over the world, most respondents were Dutch and employed by DICT. Because not all units within DSM were equally represented in the sample, this research was mainly a population research. However, because the majority of the sample is working for DICT, it is possible to draw conclusions for this specific business group. It is, however, recommendable for future research to collect data from a larger and more diverse sample.

Although exploratory, the findings of this study are important for researchers in the field of organisational communication. This study is one of the first (to my knowledge) to research channel selection within a multinational profit organisation. Furthermore, a first attempt was made to distinguish several kinds of communication messages to determine whether channel selection was dependant on the content of the message. Three communication messages were distinguished in relation to the research environment; solely informative messages, communication in which an action is requested and communication in which feedback is requested.

Quantitative results show that channel selection does not depend on the content of the message but rather on the situation. In the questionnaire, a distinction was made between communication on weekdays and communication during weekends. However, qualitative results do show that people consider the content of the message when choosing a channel. An explanation for this discrepancy could be that, within the interviews, people could reflect on their own personal situation and refer to situations in which they selected a specific channel for a specific message. For the quantitative research, respondents were only asked for organisational related messages, which could explain why the channel selection process was not influenced by the content. Furthermore, respondents were limited to the answer categories in the quantitative research.

Another striking difference between weekdays and weekends was the fact that during the week, respondents indicated they prefer to receive email communication while during weekends there is a major shift to communication via phone (text massage or phone call). The most important motivation given for this difference was that during the week, respondents are at work and have their computer on (which automatically runs Outlook). Some people do not have a laptop and so they are not able to check their email during weekends, other state they just do not want to be contacted for work related matters during the weekend. Another explanation could be that during the week there is a certain amount of social pressure both by management (you need to get the job done) as well as by peers (who expect you to react on an email within 24 hrs). Furthermore, it is likely that, during the weekend, people are more engaged in private (social) activities than during the week. However, future research could contribute to find out what the exact reason for the channel preferences is during the week vs. the weekend. Besides, it would be interesting to know what the results would be for (1) a larger research population and (2) the research population of a different company.

Based on figure 4.1.1, it can be concluded that the gender distribution within the sample is representative for the whole of DSM. The age distribution within the sample is similar to the age distribution within the DSM NL workforce though the youngest and oldest categories are somewhat underrepresented. It is difficult to compare the age categories to the global DSM workforce, as for the global annual report different age categories have been used. We must bear in mind however, that research results based on a larger group of respondents could differ. The current sample was too small (<1%) to be able to make assumptions about the entire workforce.

With this research, a first attempt has been made to identify different communication messages and the most effective channels with which these messages can be communicated. Though the types of communication messages can differ per organisation, the results presented in this thesis can be used as a starting point for further research. Next to that, it is recommendable to not only use a different sample (people within a different organisation) but also a more diverse sample with regard to (e.g.) nationality in order to be able to find more conclusive information about the role that culture plays in the channel selection process. Furthermore, it would be interesting to determine whether the ICT community in general is more aware of channel characteristics compared to the rest of the company or that this is only applicable to DSM.

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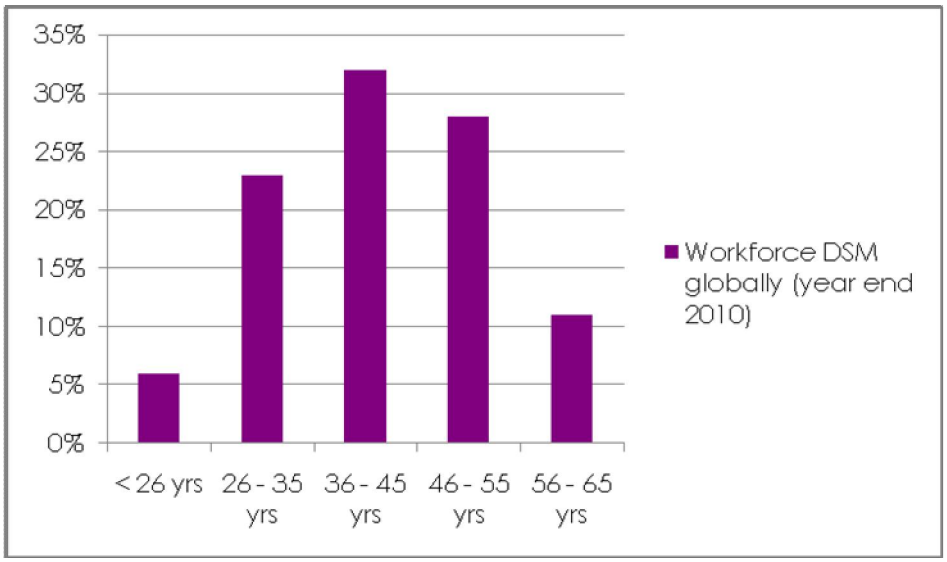
# 9. Appendices

9.1 Quantative research

9.1.1 Age spread DSM global workforce



9.1.2. Questionnaire

1. What is your age? [Dropdown – 1 choice only]
<29
30-34
35-39
40-49
50-54
55 or older

2. What is your gender? [Dropdown – 1 choice only]
Male
Female

3. What is your nationality? [Text field]

_____

4. What is your highest completed form of education? [Dropdown – 1 choice only]
Primary Education (basisschool)
Preparatory middle-level vocational education (VMBO, MBO, LTS)
Lower General Secondary Education (MAVO)
*Higher General Secondary Education (HAVO)*
Pre-university Secondary Education (VWO)
Undergraduate Bachelor (HBO)
Undergraduate Master (HBO)
Postgraduate Bachelor (WO)
Postgraduate Master (WO)
Postgraduate Doctoral (WO)
Postgraduate Post-doctoral (WO)

5. What is your current position within DSM (you may also give a short description of your daily tasks) [Multiple line text field]

_____
_____
_____
_____
_____

6. How long have you been employed by DSM? [Dropdown – 1 choice only]
0-3 yrs
3-10 yrs
> 10 yrs

7. What business group are you working for?
[You can choose between nutrition, pharma, etc…. 1 choice only]
1. Nutrition
(if select Nutrition, show items below, make them selectable, 1 choice only)
- DSM Nutritional Products
- DSM Food Specialties

2. Pharma
(if select Pharma, show items below, make them selectable, 1 choice only)
- DSM Pharmaceutical Products
- DSM Anti-Infectives

3. Performance Materials
(if select Performance Materials, show items below, make them selectable, 1 choice only)
- DSM Resins
- DSM Engineering Plastics
- DSM Dyneema

4. Polymer Intermediates
(if select Polymer intermediates, show items below, make them selectable, 1 choice only)
- DSM Fibre Intermediates

5. Corporate Staff
(if select Corporate Staff, show items below, make them selectable, 1 choice only)
- Secretariat
- Human Resources
- Strategy & Acquisitions
- Communications
- Operational Audit
- Legal Affairs
- Finance

6. Functional Excellence
(if select Functional Excellence, show items below, make them selectable, 1 choice only)
- Innovation Centre
- Safety, Health, Environment & Manufacturing
- DSM Marketing Office

7. Shared Services
(if select Shared Services, show items below, make them selectable, 1 choice only)
DSM ICT
DSM Sourcing
DSM Business Support
DSM Expert Centre

8. Managing Board of Directors

8. In which region do you operate? [Dropdown – 1 choice only]
Africa
Asia/pacific
Europe & Middle East
Central & South America
North America

9. Do you work on different locations for work related issues? [1 choice only]
Yes [If yes, the following additional question is displayed: *Is travelling abroad necessary?* Yes/no]
No (If no, the new question mentioned above is not visible)

10. Which equipment has DSM provided you with? [Multiple select option]
Desk phone
Mobile phone
PDA
Desk computer
Laptop
Pager
Fax

11. How frequently do you use your Aurora computer during work hours? (Please indicate computer use for work related issues only) [Dropdown – 1 choice only]
I don't have an Aurora computer
I don't use my Aurora computer every day
I use my Aurora computer less than 2 hours per day
I use my Aurora computer between 2 and 5 hours per day
I use my Aurora computer between 6 and 9 hours per day
I use my Aurora computer over 9 hours per day

12. How many hours do you need your Aurora computer for the execution of your job? [Dropdown – 1 choice only]
I don't have an Aurora computer
I don't use my Aurora computer every day
I use my Aurora computer less than 2 hours per day
I use my Aurora computer between 2 and 5 hours per day
I use my Aurora computer between 6 and 9 hours per day
I use my Aurora computer over 9 hours per day

13. Do often do you use the Internet? (Please indicate Internet use for work related issues only) [Dropdown – 1 choice only]
I never use the Internet
I sporadically use the Internet (not every day)
I use the Internet less than 2 hours per day
I use the Internet between 2 and 5 hours per day
I use the Internet between 6 and 9 hours per day
I use the Internet over 9 hours per day

14. Do you make use of DSM specific (communication) channels outside regular working hours? (such as DSM webmail, Intranet, OCS etc.) [1 choice only]
Yes
No

15. Do you work from home or some place other than your own office at least once a week? [1 choice only]
Yes (if select Yes, show items below, make them selectable, 1 choice only)
- From home
- From place other than own office
- From home and other place than office

No

16. How often do you use the following social media? (Please indicate social media use for work related issues only) [Radio buttons per social media channel]

| | | |
|---|---|---|
| 1.Yammer | Daily \| Weekly \| Monthly \| Yearly \| Never | [1 choice per channel] |
| 2. LinkedIn | Daily \| Weekly \| Monthly \| Yearly \| Never | [1 choice per channel] |
| 3. Face book | Daily \| Weekly \| Monthly \| Yearly \| Never | [1 choice per channel] |

17. Would you use social media (other than mentioned above) if DSM would provide access to them? [1 choice only]
Yes [If yes, show text field and make this mandatory to fill out]
No

18. If DSM ICT wants to inform you during the week, which communication channel should they use to inform you? [Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM" for the dropdown items]

19. Why do you prefer receiving information through this channel? [Multiple text field]

20. If DSM ICT wants to inform you during the weekend which communication channel should they use to inform you?
[Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM"for the dropdown items]

21. Why do you prefer receiving information through this channel? [Multiple text field]

22. If DSM ICT wants to inform you and ask you to undertake action during the week which communication channel should they use to inform you?
[Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM"for the dropdown items]

23. Why do you prefer receiving information through this channel? [Multiple text field]

24. If DSM ICT wants to inform you and ask you to undertake action during the weekend which communication channel should they use to inform you?
[Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM" for the dropdown items]

25. Why do you prefer receiving information through this channel? [Multiple text field]

26. If DSM ICT wants to ask you for feedback during the week which communication channel should they use to inform you?
[Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM" for the dropdown items]

27. Why do you prefer receiving information through this channel? [Multiple text field]

28. If DSM ICT wants to ask you for feedback during the weekend which communication channel should they use to inform you?
[Dropdown – 1 choice only]
[see "§8.2.2 Overview available (communication) channels within DSM" for the dropdown items]

29. Why do you prefer receiving information through this channel? [Multiple text field]

33. Is there anything we did not ask that we should have asked to get a better insight into your channel choice? [1 choice only]
Yes [If yes, mandatory text field]
No

34. We are still looking for respondents that we may interview a little more in dept about channel choice, may we contact you? [1 choice only]
Yes [If yes, mandatory email field displays to be filled out]
No

DSM ICT and Anouk Breuls sincerely thank you for your cooperation!

Are you curious about the results and the final report? Please send an email to anouk.breuls@dsm.com and you will receive a copy of the report in February, 2011.

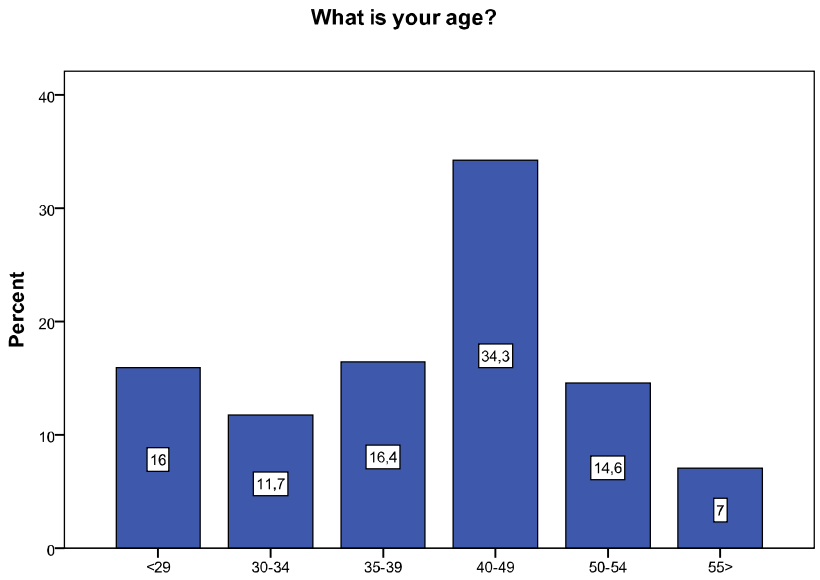
### 9.1.3 Overview statements

| | | Totally agree | Agree | Neutral | Disagree | Totally disagree |
|---|---|---|---|---|---|---|
| 1 | Some channels are suited better to solve problems than other channels | | | | | |
| 2 | Not every channel is suitable to answer certain questions | | | | | |
| 3 | The available service channels have different characteristics | | | | | |
| 4 | I am aware of the characteristics of a service channel when I choose a channel | | | | | |
| 5 | The content of the message determines my choice for a certain channel | | | | | |
| | | | | | | |
| 6 | I usually deploy the same channels | | | | | |
| 7 | Habits determine largely the channel I choose | | | | | |
| 8 | I don't like uncertain situation | | | | | |
| 9 | I always use the channel that gives me the most certainty | | | | | |
| | | | | | | |
| 10 | In my channel choices I am guided by my previous experiences | | | | | |
| 11 | When I need to choose a channel, I take my experiences with this channel into account | | | | | |
| 12 | Experiences give me grip when I need to make a new channel choice | | | | | |
| | | | | | | |
| 13 | DICT information is often difficult to understand | | | | | |
| 14 | I have many questions regarding DICT information that I don't understand | | | | | |
| 15 | Very often DICT information is incomprehensible, which leads to questions | | | | | |
| | | | | | | |
| 16 | Emotions influence my channel choice behaviour strongly | | | | | |
| 17 | When choosing a channel I am sometimes guided by my emotional state of mind | | | | | |
| 18 | I always want to express my emotions directly | | | | | |
| | | | | | | |
| 19 | When I need information and I am near my computer, I will most certainly use this channel | | | | | |
| 20 | When I need contact, I use the channel that is closest to where I am at that point | | | | | |
| 21 | When I choose a channel I take the time it takes to get contact into account | | | | | |
| 22 | When I need contact, it should take as little time as possible | | | | | |
| | | | | | | |
| 23 | My channel choice depends on the type of question I have | | | | | |
| 24 | I don't usually choose a channel on autopilot | | | | | |
| 25 | When I choose a channel, I usually think thoroughly before choosing a channel | | | | | |
| 26 | I always first consider the problem I have, before choosing a channel to solve it | | | | | |

## 9.1.4 Demographical data (output SPSS)

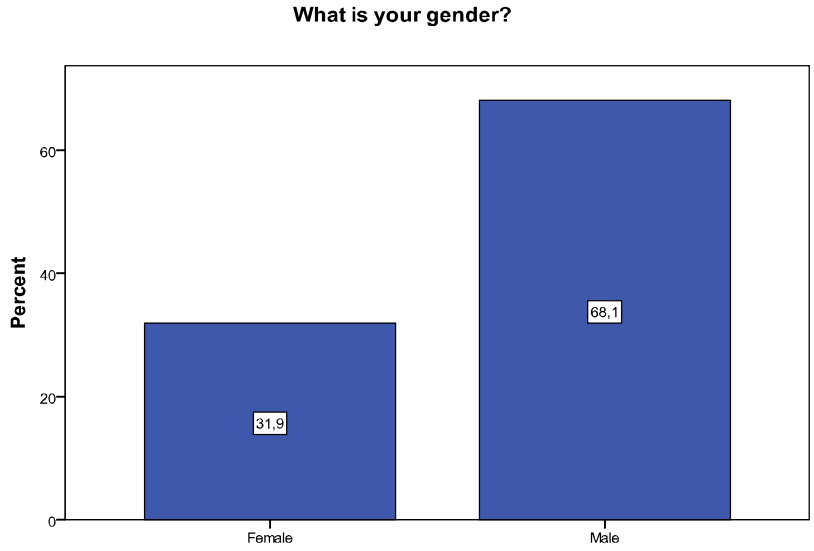
Age

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | <29 | 34 | 16,0 | 16,0 | 16,0 |
| | 30-34 | 25 | 11,7 | 11,7 | 27,7 |
| | 35-39 | 35 | 16,4 | 16,4 | 44,1 |
| | 40-49 | 73 | 34,3 | 34,3 | 78,4 |
| | 50-54 | 31 | 14,6 | 14,6 | 93,0 |
| | 55> | 15 | 7,0 | 7,0 | 100,0 |
| | Total | 213 | 100,0 | 100,0 | |



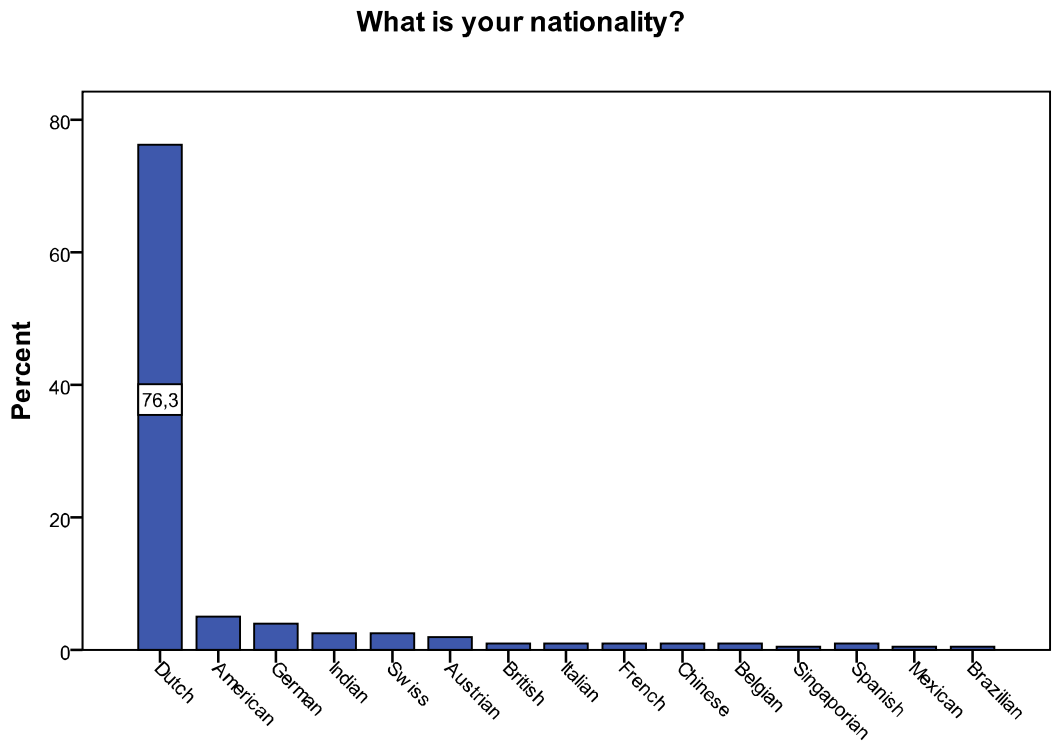
Gender

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Female | 68 | 31,9 | 31,9 | 31,9 |
| | Male | 145 | 68,1 | 68,1 | 100,0 |
| | Total | 213 | 100,0 | 100,0 | |



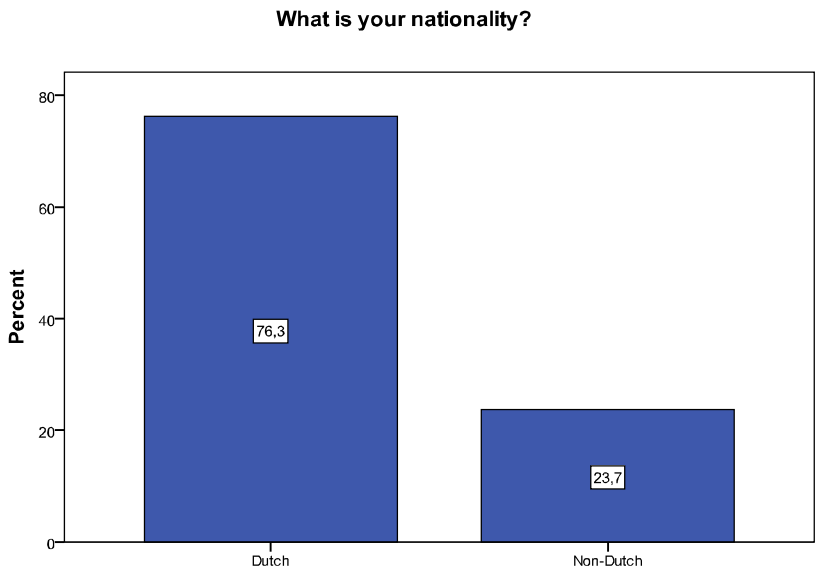
Nationality

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Dutch | 151 | 70,9 | 76,3 | 76,3 |
| | American | 10 | 4,7 | 5,1 | 81,3 |
| | German | 8 | 3,8 | 4,0 | 85,4 |
| | Indian | 5 | 2,3 | 2,5 | 87,9 |
| | Swiss | 5 | 2,3 | 2,5 | 90,4 |
| | Austrian | 4 | 1,9 | 2,0 | 92,4 |
| | British | 2 | ,9 | 1,0 | 93,4 |
| | Italian | 2 | ,9 | 1,0 | 94,4 |
| | French | 2 | ,9 | 1,0 | 95,5 |
| | Chinese | 2 | ,9 | 1,0 | 96,5 |
| | Belgian | 2 | ,9 | 1,0 | 97,5 |
| | Singaporean | 1 | ,5 | ,5 | 98,0 |
| | Spanish | 2 | ,9 | 1,0 | 99,0 |
| | Mexican | 1 | ,5 | ,5 | 99,5 |
| | Brazilian | 1 | ,5 | ,5 | 100,0 |
| | Total | 198 | 93,0 | 100,0 | |
| Missing | System | 15 | 7,0 | | |
| Total | | 213 | 100,0 | | |



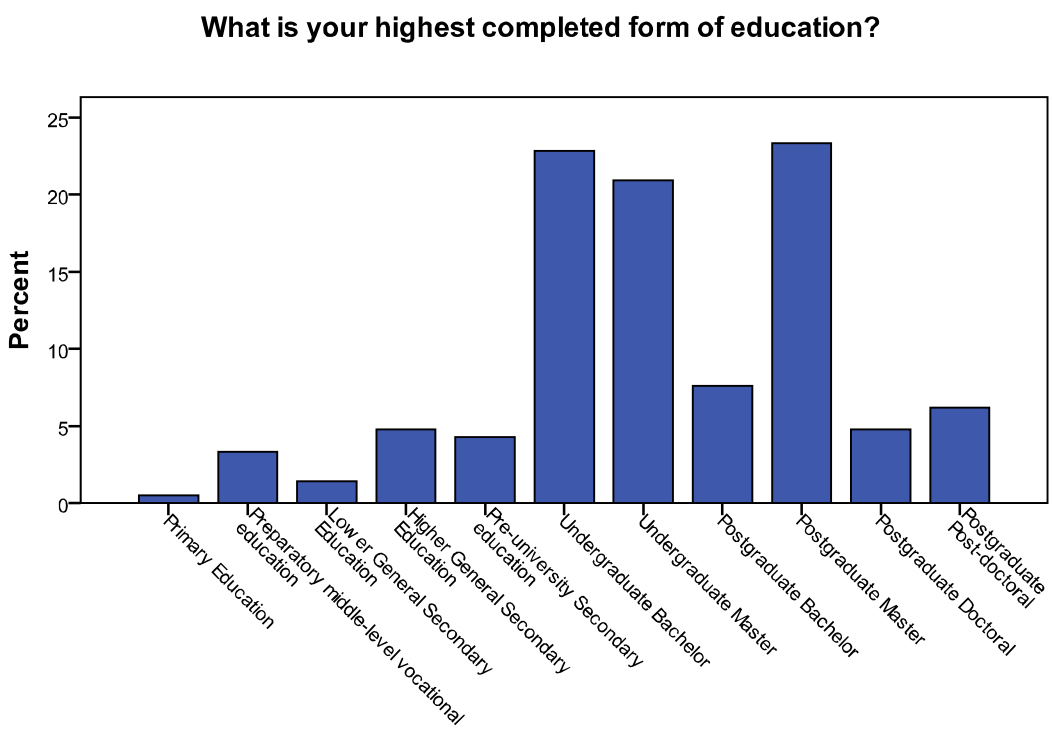
Nationality2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Dutch | 151 | 70,9 | 76,3 | 76,3 |
| | Non-Dutch | 47 | 22,1 | 23,7 | 100,0 |
| | Total | 198 | 93,0 | 100,0 | |
| Missing | System | 15 | 7,0 | | |
| Total | | 213 | 100,0 | | |



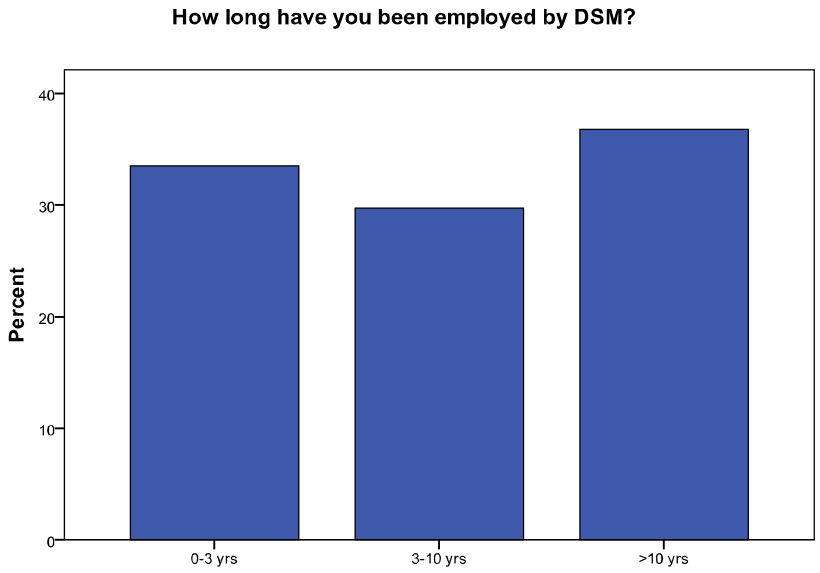
Education

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Primary Education | 1 | ,5 | ,5 | ,5 |
| | Preparatory middle-level vocational education | 7 | 3,3 | 3,3 | 3,8 |
| | Lower General Secondary Education | 3 | 1,4 | 1,4 | 5,2 |
| | Higher General Secondary Education | 10 | 4,7 | 4,8 | 10,0 |
| | Pre-university Secondary education | 9 | 4,2 | 4,3 | 14,3 |
| | Undergraduate Bachelor | 48 | 22,5 | 22,9 | 37,1 |
| | Undergraduate Master | 44 | 20,7 | 21,0 | 58,1 |
| | Postgraduate Bachelor | 16 | 7,5 | 7,6 | 65,7 |
| | Postgraduate Master | 49 | 23,0 | 23,3 | 89,0 |
| | Postgraduate Doctoral | 10 | 4,7 | 4,8 | 93,8 |
| | Postgraduate Post-doctoral | 13 | 6,1 | 6,2 | 100,0 |
| | Total | 210 | 98,6 | 100,0 | |
| Missing | System | 3 | 1,4 | | |
| Total | | 213 | 100,0 | | |



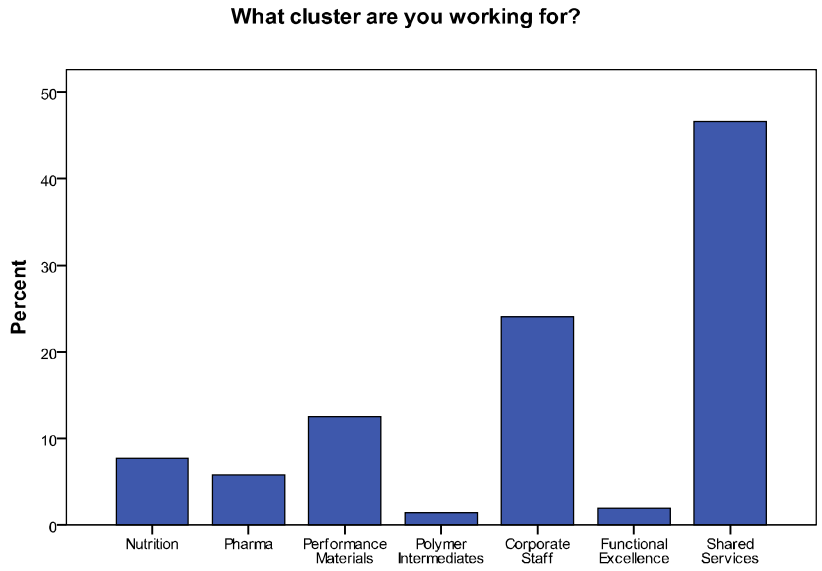
**Employed Since**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 0-3 yrs | **71** | **33,3** | **33,5** | **33,5** |
| | 3-10 yrs | **63** | **29,6** | **29,7** | **63,2** |
| | >10 yrs | **78** | **36,6** | **36,8** | **100,0** |
| | Total | **212** | **99,5** | **100,0** | |
| Missing | System | **1** | **,5** | | |
| Total | | **213** | **100,0** | | |



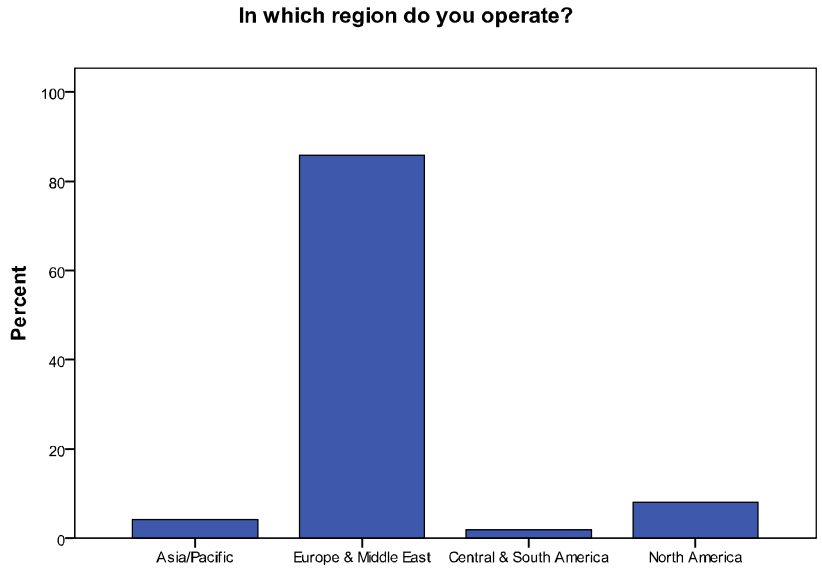
Business Group

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | DSM Nutritional Products | 5 | 2,3 | 3,3 | 3,3 |
| | DSM Food Specialties | 3 | 1,4 | 2,0 | 5,2 |
| | DSM Pharmaceutical Products | 4 | 1,9 | 2,6 | 7,8 |
| | DSM Anti-Infectives | 3 | 1,4 | 2,0 | 9,8 |
| | DSM Resins | 12 | 5,6 | 7,8 | 17,6 |
| | DSM Engineering Plastics | 3 | 1,4 | 2,0 | 19,6 |
| | DSM Dyneema | 8 | 3,8 | 5,2 | 24,8 |
| | DSM Fibre Intermediates | 3 | 1,4 | 2,0 | 26,8 |
| | Secretariat | 5 | 2,3 | 3,3 | 30,1 |
| | Human Resources | 6 | 2,8 | 3,9 | 34,0 |
| | Communications | 11 | 5,2 | 7,2 | 41,2 |
| | Legal Affairs | 1 | ,5 | ,7 | 41,8 |
| | Finance | 2 | ,9 | 1,3 | 43,1 |
| | Innovation Center | 2 | ,9 | 1,3 | 44,4 |
| | Safety, Health, Environment & Manufacturing | 1 | ,5 | ,7 | 45,1 |
| | DSM Marketing Office | 2 | ,9 | 1,3 | 46,4 |
| | DSM ICT | 78 | 36,6 | 51,0 | 97,4 |
| | DSM Sourcing | 1 | ,5 | ,7 | 98,0 |
| | DSM Business Support | 2 | ,9 | 1,3 | 99,3 |
| | DSM Expert Center | 1 | ,5 | ,7 | 100,0 |
| | Total | 153 | 71,8 | 100,0 | |
| Missing | System | 60 | 28,2 | | |
| Total | | 213 | 100,0 | | |



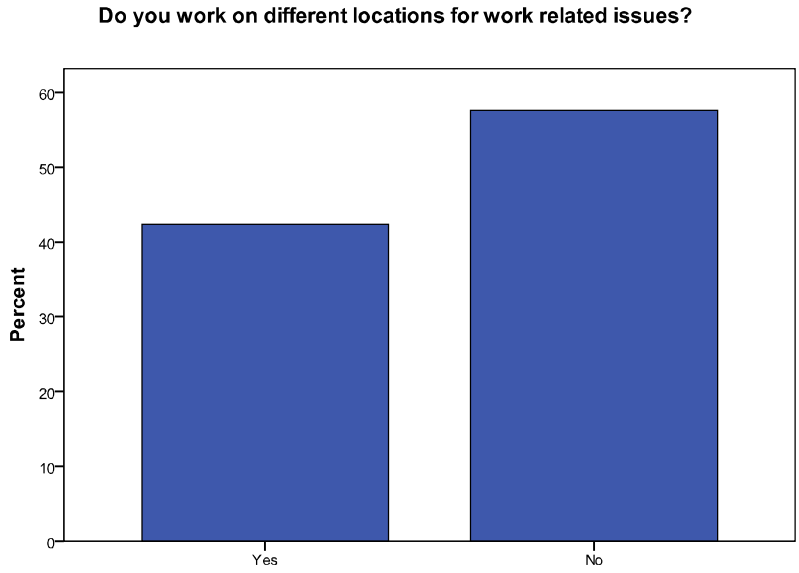
**Region**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Asia/Pacific | **9** | **4,2** | **4,3** | **4,3** |
| | Europe & Middle East | **181** | **85,0** | **85,8** | **90,0** |
| | Central & South America | **4** | **1,9** | **1,9** | **91,9** |
| | North America | **17** | **8,0** | **8,1** | **100,0** |
| | Total | **211** | **99,1** | **100,0** | |
| Missing | System | **2** | **,9** | | |
| Total | | **213** | **100,0** | | |



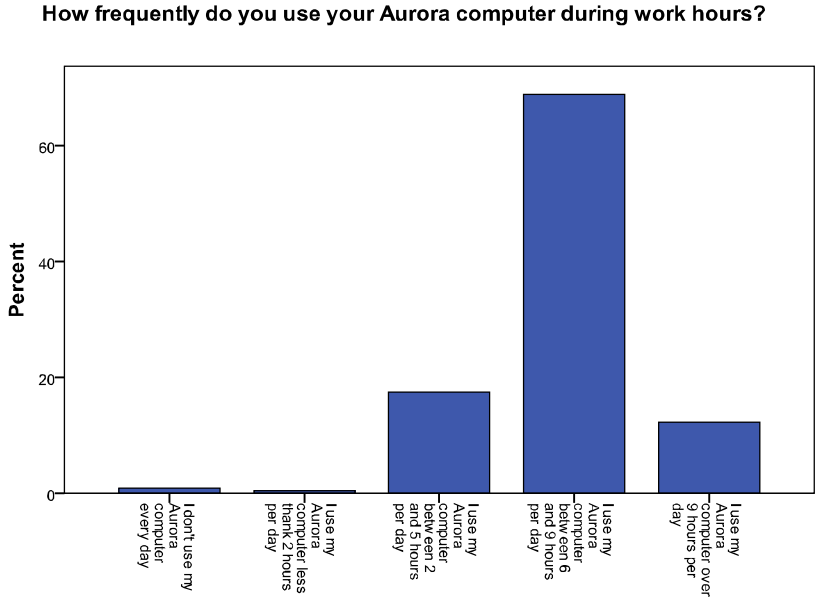
**Different Locations**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | **89** | **41,8** | **42,4** | **42,4** |
| | No | **121** | **56,8** | **57,6** | **100,0** |
| | Total | **210** | **98,6** | **100,0** | |
| Missing | System | **3** | **1,4** | | |
| Total | | **213** | **100,0** | | |



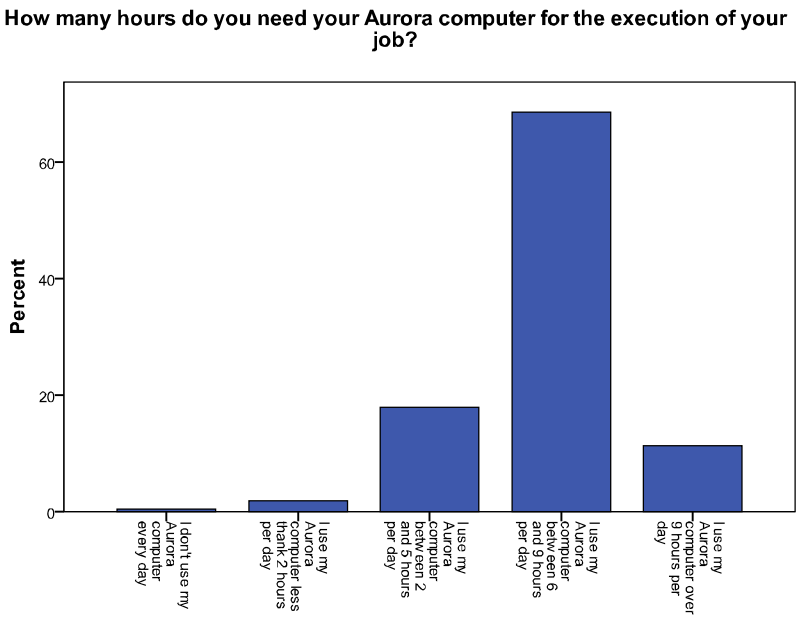
**FreqUseAuroraComputer**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | I don't use my Aurora computer every day | **2** | **,9** | **,9** | **,9** |
| | I use my Aurora computer less than 2 hours per day | **1** | **,5** | **,5** | **1,4** |
| | I use my Aurora computer between 2 and 5 hours per day | **37** | **17,4** | **17,5** | **18,9** |
| | I use my Aurora computer between 6 and 9 hours per day | **146** | **68,5** | **68,9** | **87,7** |
| | I use my Aurora computer over 9 hours per day | **26** | **12,2** | **12,3** | **100,0** |
| | Total | **212** | **99,5** | **100,0** | |
| Missing | System | **1** | **,5** | | |
| Total | | **213** | **100,0** | | |



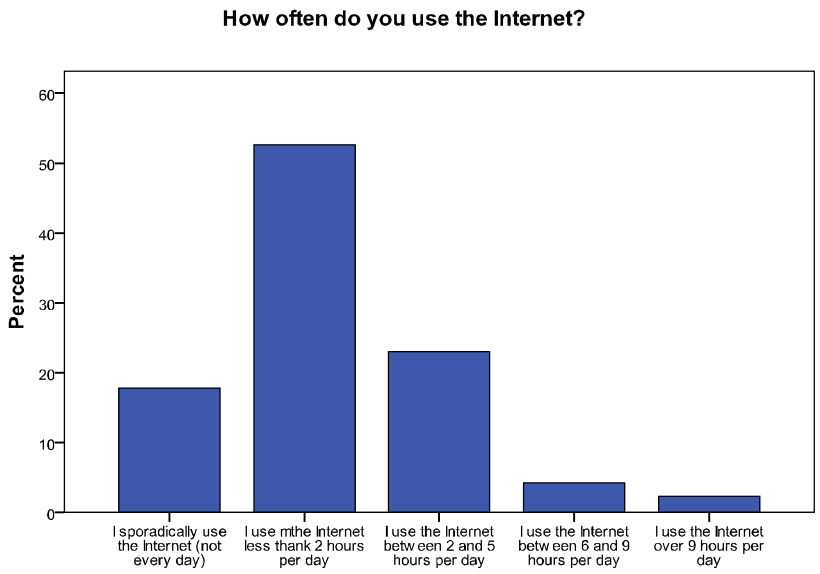
**NeedAuroraComputer**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | I don't use my Aurora computer every day | 1 | ,5 | ,5 | ,5 |
| | I use my Aurora computer less than 2 hours per day | 4 | 1,9 | 1,9 | 2,3 |
| | I use my Aurora computer between 2 and 5 hours per day | 38 | 17,8 | 17,8 | 20,2 |
| | I use my Aurora computer between 6 and 9 hours per day | 146 | 68,5 | 68,5 | 88,7 |
| | I use my Aurora computer over 9 hours per day | 24 | 11,3 | 11,3 | 100,0 |
| | Total | 213 | 100,0 | 100,0 | |



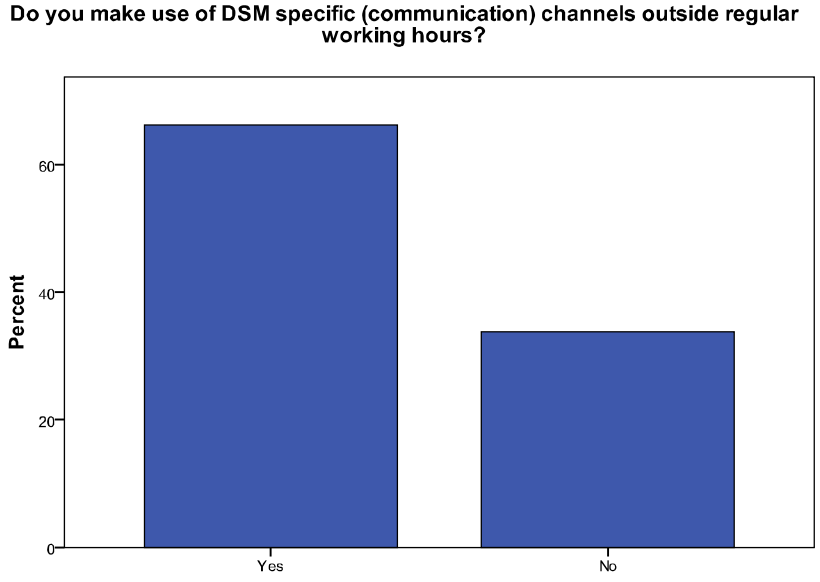
**Internet Usage**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | I sporadically use the Internet (not every day) | **38** | **17,8** | **17,8** | **17,8** |
| | I use the Internet less than 2 hours per day | **112** | **52,6** | **52,6** | **70,4** |
| | I use the Internet between 2 and 5 hours per day | **49** | **23,0** | **23,0** | **93,4** |
| | I use the Internet between 6 and 9 hours per day | **9** | **4,2** | **4,2** | **97,7** |
| | I use the Internet over 9 hours per day | **5** | **2,3** | **2,3** | **100,0** |
| | Total | **213** | **100,0** | **100,0** | |



**CommsChannelsOutsideWorkingHours**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | **141** | **66,2** | **66,2** | **66,2** |
| | No | **72** | **33,8** | **33,8** | **100,0** |
| | Total | **213** | **100,0** | **100,0** | |

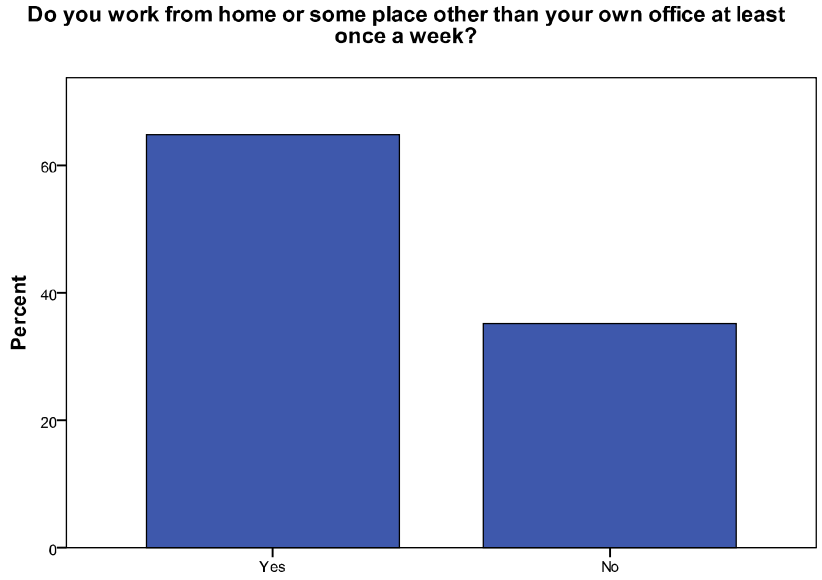


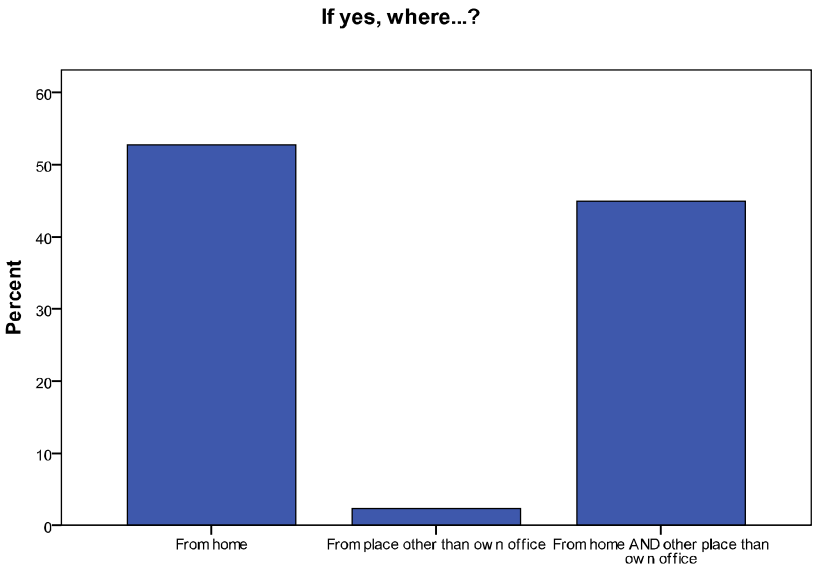
**WorkOutsideOffice**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | **138** | **64,8** | **64,8** | **64,8** |
| | No | **75** | **35,2** | **35,2** | **100,0** |
| | Total | **213** | **100,0** | **100,0** | |

**WorkOutsideOfficeYes**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | From home | **68** | **31,9** | **52,7** | **52,7** |
| | From place other than own office | **3** | **1,4** | **2,3** | **55,0** |
| | From home AND other place than own office | **58** | **27,2** | **45,0** | **100,0** |
| | Total | **129** | **60,6** | **100,0** | |
| Missing | System | **84** | **39,4** | | |
| Total | | **213** | **100,0** | | |




If yes, where...?
Percent
60
50
40
30
20
10
0
From home
From place other than own office
From home AND other place than own office

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| ICTInfoWeek * ICTInfoWeekend | 211 | 99,1% | 2 | ,9% | 213 | 100,0% |

ICTInfoWeek * ICTInfoWeekend Crosstabulation
Count

| | | ICTInfoWeekend | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-mail | Phone | DSM Newscast (Netpresenter) | Internet | Social Media - Facebook | Social Media - LinkedIn | Intranet - ICT User Help | Intranet - RSS feed | Intranet - Alerts | Intranet - Other | Other | No | Total |
| ICTInfoWeek | E-mail | 57 | 57 | 0 | 5 | 0 | 3 | 0 | 0 | 1 | 0 | 5 | 26 | 154 |
| | DSM Newscast (Netpresenter) | 3 | 4 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 15 |
| | Memo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | Newsletter (pICTure) | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | Office Communicator (instant messaging) | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 7 |
| | Internet | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | Social media - Yammer | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - My interest | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| | Intranet - ICT User Help | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| | Intranet - DSM Connect | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - RSS feed | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 6 |
| | Intranet - Blog | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - Alerts | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 9 |
| | Intranet - Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | Other | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 6 |
| Total | | 70 | 73 | 1 | 6 | 2 | 3 | 1 | 4 | 3 | 2 | 11 | 35 | 211 |

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| ICTActionWeek * ICTActionWeekend | 209 | 98,1% | 4 | 1,9% | 213 | 100,0% |

ICTActionWeek * ICTActionWeekend Crosstabulation
Count

| | | ICTActionWeekend | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-mail | Phone | Audio conferencing | Memo | Office Communicator (instant messaging) | Internet | Social Media - Facebook | Intranet - RSS feed | Intranet - Alerts | Other | no | Total |
| ICTActionWeek | E-mail | 40 | 90 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 12 | 2 | 146 |
| | Phone | 2 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 25 |
| | Audio conferencing | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Video conferencing | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | DSM Newscast (Netpresenter) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Memo | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Office Communicator (instant messaging) | 2 | 14 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 18 |
| | Social media - Yammer | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - ICT User Help | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - RSS feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | Intranet - Alerts | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| | Other | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 8 |
| Total | | 47 | 135 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 16 | 3 | 209 |

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| ICTFeedbackWeek * ICTFeedbackWeekend | 209 | 98,1% | 4 | 1,9% | 213 | 100,0% |

ICTFeedbackWeek * ICTFeedbackWeekend Crosstabulation
Count

| | | ICTFeedbackWeekend | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-mail | Phone | Internet | Social Media - Facebook | Social Media - LinkedIn | Intranet - RSS feed | Intranet - Alerts | Other | no | Total |
| ICTFeedbackWeek | E-mail | 40 | 93 | 2 | 1 | 1 | 0 | 0 | 13 | 1 | 151 |
| | Phone | 1 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| | Audio conferencing | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| | DSM Newscast (Netpresenter) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| | Office Communicator (instant messaging) | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| | Social media - Yammer | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - RSS feed | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| | Intranet - Forms/Surveys | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Intranet - Alerts | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 5 |
| | Intranet - Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Other | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 |
| Total | | 46 | 137 | 2 | 1 | 1 | 1 | 2 | 18 | 1 | 209 |

### 9.1.5 Parameter estimates for significant models

| Information - weekend | | *B* | *Std. Error* | *Wald* | *df* | *Sig.* |
|---|---|---|---|---|---|---|
| Phone | Intercept | 6.935 | 3.904 | 3.156 | 1 | .076 |
| | AGE | -.386 | .281 | 1.880 | 1 | .170 |
| | EDUCATIO | -.091 | .148 | .381 | 1 | .537 |
| | V83_A | .175 | .198 | .782 | 1 | .377 |
| | V84_A | -.357 | .311 | 1.319 | 1 | .251 |
| | TASK_CHA | -.052 | .115 | .204 | 1 | .652 |
| | EMOTIONS | -.359 | .172 | 4.329 | 1 | .037 |
| | V87_A | -.167 | .202 | .683 | 1 | .409 |
| | [GENDER=1] | -1.880 | .637 | 8.721 | 1 | .003 |
| | [GENDER=2] | 0 | . | . | 0 | . |
| | [BG=1.00] | .203 | .677 | .090 | 1 | .764 |
| | [BG=2.00] | 0 | . | . | 0 | . |
| | [EMPLOYED=1] | -.538 | .967 | .309 | 1 | .578 |
| | [EMPLOYED=2] | .392 | .767 | .261 | 1 | .609 |
| | [EMPLOYED=3] | 0 | . | . | 0 | . |
| Other | Intercept | -1.936 | 5.942 | .106 | 1 | .745 |
| | AGE | .431 | .399 | 1.169 | 1 | .280 |
| | EDUCATIO | .024 | .188 | .017 | 1 | .897 |
| | V83_A | -.472 | .326 | 2.092 | 1 | .148 |
| | V84_A | .107 | .497 | .046 | 1 | .830 |
| | TASK_CHA | .078 | .172 | .205 | 1 | .651 |
| | EMOTIONS | -.253 | .246 | 1.056 | 1 | .304 |
| | V87_A | .443 | .304 | 2.124 | 1 | .145 |
| | [GENDER=1] | .013 | .929 | .000 | 1 | .989 |
| | [GENDER=2] | 0 | . | . | 0 | . |
| | [BG=1.00] | 2.143 | 1.101 | 3.788 | 1 | .052 |
| | [BG=2.00] | 0 | . | . | 0 | . |
| | [EMPLOYED=1] | 2.403 | 1.304 | 3.395 | 1 | .065 |
| | [EMPLOYED=2] | .392 | 1.170 | .112 | 1 | .738 |
| | [EMPLOYED=3] | 0 | . | . | 0 | . |
| None | Intercept | 9.582 | 4.754 | 4.062 | 1 | .044 |
| | AGE | -.455 | .341 | 1.781 | 1 | .182 |
| | EDUCATIO | -.389 | .182 | 4.564 | 1 | .033 |
| | V83_A | .093 | .243 | .147 | 1 | .702 |
| | V84_A | -.382 | .384 | .990 | 1 | .320 |
| | TASK_CHA | -.211 | .156 | 1.823 | 1 | .177 |
| | EMOTIONS | -.047 | .217 | .047 | 1 | .829 |
| | V87_A | -.127 | .257 | .244 | 1 | .621 |
| | [GENDER=1] | -1.794 | .842 | 4.537 | 1 | .033 |
| | [GENDER=2] | 0 | . | . | 0 | . |
| | [BG=1.00] | -2.311 | 1.057 | 4.784 | 1 | .029 |
| | [BG=2.00] | 0 | . | . | 0 | . |
| | [EMPLOYED=1] | .322 | 1.122 | .082 | 1 | .774 |
| | [EMPLOYED=2] | .332 | 1.028 | .104 | 1 | .747 |
| | [EMPLOYED=3] | 0 | . | . | 0 | . |

a This parameter is set to zero because it is redundant.

| *Action - weekend* | | *B* | *Std. Error* | *Wald* | *df* | *Sig.* |
|---|---|---|---|---|---|---|
| Phone | Intercept | 7.966 | 4.485 | 3.155 | 1 | .076 |
| | AGE | -1.067 | .366 | 8.513 | 1 | .004 |
| | EDUCATIO | -.049 | .159 | .096 | 1 | .756 |
| | V83_A | .343 | .217 | 2.497 | 1 | .114 |
| | V84_A | -.590 | .385 | 2.345 | 1 | .126 |
| | TASK_CHA | -.160 | .126 | 1.602 | 1 | .206 |
| | EMOTIONS | .163 | .185 | .779 | 1 | .377 |
| | V87_A | -.069 | .246 | .078 | 1 | .780 |
| | [GENDER=1] | -1.464 | .697 | 4.415 | 1 | .036 |
| | [GENDER=2] | 0 | . | . | 0 | . |
| | [BG=1.00] | .592 | .833 | .505 | 1 | .477 |
| | [BG=2.00] | 0 | . | . | 0 | . |
| | [EMPLOYED=1] | -1.386 | 1.054 | 1.731 | 1 | .188 |
| | [EMPLOYED=2] | -.134 | .926 | .021 | 1 | .885 |
| | [EMPLOYED=3] | 0 | . | . | 0 | . |
| Other | Intercept | -.515 | 5.811 | .008 | 1 | .929 |
| | AGE | .037 | .461 | .006 | 1 | .936 |
| | EDUCATIO | -.538 | .246 | 4.775 | 1 | .029 |
| | V83_A | .360 | .292 | 1.522 | 1 | .217 |
| | V84_A | .277 | .506 | .299 | 1 | .584 |
| | TASK_CHA | -.214 | .181 | 1.407 | 1 | .236 |
| | EMOTIONS | -.053 | .258 | .042 | 1 | .838 |
| | V87_A | -.323 | .304 | 1.123 | 1 | .289 |
| | [GENDER=1] | .188 | .943 | .040 | 1 | .842 |
| | [GENDER=2] | 0 | . | . | 0 | . |
| | [BG=1.00] | -.577 | 1.182 | .238 | 1 | .626 |
| | [BG=2.00] | 0 | . | . | 0 | . |
| | [EMPLOYED=1] | 1.502 | 1.516 | .982 | 1 | .322 |
| | [EMPLOYED=2] | 2.703 | 1.234 | 4.803 | 1 | .028 |
| | [EMPLOYED=3] | 0 | . | . | 0 | . |

a This parameter is set to zero because it is redundant.

| *Feedback - weekend* | | *B* | *Std. Error* | *Wald* | *df* | *Sig.* |
|---|---|---|---|---|---|---|
| Phone | Intercept | 7.504 | 3.882 | 3.737 | 1 | .053 |
| | Age | -.585 | .292 | 4.012 | 1 | .045 |
| | Education | -.094 | .149 | .397 | 1 | .529 |
| | Channel_Characteristics | .165 | .198 | .698 | 1 | .403 |
| | Experience_new | -.348 | .312 | 1.246 | 1 | .264 |
| | Task_Characteristics | -.264 | .120 | 4.840 | 1 | .028 |
| | Emotions_new | .179 | .171 | 1.097 | 1 | .295 |
| | Elaboration_new | -.118 | .206 | .327 | 1 | .567 |
| | [Gender=1] | -1.261 | .598 | 4.441 | 1 | .035 |
| | [Gender=2] | 0[b] | . | . | 0 | . |
| | [EmployedSince=1] | -1.080 | .928 | 1.356 | 1 | .244 |
| | [EmployedSince=2] | .667 | .853 | .611 | 1 | .434 |
| | [EmployedSince=3] | 0[b] | . | . | 0 | . |
| | [BG=1.00] | .292 | .703 | .173 | 1 | .677 |
| | [BG=2.00] | 0[b] | . | . | 0 | . |
| Other | Intercept | 2.939 | 6.282 | .219 | 1 | .640 |
| | Age | .057 | .483 | .014 | 1 | .906 |
| | Education | -1.011 | .384 | 6.917 | 1 | .009 |
| | Channel_Characteristics | .045 | .320 | .020 | 1 | .888 |
| | Experience_new | .029 | .480 | .004 | 1 | .951 |
| | Task_Characteristics | -.113 | .219 | .265 | 1 | .607 |
| | Emotions_new | -.015 | .297 | .003 | 1 | .960 |
| | Elaboration_new | .062 | .365 | .029 | 1 | .865 |
| | [Gender=1] | -.435 | 1.086 | .160 | 1 | .689 |
| | [Gender=2] | 0[b] | . | . | 0 | . |
| | [EmployedSince=1] | 3.139 | 2.153 | 2.125 | 1 | .145 |
| | [EmployedSince=2] | 4.787 | 1.793 | 7.123 | 1 | .008 |
| | [EmployedSince=3] | 0[b] | . | . | 0 | . |
| | [BG=1.00] | -.205 | 1.302 | .025 | 1 | .875 |
| | [BG=2.00] | 0[b] | . | . | 0 | . |

## 9.2 Qualitative research

### 9.2.1 Interview questions

1. Which communication channel do you use most frequently for work related communication?
    a. Why do you use this specific communication channel most often?

2. Which characteristics do you find important in a communication channel?
    a. Why do you find these characteristics important?

3. How can DSM stimulate you to use other channels than [mentioned question1]?

4. What is the most important reason for you to not use certain channels?

5. What influence do new communication channels have on your channel use?
    a. Would you attend training for the use of (new) channels if DSM would provide them?
    b. If no, why not?

6. Are you familiar with social media?
    a. If yes, could you give an advantage and a disadvantage of social media?

7. Are there channels that you would use for the execution of your work that are currently not accessible within DSM?
    a. If yes, what would they be?
    b. Why these?

8. You work in the [check] region. Do you experience differences between different regions in the use of communication channels?
    a. If yes, what are the differences?

9. Do you see patterns in the use of communication channels? In other words, are certain channels more common than others are in business groups or teams?

10. How would you define need to know information?
    a. Should DICT inform you about other information than need-to-know, for example nice to know?

11. Which communication channel do you normally use if you want to contact a colleague?
    a. Which communication channel do you normally use if you want to contact DICT?
    b. Via which communication channel do you prefer to receive information from DICT?

12. In the questionnaire, that you filled out we provided you with a list of communication channels accessible within DSM. Were you familiar with all these communication channels?
    a. If no, how come?

13. Does your channel choice depend on the (content of the) message you send?

14. Do you adjust your channel choice to the person you communicate to/with?
    a. If yes, could you provide me with an example?

9.2.2 Overview available (communication) channels within DSM

1. E-mail
2. Phone
3. Audio conferencing
4. Video conferencing
5. DSM newscast (Netpresenter)
6. Memo
7. Newsletter (pICTure)
8. Office Communicator System (OCS, instant messaging)
9. Internet
10. Social media – Yammer ("internal")
11. Social media – Facebook (external)
12. Social media – LinkedIn (external)
13. Intranet - My services
14. Intranet - My functional area
15. Intranet - My interest
16. Intranet - Customer Service Catalogue
17. Intranet - ICT User Help
18. Intranet - DSM Connect
19. Intranet - Voice
20. Intranet - Videos
21. Intranet - RSS feed
22. Intranet - Wiki
23. Intranet - Blog
24. Intranet - Forms/Surveys
25. Intranet - Discussion Boards
26. Intranet - Alerts
27. Intranet - Other
28. Other

## 9.3 Additional information theoretical framework

### 9.3.1 Explanation communication model

The communication model (Fig. 3.1) shows the five basic factors that make it possible for a message to “travel” from one place to the other. The first factor is the information source. This source chooses the message that has to be communicated. Secondly, the transmitter encodes the message from spoken or written words into (electronic) signals that are sent to the receiver through the communication channel, which is the third factor. The receiver decodes the signals into the original message and interprets the message, passing it through to the final destination. A sixth factor that comes from outside of the linear format is the noise source. This is the information that was added to the message or the signal and was not intended by the sender. This noise source can be internal (such as a receiver's own knowledge, attitude, or beliefs) or external (coming from other sources) and can positively or negatively affect the message depending on whether the noise either confirms or contradicts the message (Shannon & Weaver, 1948).