Digital reciprocity

Network-analysis of reciprocal behaviour in a physical and digital cooperative goal oriented network

Master thesis
Sociology

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Abstract

In the Netherlands healthcare is a field of interest in politics, as it is marked as an unsustainable debit entry of the welfare state. Policy directed at healthcare is one of the influences the education of healthcare professionals has to deal with, in terms of properly preparing these professionals to enter the labour market. In vocational education (MBO) proper preparation is achieved by offering students internships. The research reported in this thesis focusses on the cooperative goal oriented network organisation NetwerkZON, an organisation concerned with matching internships in healthcare vocational education in the North of the Netherlands. Research is performed to uncover the nature of the relationship between internship provision by health care organisations and their participation in digital network communication, and whether the four conditions of reciprocal behaviour identified by Zuidersma (2012) can explain success in matching organisations (educational institutes and healthcare providers) for internships. Significant differences are found between organisations that are involved in the complementary digital communication platform Moodle (an informal exchange web based digital platform). These results confirm the expectation that organisations that are more involved in the network through cooperative goal oriented reciprocal behaviour, are to benefit more from a complementary digital communication platform. Results show no significant evidence in difference of success for organisations who do participate, opposed to who do not participate in a complementary digital communication platform. The lack of evidence for a difference in success between included and excluded organisations from Moodle can be explained by the selection for the complementary digital communication platform, excluding the less invested or involved of the network. Finally, the four conditions of reciprocity are believed to self-reinforce themselves. The self-reinforcing strength of the four conditions for reciprocal behaviour for the difference among the included organisations, is explained by the number of matched internships as a representation of investment and possible commitment due to size of the organisation.

KEY WORDS:

RECIPROCITY, NETWORK-ANALYSIS, ORGANISATION, DIGITAL, COMMUNICATION

CONTENT

List of tables and figures

READING GUIDE

This thesis addresses a complex subject for which I have decided to add the following:

The thesis is divided into three main parts; (I) context, (II) theory & data and, (III) outcome. Also, for the Chapters 1 to 6 a short summary is given at the end of each chapter and a glossary is included where terms and concepts that are underlined the first time they are mentioned are incorporated.

Besides these additions, the discussion of analysis and presentation of the results is combined into one chapter (Chapter 6) for better understanding of the results and minimize confusion of all the different tests performed.

Hopefully it increases the ease of understanding and comprehensibility.

In part I the context is described.

Chapter 1, briefly describes the societal context in which the network of interest is operating (the network of NetwerkZON). Chapter 2 introduces NetwerkZON, where the research reported in this thesis is performed. And in Chapter 3 the reasons for research are presented, as well as the two main research questions.

In Part II theory and data are discussed.

In Chapter 4 the theoretical and conceptual framework is given, mainly by explaining reciprocal behaviour in networks using digital communication, as behavioural theory to explain success of matching healthcare students and organisations for internships. Previous research has not provided a ready-to-use theory and thus existing theory for some but not all parts of this thesis is used. The theory used in this thesis by Zuidersma (2012), originates from comparable contexts, and main ideas are borrowed to explain the expectations of the mechanisms in the research reported in this thesis. These existing theories will be complemented by own thoughts and ideas. In Chapter 5 the research design, data and methodology will be discussed.

In part III the outcome discussed.

In Chapter 6 analysis is described and simultaneously the results are presented. Followed by the discussion of these results in Chapter 7. And finally the thesis will be concluded in Chapter 8 accompanied by recommendation for future research.

PART I - CONTEXT

1 Introduction

1.1 Context of research

The context of the research reported in this thesis is the tension between the supply and demand side of the healthcare labour market: (institutions serving) clients and (educational programs 'producing') healthcare professionals in the Northern provinces (Groningen, Drenthe and Overijssel) of the Netherlands. Both the healthcare institutions and the educational healthcare programs operate within dynamic spheres where changes keep taking place and continuous reaction is needed in order to reach an as close as possible match between demand (healthcare institutions) and supply (trained healthcare professionals). This demand of well trained and experienced professionals at the labour market relates to many different issues, that go beyond a fluid transition between education and labour. Examples of labour market influences on how and for what job competences healthcare professionals should be trained (i.e. the content of educational healthcare programs) are, economic issues, the demands of clients, population ratios and so on. This challenges the educational healthcare programs to continuously adapt to give answer to the demand of the labour market.

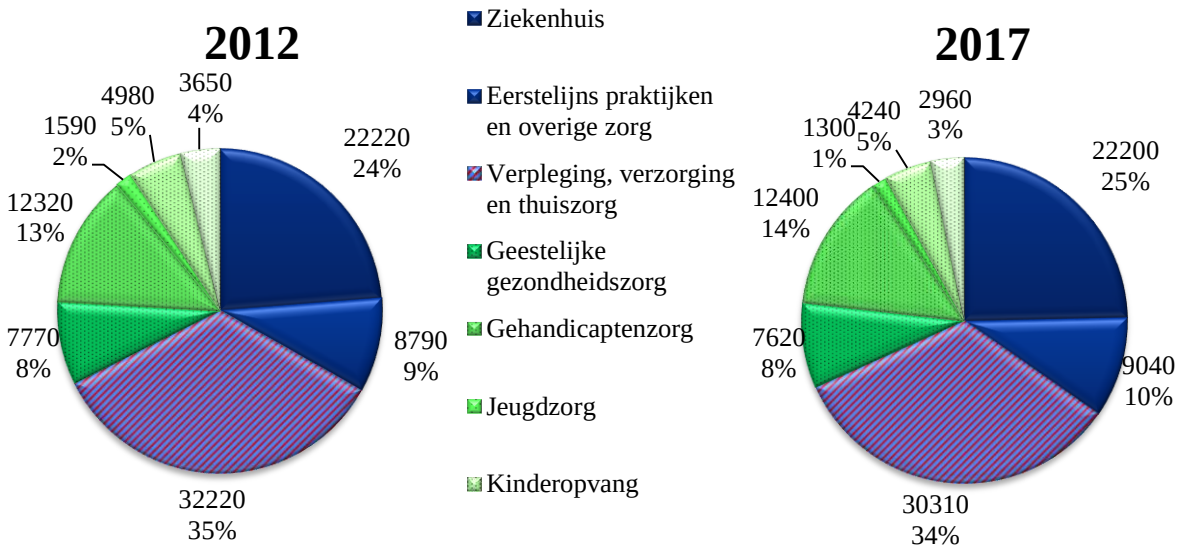
1.2 Healthcare demand and supply side

The demand and supply of healthcare in society is fluctuating, and this demand and supply cycle unfolds concurrently with a continuing change of standards in education and occupational responsibilities of healthcare professionals. The population structure and what the demands and wishes of this population are affect the demand side in terms of what content of educational healthcare programs should offer, and thus how future healthcare professionals should be educated. For educational healthcare programs it is challenging to continuously supply according to what the demand side demands because of a phenomenon also referred to as the cattle cycle (also hog cycle or pork cycle). This model basically states that when demands increase, the supply side needs time to meet the demands because of breeding time. Before cattle can be slaughtered to be sold for meat it needs to reach a certain age. This implies that if the supply side of the market solely responds to current demand, it will always be taken over by events. Chances are that by the time the supply side can meet up with this (old) demand, the demands have already changed (Rosen, S., Murphy, K. and Scheinkman, J., 1994). In healthcare education the 'breeding time' is a metaphor for the time needed to educate students to become professionals (which is on average four years).

National, regional and local policy also influence the demand and supply side. Political and policy dynamics determine, and thus from time to time change, the context of the field of professional healthcare. The supply side is affected by the standards set by national government, assessing what is legally obliged and desired to be part of an educational program. These programs in turn affect the attractiveness of and preference for certain educational programs by students, as well as what is assessed as necessary healthcare by the government and health insurance organisations.

The supply side needs to deal with an unbalanced interest of healthcare students compared to the demand in specialisations (e.g. the care for the elderly is not among the specialisations that see a decline in demand, but is also not a specialisation favoured by many students). This is shown in Figure 1 and 2, which, respectively, display the demand and supply of healthcare professionals in Groningen and Drenthe over time. The proportions of both figures show the distribution of general types of specialisations, and portray a continuing mismatch between demand and supply. The most obvious way to state this mismatch with these figures is to discuss the difference in proportion of the dotted green (up to almost white) area in Figure 1. This green proportion is one of the two domains in which healthcare is commonly divided: care and help versus wellbeing. Green being more specified towards wellbeing of people, where blue (the plain parts) is more concerned with short term (medical) care. And the red domain (in Figure 1 the striped part, being a combination of red and blue, and in Figure 2 the striped parts) of these figures concerns long term help/assistance. The red area of care and assistance is combined with the blue area of short-term and medical care when discussing healthcare, as it is also combined in this fashion in educational institutes and their educational programs due to the similarity in the content of the educational tracks.

FIGURE 1. HEALTHCARE DEMAND IN GRONINGEN AND DRENTHE PER BRANCH – OBSERVED (20012) AND EXPECTED (2017) HEALTHCARE PROFESSIONALS NEEDED

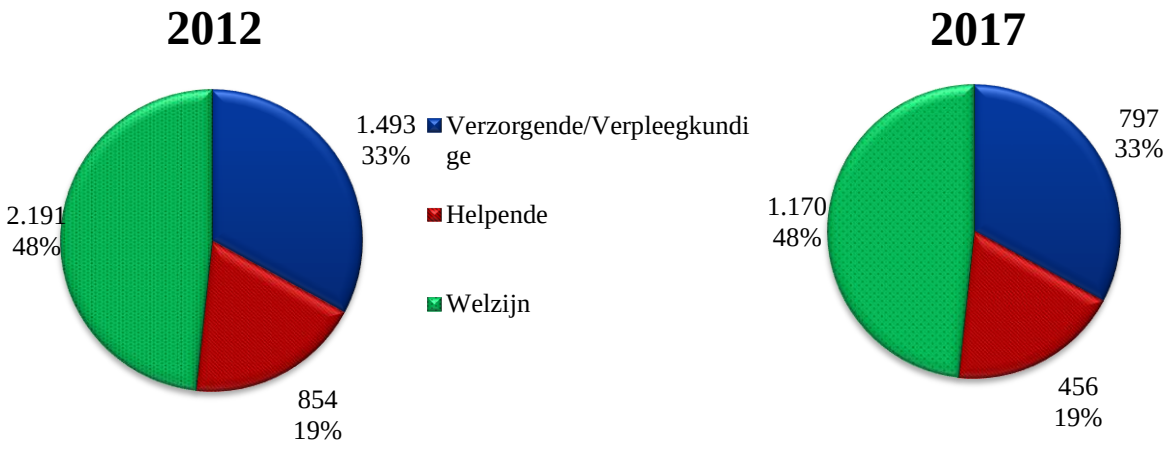


Source: NetwerkZON, 2016, p. 12-13

In Figure 1 - 2012 the green to white-green proportion of demand was 32% in total, while the proportion of graduates (Figure 2 – 2012) was 48%. The expectancy shown in Figure 1 - 2017 is a estimation created by observing trends in the past. This figure shows that the proportion of demand (the number of needed healthcare professionals in the field) will stay at 32% and the total proportion of graduates in this field (Figure 2 – 2017) will also stay at 48%. After many years in which entry and leave on the labour market is left to follow this uncontrolled natural dynamic, an overrepresentation of professionals specialised in areas of wellbeing (opposed to care and help) will rise and continue to

grow. If this mismatch continues to exist, the employability of all graduated healthcare students will become more challenging. Improvement will occur if healthcare educational programs, with the help of healthcare and (semi-)governmental organisations, interfere and stimulate the more neglected specialisation trajectories (e.g. the specialisations concerning help (red/striped proportion) in Figure 1 and in Figure 2). This emphasises the need for educational healthcare programs to keep adapting, and stresses the importance of a collaboration between these two (demand and supply) sides of the market. Only this way a continuing proper match between the needed and the actually graduating healthcare professionals can be achieved.

FIGURE 2. HEALTHCARE SUPPLY IN GRONINGEN AND DRENTHE PER EDUCATIONAL TRAJECTORY – OBSERVED (2012) AND EXPECTED (2017) HEALTHCARE PROFESSIONAL GRADUATES



Source: NetwerkZON, 2016, p. 12-13

Figure 2, as mentioned, demonstrates a status quo of graduates for 2012 and expectations for 2017. In total, the number of graduates in 2017 is expected to be almost half the number of graduates observed in 2012. This absolute difference is a result of policy executed to limit the amount of enrolments for health education, in order to not flood the labour market with healthcare professionals (NetwerkZON, 2016, p. 13).

Summary of Chapter 1

The healthcare labour market (both demand and supply side) is influenced by many things. In this thesis, this field is approached by dividing it in two: (1) the supply side, meaning education, or educated healthcare professionals who (can) offer healthcare to clients and (2) the demand side, meaning institutions working for clients and clients of healthcare themselves.

To provide and receive healthcare as efficiently as the capacity of the market allows, one has to recognise the phenomenon called the 'cattle cycle'. This phenomenon refers to the delay of response that is inherent to education due to the duration of educating students. Educational institutes need to estimate the demand of the labour market roughly four years in advance, because healthcare students receive on average four years of education. In order to provide an as high as possible job guarantee and proper supply of healthcare, educational institutes need to act upon the situation predicted to unfold after four years in terms of what programs they offer and how many students can be educated without overflowing the market with supply in one (or more) certain field of expertise.

The figures in this chapter show that supply and demand do not run in parallel. The healthcare market and its participants form the societal context of the research reported in this thesis.

2 Background information on NetwerkZON

2.1 Facilitator and promoter - NetwerkZON

This thesis is realized in collaboration with NetwerkZON, an organisation instantiating a cooperative goal oriented network (see also 4.2), with the theory of reciprocity as the basis of their administrative model. NetwerkZON is the facilitator of the cooperative goal oriented network structure between healthcare organisations and educational healthcare programs together with various levels of institutional and governmental organisations in the North of the Netherlands. Since 1997, NetwerkZON is established as a cooperative association (network) co-existing with the five organisations that offer the educational healthcare programs in the northern provinces in the Netherlands (ROC Drenthe College, ROC Noorderpoort, ROC Alfa-college, ROC Menso Alting and the Hanzehogeschool Groningen).

NetwerkZON facilitates the necessary collaboration between the schools and many healthcare organisations. This collaboration is focussed on the sectors of help, care and wellbeing (together healthcare); matching between demand and supply on the labour market; increasing labour productivity and efficiency. Concerning demand and supply, their goal is to provide as many sufficiently good internships at healthcare organisations for healthcare students as possible, up to an occupancy rate of 100% (meaning an internship for every healthcare student of legal legitimate quality reviewed by the Stichting Beroepsonderwijs en Bedrijfsleven (SBB)[1]). So every student gets as much experience as possible to be prepared for entry into the labour market. For NetwerkZON this means a continuous task of monitoring and controlling the collaboration in a cooperative reciprocal way. This task of NetwerkZON is ongoing because of the dynamic nature of demand and supply. For the demand and supply sides of healthcare professionals NetwerkZON has recognized the similarities with the phenomenon called ‘cattle cycle’ mentioned earlier, but advocates supply should develop ahead of demand in order to meet the demand at the moment it occurs. For this the cooperative goal oriented network is of need, in order to make an as accurate as possible prediction of future demand in healthcare, and to partially influence the demand side of the market in order to match the demand and supply side of the market as seamless as possible.

2.2 The (re)creation of the market

Seemingly unique in the labour and educational market of healthcare is that the model of NetwerkZON makes it possible to create a custom market for its participants. Because both

[1] The SBB is an organisation operating on national level that aims to provide vocational training as fitting as possible. They offer schools and educational organisations support and are responsible for legitimization of and support for educational programs, maintaining the quality of mbo (vocational) level education and quality guidelines for labour market oriented educational components of educational programs, like internships. The SBB monitors about 250.000 legitimate educational organisations and review their quality. The SBB uses a qualification structure for every mbo level trajectory and diploma which states national requirements (https://www.s-bb.nl/).

educational institutes and healthcare institutes work together as partners within the network of NetwerkZON, they can together shape both how they want to educate future professionals as well as the demand of the healthcare institutes. In this way demand and supply can be aligned very precise. The healthcare supply and demand sides would not be able to be shaped by the network its partners as much as it is in the concerning region, if it was not for the network its collaboration (i.e. if the partners were not involved in this network, non would be able to have as much influence in changing or determination of how the demand and supply sides of the healthcare market takes shape). This is due to the fact that a great majority of the stakeholders of this market are involved in this network. Influencing demand is not a natural movement of the market, it is a controlled influencing of the market. The partners in the network of NetwerkZON interact and influence each other to optimize use of the network its potential and the potential of the healthcare services all the partners can offer. The following example is a fictional clarification of the statement that together with receiving organisations (healthcare organisations) and legislative organisations (e.g. government), the providing organisations (schools) can influence the market by partly shaping and reshaping demand based on available supply. The example fits the two figures discussed in Chapter 1.

EXAMPLE 1. THE CREATION OF ITS OWN MARKET

Schools educate students to become professional A (within domain care), which are marginally demanded in society. Additionally, they also educate students to become professional B (within domain wellbeing), for which is a marginal demand in society but a moderate-to-high interest by students. For the schools this is a problem, because they cannot provide all students with a job after graduating. It is as hard for the schools to find fitting internships while training their students and thus guarantee provision of the knowledge, skills and experience necessary for graduating. The schools discuss this problem with their partners in the network. They put this dilemma on the network agenda, and together try to come up with the best solution to both provide in a fluent and successful educational program (including good internships), as well as a good perspective on future job possibilities after graduating. The come up with a reform of the demand side: Together the schools and the healthcare organisations establish a new form of collaborative healthcare in which the work of professional A and professional B gets combined, and the client receives better care with more attention to wellbeing than before. Which eventually also satisfies governmental goals if downsizing the needed budget for a healthy self-sufficient society.

2.3 The communication platforms of NetwerkZON

2.3.1 The established platforms

Following global patterns, NetwerkZON makes (an increasing) use of digital means of communication in order to increase chances of reaching their goals. The organisations connected by NetwerkZON are

subject of the research reported in this thesis. Three digital communication platforms that are different in nature and use at the time of investigation can be differentiated. The first is the physical network platform, this platform facilitates interaction through in-person encounters. An example of an activity on this platform would be a meeting at which actors are physically present, e.g. informing partners, discussing results and progress (an actor refers to an individual, in this thesis mostly representing an in the network of NetwerkZON involved organisation). Of the three platforms, this platform provides the most room for discussion and evaluation of organisation. The semi-physical and more 'old fashioned' encounters, like having a conversation on the phone, communicating through work email, and comparable forms of communications that do not include communication through the other two communication platforms (Stagematching and/or Moodle), are also included in this platform.

The second platform, Stagematching, is a digital platform. This platform was the first digital platform of NetwerkZON, which substituted certain activities that otherwise needed to be carried out through life encounters and manual work. This platform includes all the work of the actual administrative matching of healthcare students and organisations for internships. It is a web based platform designed to be practical and productive and leaves up to no room for other types of communication; it is a formal and hands-on platform.

The third platform, Moodle, is a more informal web based digital platform. This platform is used in a variety of ways, from the exchange of digital documents to the implementation of projects and the exchange of opinions and information. All these sub-platforms are in use as measures for attaining their goal of a sufficient amount of good internships for all healthcare students, as a cooperative goal oriented network.

The first platform, the physical (network) platform, differs on a very important aspect from the two other platforms. Stagematching and Moodle are both digital platforms, for which accounts are needed to access the platform. Thus, an invitation or granted access for the platform is necessary. Participating as a member of NetwerkZON in Stagematching or Moodle, is a selection within a selection. Not just everybody can become partner of NetwerkZON, NetwerkZON makes a selection of partners relevant to the existing network for achieving the collective goal. A selection and exclusion also takes place in the establishment of the digital networks, to also establish and maintain the guarantee of goal oriented effectiveness of these platforms. For Stagematching the selection is determined by the contribution a partner can make concerning internships. A selection for Stagematching is made by NetwerkZON, together with the educational institutes, according to directions concerning quality of internships set up by the government. For Moodle selection for in- or exclusion is determined by the contribution a partner can make concerning multiple topics that are discussed on Moodle.

2.4 Stagematching and Moodle

Stagematching

Stagematching is a substitutional digital communication platform (for a detailed explanation see Appendix B – Digital communication platforms). Stagematching is a digital communication platform that has completely changed the way in which the concerning information is handled. Before the existence of this platform, the matching that occurs on this platform was done in physical encounters and was manual work. Now, the form-like digital communication platform completely substitutes this, during no other encounter of at any other platform the matching of intern and organisations is arranged.

Moodle

Moodle is a complementary digital communication platform (for a detailed explanation see Appendix B – Digital communication platforms). Moodle consists of documents and discussions that are also discussed and distributed during other encounters. But this does not concern all the discussions and distribution that occurs on Moodle. Many of these are only introduced or receive a basic discussion, which then is expected to continue in depth at the digital communication platform. Afterwards, outcomes (or other concluding actions) are discussed either also on Moodle or during contact on the physical platform.

Summary of Chapter 2

The network of NetwerkZON is a cooperative goal oriented network of healthcare organisations and educational healthcare programs together with various levels of institutional and governmental organisations, with the theory of reciprocity as the basis of their administrative model. The network focusses on help, care and wellbeing (i.e. healthcare); matching between demand and supply; aiming to increase labour productivity and efficiency. NetwerkZON has recognized the 'cattle cycle' phenomenon and advocates supply should develop ahead of demand in order to meet the demand at the moment it occurs. For this the cooperative goal oriented network is of need, in order to make an as accurate as possible prediction of future demand in healthcare, by composing an as large as still is efficient range of different involved actors of various organisations on multiple levels. The model of NetwerkZON makes it possible to (re)create an customized market for the network its participants, due to the fact that a great majority of the stakeholders of this market are involved in the network. The stakeholders are the multiple levels of (semi-)government, healthcare institutions that provide (in)direct care for clients, the clients and their relatives and friends involved in their care, educational institutions and healthcare students. The partners in the network of NetwerkZON interact and influence each other to optimize use of the network its potential and the potential of the healthcare services all the partners can offer.

NetwerkZON makes (an increasing) use of digital means of communication in order to increase chances of reaching their goals, through three platforms for communication: (1) the physical platform (in-person encounters and 'old fashioned' encounters (telephone, email, etc)), (2) the digital platform Stagematching and (3) the digital platform Moodle. For Stagematching and Moodle, NetwerkZON selects and excludes certain partners depending on the platform's (sub-)goals. Only those who are believed to contribute to this subnetwork are selected to be involved in Stagematching and/or Moodle.

Three types of digital communication platforms have been defined, which are explained in detail in Appendix B – Digital communication platforms: The complementary, substitutional, and additional digital communication platform. Stagematching is a substitutional digital communication platform and Moodle is a complementary digital communication platform.

3 Reasons for research

What the research reported in this thesis aims to uncover is whether the conditions of reciprocal behaviour (discussed in Chapter 4) can explain organisations their behaviour on both digital platforms of NetwerkZON, and whether contact on multiple digital network platforms increases success (matching of internships) in a cooperative goal oriented network built on reciprocal behaviour. In physical cooperative goal oriented network structures the existence of certain contributing conditions for this increase in success have already been identified by Zuidersma (2012). In her research Zuidersma created a bridge between reciprocal behaviour in communities and in organisational networks. The research reported in this thesis takes this theme to the next level by introducing the new component of digital reciprocity at multiple digital network platforms in the development and extension of empirical understanding of reciprocal behaviour and the functioning of networks in the digital era.

Besides the empirical relevance of delivering new insights into the developments towards more digital communication in organisational networks and an elaboration on the new field of reciprocal behaviour in organisations, this research holds sociological and societal relevance. The research reported in this thesis addresses a large area of the society, if not its whole. Almost every member in society is confronted with (an increase) in digital communication this day, of which mechanisms and consequences are yet to be fully explored and explained. These digital communications have implications for individual behaviour as well as meso/macro level outcomes, but they cannot yet be completely understood from individual perspective.

Because of the increase of digital networks compared to the number of physical networks, and the forecast of only (acceleration of) growth of this type of network and communication, there should be and is a growing interest in and need for research of this kind (De Haan, J. 2008, p. 365-367). In the Netherlands the effect of digital communication as a support in healthcare is of great interest. Medical insurance in the current form of the welfare state is a costly construction that is viewed to be untenable. Steps are taken to find a solution in digital communication. For example sensor technology is a practical technique that is applied in providing information on clients without the necessity of being present for professionals. Not only for direct care, but also for a longer independence and wellbeing of the elderly the digital world seems to be a profit. Smart housing, which is technology used for longer independent living, increases the time a people can live on their own (De Haan, J., 2008, p. 375). These new technologies are also of interest for its potentially rich data for research. Mutual digital communication as support of healthcare between client and healthcare providers, as well as amongst healthcare providers and other relevant involved organisations, and smart housing, is a theme that can aid to keep offering a certain standard of healthcare without this healthcare becoming too expensive for society. The research reported in this thesis is of particular value because of its

combination of much needed exploration of digital communication networks combined with the relative new subject of reciprocal behaviour in a cooperative goal oriented network.

Furthermore, the research reported in this thesis is of practical relevance. NetwerkZON (including all its members), but also other interested comparable organisations or networks, can profit from the outcomes of this research. It might give directions or implications on the set up and maintenance of their network structure by providing insights into what does not work (as well) and/or what does work (better). The results of this thesis provide insight in mechanisms to explain and/or improve the (communication and) collaboration within the network, and with that, the rate of success in matching healthcare students and providing society with well-trained healthcare professionals.

3.1 Research questions

The aim of the research reported in this thesis is to investigate what this particular network (of NetwerkZON) looks like, whether there is a relationship between interaction on the digital platforms and the achieved results in terms of 'success', and how the establishment of the conditions of reciprocal behaviour by Zuidersma influence these effects and vice versa. Success is measured in the amount of sufficient good internships that are created for healthcare students (see also 5.2). The research questions of the research reported in this thesis are the following:

1. What is the relationship between digital communication and the provision of internships?
2. Can the four conditions for reciprocal behaviour explain this relationship?

To answer the research questions of this thesis, the research reported in this thesis is both fundamental and practice-based research. It addresses a gap of knowledge as well as a practical question of network functioning from NetwerkZON. Due to the lack of theory existing that specifically focusses on the concerning field of research, the research reported in this thesis is explorative ('t Hart, H., Boeije, H. and Hox, J., 2007, p. 71-75). But the practical aspect of NetwerkZON allows to also perform testing research, using the data from NetwerkZON. The first research question concerns the more practice-based nature of the research reported in this thesis. The second research question is more fundamental and explorative.

Summary of Chapter 3

The research reported in this thesis aims to uncover:

> Whether the conditions of reciprocal behaviour (Chapter 4) can explain organisations their behaviour on both digital platforms of NetwerkZON .
> Whether contact on multiple digital network platforms increase success in a cooperative goal oriented network build on reciprocal behaviour.

In physical cooperative goal oriented network structures the existence of certain contributing conditions for this increase in success have been identified by Zuidersma (2012). In her research Zuidersma created a bridge between reciprocal behaviour in communities and in organisational networks. Here digital reciprocity at multiple digital network platforms is added to this body of work to contribute to the development and extension of empirical understanding of reciprocal behaviour and the functioning of networks in the digital era.

The research reported in this thesis addresses digital communication to contribute to the understanding of mechanisms and consequences of our digital communication and behaviour, on individual as well as meso/macro level. In the case of healthcare and medical insurance this could contribute to the empowerment of digital solutions in the costly welfare state of the Netherlands. NetwerkZON, its partners and other interested comparable organisations or networks can profit from the outcomes of this research. The results of this thesis also explores and provides insight in mechanisms explaining and provides insight to improve the (communication and) collaboration within the network, and with that, the rate of success. The research questions of the research reported in this thesis are the following:

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PART II - THEORY & DATA

4 THEORETICAL FRAMEWORK

4.1 RECIPROCAL BEHAVIOUR – THE THEORY OF RECIPROCITY

The richest source of information on this subject is the research performed by Jelly Zuidersma (2012) on reciprocal behaviour patterns in regional cooperative relations. Not only is this the first complete work of research on reciprocal behaviour in organisational structures, it also forms a source of information that fits the case of the network of NetwerkZON exceptionally well. The structure of NetwerkZON and its network is based on the findings of Zuidersma (2012) her work. The behavioural theory of reciprocity from this work is there for adopted for the research reported in this thesis.

In exploring and explaining macro-level situations, outcomes and behaviour, a behavioural theory is of great importance as values do not simply lead to social outcomes (Zuidersma, 2012, p.27, p.30). The theory of reciprocity states that an individual contributes to a common goal if they trust others to do so as well. If this behaviour is not mutual they will show free-rider behaviour[2] (i.e. defect). When not all members in the group show reciprocal behaviour, the group will be unbalanced and all types of behaviour and expectations (reciprocal behaviour and free-rider behaviour, or cooperation and defection) will be represented in the group. This unbalance provides a setting in which the group can only marginally achieve its (on reciprocal collaboration based) goals, if at all (Zuidersma, 2012, p.37). To achieve a context for a group where transcending goals can be attained and all organisations have a same point of view, the context needs to satisfy certain conditions. Again, to the behavioural theory of reciprocity this involves mainly that organisations need to trust one another. For this, a second condition is needed, the absence of status behaviour (absence of differentiating oneself from and have some contempt toward the group). When this is secured, for the realisation of a collective viewpoint of transcending goals, four conditions of reciprocal behaviour are needed: being able to reach each other, interdependence, multi-layered relationships and future perspective (Zuidersma, 2012, p. 41-42).

The social, macro-level situation in the case of NetwerkZON, refers to the situation of the challenge of seamlessly matching healthcare education and labour market. The actors operating on micro-level recognise that behaving only on behalf of their own organisation has brought them to the situation of mismatch between education and the labour market. They also recognise that they are limited in handling this problem if their organisations do not work together or only work together occasionally. At this point, following the theory of reciprocity, the now partners of NetwerkZON decided that if they wanted to change this situation, they have to be a social actor (not a rational actor). This means that the choices the individual makes, need to be on behalf of the common, macro-level outcome. This realisation of not solely striving for personal and foremost individual benefits makes organisations to

[2] Free-riders are actors that profit from goods or services of which they are not excluded, without contributing to the creation of this good or service nor do they contribute to the maintenance of the good or service that is established (Kollock, P., 1998, p.189).

reach out to other concerning organisations based on the idea for a collaboration that will exceed personal interest. Multiple organisations willing to work together for a goal exceeding the single actors and organisations their benefit and interest, leads to inter-organisational reciprocal collaboration on network level if the context harbours the conditions that motivate reciprocal behaviour. It leads to a reciprocal cooperative goal oriented network if the relations have the potential to be transparent, organisations sense a mutual trust, status behaviour is absent and the four conditions of reciprocity are present.

NetwerkZON continuously stimulates reciprocal behaviour to maintain the reciprocal collaboration by putting dilemmas of single organisations on the agenda of the whole network and make members contribute in the creation of a solution instead of offering an instant solution they can just act upon. The idea of influencing this collaboration by sharing 'individual' organisation (i.e. organisational-level) dilemmas in this way (and according to Zuidersma her theory of reciprocity) is to produce more engagement among the involved organisations, which in turn is expected to have a positive influence on the four conditions of reciprocity that need to be present to establish and maintain cooperative goal oriented reciprocal behaviour.

4.2 Reciprocal behaviour in cooperative goal oriented networks

A cooperative goal oriented network is a network in which three or more legally independent organisations work together to not only achieve their own goals but also pursue a collective goal. The creation of such a network can be part of the solution of a social dilemma, when uncoordinated individual decisions lead to suboptimal performance (Zuidersma, J., 2012, p.22-23).

The design of an organisation is a key factor in the extent to which an organisation is capable of reaching success. It is important that the design is correctly structured and that the appropriate administrative body is established (Zuidersma, J., 2012, p. 23-24):

- Voluntarily vs. compulsory: Voluntarily established usually implies higher chance of success, though mostly it is (compulsory) prescribed top down.
- Development of internal vs. external legitimacy: To succeed, it is advisable to first create internal legitimacy (members of the network themselves positively judge the network) before attending the external legitimacy (external positive judgement by for example funders, regulators and the public). Establishment the other way around is proven to be difficult if not impossible.
- Directive centre[3]: The network needs an organisation that establishes and maintains the network consisting of multiple organisations. This is a crucial element of effectiveness because it stimulates integration and coordination.
- Before the network is designed it is best to establish the network its aim and the criteria to measure this aim.
- Density: the structure needs to be dense enough to work together based on trust, but not too dense (as this works counterproductive).

[3] NetwerkZON is the directive centre of the network that is investigated in the research reported in this thesis.

As with social relationships, within a network social capital is important. It is necessary that information is available in a network, especially on organisational level. It is a key element of being able to take distance from acting only out of self-interest and start thinking and acting on behalf of a collective interest (most effectively when this is externally inflicted). Information in cooperative goal oriented networks is very important because if information is lacking, it is uncertain for actors and organisations what the transcending goals and interests are. In such a situation the classic principal-agent-client problem easily emerges[4] (Zuidersma, J., 2012, p. 32-33).

Literature also refers to status behaviour as behaviour based on an egoistic or individualistic social value orientation or based on competitive social value orientation. These social value orientations are aggregated as the proself social value orientations. Actors that have an egoistic social value orientation do not take others into account in any social encounter. They might keep up the appearance to take others into account from time to time, but this eventually turns out only for the best of their own. Actors that have a competitive social value orientation aim to make the difference between themselves and others as big as possible, in their own favour. Proself social value orientations do not cooperate to achieve actor-transcending goals, and thus cannot be reconcilable with reciprocal behaviour. This defecting behaviour makes it impossible for other actors to trust the actor in a reciprocal relationship. Other actors have no guarantee that the egoistic or competitive actor will not betray them when this is in this actor its favour (De Cremer, D. and Van Vugt, M., 1999, p. 873-874). Van Vugt and Van Lange (2006) argue that individuals will react more severe to behaviour that damages trust or group performance than they would react positively to behaviour that supports this. Thus, in a reciprocal network, egoistic and competitive actors are distrusted and rejected. A good functioning reciprocal network will address the non-conforming actor, and if the undesired behaviour continues the network would eventually reject participation of this actor in the network completely. Besides trust, collective reciprocal behaviour in cooperative goal oriented networks exists only when relations include multiple layers of involved organisations that fulfil multiple roles, when organisations of the network can reach out to one another, when they need each other to achieve their own organisation transcending goal and when they perceive their investment and commitment to be worthy due to a long-term future relationship perceived to be valuable (2012, p. 24-27, p. 45).

[4] The principal-agent model describes how information about an concept of action (e.g. policy) is created by a different actor (the principal) than the one who implements this concept of action (agent) nor is this actor part of the target group this concept of action is designed for. Every stage of passing on information from one actor to another leaves potential room for personal interpretation and for why and how this concept of action should be and is executed. This room for interpretation is decreased the more aware the agent is of the principal its ideas and reasons. When too much room for interpretation is enabled, results cannot be measured with the in advance set means of evaluation for the execution is not the same as was designed. The designed concept of action might even do more harm than help when initial aims are no longer the foundation of the concept of action and its execution (Wolters, W. and De Graaf, N. D., 2006, p. 52-53).

4.3 Conditions of reciprocal behaviour in cooperative goal oriented networks

4.3.1 Being able to reach each other

The first condition for reciprocity in cooperative goal oriented networks is being able to reach each other. Being able to reach each other concerns three aspects. First of all (actors of) organisations from a network need to be able to understand each other. Second, geographically people need to be able to get in contact with each other. And third, contact needs to be technically facilitated (Zuidersma, 2012, p. 46). The first aspect, understanding each other is the aspect that is of greatest interest in the research reported in this thesis. This concerns the nature of communication. The second aspect, bridging the geographical distance, is assumed to be guaranteed, as the network under investigation is an established functioning network. Though, the adding of a digital communication platform could imply that the geographical distance is bridged more time-efficient. On the other side, it could also have an opposite effect. If people have a hard time understanding each other, but are in some way forced to use this communication platform, the geographical bridging deteriorates. The third concept, the technical facilities of contact and communication are well established. The effect of the digital communication platform Moodle is an addition to what already works, the functioning network. Pure technical, it is assumed the platform functions properly.

Being able to understand each other is expected to affect the use, and the intensity and frequency of use of a digital communication platform. This mainly has to do with language. Understanding (or lack thereof) through language exists of two different aspects. First of all, the use of computers is not (yet) something the concerning generation is brought up with similar to learning to speak, write and read. This might be the case for future organisations, existing of people that know how to communicate via digital media as easily and naturally as during a physical encounter, but this cannot be assumed with the current actors. What is meant here is the difference between the ease of use of this medium (internet) compared to spoken words including tone and non-verbal communication, the use of technique (De Jong, Y., 2015, p. 12). The other aspect of language as an affecting factor is a possible difference in what type of words are used, which formalities are customary, etc.; the behaviour in communication on a digital communication platform. If not all actors in a relationship or network know how to communicate properly online this might damage the relationship. The difference of online communication could be explained as younger people who grew up with online communication as being digital natives, while older people are digital immigrants at their best. The latter are able to master the skill of using digital communication but will always keep their (non-)digital accent (De Haan, J., 2008, in SCP, 2008, p. 374). The most damage of a difference of use in and perception of online communication would be expected on the side of those ‘who do not know how to speak digital’, because they might feel excluded or misunderstood, or might not be comfortable with the expectations of speed that come with communicating online (De Haan, J., 2008, p. 374-380). Online communication, more than verbal physical communication, is supported by images and symbols. Also

unofficial abbreviations are commonly used. This way of speaking, which might in some cases be more comparable with informal communication or slang, could be perceived as not professional by people who do not know these practises that have become accepted as use of language online. Trust, but also future perspective, could be jeopardised by this inequality of understanding and thus could damage a collaboration.

The two aspects addressed above concern the difference in sending, receiving and perceiving information online and the way it is or would be when people are physically present and tone and expression is a part of the message; non-verbal communication is lacking. In part, digital communication is comparable with written communication, like a newspaper or a written letter. Yet digital communication differs to the extent that people are communicating way faster and more anonymous. Even images and symbols that could be used to enhance a state of mind of the sender is more open for interpretation than the non-verbal communication through body language, which human have developed to interpret as correct as possible over thousands of years for survival and signalling danger or favourable situations. Emotions are more difficult to perceive, this makes corresponding more difficult. For example, frustration could not be projected at the source, because the person who causes the frustration through the words it has written, is absent. This could affect trust, because it is more difficult to call on an individual its behaviour if he/she is not present. Likewise, it is difficult to call on an individual its behaviour, during a later physical encounter when the moment that caused frustration has long passed and the relationship or collaboration is already continuing. This could cause discontent and might facilitate regret and disappointment regarding the relationship or collaboration. If the person who feels frustrated would project its anger through digital means, again interpretation is open for the receiver to possibly perceive it way more aggressive than meant. Reaction or the lack of reaction to misunderstandings both has a bigger potential to harm the relationship more than during physical encounters due to the lack of non-verbal but physical communication to soften the communicated message. Because of this, it is assumed that at least in the start-up period of the use of a digital communication platform, actors and/or organisations withhold themselves to a certain degree in using this platform for communication.

Language is an important aspect of digital communication. When not well established, it harbours many potential threats not only for the ability to reach each other, but also for trust, future perspective, and the potential increase of multi-layered relationships. So investing in learning to use digital communication and ‘speak digital’ could be useful for a good or better (digital) collaboration. Yet learning these ways are time consuming. It mostly means learning through frequent use, possibly more than strictly necessary. This learning to communicate thus might add more time to be invested in the use of the digital network platform. Something an organisation might not prefer to do if this is not mandatory or strictly necessary, also depending on the relative cost for the organisation, which in turn depends on its size, as discussed in section Appendix B - Digital communication platforms. (De Haan,

J., 2008, p. 369). Assumed is that larger organisations are able to invest more in being able to reach each other, because it costs larger organisations less (per employee) to invest than smaller organisations.

An important comment on this condition is that for the digital platforms, both Stagematching and Moodle, the setup of the websites dictate to some extent how organisations have to communicate. Stagematching mostly resembles a predetermined form that organisations fill in. Moodle tends to be more like a physical platform that harbours less boundaries in how to communicate, yet this platform also dictates what to communicate about, through which sections of the platform and with which organisations you are (not) communicating. Organisations are channelled in their communication. For some, this might decrease to some extent the language learning difficulties discussed above.

Being able to reach each other – summarized

In short, being able to reach each other as the first condition for reciprocal behaviour in cooperative goal oriented networks concerns:

- The ability to understand each other;
- The geographical ability to contact each other, and;
- The technical facility for contact.

The new digital communication platform that was of interest in the research reported in this thesis, dictates to some extend the way of communicating. Still, some aspects are assumed to result in lower use of the digital communication and need to be taken into account when interpreting the results:

- The difficulty some actors have with the new language;
- The different, more informal use of digital language;
- The lack of non-verbal physical communication, and;
- The possible higher investment needed to get acquainted with the digital communication platform.

For being able to reach each other the following hypothesis is formulated:

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

4.3.2 Interdependence

The second condition for reciprocity in cooperative goal oriented networks is interdependence. Interdependence is created when organisations in a network constantly change the nature of their role within the network. In one situation the organisation fulfils the role of giver, providing a product or knowledge. In another situation the organisation fulfils the role of receiver, receiving a product or knowledge. The more switching in roles, as well as with more partners to switch roles, the higher the interdependence will be, which results in more reciprocal behaviour (Zuidersma, 2012, p. 47). This type of interdependence is a functional interdependence. This concerns binary relationships (one-on-

one) and multiple relationships (a network). It should be considered that organisations with more interdependent relationships are more invested in the network, and benefit more from the reciprocal collaboration than organisations with fewer interdependent relationships. Organisations with more interdependent relationships are expected to have a more central position in the network (i.e. have more ties to other organisations). This position is also expected to increase more positively than the positive increase organisations with less interdependent relationships will experience. In other words, the more interdependence an organisation 'possesses' (both giving and receiving), the more this will be stimulated and increased.

INTERDEPENDENCE – SUMMARIZED

The condition interdependence describes the roles of the organisations in the network. The degree of organisations being interdependent depends on the roles of giving and receiving. The more switching of roles, the more interdependent two organisations are. The more an organisation has of this type of relationships, the more interdependent its network is.

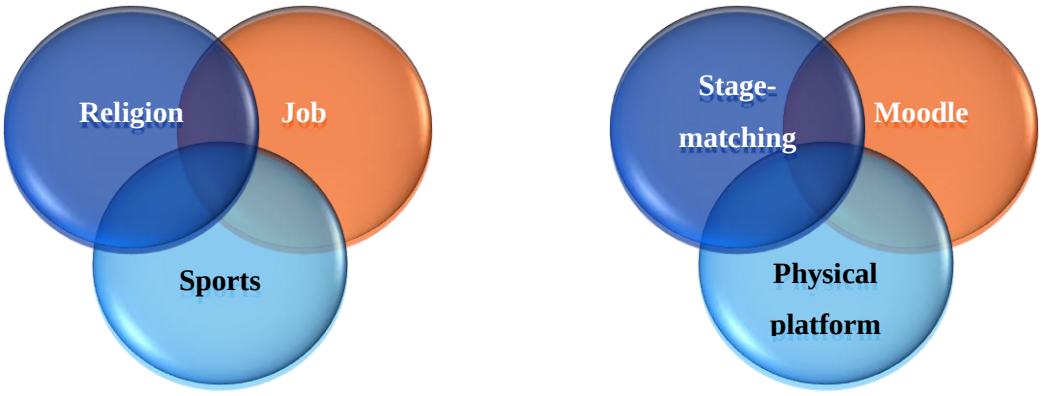
For interdependence the following hypothesis is formulated:

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

4.3.3 MULTI-LAYERED RELATIONSHIPS

The third condition for reciprocal behaviour in cooperative goal oriented networks is multi-layered relationships. Multi-layered relationships refers to the amount of layers an organisation involves within its relationship. Multi-layered relationships has two forms. The first form of this condition is, when people meet someone else outside their initial context of contact they are more inclined to invest in the relationship. Figure 3A. illustrates a multi-layered relationship. The circles represent contexts in which actors could meet each other. If two actors are both involved in the same job context and in the same religious context, their relationship is multi-layered. The more overlapping contexts in which they could potentially meet, the more multi-layered their relationship is. This figure shows three overlapping areas, this could be more due to a shared living area, shared hobbies, both being parents with children at the same school, etc.

FIGURE 3. MULTI-LAYERED RELATIONSHIPS – DIFFERENT AREAS OF CONTACT

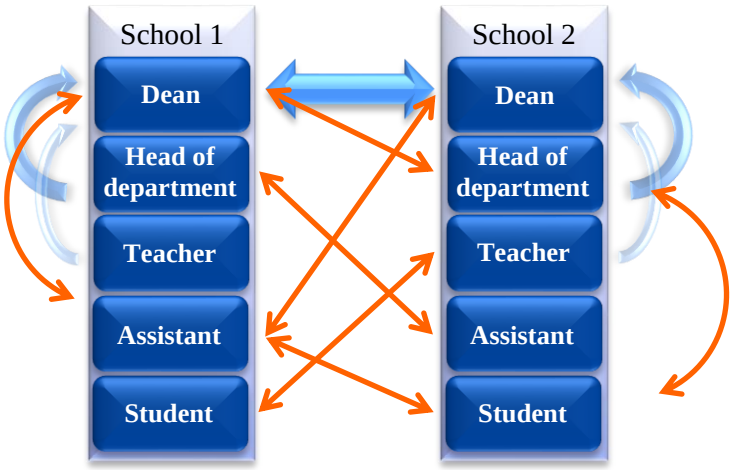


A. **B.**

Multi-layered relationships can also be applied to only the organisational context. If actors (on behalf of their organisation) have more shared contexts that are organisation- or (net)work-related, their professional relationship becomes more multi-layered, as shown in Figure 3B. This multi-layered relationship is strengthened or reinforced when more members of the same network have multi-layered relationships, i.e. it is contagious. So more multi-layered actors in a network enhance the probability of organisation to be (more) multi-layered. It also provides more social resources (help from somebody in service, goods or knowledge) that can be used for multiple goals, in different networks. The frequency of people meeting their relations in other contexts also increases the willingness to help, i.e. show reciprocal behaviour. This willingness or reciprocal behaviour is a result of the multi-layered relationships through the interdependence it stimulates, which will be discussed in the next section (Zuidersma, 2012, p. 46-47).

The second form of multi-layered relationships on network level is the contact that occurs on different levels between actors. This is illustrated in Figure 4. This (blue) basis is called a silo-effect, only at higher hierarchical levels inter-organisational communication occurs. According to the silo-effect, within an organisation the communication is also mostly found in higher hierarchical levels and usually upwards. Thus, the lower the hierarchical position, the lower the communication about organisational or structural issues. Cross-hierarchical inter-organisational of communication occurs close to never (Vatanpour, H., Khorramnia, A. & Forutan, N., 2013, p. 208-209).

FIGURE 4. MULTI-LAYERED RELATIONSHIPS – DIFFERENT LEVELS OF CONTACT



The orange lines in the of Figure 4 show possible multi-layered relationships. These links of communication and interaction reverses the classic hierarchical organisational structure by implementing interdependence, something NetwerkZON tries to keep working at all times. The multi-layered relationships through multi-layered communication creates a higher standard of shared responsibility in organisations and networks, because organisational responsibility is transferred through the whole organisation. An organisational problem is no longer a problem for example only the management has to deal with, it is shared with others on different levels of the organisation. And along with this sharing these people are asked to help in coming up with a solution or improvement and input of social capital. NetwerkZON tries to lift this to an even higher level by focussing on the demands and needs of a target group not directly concerning the agenda of the involved organisations of the network, but the healthcare students and clients of healthcare.

As mentioned in the introduction, the digital platforms are exclusive. It is important to take this exclusiveness into account, because actors (on behalf of their organisation) are assigned to the digital network platforms by NetwerkZON. In other words, they did not choose to (not) be involved in it. For analysis this is relevant especially concerning Moodle, because it could affect the extent to which an organisation has multi-layered relationships. If an organisation is not included in a platform it affects the potential of the relationship compared to other organisations that are included in the platform. The excluded organisation is left out of a potential partnership with other relevant organisations, with whom it otherwise could have established a (more) functional and important relationship. Though the exclusiveness protects the network against free-riders, this in turn might affect the overall relationship of excluded organisations as they are left out of the enhancement multi-layered relationships have on existing relationships (Zuidersma, J., 2012, p.36-37).

The strength gained from multi-layered relationships makes organisations favour other organisations that are not excluded from any network communication possibility. Whether this effect is more prevalent when concerning large organisations (with a higher number of employees) or when concerning small organisations (with a smaller number of employees) is unknown. This probably depends on the necessity of the use of the channel (which is discussed in Appendix B - Digital communication platforms). Expected is that organisations that are included in Moodle have a greater chance at extending their multi-layered relationships and thus have the opportunity to become more successful due to an increase in/strengthening of the conditions for reciprocity.

MULTI-LAYERED RELATIONSHIPS – SUMMARIZED

Summarized, the second condition of reciprocal behaviour in cooperative goal oriented networks multi-layered relationships concerns two forms:

- The overlapping of different contexts in which actors meet, and in which the actors has a different role per context (parent, employer, fellow sports fan, etc.), and;
- The integration of the whole organisational structure in problem signalling and decision making through open communication and sharing responsibility, on inter- and intra-organisational level.

Exclusiveness is an important aspect for organisations within the network of NetwerkZON for the potential of becoming multi-layered. We expect that organisations excluded from Moodle are less multi-layered, resulting in a lower increase of success.

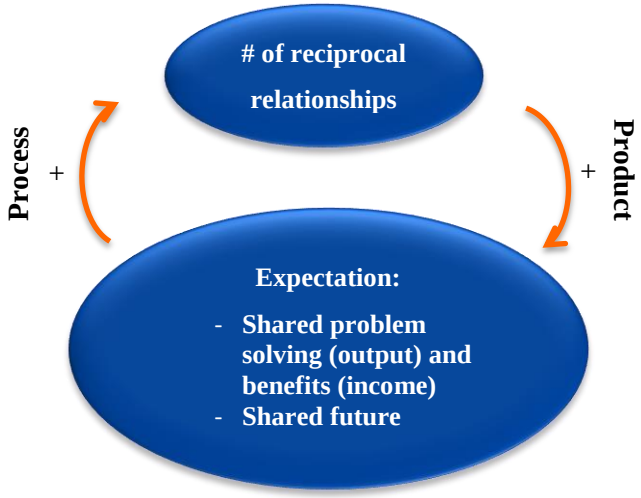
For multi-layered relationships, through in-/exclusion of organisations in Moodle, the following hypothesis is formulated:

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion into Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

4.3.4 FUTURE PERSPECTIVE

Future perspective is the fourth and final condition for reciprocity in cooperative goal oriented networks. Future perspective refers to the perspective regarding the potential of a future relationship. Organisations have a greater trust in a future relationship when the expectations of the input and output of a collaboration increases, and thus when the density of the collaboration (the network structure) is higher. The more organisations expect to have shared problem solving (output) and shared benefits (income), the more reciprocal relationships an organisation will establish. And, organisations that have more reciprocal relationships expect a more shared future (Zuidersma, 2012, p. 47). This is shown in Figure 5.

FIGURE 5. FUTURE PERSPECTIVE



The condition of future perspective thus creates a positive spiral of reciprocity once it is present and robust. The condition facilitates the situation and the situation facilitates the condition. Future perspective has influence on the other three conditions, as they have on future perspective. Simply put, future perspective is the organisation its expectation of the other conditions to be still robust and profitable in the long run.

The fourth hypothesis will not be directly tested. When evidence is found for the other three hypotheses, assumed is that this is evidence for investing in continuation of the collaboration, and thus an empowerment of future perspective. Evidence (or no evidence) for the first three hypotheses will be the results for Hypothesis 4

FUTURE PERSPECTIVE – SUMMARIZED

In short, future perspective embodies three mechanisms:

- Greater trust in a future relationship because of shared input and output;
- The more shared input and output, the higher the expectation of a future relationship will be, and;
- The more the reciprocal relationships an organisation has, the more they expect a shared future.

These three mechanisms are positively influencing each other. Moreover, a positive perception of future relationships positively affect the other three conditions of reciprocity (being able to reach each other, interdependence and multi-layered relationships), because it stimulates investment in the relationship. For future perspective, the following (not directly to be tested) hypothesis is formulated:

H4. The higher the expectancy of future relationships, the higher the increase of success.
(Expectancy of future relationships increases the level of investment in the other three conditions, and the better established the other three conditions are, the higher the success is expected to be.)

4.3.5 The four conditions of reciprocal behaviour – summarized

In the research reported in this thesis, it is assumed that status behaviour is absent, mutual trust and the four conditions are existing in varying degrees per organisation. Expected is that, as explained, the conditions reinforce themselves, this is even more enhanced when all organisations perceive a positive future relationship. In a cooperative goal oriented network, with the theory of reciprocal behaviour as its fundament, it is expected that the organisation with the most reciprocal relationships is working on establishing more. Those who have a few or no reciprocal relationships are expected to invest less in creating reciprocal relationships. Assumed is that Stagematching enhances all the conditions of cooperative reciprocal behaviour. It increases trust and decreases status and free-rider behaviour because of its transparent nature (all the involved organisations can see the actions of others). It increases being able to reach each other due to its digital and uniform nature. It increases multi-layered relationships because a separate virtual context (the actual digital platform Stagematching) is created in which it fulfils a different role than in other context, while relationships overlap these contexts (Figure 3). It increases the condition future perspective because the nature of the digital platform visualises the need (not (yet) matched internships), and results (matched internships) of working together. The only condition of which it is too uncertain to assume it increase, is interdependence. This is assumed to stay the same, neither the number of needed and offered internships nor the roles of the involved organisations change. The only assumption that can be made is that the interdependence is more apparent. Another digital communication platform is an opportunity for an organisation to increase its future sustainability. This could imply that an (actor of an) organisation is inclined to make a greater effort in learning to use and using a new type of communication in order to strengthen and increase its network, if the organisation is large enough to have the capacity to do so. To be included in a digital communication platform provides more possibilities of creating or enhancing multi-layered relationships. Not only are the relationships easier to establish or maintain concerning the different layers or an organisation that are possibly present at the platform, also the digital communication platform is the creation of a different area in which the (actor of an) organisation meets his relationship while both fulfilling a different role as it probably has on the other platforms where they interact (if they already did). The degree of investment an organisation is willing to make is assumed to be reducible from an organisation its centrality. The theory of reciprocity states that for a good functioning cooperative goal oriented network, organisations have to be interdependent. The more central an organisation is, the more it is depending on others and the others depend on the organisation. Central organisations are more interested in investing in maintaining this interdependence as it has more of it. Thus the organisations are more interested and inclined to maintain the conditions of reciprocity in their network; being able to reach each other, interdependence, multi-layered relationships and future perspective. As these organisations are more invested in providing the conditions for success, it is expected that these organisations themselves have more success because of their stronger reciprocal behaviour. Which in turn might make them

interesting and wanted partners for a collaborative reciprocal relationship. Important is that future perspective, addressed in the fourth hypothesis is not something that will be tested in the research reported in this thesis. Yet it is assumed that when evidence is found for the other three hypotheses, this must be under influence of the future perspective organisations have on their relationships that form the network. When no evidence is found for the first three hypotheses, an increase of future relationships based on the strength of the other three conditions for reciprocity cannot be advocated. At best, the condition future perspective stays the same while the other conditions are not affected. Also the density of Stagematching 2012-2013 and Stagematching 2014-2015 is analysed because it influences potential outcomes concerning Hypothesis 1. On the one side a result of a more dense structure of the network would imply that smaller organisations within the network benefit from the second digital communication platform Moodle, i.e. the condition of 'being able to reach each other' would then be strengthened. On the other side, a result of a less dense structure could imply that not smaller but larger organisations benefit from the second digital communication platform Moodle and possibly exclude smaller organisations (for example because they have more human capital, more to lose once invested in the network or(/and thus) more expectations concerning future perspective).

Hypotheses

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion into Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

H4. The higher the expectancy of future relationships, the higher the increase of success.
(Expectancy of future relationships increases the level of investment in the other three conditions, and the better established the other three conditions are, the higher the success is expected to be.)

These hypotheses will together explore and are aimed to answer the following:

Main research questions

1. What is the relationship between digital communication and the provision of internships?
2. Can the four conditions for reciprocal behaviour explain this relationship?

Summary of Chapter 4

Being able to reach each other concerns: the ability to understand each other, the geographical ability to contact each other, and the technical facility for contact. The new digital communication platform Moodle dictates to some extend the way of communicating. Still, some aspects are assumed to result in lower use of the digital communication and need to be taken into account: the difficulty of (actors of an) organisation with the new language, the different and more informal use of digital language, the lack of non-verbal physical communication, and the possible higher investment needed to get acquainted with the digital communication platform. The following hypothesis is formulated:

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

Interdependence describes the roles of the organisations in the network. The degree of organisations being interdependent depends on the roles of giving and receiving. The more switching of roles (of giving and taking e.g. information), the more interdependent two organisations are. The more an organisation has of both these type of relationships, the more interdependent its network is. The following hypothesis is formulated:

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

Multi-layered relationships concerns two forms: the overlapping of different contexts in which organisations meet in which the organisations has a different role per context, and the integration of the whole organisational structure in problem signalling and decision making through open communication and sharing responsibility, on inter- and intra-organisational level. Exclusiveness is an important aspect for organisations for the potential of becoming multi-layered. Expected is that organisations excluded from Moodle are less multi-layered, resulting in a lower increase of success. The following hypothesis is formulated:

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion into Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

Future perspective embodies three mechanisms: greater trust in a future relationship because of shared input and output, the more shared input and output means a higher the expectation of a future relationship, and more reciprocal relationships results in more expectancy of a shared future. These three mechanisms are positively influencing each other. A positive perception of future relationships positively affect the other three conditions of reciprocity and a robust establishment or increase in strength of the other three conditions positively affect future perspective, because it stimulates investment in the relationship. The following hypothesis is formulated:

H4. The higher the expectancy of future relationships, the higher the increase of success.
(Expectancy of future relationships increases the level of investment in the other three conditions, and the better established the other three conditions are, the higher the success is expected to be.)

It is assumed that status behaviour is absent and mutual trust and the four conditions are present. Expected is that the conditions reinforce themselves, this is even more enhanced when all organisations perceive a positive future relationship. It is expected that the organisation with the most reciprocal relationships is working the hardest on establishing more. Assumed is that Stagematching enhances all the conditions of cooperative reciprocal behaviour. It increases trust and decreases status and free-rider behaviour thru transparency. It increases being able to reach each other due to its digital and uniform nature. It increases multi-layered relationships because a separate virtual context is created in which it fulfils a different role than in other context, while relationships overlap these contexts. It increases the condition future perspective because the nature of the digital platform visualises the need and results of working together. Interdependence is assumed to stay the same. The only assumption that can be made is that the interdependence is more apparent. Another digital communication platform is an opportunity for an organisation to increase its future sustainability. Implying an organisation is inclined to make a greater effort in using a new type of communication. Inclusion provides more possibilities in creating or enhancing multi-layered relationships. The relationships are easier to establish/maintain and the digital communication platform is the creation of a different area in which the (actor of an) organisation meets his relationship while both fulfilling a different role than it has on the other platforms (i.e. expanding its multi-layered relationships). The extent of investment an organisation is willing to make is assumed to be reducible from an organisation its centrality. The more central an organisation is, the more it is depending on others and the others depend on the organisation. These organisations are expected to be more interested and inclined to maintain the four conditions of reciprocity in their network. As these organisations are more invested in providing the conditions for success, it is expected that these organisations themselves have more success because of their stronger reciprocal behaviour. Which in turn might make them interesting and wanted partners for a collaborative reciprocal relationship. Expected is that the more central an organisation is, the higher its increase of centrality will be after the empowerment of the implementation of Moodle on the four conditions of reciprocity. Assumed is that when significant evidence is found for Hypothesis 1 to 3, this must be under influence of the future perspective organisations have on their relationships that form the network, or the increasing effect the validation of the other three conditions will have on future perspective. The hypotheses will together explore and are aimed to answer the main research questions:

1. What is the relationship between digital communication and the provision of internships?
2. Can the four conditions for reciprocal behaviour explain this relationship?

5 Data and Methodology

5.1 Data

This research looks at two different moments in time in order to uncover a direction (if present) in the relationship between the two digital platforms Stagematching and Moodle, to identify causality. For analysis, raw data from Stagematching and Moodle is extracted, for the school years 2012-2013 and 2014-2015. The reason why these years were chosen is because an analysis timeframe was needed in which it would be possible to compare a situation when Moodle was not existing and a situation when Moodle was in use. Moodle was introduced early in 2014, so the school year of 2014-2015 was the first in which it was running during this whole period. To make sure that network influencing factors like composition were as minimal as possible, a comparing period as close as possible to the implementation of Moodle was chosen, which is 2012-2013 (a year later would incorporate about six months in which Moodle was introduced and thus not a suitable period of comparison).

As stated, Stagematching is a database website designed to match supply and demand regarding internships in the healthcare sector. Stagematching is in use for a period of at least sixteen years (before 2000). Moodle is a platform designed as a forum for communication between cooperating organisations in education and healthcare, also providing as a platform for exchanging information and documents. As also mentioned, for both websites access is provided by NetwerkZON by giving (actors of an) organisation accounts to enter the platforms. Not all the network partners and/or involved individuals that include an organisation have received an account to enter these platforms. NetwerkZON qualifies organisations and individuals as members of these platforms based on their contribution to and the necessity of their involvement in business that is discussed and treated at the concerning platforms.

The two digital platforms are built very differently, this means they provided two different types of data-sets. Besides the differences in composition of the websites, the (actors of) organisations are classified differently on the websites. In Stagematching the organisations are classified by location of the organisation, this implies there are no labelled or known individuals included in the possible interactions. In most cases one or maybe a few individuals act on behalf of a location, the location by its very nature include more than one individual. This person that might act on behalf of a location or organisation on Stagematching does not have to be the individual that is also communication on Moodle, this could very well be a completely different person. Moodle classifies individuals that are involved in the network, first of all by organisation, secondly by role (mentor, teacher, guest, etc.). Unfortunately, the roles are not registered for every actor. And for those who are registered, this has not been done according a uniform procedure which resulted in too many different ambiguous labels. Therefore, analysis on the level of the role of involved individuals was discarded and an organisational level network-analysis was chosen.

The differences in classification of organisations and locations of organisations was recoded into comparable groups for Stagematching and Moodle. In Appendix A a list of involved organisations is included, in which the organisations are displayed in three groups: (1) 35 organisations only involved in Moodle, (2) 38 organisations only involved in Stagematching, and (3) 38 organisations involved in both Moodle and Stagematching. Important on this matter was to decide whether it was necessary to trace to what extent the actor of Stagematching is involved in and/or informed about the activities on Moodle. Again, as well as with the number of individuals of an organisation that are involved in either websites, decided was to assume an uniform organisational involvement exceeding the individual preferences when they were active at either website as this was an activity as their professional role - a member of the concerning organisation that is working on individual and organisational transcending goals and interests, as is also explained in the theoretical framework in the section about interdependence (section 4.3.2). Besides, tracing back which individuals represent the concerning organisation in Stagematching would be too time consuming for this particular research.

The data is delivered by the software designer Rovecom, commissioned by NetwerkZON. An important element that was reviewed before working with the data, concerned anonymity of the actors. The data base behind the websites had never been used for a comparable purpose and contained personal information of individuals involved with the organisations. For the research reported in this thesis every individual is anonymised towards only the concerning organisation as label. For Stagematching this means an aggregation of divisions of a certain organisation that offer an internship. For Moodle an organisation stands for the aggregation of the individuals from this organisation that are invited to this platform. So for Moodle, if a certain organisation has for example five members acting on Moodle, these individuals are all seen as the same organisation, and each action of an individual is counted for as an action of the concerning organisation. Their actions together is the aggregated action of the organisation. Concerning both the transformed data sets, it is invisible which particular individual performed a particular action. This aggregation limits the in-depth understanding. There is no possibility to analyse for example to what extend the involvement of different levels of the organisation influences the results. But it is assumed that this is not a problem for the research questions of this thesis. Here we aim to uncover whether there is an effect of Moodle. More in-depth analysis would be fitting in future research, as will be discussed in the conclusion and recommendations.

After extraction of the data from Stagematching and Moodle, the data needed to be transformed to a set usable for UCINET (UCINET is a social network analysis program by Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2002), as will be described in more detail in section 5.3). Both sets needed to become useable to produce statistics, as well as matrix format sets for performing permutation tests, and ultimately running QAP regressions (MR-QAP) and logistic regressions (tests and analysis is more extensive discussed in section 5.3). The conversion of the datasets from online database format

to UCINET was performed by the advisor, Christian Steglich, and turned out to be a major time consuming component of the research reported in this thesis. As already noted on Moodle, also within Stagematching multiple organisations turned out to be registered slightly different, or in some cases got a different name. For this reason one organisation consists out of multiple organisations of 2012-2013, because in 2014-2015 these organisations merged. To keep this comparable between the two timeframes, these organisations are combined to one organisation. It concerns the organisations Treant, which is a merge of the organisations Zorggroep Leveste Emmen, Zorggroep Middenveld Drenthe Hoogeveen, and Refaja Ziekenhuis Stadskanaal.

After recoding the two types of datasets it was possible to perform analysis and research on whether there is proof for an effect of Moodle on the success of number of internships matched on Stagematching.

5.2 Operationalization

5.2.1 Dependent variable

Success

Success is measured as the number of internships facilitated through the Stagematching network, which is different from the meaning of success used by NetwerkZON: “sufficient good internships”. Sufficiency and whether an internship is good, cannot be tested with the current data. Also it is assumed that the internships are correctly monitored by the SBB and besides, whether the internships are or aren’t good is not of our direct concern. Also, sufficiency is not of concern of the research reported in this thesis. Here, the question concerns whether there is an increase due to adding a digital communication platform to the existing platforms of communication.

The type of internship is not differentiated and thus cannot be used as a control variable. The duration defines the weight of an internship. Every internship as counted stands for three months. If an internship would last half a year, six months, this internship is counted for as if it were two. The reason for this weighing is that we are looking for investment behaviour, reciprocity. A longer internship means a longer investment in both the relationship two organisations have and the common goal they aspire.

Stagematching 2014-2015

For the analysis with UCINET the data from Stagematching in the school year 2014-2015 is the dependent variable. This data represents the number of internships a school matches with an organisation. A match is what is perceived as an interaction between two organisations in the network on the digital communication platform Stagematching. This variable is the operationalisation of success.

Existence of interaction

Interaction on Stagematching is binary. For this website, the fact that an organisation or school is registered, means it is available for matching internships. Interaction on Stagematching means, an organisation and a school are matched for an internship.

Frequency of interaction

An organisation could offer more than one internship, which is more often the case than not. So do the schools, they all offer more than one intern. The more matched internships between a school and an organisation, the higher the weight of the interaction of this link.

5.2.2 Independent variable

Moodle

Interaction on Moodle involves actual registered posts/action (more than just browsing through the website). Unfortunately de data did not include uploading or downloading documents as a registered action. Neither did it contain the duration of an actor being present on the digital communication platform Moodle. Therefore inclusion in the platform was used for the analysis of the effect of Moodle on success in Stagematching 2014-2015 performing multiple regressions. For the centrality analysis (H2) the possibility of communication through Moodle was used also. The data matrix was transformed to a binary (0-1) matrix, where 0 means that the concerning organisation had no access to Moodle but was involved with Stagematching and 1 means that the concerning organisation had access to Moodle and was involved with Stagematching.

5.2.3 Control variable

Stagematching 2012-2013

Stagematching 2012-2013 is the control variable. It enables both to control for a direction and for the validity of the effect of Moodle on Stagematching 2014-2015 (by running analysis to test the influence of Moodle on Stagematching 2012-2013).

5.3 Method

For this type of data and the analysis we wanted to perform, it was not possible to use regression analysis in a program like SPSS. On the one hand, SPSS correlates vectors with individual-level variables. The available type of data requires a regression of matrices containing social relationships. Also, procedures in SPSS assume independence of observations. Our data set consists by design of interdependent observations. Therefore, we rely on permutation based tests, using UCINET only. UCINET is a social network analysis program by Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet 6 for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies is the version used for analysis of the research reported in this thesis. UCINET, together with several additional tools like NetDraw, is a software program that makes it possible to analyse -among many things- centrality, subgroups, equivalence and network structure, and perform many various statistical analysis and visualisation of analysis. UCINET allows to analyse data that is not

independent or a sample from a normal distribution, like the data used in the research reported in this thesis. The data does not contain a random selected sample that is representative of a population, a change in one relation potentially influences (all) other relations (Borgatti, S.P., Everett, M.G. and Johnson, J.C., 2013, p.127-133).

Using the permutation tests the data was analysed with the QAP correlation technique and the multiple QAP regression technique (MR-QAP). QAP technique correlates two matrices and compares the correlation in the two matrices with the correlations obtained in a given number of permutations of the network organisations, here this number was set to 5.000 and 10.000. The test counts the proportion of correlations that are stronger than the correlation of the two unpermuted matrices of the research among these 5.000 or 10.000 independent permuted data sets. Like other analytical techniques, a *p*-value of less than five percent is considered to be significant, and this indicates that the hypothesis stating the matrices are related is supported. QAP regression allows the use of a dyadic dependent variable and multiple independent variables. The R-square value is of high importance here, it reveals the extent to which the dependent variable is explained by the one or more used independent variables.

Because for some analysis binary outcome variables are analysed, in these cases logistic QAP regression (LR-QAP) was used. In this case the coefficient does indicate that out of for example 1000 cases, what is tested occurs more per 1 change. The coefficient indicates a greater-than chance change (when significant).

The valued data has been transformed into binary data to assure the interpretation of results, in the cases where otherwise valued data would be compared to or analysed with binary data. All values greater than 0 were transformed into 1 (and 0 stayed 0). The same analysis has been run with dichotomization of values greater than 2 into 1 and values greater than 5 into 1 (with in both cases 0 staying 0). This way we attempted to reveal to what extent the results were robust.

Summary of Chapter 5

Stagematching is a database website designed to match supply and demand regarding internships in the healthcare sector, running for at least sixteen years. Moodle is a platform designed resembling a forum for communication and for exchanging information, implemented in 2014. Not all organisations have received an account to enter these platforms. NetwerkZON qualifies actors/organisations by means of the expected contribution. For analysis, raw data from Stagematching and Moodle is extracted, for the scholastic years 2012-2013 and 2014-2015 (half a year before and half a year after implementation of Moodle). Besides the differences in composition of the websites and its data, the actors and organisations are classified differently in the websites. This dictated an organisational level network-analysis. There are three groups involved in analysis: (1) 35 organisations only involved in Moodle, (2) 38 organisations only involved in Stagematching, and (3) 38 organisations involved in both Moodle and Stagematching. For the research reported in this thesis every individual is anonymised towards only the concerning organisation as label. For Stagematching this means an aggregation of divisions of a certain organisation that offer an internship. For Moodle an organisation stands for the aggregation of the individuals from this organisation that are invited to this platform. So for Moodle, if a certain organisation has for example five members acting on Moodle, these individuals are all seen as the same organisation, and each action of an individual is counted for as an action of the concerning organisation. After extraction of the data it needed to be transformed to a set usable for UCINET, to produce statistics, matrix format sets for permutation tests, and ultimately QAP regressions and logistic regressions. In the research reported in this thesis the dependent variable was Stagematching 2014-2015 and the independent variable was Moodle, with Stagematching 2012-2013 as a control variable. The effect of Moodle on success in Stagematching 2014-2015, compared to Stagematching 2012-2013, shows the difference in success affected by Moodle. Increase in success is meant as more matched internships by a labour market demand side organisation (e.g. a hospital). Every three months of matched internship is counted as one success. Inclusion of organisations in Moodle was used for the analysis of the effect on success of Moodle on Stagematching 2014-2015. For the centrality analysis the possibility of communication through Moodle was used also. The data requires regression of matrices containing social relationships, of interdependent observations. Therefore, we rely on permutation based tests, using UCINET only. Using permutation tests the data was analysed with the QAP correlation technique and the multiple QAP regression technique. For some analysis binary variables are used. For these results it has to be taken into account that the regression is ordinary, thus creates no odds. To capture this, a logistic QAP regression must be performed.

PART III - OUTCOME

6 Analysis & result

The order of the analysis and presentation of the results will slightly deviate from the order of the formulated hypotheses. Instead of starting with hypothesis 1, followed by hypothesis 2 and hypothesis 3, hypothesis 1 will be addressed last. This order follows the logic of the various analysis that run after one another.

Hypothesis 2

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

The first analysis was done to obtain the density of the network. The density of the network is a characterization of the network in terms of overall ties existing in the network. It gives a result that states the proportion of ties, as part of all the ties possible in the network. This is done with a density analysis, which is a test of cohesion in UCINET. This analysis is performed on the two different digital communication platform datasets: (1) Stagematching 2012-2013 and (2) Stagematching 2014-2015.

The second analysis is performed to obtain the centrality of organisations in the network. It concerns the organisations that are involved with Stagematching, both included and excluded from Moodle. This also provide the datasets to use for the analysis for hypothesis 3. In UCINET the Freeman Degree Centrality method is used for this analysis for the two separate datasets of Stagematching. The dataset of Moodle concerns the organisations that were registered (i.e. granted access, the dataset does not provide actual interaction numbers).

Table 1. Density and centrality in Stagematching 2012-2013 and Stagematching 2014-2015

	Stagematching 2012-2013	Stagematching 2014-2015
Density	1.297	1.279
Average centrality*	16,506	14,946

* For centrality per organisation see Appendix C test 2 a and b.

Hypothesis 3

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion into Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

The analysis performed to test hypothesis 3 consists of several tests. First of all a t-test (one- and two-sided) is performed in order to compare with the results that were found concerning centrality in the previous section. It concerns internship demand being met, meaning the results will show (no) evidence for the effect of matching internships of healthcare organisations that are and are not included in Moodle.

The One-Tailed T-Test shows that there is high significant evidence for the number of internship positions in the organisation that were filled in 2014-2015 being bigger than in 2012-2013 on Stagematching. Stagematching 2012-2013 > 2014-2015: 1,000 and group 2014-2015 > 2012-2013: <0,001, with a mean difference of 76,941.

Also a node level regression is done in order to uncover the effect of Moodle on Stagematching 2014-2015. In this node level regression, the result should be the same to the (one-sided) t-test result. After this another test is performed in which Stagematching 2012-2013 is added to the analysis and thus both Stagematching 2012-2013 and Moodle are the independent variables. This test is also a node level regression. This is done to see to what extent the effect of Moodle, obtained in the first node level analysis, is still attributed to Moodle.

The node level regressions of Stagematching 2014-2015 and Moodle show that when a regression is performed with only participation in Moodle as independent variable, Moodle has a high significance of p <0,001, but when Stagematching 2012-2013 is added to the regression analysis, Moodle is no longer significant, and a positive and extremely high significant effect is found for the effect of Stagematching 2012-2013 on Stagematching 2014-2015 ($p = 5{,}8^{-0041}$).

TABLE 2. NODE LEVEL REGRESSION - MOODLE AND STAGEMATCHING 2012-2013 VS. STAGEMATCHING 2014-2015

		p		*P*
Moodle	76,941	<0,001*	-1,217	0,834
Stagematching 2012-2013			0,991	$5{,}8^{-0041}$*

* Significant

Following is the test with Stagematching 2012-2013 as dependent variable. This is practically impossible because Moodle did not exist at this time, but the analysis is to ensure that a perceived effect of Moodle is not actually an effect by Stagematching 2012-2013. If this test shows a positive and significant result, interpretations of these tests (with Moodle as independent variable, and Moodle and Stagematching 2012-2013 as independent variables) should be made with caution.

The node level regression with Stagematching 2012-2013 as dependent variable and Moodle as independent variable shows an effect of 78,884 with a high significance of p < 0,001 (F = 18,201)

Finally, the difference in centrality between Stagematching 2012-2013 and Stagematching 2014-2015 as independent variable is analysed with a node level regression and Moodle as dependent variable, to test whether this difference in degree of centrality is ascribed to Moodle. This is a multiple regression analysis on only the organisations that are included in both digital communication network platforms. The analysis aims to uncover the influence of Moodle on success in Stagematching 2014-2015, and Stagematching 2012-2013 is included in the analysis as a control variable (again to ensure effects of Moodle can actually be ascribed to Moodle. This analysis is performed through a multiple QAP regression via Double Dekker semi-partialling. Here the Moodle dataset concerns the size of the organisations by aggregating individuals into one organisation. So Moodle is also represented in a weighted/valued matrix dataset.

The node level regression done to analyse the effect of Moodle on difference in centrality between Stagematching 2012-2013 and Stagematching 2014-2015 is - 1,943 and is not significant (p = 0,721; F = 0,129). In this analysis the schools (the educational healthcare programs) are excluded.

Hypothesis 1

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

To make sure the results done for the third hypothesis (the multiple regression on only organisations included in both digital platforms of the) are justifiable, three logistic regression analyses are performed using dichotomized datasets of Stagematching used for the fourth analysis. In these datasets the values are transformed into binary data (only 0 and 1). For the first test every value bigger than 0 is transformed to 1, for the second test every value bigger than 2 is transformed to 1 and in the third test every value bigger than 5 is transformed to 1. This dichotomisation is done using Boolean Combination in UCINET, and the three tests following are executed using a logistic QAP regression. This is done to find out whether the effect of Moodle on Stagematching is dependent on strong ties or weak ties between organisations. The strength of a tie of an organisation is determined by the amount of interns that are placed at the organisation simultaneously.

This analysis will also possibly provide evidence for the 1st hypothesis because the more prominent (i.e. larger in offering internships) an organisation is in Stagematching the stronger the effect is expected to be:

R^2 of Moodle and Stagematching 2012-2013 explaining the success in Stagematching 2014-2015 is found to be 0,914. The effect of only Moodle is 0,624; with a significance of P=0,041. This is a positive significant effect of Moodle on Stagematching 2014-2015. The effect of Stagematching 2012-2013 as independent variable is 0,953; with a significance level of P<0,001. This is a positive and

highly significant effect of Stagematching 2012-2013 as independent variable on Stagematching 2014-2015 as dependent variable.

The results of the analysis with the dichotomized datasets are shown in Table 3. When the datasets of Stagematching are transformed into any Stagematching data value higher than zero as one ($x > 0 = 1$), the effect of Stagematching 2012-2013 is 9,011 and highly significant ($p = 0{,}001$), and the effect of Moodle is 1,117 but not significant ($p = 0{,}194$). When the datasets of Stagematching are dichotomized with the command of higher than two is one ($x > 2 = 1$) the effect of Stagematching decreases (-1,625) but is still highly significant (7,386; $p < 0{,}001$). The same trend is noticeable among the effect of Moodle: the effect size decreases, but the effect goes from not significant to significant ($p = 0{,}029$). When the datasets are dichotomized to $x > 5 = 1$, this the effect of Stagematching slightly decreases further and stays as significant (7,228; $p < 0{,}001$). The effect of Moodle increases compared to the previous dichotomization to 1,196 with a very high significance of $p < 0{,}001$. The highest effect, with also the highest significance of Moodle is found with a Boolean Combination of $x > 5 = 1$, in this analysis the effect of Stagematching 2012-2013 is at its lowest (while still high).

TABLE 3. EFFECT OF STAGEMATCHING 2012-2013 AND MOODLE VS. STAGEMATCHING 2014-2015 WITH BINARY DATA

			Boolean Combination			
	$x > 0 = 1$	*p*	$x > 2 = 1$	*p*	$x > 5 = 1$	*P*
Stagematching 2012-2013	9,011	0,001*	7,386	<0,001*	7,228	<0,001*
Moodle	1,117	0,194	0,910	0,029*	1,196	<0,001*

* Significant

Finally, an analysis is performed to uncover the correlation of change in success due to implementation of Moodle, between Stagematching 2012-2013 and Stagematching 2014-2015 with a dataset containing the difference values. This analysis is performed only on the organisations included in both digital communication platforms. Again a multiple QAP regression via Double Dekker semi-partialling is used.

Found is that the R^2 of Moodle and Stagematching 2012-2013 for Stagematching 2014-2015 is 0,010.

The effect of Moodle is 0,847; with a significance of P=0,018. This shows a positive significant effect of Moodle on the difference between Stagematching 2012-2013 and Stagematching 2014-2015.

Summary of Chapter 6

Hypothesis 2

The fist analysis, is to obtain the density of the network. This analysis is performed on the two different digital communication platform datasets: (1) Stagematching 2012-2013 and (2) Stagematching 2014-2015. The second analysis is performed to obtain the centrality of organisations. These analysis are performed to provide evidence for the 2nd hypothesis:

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

Hypothesis 3

First of all a t-test is performed in order to compare with the results of analysis for Hypothesis 2. Second, a node level regression in order to uncover the effect of Moodle on Stagematching 2014-2015 is done. Third, a node level regression in which Stagematching 2012-2013 is added to the analysis besides Moodle as an independent variables to see to what extent the effect is attributed to Moodle. Finally, the difference in centrality between Stagematching 2012-2013 and Stagematching 2014-2015 is analysed with a node level regression, to test whether this difference in degree of centrality can be ascribed to Moodle, with a QAP regression via Double Dekker semi-partialling on only the organisations that are included in both digital communication network platforms. These analysis are performed to provide evidence for the 3rd hypothesis:

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion into Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

Hypothesis 1

Three logistic regression analyses are performed using dichotomized datasets of Stagematching. In these datasets the values are transformed into binary data (only 0 and 1): >0 = 1, > 2 = 1, and > 5 = 1 using Boolean Combination and testing with logistic QAP regression. Finally, analysis is performed to uncover the correlation of change in success due to implementation of Moodle, between Stagematching 2012-2013 and Stagematching 2014-2015 with a dataset containing the difference values, on the organisations included in both digital communication platforms with multiple QAP regression via Double Dekker semi-partialling. These analysis are performed to provide evidence for the 1st hypothesis:

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

7 Discussion of results

The results of the research reported in this thesis, give answer to the hypotheses that were drawn. Together the hypotheses provide in the answer of the two main research questions of this thesis. And the results will contribute to the field of research addressing the less explored combination of reciprocal behaviour in cooperative goal oriented networks and digital communication platforms.

Main research questions

1. What is the relationship between digital communication and the provision of internships?
2. Can the four conditions for reciprocal behaviour explain this relationship?

Hypotheses

H1. Larger organisations have more capacity to invest in another digital communication platform (Moodle), and thus are expected to experience a higher increase in success after implementation of Moodle than smaller organisations.

H2. Organisations with more interdependent relationships are more committed to the network, and are thus expected to experience a higher increase in success.
(Organisations with more interdependent relationships are assumed to be more central, and become more central indicating an increase of interdependence.)

H3. Organisations included in Moodle experience a higher increase in success than organisations excluded from Moodle.
(Inclusion of Moodle provides organisations with more possibilities of multi-layered relationships than organisations that are excluded from Moodle.)

H4. The higher the expectancy of future relationships, the higher the increase of success.
(Expectancy of future relationships increases the level of investment in the other three conditions, and the better established the other three conditions are, the higher the success is expected to be.)

The first result, which is not formally hypothesised, is as interesting as the results that will follow. This concerns the results of the density analysis. The second dataset of Stagematching shows an overall less dense network. This does not agree with behaviour that could be expected for smaller organisations referring to the first condition for reciprocity, being able to reach each other. One of the possibilities mentioned in Chapter 2 (and discussed in more detail in Appendix B) was that the complementary digital communication platform Moodle could increase the ability to reach each other because of newly made ties by smaller organisations through this less costly (no travel expenses and time) way of communicating. The result enhances the statements about confirmation of Hypothesis 1; it suggests that especially larger organisations benefit from a complementary communication platform. Whether this is because of larger human capital or more expectations concerning future perspective stays undetermined.

In- and exclusion and centrality

It was argued that organisations that are more invested in maintaining and improving their reciprocal relationships with their partners in the network of NetwerkZON, would benefit from being included in another digital communication platform and show more success on the Stagematching platform. The results show that this cannot be significantly confirmed when analysing the difference in organisations involved in both digital network platforms and all those in Stagematching (involved and not involved in Moodle).

The node-level analysis shows there is a correlation between Stagematching 2014-2015 and Moodle. But when controlling for Stagematching 2012-2013 it shows that Moodle has no longer a significant part in explaining the increase of success (P = 0,834). This result is substantiated by the analysis of difference in degree, showing that Moodle does not explain the difference in centrality of organisations between 2012-2013 and 2014-2015 (P = 0,721). When changing de dependent variable into Stagematching 2012-2013 a comparable result is obtained as with the dependent variable Stagematching 2014-2015 (2014-2015: 76,941; P < 0,001 vs. 2012-2013:78,884; P < 0,001). Any explanatory share that Moodle statistically has on Stagematching 2012-2013 is practically impossible, Moodle was not yet implemented at this time. Yet, it does show that there is a correlation that has to be explained a different way. The increase of success in Stagematching could have something to do with the ability of organisations to be selected for Moodle (registered access), or the other way around. A possible explanation for this would then be that Moodle is a selection of organisations that are more invested (in terms of numbers of accepted interns) in the network of NetwerkZON. Most of the organisations that are selected for Moodle are organisations that are not only involved in internships but also in the ins and outs of the management of the organisation. As stated, the organisations that are more involved in the network, are on average also more involved and committed to maintaining and/or increasing reciprocal behaviour and collaboration in the network. This would than imply that these organisations are more reciprocal concerning the four conditions of reciprocal behaviour (Zuidersma, J., 2012). This possible explanation implies that not the difference in being able to participate on a complementary digital communication platform is what makes the difference in success, but the reason of being invited to such a platform is to be the explanation of possible beneficial effects on success. Based on node level analysis for Hypothesis 3, no compelling evidence was found. Also for Hypothesis 2 the results are inconclusive, based on node level analysis. When using more informative tests, these results could be more detailed and possibly provide (significant) evidence.

Size of organisations and involvement

The results show that when analysing the organisations involved only in both digital network platforms in the years 2012-2013 and 2014-2015 with a multiple QAP regression, there is a significant correlation between the increase of success and the involvement in the digital network platform Moodle. The first analysis investigates the datasets without dichotomizing the values in the matrices.

The amount of matched internships is absolute. When transforming the Stagematching datasets into binary variables (to see whether the results show to what extent the effect of Moodle relies on strong versus weak ties between organisations) it seems this significance of Moodle disappears. But when the weighing for the dichotomization is increased ($x > 2$ and $x > 5$) the correlation becomes significant, and increasingly so. Also the effect of this significant result becomes larger. This result confirms the expectation of Hypothesis 1: larger organisations become more successful. The larger organisations that are more involved in terms of accepting more interns, benefit more from the implementation of a complementary network platform (Moodle). This result is substantiated by the regression analysis results on the difference between the two years of Stagematching. Which show that every new opportunity of hiring an intern an organisation has increases for 0,847 of matching in the second timeframe of analysis, with a significance level of P = 0,018.

The results do not only confirm that involved organisations become more successful due to the implementation of a new digital communication platform. The results also show that the higher the involvement, the higher the effect is of a complementary digital communication platform. This also confirms the expectation of Hypothesis 1 stating that larger organisations are more likely to become more successful due to Moodle than smaller organisations. This could be caused by their expected higher opportunity of selection for Moodle. The assumption for this reasoning is that larger organisations have a stronger voice in influencing government and policy in favour of the network of NetwerkZON, as they represent a larger aspect of the (health)market and they have a greater potential in terms of (human) resources. The other way around is just as interesting: The network of NetwerkZON has to agree upon the organisational direction it takes. The larger the organisation involved in the decision making process (which occurs in physical network platform encounters and Moodle, but not on Stagematching) the larger the share of the network that is involved with the decisions made it embodies. This involvement is likely to improve understanding of decision making, which is favourable for acceptance and positive recognition of the organisational chosen path (i.e. the chosen policy) in achieving and maintaining their organisational level transcending goal. This result is strengthened by the fact that density has not increased, and thus the complementary digital communication platform is not (solely) used to create new relationships, but at least also functions as a restorative for the condition being able to reach each other.

Future perspective

The fourth hypothesis was, as stated, not directly testable. The data can provide no evidence for this expectation. But the results of the first three hypotheses are believed to indicate that future perspective is only increased slightly, if at all. This is derived from the line of reasoning that if for all hypotheses significant evidence would be found, all the conditions for reciprocal behaviour would be strengthened, but if for none significant evidence would be found, future perspective would have stayed the same or decreased. As no significant evidence is found for two hypotheses and for one there

is, without clear proof a cautious interpretation of possible contribution to the condition for reciprocity future perspective is worth mentioning, but no evidence is provided.

SUMMARIZED

There is no evidence for Hypothesis 2 referring to the condition of interdependence, expecting a higher increase in success for organisations that are more central. This hypothesis was not tested among only the organisations both in Stagematching and Moodle.

Analysis shows there is no significant evidence to support Hypothesis 3 concerning multi-layered relationships, that expected a positive difference in effect of Moodle for organisations that were involved with Moodle opposed to those who were not involved with Moodle. On itself, Moodle seems not to be an impulse for this condition for reciprocity.

For Hypothesis 1 significant evidence is found concerning the condition being able to reach each other, supporting that the more internships are matched between two organisations that are both involved in the two digital communication platforms Stagematching and Moodle, the bigger the contributing effect on success of Moodle is and the stronger this effect is. As discussed in Chapter 2, this might have to do with learning to work with and on the new complementary digital communication platform.

ANSWER TO THE RESEARCH QUESTIONS

1. What is the relationship between digital communication and the provision of internships?
2. Can the four conditions for reciprocal behaviour explain this relationship?

The results show that there is a correlation between digital network communication on Moodle and success. The results suggest a ‘the rich get richer’ effect, where the more successful organisations (those who already have a higher amount of matches) experience the highest increase in success due to the introduction of the complementary digital network platform Moodle. The results suggest to support the statement that was given: the organisations that are less interesting in terms of successfulness are not selected for Moodle, selection within selection appears to take place. This would also explain why there was no significant evidence in difference between included and excluded organisations from Moodle. The analysis that used Moodle as independent variable and Stagematching 2012-2013 as dependent variable substantiates this conclusion, because the selection for Moodle is based on how successful -and with this, potentially interesting for Moodle- the organisations of Stagematching were. Within this selection of the successful, there is a significant difference. Larger organisations that are more involved in terms of accepting interns for their offered internships, seem to significantly increase this investment and involvement in the cooperative goal oriented network and increase their success the most after Moodle is implemented. The four conditions for reciprocity according to Zuidersma (2012), cannot all be applied for explaining the success found in the results in this thesis.

8 Conclusion and recommendations

A healthy healthcare labour market is the interest of NetwerkZON. The cooperative goal oriented network, with healthcare organisations, legislative institutions and healthcare educational institutions, aims to create an as effective as possible network in matching supply and demand in healthcare professionals. The basis of their network is the theory of reciprocal behaviour by Zuidersma (2012). Three of the four conditions of this theory (being able to reach each other, interdependence, multi-layered relationships) are addressed within an environment of trust and without status behaviour.

The organisations in the network work together to achieve an organisational level transcending goal that none could achieve without the others, while this is of benefit for all. The network works to achieve this goal by making organisations give and receive as much as possible; fulfilling different roles within the network; working together on multiple disciplines; working together with any and every layer of the organisations; and innovate as much as possible to be as decisive and dynamic as the network can be.

The research reported in this thesis aims to uncover whether their new complementary digital communication platform Moodle, contributes to this method and aim of NetwerkZON. Data concerning the success measured in matched internships, is obtained from their internship matching platform Stagematching. The data contains the scholastic years 2012-2013 and 2014-2015, a timeframe before and a timeframe after implementation of Moodle in 2014. Also data from Moodle is obtained. The data is used to test the increase in successfulness of organisations, where a higher increase for Moodle users, a higher increase for larger organisations, and a higher increase for more committed users in success was expected and hypothesised. The results of the research reported in this thesis show that inclusion and exclusion of Moodle does not determine the amount of success an organisation has. This result concerning multi-layered relationships can be explained by the selection for Moodle: this selection is now assumed to be based on successfulness of organisations through investment of the concerning organisations. The results suggest that more multi-layered organisations were selected for Moodle, which would mean Moodle could not have the effect that was hypothesised because the organisations are included in Moodle for this multi-layered character of the organisation already. Referring to Hypothesis 2, no significant evidence for centrality representing interdependence was found. Future perspective in the network depends on the establishment of the other conditions for reciprocity and therefor future perspective is believed to be slightly strengthened, due to the last condition for reciprocity to discuss:

Being able to reach each other is found to be significantly affected by the implementation of Moodle in 2014. This result is obtained by analysing the users included in Moodle. It appeared that larger organisations were more influenced by their inclusion of Moodle. The multiple QAP regressions on organisations involved only in both digital communication platforms show that the larger the organisation, the larger the effect of Moodle is. This confirms the assumption that the willingness and

ability to invest more in Moodle is restricted by size. Smaller organisations were expected to be less able to invest in a new digital communication platform, especially if it is not substitutional. A complementary digital communication platform, as Moodle is, asks proportionally more time investment from smaller organisations.

To fully understand the effects of the conditions for reciprocal behaviour in cooperative goal oriented networks, and especially in these networks also using digital communication platforms, much still needs to be investigated and uncovered. The results of this research show to some extent that the conditions for reciprocity are usable to explain success in a network structured according to the theory of reciprocity by Zuidersma (2012). But only one of the conditions is shown to be of significant effect in the research reported in this thesis. This could be due to many things, as the context is new and not yet marked out and determined. To reach more specific and clear results and conclusions, much more research needs to be done. This will also help in developing less restricted research designs, contexts and conditions. As for the research reported in this thesis, it was not feasible to take all possible, but unknown and concealed, influencing aspects into account.

One of the possible influences that is not included are the activities that took place at the physical platform. It is possible that certain activities could influence the results regarding the conditions both positively and negatively. This could be complemented by adding qualitative research methods to a quantitative research as the research reported in this thesis.

Another influence that could not be accounted for was the newness of the complementary digital communication platform Moodle. It was implemented only half a year in advance of the used data. This could imply that (actors of an) organisations were still getting used to using the platform, and thus results might be less significant and less effective than they will be when the organisations have become accustomed to Moodle.

There are a lot of additions to be made to the research reported in this thesis. It is a subject that is yet so little exposed, and many more variations can be made to explore the subject more in depth until the working mechanisms are established. The research reported in this thesis mainly aimed to uncover *if* digital network communication platform influences the success of a cooperative goal oriented network. The positive results encourage to further explore *why* a digital communication platform influences the success of a cooperative goal oriented network.

One of the ways this could be done is by using datasets that contain more detail, for example concerning the roles of individuals behind the organisations. This will look more into the individual contribution to the network outcome, and the results will contribute to a more complex explanation of why results come out the way they do.

Another addition to the research reported in this thesis concerns looking into investment and/or commitment of the organisations. It was beyond the boundaries of the scope of the research reported

in this thesis to look at this. For future research, size of an investment (in terms of the size of an organisation) could be determined by looking into the number of employees that participate in similar types of services as the intern is expected to attend. The number of interns divided by the amount of comparable employees would provide the relative investment/commitment. This would give a more accurate indication than the research reported in this thesis does.

Furthermore, many qualitative techniques could be used to thicken the understanding of the mechanisms, like interviews and discourse analysis of digital platform communication. It could provide different weighing to different types of communication (like replying to one another, initiating a discussion, sharing information and subtracting information) within the single digital communication platform, and could eventually differentiate in effect of activities within the digital communication platform. Also frequency and duration of attending the digital communication platform could be taken into account in these in-depth analyses. Qualitative methods could highlight the existence or reciprocal behaviour amongst organisations, justifying the conditions of reciprocal behaviour as mechanisms for success in cooperative goal oriented network organisations. This will create a broader and stronger base for the confirmation and establishment of the reciprocity mechanisms of Zuidersma and will provide more information for organisations to use digital communication platforms to reinforce communication in their networks.

Finally, recommended for future research is to look into effect of and behaviour on digital media concerning differences compared to physical communication platform behaviour. Anonymity could result in (actors of) organisations speaking up more frequent because they feel secure in their own office without a potential threat of a (verbal or even physical) fight. It could decrease the establishment of the all the conditions and trust. In the case of this thesis, the added variable of the two platforms being digital makes it more possible to have different outcomes regarding the four conditions. As already mentioned, the ability for different ways to contact and interact with different organisations makes it possible that organisations chose to change their channel through which they communicate. If the (actor of an) organisation uses a complementary or an additional digital communication platform as a substitutional digital communication platform, other (necessary) forms of communication are lost. Losing these encounters, the social structure of the network could change in any (positive or negative) direction. This also depends on an increase (or decrease) of anonymity that the (actor of an) organisation perceives due to this change. Furthermore, it is possible that the existence of another platform, where a different type of work is executed, changes the perception of commitment of involved organisations. This possibly concerns the perception of both an organisation its own commitment or involvement, and that of another organisation. For example, an organisation highly active on the physical communication platform, could potentially be less active on one or both of the digital communication platforms. This could be interpreted in many ways and due to these endless possibilities, it is potentially more eligible for misinterpretations than correct interpretations.

9 Acknowledgements

Doing the research reported in this thesis, and writing the thesis has been a challenge. The research reported in this thesis was performed on data obtained from a network that has an organisational structure I was not familiar with. While working in the network during my internship, the cooperative goal oriented network structure appealed to me. On the other hand it was a challenge to fully understand, because this context for reciprocity was completely new to me. Most things regarding this theoretical basis underlying the communication and collaboration seemed logical, or even natural. Yet, reciprocity as style for managing a network and collaboration within a network appeared to be a covert aspect of this, at first. But it turned out to be a very present and continuous aspect with a huge spectrum of possible mechanisms that for the conditions to function and affect the collaboration. Many of these are touched in the scarce available research performed on this topic, but probably more are still unknown to be of influence.

For understanding the theoretical aspect that is also the basis for this thesis, and of course the data used for analysis, I especially want to thank Jelly Zuidersma very much. Not only has she accepted me as a (research) intern and offered me the opportunity to use her theory, but she also voluntarily committed to the role as my theoretical advisor. Thanks to Jelly I was guaranteed of the understanding of the theoretical part of this thesis. Together with my advisor from the University of Groningen, Christian Steglich, we have been able to discuss NetwerkZON down to the last detail.

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An third and last, I specially want to thank my sister for reading and revising this thesis for editing in the last phase of completion. During the writing and editing I have read the report myself many times, and every time I did I was surprised by the time it took me to read through the concerning section (not to mention the whole thesis). Thank you very much for giving up your time to correct my spelling and grammar mistakes and pointing out what needed to be improved for understanding. This has been of great value, as it also offered me a fresh insight in how this thesis is read by others who have not been committed to the subject for a long time.

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GLOSSARY

Actor

A person, in this thesis most of the time acting on behalf of an organisation.

Additional digital communication platform

This platform would be additional when information is also distributed at the initial platform and attending the initial platform (here physical) is expected or mandatory. So at the additional platform this information can be obtained as well, but does not provide anything extra not obtained from the initial platform. The adding of this additional digital communication platform does not change anything about the function or nature of the initial (physical) platform.

Being able to reach each other

Being able to reach each other concerns three aspects. First of all organisations from a network need to be able to understand each other. Second, geographically people need to be able to get in contact with each other. And third, contact needs to be technically facilitated (Zuidersma, 2012, p. 46).

Complementary digital communication platform

A third variation is a platform type that is both additional and substitutional. In this case the digital communication platform does not exclusively provide the essential information (this is still also provided through other media), but is does provide a platform for communication on the subject that has not been or ever will be addressed other ways. Shown in example 4, it contributes in the understanding of the essential information, it complements the essential, initial form of communication.

Cooperative goal oriented network

This is a network in which three or more legally independent organisations work together to not only achieve their own goals but also pursue a collective goal. The creation of such a network can be part of the solution of a social dilemma, when uncoordinated individual decisions lead to suboptimal performance (Zuidersma, J., 2012, p.22-23)

Digital communication platform

A digital communication platform is a platform that enables communication through digital media. The two platforms Stagematching and Moodle are the two digital communication platforms of NetwerkZON. Three digital communication platforms are distinguished: Additional, complementary and substitutional digital communication platforms.

Four conditions for reciprocity

The four conditions for reciprocity, according to the theory of reciprocity of Zuidersma (2012), are: being able to reach each other, interdependence, multi-layered relationships and future perspective.

Future perspective

Future perspective refers to the perspective regarding the potential of a future relationship. Organisations have a greater trust in a future relationship when the expectations of the input and output of a collaboration increases, and thus when the density of the collaboration (the network structure) is higher. The more organisations expect to have shared problem solving (output) and shared benefits (income), the more reciprocal relationships an organisation will establish. And, organisations that have more reciprocal relationships expect a more shared future (Zuidersma, 2012, p. 47).

Interdependence

The third condition for reciprocity in cooperative goal oriented networks is interdependence. Interdependence is created when organisations in a network constantly change the nature of their role within the network. In one situation the organisation fulfils the role of giver, providing a product or knowledge. In another situation the organisation fulfils the role of receiver, receiving a product or knowledge. The more switching in roles, as well as with more partners to switch roles, the higher the interdependence will be, which results in more reciprocal behaviour (Zuidersma, 2012, p. 47).

Moodle

Moodle is a complementary digital communication platform. Moodle consists of documents and discussions that are also discussed and distributed during other encounters. But this does not concern all the discussions and distribution that occurs on Moodle. Many of these are only introduced or receive a basic discussion, which then is expected to continue in depth at the digital communication platform. Afterwards, outcomes (or other concluding actions) are discussed either also on Moodle or during contact on the physical platform.

Multi-layered relationship

Multi-layered relationships refers to the amount of layers an organisation has within its relationships. The idea of this condition is, when people meet someone else outside their initial context of contact they are more inclined to invest in the relationship. Another form of multi-layered relationships on network level is the contact that occurs on different levels between organisations.

Physical (network) platform

The first is a physical platform, this platform exists of interaction through in-person encounters. An example of an activity on this platform would be a meeting at which actors are physically present, e.g. informing partners, discussing results and progress. Of the three platforms, this platform provides the most room for discussion and evaluation of organisation. The semi-physical encounters, like having a conversation on the phone, communicating through work email, and comparable forms of communications that do not include communication through the other (second and third) communication platforms Stagematching or Moodle, are also included to this physical platform.

Stagematching

Stagematching is a substitutional digital communication platform. Stagematching is a digital communication platform that has completely changed the way in which the concerning information is handled. Before the existence of this platform, the matching that occurs on this platform was done in physical encounters and was manual work. Now, the form-like digital communication platform completely substitutes this, during no other encounter of at any other platform the matching of intern and organisations is arranged.

Status behaviour

Status behaviour is competitive behaviour between peers over rare goods. This type of behaviour undermines reciprocal relationships (Zuidersma, J., 2012, p. 24-27, p.33, p. 45).

Substitutional digital communication platform

A variation of type of digital communication platform is the substitutional digital communication platform. A digital communication platform could provide information or material that is also obtained from other, initial communication platforms, but participation of initial platform is not necessarily expected or mandatory. The way of obtaining information can be chosen. For commercial organisations the most costly information platform is likely to be disestablished. This form of an additional platform takes the shape of a substitutional communication platform. Example 3 illustrates how a substitutional platform could influence the decision in participating in the various existing platforms (physical and digital).

Success (here)

Success is the term used for the amount of matched internships on Stagematching. An increase in success is, in this thesis, shown by an increase of matched internships on Stagematching. A decrease in success is, in this thesis, shown by a decrease of matched internships on Stagematching

Sufficient good internships

NetwerkZON measures their organisational and network goals by means of success. Their definition of success is: sufficient good internships. An internship will be marked as GOOD when it fulfils the required level of intensity. This level of intensity is for the MBO educational health and care programs strictly preserved by an independent national review committee, the SBB (in our data still called 'Calibris'). For the HBO educational health and care programs this guidelines are still under development. This is developed by the HBO-committee, existing of representatives of the schools involved. Success in SUFFICIENCY means internships for every student of the educational health and care programs, excluding the freshmen (the educational MBO and HBO health and care programs don't have an internship in their first year). It is a network level aim to which the network adapts and creates solutions for to work towards achieving and maintaining its goals. It exceeds the individual goals of involved organisations in the network.

APPENDIX A - ORGANISATIONS

TABLE 4. LIST OF ORGANISATIONS

Only on **MOODLE** (35)		Only on **STAGEMATCHING** (38)		BOTH (38)	
9	Arlero Thuiszorg	6	Accare	1	AlfaCollege
16	Calibris	7	Accolade Zorggroep	2	DrentheCollege
26	De Zorgpartners	10	BCM Zorg en Dienstverlening	3	Hanzehogeschool
28	DZC Kraamzorg	11	Beter Thuis Wonen	4	MensoAlting
29	Eyescan	12	Bizim Zorg Hoogezand	5	Noorderpoort
31	Friesepoort	14	Burgemeester van Julsinghatehuis	8	Anthojo
32	FrieslandCollege	17	De Berkenhof	13	Blanckenborg
33	Gemeente Drenthe	20	De Noorderbrug	15	Buurtzorg Nederland
34	Gemeente Groningen	21	De PrinsHoeve	18	De Hoven
48	ISIS Kraamzorg	24	De Westerkim	19	De Kraamvogel
51	Kentalis	25	De Zijlen	22	De Stouwe
54	Kraamcentrum Assen	27	Dialysekliniek Noord	23	De Trans
56	Kraamzus	30	Familie H. Duipmans	36	GGZ Drenthe
58	Leveste Care	35	GGD Noord-Midden Drenthe	38	Het Groene Kruis
62	Menzis	37	Herbergier Gees	44	iCare
63	MHZ	39	Het Hooge Heem	47	Interzorg Noord Nederland
66	NetwerkZON	41	Hoeve Loevestein	49	Jannes van de Sleedenhuis
67	NHL Hoogeschool	42	Huize Wezup	57	Lentis
69	NL Projecten	43	Hyperbare Geneeskunde	59	Martini Ziekenhuis
70	Noorderboog	45	Ilmarinen	60	Meander
74	Open universiteit	50	Joling Thuiszorg	72	Ommelander
77	Rijksuniversiteit Groningen	61	MensEnZorg	73	Oosterlengte
78	Rovecom	64	Mytylschool Pr Johan Friso	76	Promens Care
81	Ssentia	65	Namaste	80	Saxenburgh
92	Van Boeijen	68	Nieuw Woelwijck	82	St. Franciscus
94	Visio	71	NOVO	84	t Gerack
100	WZC Beatrix	75	Oude en Nieuwe Land	85	Tangenborgh
103	ZLM Zorg	79	s Heeren Loo	89	Zorggroep Leveste Middenveld
104	ZMH	83	t Derkshoes	90	TSN Thuiszorg
106	Zorg Innovatie Forum	86	TDC/Wijk-Zorg	91	UMCG
107	Zorgbelang Drenthe	87	Thuiszorg Respect	93	Van Mesdag
112	ZorgCentrumZuidWestDrenthe	88	Thuiszorg/Hospice de Ommejas	96	VNN
116	Zorgplanet	97	Vredewold	99	Wilhelmina Ziekenhuis
117	ZorgPleinNoord	98	Westerholm/Rikkers-Lubbers	102	ZINN
118	Zorgzaak	108	Zorgboerderij de Berkenhoeve	105	Zonnehuisgroep Noord
		109	Zorgboerderij de Hooimijt	113	Zorggroep Drenthe
		110	Zorgboerderij Duinhoeve	114	Zorggroep Groningen
		111	Zorgboerderij Zie Zoo	115	Refaja

APPENDIX B - DIGITAL COMMUNICATION PLATFORMS

THREE POSSIBLE TYPES OF COMMUNICATION PLATFORMS IN A COOPERATIVE GOAL ORIENTED NETWORK

In this thesis, three types of digital communication platforms are identified. The additional digital communication platform, substitutional digital communication platform, and complementary digital communication platform. Available time, the size and other aspects of organisations have implications for interpretation of the results, because these characteristics affect decision making concerning the use of the digital communication platform(s). Which in turn affects an organisation its position in the network and their perception and contribution for themselves and their (potential) partners concerning the four conditions for reciprocal behaviour. This means: a small and a large organisation in otherwise same conditions will probably benefit to a very different extent giving/showing very different results in the research reported in this thesis.

ADDITIONAL DIGITAL COMMUNICATION PLATFORM

An additional digital communication platform refers to a digital platform where communication includes only information sharing that is additional to the information obtained through other communication platforms as for example the physical communication platform in a meeting. This could be the distribution of the agenda or afterwards its record. Another example would be when actors are asked to in advance choose their 'favourite' item of the agenda so the majority of the available time will be used to address the most popular items. Influencing the priorities of the agenda of a meeting can be beneficial, but when an actor/organisation does not participate, it will still obtain the information about the actual items of the meeting when present. A specific explanatory example for using an additional digital communication platform follows in Example 2.

EXAMPLE 2. ADDITIONAL DIGITAL COMMUNICATION PLATFORM

Imagine that using this additional channel costs eight hours a week and every employee that belongs to an organisation has 40 hours available to be productive for all the work that needs to be done. A small organisation consisting out of two employees together would have 80 hours in which these eight hours of additional network communication has to be accomplished. Using this extra channel will thus consume 10% of their collective time. It would cost every employee four hours to collectively finish the job. A large organisation consisting out of 200 employees on the other side would together have 8.000 hours in which these eight hours of additional network communication has to be accomplished. Using this extra channel will thus consume 0,001% of their collective time. It would cost every employee 2,4 minutes to collectively finish the job.

This platform would be additional when information is also distributed at the initial platform and attending the initial platform (here physical) is expected or mandatory. So at the additional platform this information can be obtained as well, but does not provide anything extra not obtained from the initial platform. The adding of this additional digital communication platform does not change anything about the function or nature of the initial (physical) platform.

This example is not representative of an actual situation. In reality not all employees participate in working on the digital communication platform. But it does resemble how much time is occupied or is passed on per not involved employee to an involved employee. The more employees, the more the work can be distributed among the organisation, and the less interfering it is assumed to be for the organisation. This example clearly illustrates why for a small organisation an additional communication platform could be perceived as more costly, and this organisation thus might be less inclined in using this additional channel of communication.

SUBSTITUTIONAL DIGITAL COMMUNICATION PLATFORM

The second type of digital communication platform is the substitutional digital communication platform. A digital communication platform could provide information or material that is also obtained from other, initial communication platforms, but participation of initial platform is not necessarily expected or mandatory. The way of obtaining information and communicating can be chosen. For commercial organisations the most costly information platform is likely to be disestablished in the long run. This form of an additional platform then takes the shape of a substitutional communication platform. Example 3 illustrates how a substitutional platform could influence the decision in participating in the various existing platforms (physical and digital).

EXAMPLE 3. SUBSTITUTIONAL DIGITAL COMMUNICATION PLATFORM

For example, imagine that an employee has to attend a meeting in which it will obtain a document, an informational bulletin on procedures that are handed out during this meeting. This meeting might then also be used to discuss the information the bulleting contains, to discuss the procedure or express expectations of the concerning procedure. For attending this meeting, organisations do not only invest time in attending, they also have to invest in the means of traveling and the time this consumes. In the previous example relative costs for smaller and larger organisations are discussed, this also applies to the extra time investment of actors for traveling. If for this reason, or others, the network decides to not organise a physical (face-to-face) meeting, but post the bulleting online and with it leave a forum open to discuss and express everything otherwise done in the physical meeting, the digital platform substitutes the physical meeting and eliminates (costly) time concerned with attending this physical meeting.

This substitutional digital communication platform potentially changes the function and the nature of the necessity of the initial (physical) platform.

This example shows a reason (especially for small organisations) to invest in (especially substitutional) digital communication channels, as it is a reverse situation of that discussed in example 2. The relative gained time, the benefit, is larger for smaller organisations than for bigger organisations.

COMPLEMENTARY DIGITAL COMMUNICATION PLATFORM

The third variation is a platform type has both additional as well as substitutional characteristics. In this case the digital communication platform does not exclusively provide the essential information (this is still also provided through other media), but is does provide a platform for communication on the subject that has not been or ever will be addressed other ways. Shown in example 4, it contributes in the understanding of the essential information, it complements the essential, initial form of communication.

EXAMPLE 4. COMPLEMENTARY DIGITAL COMMUNICATION PLATFORM

In this case an organisationwould have to invest in a physical meeting, but is not obliged to use the digital platform for the essential information. It has received the informational bulletin and has attended the discussion on the information, procedure and the expectations in the meeting in the initial (physical) platform. Yet after this meeting has finished, a report of the meeting is posted on the digital platform and a forum is created to subsequently discus not only concepts that have stayed unclear, but also things like progress when a procedure is implemented, and problems that emerge during implementation. An actor is not obliged to read this and participate in these discussions to implement the procedure, but it could do so if it feels it could benefit from it. The digital platform is the only source for this complementary information.

This complementary digital communication platform changes the function and nature of the extent of use of the initial (physical) platform.

This third example portrays a situation in which both smaller and larger organisations can benefit. Possibly, as with the substitutional digital communication platform, the smaller organisation might have a higher interest in this complementary platform, as it keeps a channel open for communication that is not mandatory. Larger organisations are assumed to have larger social capital; a larger network (formal and informal) that can be used for problem solving or understanding. The complementary platform provides a link for smaller organisations to increase their social capital through contact with the other organisations by means of another channel.

Appendix C - Outputs UCINET analysis

Test 1 - Density

Test 1a

	1 Avg Value	2 Total	3 Std Dev	4 Avg Wtd Degree
1 NEWTESTstages2012_13	1.297	7992	10.546	101.165

Test 1b

	1 Avg Value	2 Total	3 Std Dev	4 Avg Wtd Degree
1 NEWTESTstages2014_15	1.279	7880	10.784	99.747

Test 2 - Centrality

Test 2a

		1	2
		Degree	nDegree
1	AlfaCollege	858,000	11,000
2	DrentheCollege	1011,000	12,962
3	Hanzehogeschool	580,000	7,436
4	MensoAlting	191,000	2,449
5	Noorderpoort	1356,000	17,385
6	Accare	2,000	0,026
7	AccolaZorggroep	14,000	0,179
8	Anthojo	0,000	0,000
9	Arlero Thuiszorg	0,000	0,000
10	BCM Zorg en Dienstverleni	41,500	0,532
11	Berkenhof	10,000	0,128
12	Beter Thuis Wonen	0,000	0,000
13	Bizim Zorg Hoogezand	5,000	0,064
14	Blanckenborg	136,000	1,744
15	Burgemeester van Julsingh	12,000	0,154
16	Buurtzorg Nederland	14,000	0,179
17	Dialysekliniek Noord	3,000	0,038
18	Familie H. Duipmans	4,000	0,051
19	GGD Noord-Midden Drenthe	1,000	0,013
20	GGZ Drenthe	65,000	0,833
21	Herbergier Gees	4,000	0,051
22	Het Groene Kruis	0,000	0,000
23	Het Hooge Heem	14,500	0,186
24	Hoeve Loevestein	2,000	0,026
25	Hoven	204,500	2,622
26	Huize Wezup	2,000	0,026
27	Hyperbare Geneeskunde	1,000	0,013
28	iCare	260,000	3,333
29	Ilmarinen	16,000	0,205
30	Interzorg Noord Nederland	210,500	2,699
31	Jannes van Sleedenhuis	61,000	0,782
32	Joling Thuiszorg	2,000	0,026
33	Kraamvogel	0,000	0,000
34	Lentis	144,000	1,846
35	Martini Ziekenhuis	170,000	2,179

36	Meander	140,000	1,795
37	MensEnZorg	5,000	0,064
38	Mytylschool Pr Johan Fris	4,000	0,051
39	Namaste	2,000	0,026
40	Nieuw Woelwijck	11,000	0,141
41	Noorderboog	54,000	0,692
42	Noorderbrug	10,500	0,135
43	NOVO	8,500	0,109
44	Ommelander	148,000	1,897
45	Oosterlengte	218,000	2,795
46	Ouen Nieuwe Land	4,000	0,051
47	PrinsHoeve	0,000	0,000
48	Promens Care	5,000	0,064
49	s Heeren Loo	8,000	0,103
50	Saxenburgh	113,500	1,455
51	St. Franciscus	11,500	0,147
52	Stouwe	11,000	0,141
53	t Derkshoes	12,000	0,154
54	t Gerack	41,000	0,526
55	Tangenborgh	216,000	2,769
56	TDC/Wijk-Zorg	0,000	0,000
57	Thuiszorg Respect	0,000	0,000
58	Thuiszorg/Hospice Ommejas	3,000	0,038
59	Trans	77,000	0,987
60	Treant	435,000	5,577
61	TRUE	4,000	0,051
62	UMCG	171,000	2,192
63	Van Mesdag	2,000	0,026
64	Visio	64,000	0,821
65	VNN	21,000	0,269
66	Vredewold	25,500	0,327
67	Westerholm/Rikkers-Lubber	16,000	0,205
68	Westerkim	33,000	0,423
69	Wilhelmina Ziekenhuis	68,000	0,872
70	Zijlen	36,000	0,462
71	ZINN	183,000	2,346
72	Zonnehuisgroep Noord	293,500	3,763
73	Zorgboerderij Berkenhoeve	0,000	0,000
74	Zorgboerderij Duinhoeve	2,000	0,026
75	Zorgboerderij Hooimijt	0,000	0,000
76	Zorgboerderij Zie Zoo	2,000	0,026
77	Zorggroep Drenthe	72,500	0,929
78	Zorggroep Groningen	63,500	0,814
79	Zorgpartners	2,000	0,026

Test 2b

		1 Degree	2 nDegree
1	AlfaCollege	794,000	10,179
2	DrentheCollege	1236,000	15,846
3	Hanzehogeschool	643,000	8,244
4	MensoAlting	129,000	1,654
5	Noorderpoort	1138,000	14,590
6	Accare	2,000	0,026
7	AccolaZorggroep	18,000	0,231
8	Anthojo	0,000	0,000
9	Arlero Thuiszorg	0,000	0,000
10	BCM Zorg en Dienstverleni	35,500	0,455
11	Berkenhof	18,000	0,231
12	Beter Thuis Wonen	7,000	0,090
13	Bizim Zorg Hoogezand	5,000	0,064
14	Blanckenborg	100,000	1,282
15	Burgemeester van Julsingh	12,000	0,154
16	Buurtzorg Nederland	39,500	0,506
17	Dialysekliniek Noord	3,000	0,038
18	Familie H. Duipmans	1,000	0,013
19	GGD Noord-Midden Drenthe	2,000	0,026
20	GGZ Drenthe	76,000	0,974
21	Herbergier Gees	3,000	0,038
22	Het Groene Kruis	0,000	0,000
23	Het Hooge Heem	10,000	0,128
24	Hoeve Loevestein	2,000	0,026
25	Hoven	111,000	1,423
26	Huize Wezup	3,000	0,038
27	Hyperbare Geneeskunde	2,000	0,026
28	iCare	304,500	3,904
29	Ilmarinen	19,000	0,244
30	Interzorg Noord Nederland	219,000	2,808
31	Jannes van Sleedenhuis	80,000	1,026
32	Joling Thuiszorg	2,000	0,026
33	Kraamvogel	0,000	0,000
34	Lentis	145,000	1,859
35	Martini Ziekenhuis	160,000	2,051

36	Meander	229,000	2,936
37	MensEnZorg	9,500	0,122
38	Mytylschool Pr Johan Fris	4,000	0,051
39	Namaste	3,000	0,038
40	Nieuw Woelwijck	13,000	0,167
41	Noorderboog	54,000	0,692
42	Noorderbrug	14,000	0,179
43	NOVO	4,000	0,051
44	Ommelander	145,000	1,859
45	Oosterlengte	164,000	2,103
46	Ouen Nieuwe Land	4,000	0,051
47	PrinsHoeve	4,000	0,051
48	Promens Care	5,000	0,064
49	s Heeren Loo	8,000	0,103
50	Saxenburgh	109,500	1,404
51	St. Franciscus	9,500	0,122
52	Stouwe	11,000	0,141
53	t Derkshoes	4,000	0,051
54	t Gerack	18,000	0,231
55	Tangenborgh	235,000	3,013
56	TDC/Wijk-Zorg	2,000	0,026
57	Thuiszorg Respect	0,000	0,000
58	Thuiszorg/Hospice Ommejas	7,000	0,090
59	Trans	80,000	1,026
60	Treant	493,000	6,321
61	TRUE	0,000	0,000
62	UMCG	178,000	2,282
63	Van Mesdag	14,000	0,179
64	Visio	53,000	0,679
65	VNN	16,000	0,205
66	Vredewold	15,000	0,192
67	Westerholm/Rikkers-Lubber	15,000	0,192
68	Westerkim	37,000	0,474
69	Wilhelmina Ziekenhuis	50,000	0,641
70	Zijlen	34,000	0,436
71	ZINN	175,000	2,244
72	Zonnehuisgroep Noord	210,500	2,699
73	Zorgboerderij Berkenhoeve	2,000	0,026
74	Zorgboerderij Duinhoeve	2,000	0,026
75	Zorgboerderij Hooimijt	6,000	0,077
76	Zorgboerderij Zie Zoo	3,000	0,038
77	Zorggroep Drenthe	73,000	0,936
78	Zorggroep Groningen	47,500	0,609
79	Zorgpartners	0,000	0,000

Test 3 – Effect of Moodle on difference in Stagematching (1)

Test 3c

T-test

```
TOOLS>STATISTICS>T-TEST
--------------------------------------------------------------------------------

Dependent variable:                    "NEWTESTstages2014_15-deg - aanbieder only" col 1
Independent variable:                  "NEWTESTMoodlenet - aanbieder bij afnemer only" col 1
# of permutations:                     10000
Random seed:                           27218


Basic statistics on each group.

                          1          2
                    Group 1    Group 2
                 ---------- ----------
    1       Mean      24.130    101.071
    2    Std Dev      73.400     86.501
    3        Sum    1110.000   2830.000
    4   Variance    5387.625   7482.441
    5        SSQ  274615.500 495540.500
    6      MCSSQ  247830.719 209508.359
    7   Euc Norm     524.038    703.946
    8    Minimum       0.000      0.000
    9    Maximum     493.000    304.500
   10   N of Obs      46.000     28.000
   11  N Missing      28.000     46.000


SIGNIFICANCE TESTS

     Difference        ...One-Tailed Tests...      Two-Tailed
       in Means    Group 1 > 2    Group 2 > 1           Test
 ============== ============== ============== ==============
        -76.941          1.000          0.000         0.0001
```

Test 3b

With Moodle, but without 2012-2013 as independent variable

```
NODE LEVEL REGRESSION
------------------------------------------------------------------------------

Method:                                 Classical
# of permutations:                     10000
Random seed:                            32767
Dependent variable:                     NEWTESTstages2014_15-deg - aanbieder only

p-values are 2-tailed

Overall Regression Fit Statistics (p-value for F is classical test)

                   Value
                  ------
             Nobs     74
        R-Square  0.184
    Adj R-square  0.173
          F(0,0) 16.222
        Prob > F  0.000


Regression coefficients.

                      1      2      3      4
                   Coef     SE      T  c.Sig
                 ------ ------ ------ ------
    1   Intercept 24.130 11.751  2.053  0.044
    2 AlfaCollege 76.941 19.103  4.028  0.000

2 rows, 4 columns, 1 levels.
```

Test 3a

With Moodle and 2012-2013 as independent variables

```
NODE LEVEL REGRESSION
--------------------------------------------------------------------------------

Method:                                 Classical
# of permutations:                     10000
Random seed:                            32767
Dependent variable:                     NEWTESTstages2014_15-deg - aanbieder only

Overall Regression Fit Statistics (p-value for F is classical test)

                    Value
                  -------
             Nobs      74
        R-Square   0.934
    Adj R-square   0.933
          F(0,0) 505.991
        Prob > F       0


Regression coefficients.

                      1       2       3       4
                   Coef      SE       T   c.Sig
                 ------- ------- ------- -------
    1   Intercept   0.200   3.457   0.058   0.954
    2 AlfaCollege  -1.217   6.103  -0.199   0.843
    3      Degree   0.991   0.035  28.511  5.8E-0041

3 rows, 4 columns, 1 levels.
```

Test 3d

Regression with 2012-2013 as dependent variable

```
NODE LEVEL REGRESSION
------------------------------------------------------------------------------

Method:                                 Classical
# of permutations:                     10000
Random seed:                            32767
Dependent variable:                     NEWTESTstages2012_13-deg - aanbieder only

p-values are 2-tailed

Overall Regression Fit Statistics (p-value for F is classical test)

                   Value
                  ------
              Nobs     74
         R-Square  0.202
     Adj R-square  0.191
           F(0,0) 18.201
         Prob > F  0.000


Regression coefficients.

                      1      2      3      4
                   Coef     SE      T  c.Sig
                 ------ ------ ------ ------
    1   Intercept 24.152 11.374  2.124  0.037
    2 AlfaCollege 78.884 18.490  4.266  0.000

2 rows, 4 columns, 1 levels.
```

Test 3e

Difference in degree as dependent variable

```
NODE LEVEL REGRESSION
------------------------------------------------------------------------------

Method:                                 Classical
# of permutations:                      10000
Random seed:                            32767
Dependent variable:                     degree_verschil

p-values are 2-tailed

Overall Regression Fit Statistics (p-value for F is classical test)

                    Value
                  -------
              Nobs      74
         R-Square   0.002
      Adj R-square  -0.012
           F(0,0)   0.129
         Prob > F   0.721


Regression coefficients.

                      1      2      3      4
                   Coef     SE      T  c.Sig
                 ------ ------ ------ ------
    1   Intercept -0.022  3.332 -0.007  0.995
    2 AlfaCollege -1.943  5.417 -0.359  0.721

2 rows, 4 columns, 1 levels.
```

Test 4 – Effect of Moodle on Stagematching

MULTIPLE REGRESSION QAP VIA DOUBLE DEKKER SEMI-PARTIALLING
Dependent variable: FORTESTstages2014_15
Independent variables: FORTESTMoodlenet; FORTESTstages2012_13

MODEL FIT

	R-Square	Adj R-Sqr	P-Value	Obs	Perms
Model	0,91356	0,91340	0,00020	1056,00000	5000,00000

REGRESSION COEFFICIENTS

	Un-Stdized	Stdized Coef	P-value	As Large	As Small	Std Err
FORTESTMoodlenet	0,62362	0,02286	0,04079	0,04079	0,95941	0,37576
FORTESTstages2012_13	0,95334	0,95104	0,00020	0,00020	1,00000	0,04831
Intercept	0,12550	0,00000	0,00000	0,00000	0,00000	0,00000

Test 5 – Effect of Moodle on Stagematching; Boolean Combo

Test 5a

QAP LOGISTIC REGRESSION
Dependent variable: BooleanCombo 2014
Independent viariables: FORTESTMoodle; BooleanCombo 2012

Dependent variable: : BooleanCombo 2014

Overall fit of the logistic regression model

	1 LL	2 R-Sqr	3 Sig	4 Obs	5 Perms
1 Statistics:	-45,458	0,934	0,000	1056	5000

1 rows, 5 columns, 1 levels.

LR Coefficients & Permutation Results (T-stats used in permutations)

		1 Coef	2 OddsRat	3 T	4 Sig	5 Avg	6 Min	7 Max	8 SD	9 P(ge)	10 P(le)	11 Perms
1	Intercept	-6,142	0,002	-8,500								5000
2	BooleanCombo 2012	9,011	8191,478	11,221	0,001	0,014	-2,583	9,011	0,562	0,001	1,000	5000
3	FORTESTMoodlenet	1,117	3,056	1,368	0,194	-0,110	-6,180	1,117	0,689	0,194	0,806	5000

Test 5b

QAP LOGISTIC REGRESSION
Dependent variable: BooleanCombo 2014_2
Independent variables: FORTESTMoodle; BooleanCombo 2012_2
BooleanCombo: 1: >2

Dependent variable: : BooleanCombo 2014_2

Overall fit of the logistic regression model

	1 LL	2 R-Sqr	3 Sig	4 Obs	5 Perms
1 Statistics:	-85,593	0,872	0,000	1056	5000

1 rows, 5 columns, 1 levels.

LR Coefficients & Permutation Results (T-stats used in permutations)

		1 Coef	2 OddsRat	3 T	4 Sig	5 Avg	6 Min	7 Max	8 SD	9 P(ge)	10 P(le)	11 Perms
1	Intercept	-4,421	0,012	-14,439								5000
2	BooleanCombo 2012_2	7,386	1612,872	14,337	0,000	-0,005	-10,859	7,386	0,625	0,000	1	5000
3	FORTESTMoodlenet	0,910	2,483	3,069	0,029	-0,149	-6,256	0,910	0,835	0,029	0,971	5000

Test 5c

QAP LOGISTIC REGRESSION
Dependent variable: BooleanCombo 2014_5
Independent viariables: FORTESTMoodle; BooleanCombo 2012_5
BooleanCombo: 1: >5

Dependent variable: : BooleanCombo 2014_5

Overall fit of the logistic regression model

	1 LL	2 R-Sqr	3 Sig	4 Obs	5 Perms
1 Statistics:	-104,729	0,820	0,000	1056	5000

1 rows, 5 columns, 1 levels.

LR Coefficients & Permutation Results (T-stats used in permutations)

		1 Coef	2 OddsRat	3 T	4 Sig	5 Avg	6 Min	7 Max	8 SD	9 P(ge)	10 P(le)	11 Perms
1	Intercept	-4,032	0,018	-16,093								5000
2	BooleanCombo 2012_5	7,228	1377,983	12,759	0,000	-0,014	-9,041	7,228	0,656	0,000	1	5000
3	FORTESTMoodlenet	1,196	3,305	4,917	0,000	-0,199	-6,505	1,196	1,005	0,000	1	5000

Test 6 – Effect of Moodle on difference in Stagematching (2)

MULTIPLE REGRESSION QAP VIA DOUBLE DEKKER SEMI-PARTIALLING
Dependent variable: FORTESTstageverschil2014_15tov2012_13
Independent variable: FORTESTMoodlenet

MODEL FIT

	R-Square	Adj R-Sqr	P-Value	Obs	Perms
Model	0,01048	0,00954	0,01900	1056,00000	5000,00000

REGRESSION COEFFICIENTS

	Un-Stdized	Stdized Coef	P-value	As Large	As Small	Std Err
FORTESTMoodlenet	0,84722	0,10237	0,01840	0,01840	0,98180	0,37444
Intercept	-0,20044	0,00000	0,00000	0,00000	0,00000	0,00000

SUMMARY

The thesis *"Digital Reciprocity: A digital network-analysis of reciprocal behaviour in a cooperative goal oriented network"* is a report of the research performed at NetwerkZON. The thesis sheds light on only a tip of the iceberg, it addresses a new field of research concerning the combination of the fairly new field of reciprocity in organisations (instead of communities) and digital communication.

NetwerkZON addresses the issue of mismatch that continuous to exists in the healthcare professional labour market. The cooperative goal of NetwerkZON is to provide sufficient good internships for vocational (MBO) students in healthcare, to provide them with a (as high as possible) job guarantee and deliver healthcare organisations well trained and qualified healthcare professionals with as much experience as possible.

The theoretical background of this thesis in the behavioural theory of Zuidersma (2012): the theory of reciprocity. This theory states that besides the absence of status behaviour and presence of trust, four conditions are necessary to achieve and maintain a cooperative goal oriented network based on reciprocity. The four conditions are: (1) being able to reach each other, (2) interdependence, (3) multi-layered relationships and (4) future perspective. NetwerkZON is a network that cooperates based on these conditions. In 2014 NetwerkZON expanded their platforms by adding the complementary digital communication network Moodle (besides their existing physical communication platform and their substitutional digital communication network Stagematching).

The purpose of the research reported in the thesis was to uncover whether Moodle has a positive influence on their success in providing sufficient good internships and to what extent the four conditions for reciprocity can invoke the effect. Data from the two digital communication platforms was obtained to investigate this, from two academic years: (1) 2012-2013 and (2) 2014-2015. The timeframes make it possible to speak about direction of effect, because the first is a timeframe in which Moodle was not yet implemented, while during the last it was. Network analysis software UCINET was used to do logistic regression permutation tests on centrality, and multiple regressions on the valued matrices. The results show no significant differences between organisations that were involved in Moodle and organisations that were only involved in the other two platforms (physical and Stagematching).

Evidence was found that confirmed the expectations that more involved organisations in the network would possibly be more effected by Moodle, among organisations that were involved in Moodle. Results suggest this is explained by the selection within selection. Because the conditions for reciprocity need to be safeguarded, an inclusion of the network is a selection determined by the contribution of the organisation that wants to become partner of the network. A similar selection is made for Moodle. Only organisations that contribute to the content of the platform are invited and granted access by registration of an account. This also explains why there is no significant evidence found for difference in effect (i.e. success on Stagematching, representing the number of matched internships) between network partners that are and are not involved in Moodle.

Though not all hypotheses could be supported with significant evidence, results show effect for the condition of reciprocity, which seem to work within a digital communication component of a network.

SAMENVATTING

De scriptie *"Digital Reciprocity: A digital network-analysis of reciprocal behaviour in a cooperative goal oriented network*" is de rapportage van een onderzoek dat is uitgevoerd bij NetwerkZON. De scriptie belicht maar een klein deel van een heel nieuw onderzoeksgebied, betreffende de combinatie het relatief nieuwe onderzoeksgebied van wederkerigheid in organisaties (in plaats van in gemeenschappen) en digitale communicatie.

NetwerkZON houdt zich bezig met de (mis)match die bestaat tussen de zorgprofessionals en de betreffende arbeidsmarkt. Het coöperatieve doel van NetwerkZON is om voldoende goede stages te bieden voor leerlingen in de zorg op MBO-niveau, om een zo hoog mogelijke baangarantie te bieden en de zorgorganisatie een aanbod van zorgprofessionals te kunnen bieden die goed zijn opgeleid, zo veel mogelijk praktijkervaring hebben en gekwalificeerd zijn voor het werk.

De theoretische achtergrond voor de scriptie is de gedragstheorie van Zuidersma (2012): de wederkerigheidstheorie. Deze theorie stelt dat naast afwezigheid van statusgedrag en de aanwezigheid van vertrouwen, er vier condities nodig zijn om een coöperatief doel-georiënteerd netwerk gebaseerd op wederkerigheid kunt oprichten en in stand houden. De vier condities zijn: (1) bereikbaarheid, (2) onderlinge afhankelijkheid, (3) meerlagigheid en (4) toekomstperspectief. NetwerkZON is een netwerk dat samenwerkt op basis van deze condities. In 2014 heeft NetwerkZON haar platforms uitgebreid door het aanvullend digitaal communicatie platform Moodle op te richten (naast het bestaande fysieke communicatie platform en het vervangende digitale communicatie platform Stagematching).

Het doel van het onderzoek dat deze scriptie beschrijft is om te achterhalen of Moodle een positief effect heeft op het succes van NetwerkZON in het bieden van voldoende goede stages, en in hoeverre de vier condities voor wederkerigheid -als basis van NetwerkZON- een verklarende factor zijn. De gebruikte data is verkregen vanuit de twee digitale communicatie platformen, van twee schooljaren: (1) 2012-2013 en (2) 2014-2015. Het gebruiken van twee meetmomenten maakt het mogelijk de richting van een effect te onderzoeken, omdat in het eerste gebruikte schooljaar Moodle nog niet in gebruik was en in het tweede schooljaar wel. Voor het onderzoeken van de data is gebruik gemaakt van de netwerkanalyse software UCINET, om logistische regressies volgens permutatie toetsen op centraliteit uit te voeren en meervoudige regressies op matrixen uit te voeren op de geregistreerde contact waarden. De resultaten leverden geen significant resultaat op voor het verschil in effect op succes tussen organisaties die wel toegang hadden en die geen toegang hadden tot Moodle.

Er is significant bewijs gevonden die de verwachting lijkt te bevestigd dat meer betrokken en toegewijde organisaties die toegang hebben tot Moodle meer positief effect ondervinden van de oprichting van Moodle dan de zij die minder betrokken en toegewijd zijn. Dit wordt mogelijk verklaard door de selectie-in-de-selectie door NetwerkZON. Omdat de condities voor wederkerigheid gegarandeerd moeten blijven in het netwerk, worden alleen zij in het netwerk opgenomen die aan het netwerk kunnen bijdragen. Een vergelijkbare selectie wordt gemaakt uit deze groep voor het toelaten op Moodle. Alleen organisaties die bijdragen aan de inhoud van het platform worden uitgenodigd en toegelaten per registratie van een account. Dit verklaart mogelijk ook waarom er geen significant verschil is gevonden van effect op succes tussen organisaties die wel en die niet een account hebben bij Moodle.

De belangrijkste conclusie van het onderzoek dat deze scriptie trekt is dat de condities voor wederkerigheid ook van invloed zijn binnen een digitaal communicatie component van een netwerk.