MASTER'S THESIS

Co-evolutionary IS Alignment: Route to improving dynamic capabilities in the public sector?

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Award date:
2020

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Opleiding:	Open Universiteit, faculteit Management, Science & Technology
	Master opleiding Business Process Management & IT
Degree programme:	Open University of the Netherlands, Faculty of Management, Science & Technology
	Business Process Management & IT master's programme
Course:	IM0602 BPMIT Graduation Assignment Preparation
	IM9806 Business Process Management and IT Graduation Assignment
Student:	Bennaghmouch, Yassine
Identification number:	
Date:	June-2020
Thesis supervisor	Pien Walraven
Second reader	Rogier van de Wetering
Third assessor	not applicable
Version number:	1.0
Status:	Final version VAF

Abstract

Organizations in the public sector are large and have difficulties to adapt to changing environment filled with potentially conflicting views and demands. COISA focuses on simultaneous and continuous evolution in both IT- and business domain, and the interaction between these domains which could have an effect on reconfiguring internal and external competences to address rapidly changing environments, to reach the desired adaptiveness.

A theoretical framework is setup with three hypotheses. Firstly is hypothesized that Alignment competencies contributes positively to dynamic capabilities. Secondly is hypothesized that Interconnections between heterogeneous employees positively moderates the relation between alignment competencies and dynamic capabilities and final is hypothesized that Alignment motivation positively moderates the relation between alignment competencies and dynamic capabilities.

From the results, based on partial least squares path modelling (PLS-SEM) with a sample of 66 respondents with a position operating on the verge of Business and IT in the (semi-)public sector is proven that alignment competencies have a positive effect on the dynamic capabilities. Furthermore there is no significant evidence available to prove the hypothesis regarding the moderating effect, of alignment motivation and interconnections between heterogeneous employees, on the relation between alignment competencies and dynamic capabilities.

Key terms

Co-evolutionary IS alignment, Alignment competencies, Alignment motivation, interconnections between heterogeneous employees, Dynamic capabilities.

Summary

A diverse and ever-changing marketplace forces organizations to harness technology to improve their core competency and gain competitive advantage. Organizations invest large proportions of their budgets on IT, aiming to improve their overall performance. Despite these substantial investments, organizations in practice often fail to enhance organizational performance using IT. Lack of fit or alignment between business strategy and internal resources including IT gives rise to new challenges in addressing Business-IT alignment.

Organizations in the public sector, that are large and have difficulties to adapt to changing environment filled with potentially conflicting views and demands, face an extra challenge to reach a certain degree of BITA. COISA focuses on simultaneous and continuous evolution in both IT- and business domain, and the interaction between these domains which could have an effect on reconfiguring internal and external competences to address rapidly changing environments, to reach the desired adaptiveness.

The conclusion of this research are based in a literature review and a quantitative study. The literature review delivered three hypotheses: (H1) Alignment competencies contributes positively to dynamic capabilities, (H2) Interconnections between heterogeneous employees positively moderates the relation between alignment competencies and dynamic capabilities and (H3) Alignment motivation positively moderates the relation between alignment competencies and dynamic capabilities. On the basis of the literature review a theoretical framework is set up where a direct positive relation between Alignment competencies and dynamic capabilities is defined.

The theoretical framework is validated with a quantitative study. Data is collected through an online survey. The population consisted of employees that operated on the verge of Business and IT. Their organisation also had to operate within the (semi-) public sector. The data that is collected provides information about the effect of alignment competencies on dynamic capabilities. The data also provides information about the moderating effect of, interconnections between heterogeneous employees, and, alignment motivation, on the relation between alignment competencies on dynamic capabilities. Through partial least squares path modelling (PLS-SEM) an assessment is done of the reflective and formative measurement models.

From the results of the survey it is proven that alignment competencies have a positive effect on the dynamic capabilities.

The results of alignment motivation as a moderator have proven to be not significant, thus we cannot conclude the positive moderating effect of alignment motivation. The results of interconnections between heterogeneous employees as a moderator have proven to be not significant, thus we cannot conclude the positive moderating effect of interconnections between heterogeneous employees.

Contents

1. Introduction

1.1.   Background

In a diverse and ever-changing marketplace organizations are constantly seeking to harness technology to improve their core competency and gain competitive advantage. The agility of an organization to respond to changes in the competitive environment is highly dependent on its leverage on information technology (IT) (Peppard, 2010). While on the other side aligning IT strategy with business strategy has become a critical issue in most organizations (Adcock et al., 1993; Asato et al., 2009). Organizations invest large proportions of their budgets on IT, aiming to improve their overall performance. Despite these substantial investments, organizations in practice often fail to enhance organizational performance using IT (Walraven et al., 2018). This has been argued to be caused by the lack of fit or alignment between business strategy and internal resources including IT (Brynjolfsson & Hitt, 2000). This gives rise to new challenges in addressing Business-IT alignment (BITA).

1.2.   Exploration of the topic

BITA aims to apply IT in an appropriate and timely way, in harmony with business strategies, goals, and needs (Luftman & Kempaiah, 2007). Certain activities can assist in the achievement of BITA while others are clearly barriers. Achieving alignment is evolutionary and dynamic (Luftman, 2000). It requires strong support from senior management, good working relationships, strong leadership, appropriate prioritization, trust and effective communication, as well as a thorough understanding of the business environment (Luftman et al., 1999). These activities need to be aligned and cannot be seen as individual components. Walraven et al. (2018) model shows the interaction between the evolution of IT, strategies and enterprise architecture and the co-evolution of IS-alignment (COISA). Co-evolution of IS-alignment is hypothesized to be especially valuable for organizations in complex conditions which are tantamount in the public sector (Pang et al., 2014; Walraven et al., 2018; Walraven et al., 2019). Companies competing in dynamic environments are required to exhibit flexibility and agility (Smaczny, 2001; Tallon & Pinsonneault, 2011). This ability to integrate build and reconfigure internal and external competences to address rapidly changing environments is called dynamic capability by Teece et al. (1997). In contrast to operational abilities, dynamic capabilities are directed towards strategic change and aligning the organization with the environment (Zahra et al., 2006). Furthermore dynamic actors represent the active agents that implement changes in organization and IS, leading ultimately to alignment (Amarilli et al., 2017).

1.3.   Problem statement

Vander Elst and De Rynck (2014) research concludes that organizations in the public sector, that are large and have difficulties to adapt to changing environment filled with potentially

conflicting views and demands, face an extra challenge to reach a certain degree of BITA. Co-evolution of IS-alignment focuses on simultaneous and continuous evolution in both IT- and business domain, and the interaction between these domains which could have an effect on reconfiguring internal and external competences to address rapidly changing environments, to reach the desired adaptiveness.

Walraven et al. (2019) did some case studies to study COISA in the public sector and found that the model is suitable to demonstrate and visualize alignment process interactions during Electronic Medical Records (EMR) implementations and provides an insight into the interrelations between strategic and operational alignment and co-evolution between stakeholders. Unfortunately the research was only limited to three different hospitals. There is no further research about the application of COISA in the public sector and the effect on dynamic capabilities. Therefore further study is necessary to see if COISA is especially valuable for organizations in complex conditions in the public sector.

1.4.   Research objective and questions

The aim of is this research is to establish if COISA has an influence on internal and external competences of large complex organizations in the (semi-) public sector. If this influence results to be positive it could help organizations to address rapidly changing environments to reach the desired adaptiveness. The research will be done by studying the impact of COISA on the dynamic capabilities of such organizations.

Research question: What is the impact of COISA on the dynamic capabilities of complex organizations in the public sector?

1.5.   Main lines of approach

In the remainder of this paper we attempted to establish more knowledge on the subjects at hand to answer the main research question of this research by first specifying a conceptual model of Co-evolutionary IS alignment and its relation to dynamic capabilities based on relevant scientific literature. This relation would indicate that complex organizations in the (semi-) public sector should pay more attention to the mechanics behind Co-evolutionary IS alignment.

The needed empirical data for this study is collected by performing a quantitative study. This data will be used to analyse if there is a correlation between Co-evolutionary IS alignment and dynamic capabilities and thus indicate the nature of the relation. This relation could turn out to be a potential positive, negative, direct or moderating effect. The collection of the data is done by using an online survey. The platform that is used for the online survey is called LimeSurvey. LimeSurvey is an open source online survey tool. We used LimeSurvey because it was provided by the Open University in the context of GPDR-regulation.

The respondents of the online survey consist of stakeholders of organizations that operate within the (semi-) public sector in the Netherlands. Within their organization they had to operate on the verge of Business and IT.

Selection of the respondents was based of their job description ensuring they have enough experience on the topic in their organization. We searched for respondents on social platforms such as LinkedIn. We choose social platforms like LinkedIn because of the superior search function and an extensive database of professionals working in the (semi-)public sector in the Netherlands. Furthermore it also provided a possibility to search in the

already available LinkedIn network of the researchers to increase the possibility of response. To increase the probability of having the right respondents and be able to remove the respondents that do not meet the criteria, control questions were added to the online survey.

2. Theoretical framework

In this chapter the theoretical framework is set up. We will start by elaborating on the specific questions, which will help to find the right answer by using available literature. Then we will talk about the sources that are used. We will also talk about the use of queries in relation to the different sources to find the right literature. Then we will be elaborating on the progress of the literature review, like the amount of papers that have been found, how many papers have been reviewed and which papers deemed to be relevant and ended up being processed in the section of the results and conclusion. Afterwards the theoretical framework will be set out to answer the questions and the arguments from the literature that have led to these answers. Also the conclusions of the theoretical framework and the implications of these conclusions will be set out in this section. The chapter will be secluded with the objective we aim to achieve by carrying out this research.

2.1.   Research approach

For the development of the theoretical framework we used the paper of Walraven et al. (2018) as a starting point. The reason the paper of Walraven et al. (2018) is used as a starting point is because COISA is built of a structured literature review. A structured literature review is used to aggregate evidence that is relevant and related to one or more research questions (Romero Felizardo et al., 2016). In our research we also tend to find relevant evidence related to COISA, that is why we argue that it will provide enough references to apply the search methodology that is used in this research.

To find available literature to be able to develop the theoretical framework we used the *"forward snowballing"* method. The sources that complements the forward snowballing method, and we also used, is Google Scholar. First of all because Google Scholar has the possibilities to support this technique and secondly Google Scholar proves to be very voluminous and has an extensive database in comparison with the library of the Open University. The search for literature continued until no further relevant references could be found. Unfortunately we did not find enough references, that is why it was also decided to use the *"backward snowballing"* method. For the same reason as the forward snowballing method we used the paper of Walraven et al. (2018) as a starting point for the backward snowballing method. But unfortunately both snowballing methods proved to not deliver enough references to complete our theoretical framework. To be able to complete the framework we selected another method, the *"building block"* method. For this method we used another source, namely the database of the Open University library. The Open University library is favoured due to its superior search function like easier filtering of peer-reviewed studies to that of Google Scholar.

The following queries where used for additional relevant references.
- **Complexity science** (Title)
- **Dynamic capability** (Title) AND **Heterogeneity** (Title)
- **Dynamic capability** (Title) AND **Alignment** (Title)
- **Alignment** (Title) AND **Competitive advantage** (Title)

2.2.   Implementation

To find references for the theoretical framework first of all the collected papers were checked on title and abstract. Keywords like "Co-evolutionary is alignment", "Co-evolutionary alignment process", "dynamic capability", "IS alignment", "IT alignment", "Heterogeneity", "alignment motivation" where used as filter because these keywords were also used for the framework of the research by Walraven et al. (2018). This was the first segregation of literature.

The second segregation is done by studying the introduction and conclusion of the remainder of the papers. If after reading the introduction and conclusion the paper proved to be relevant then the paper would be read thoroughly.

According to Saunders et al. (2016) to determine the relevance of a paper questions should be raised about relevancy(does the paper meet your objectives/questions), sufficiency(recognisability of framework in the paper) and value(future guidance).

Furthermore all found relevant papers were logged in a literature matrix to create a clear overview of each paper which helps to spot differences and similarities more easily between articles for ease of search.

The collection of papers (basic papers included, which were provided by the Open University) resulted in 38 articles that were read thoroughly. From these 38 articles only 28 articles met the criteria of relevance, as discussed before, and thereby found relevant enough to be included. Some of these articles are used in the introduction of this paper while others are used for the development of the theoretical framework and the included conceptual model.

2.3.   Results and conclusions

Co-evolutionary IS alignment

'[…] IS alignment results when an organization's complex adaptive IS adapts to remain in alignment with the constantly-changing (and evolving) organization's goals" (Vessey & Ward, 2013, p. 283, p. 283). IS systems should thereby have a co-evolutionary approach where design is viewed as an ongoing process (Benbya & McKelvey, 2006). According to Benbya and McKelvey (2006) IS alignment is not an event but a process of continuous adaption of change. The factor continual change is critical and fundamental in the co-evolution of socio-technical systems (Benbya & McKelvey, 2006) . COSIA extends this notion by focusing on the co-evolutionary alignment activities (Walraven et al., 2018). "[…]top-down IS designs will always disappoint in the long term, as they do not allow internal complexity to evolve in line with the imposing resources, limitations, competitors, tensions, and complexity of their environments (Benbya & McKelvey, 2006, p. 16, p. 16). According to Luftman et al. (1999) to enable Business-IT alignment the organisation should focus on improving the relationship between the business and IT functional areas, working to mutual cooperation and participation in strategy development, maintaining executive support and prioritizing projects more effectively.

In this paper we will operationalize alignment competencies (or enablers as Luftman refers to them, because they are also helping to achieve alignment) at three slightly different levels, namely: operational, strategic and orchestrational. According to Walraven(2019, 03:15–05:21) the strategic alignment competency focuses on alignment on organizational

level where the operational alignment competency focuses on operational in business processes, working process, routines etc. and the orchestrational alignment competency, which is meant to ensure coherence between different IS, different processes, different roles and functions in the organization. We will use the following definition for alignment competencies: A firm's capacity to apply IT in an appropriate and timely way, in harmony with business strategies, goals and needs (Luftman et al., 1999). Although the competencies from Walraven are at different levels then Luftman they are aiming in the same direction. In the structured literature review that was conducted by Walraven et al. (2018) they identified that between and within the five alignment processes, co-evolution among business employees, IT employees and external actors takes place, in pursuit of alignment. The definition of COSIA that will be used in this research is "continuously exercised operational, orchestration and strategic alignment competencies characterized by co-evolution between different IS stakeholders in pursuit of Business-IT alignment (Walraven, 2019, 03:15–05:21)

Dynamic capabilities

According to Teece et al. (1997) the definition of dynamic capabilities is "the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments" (p. 516). For organisations to achieve a competitive advantage (in a dynamic environment) they will need to have or improve their dynamic capabilities. These capabilities are directed towards strategic change and the alignment of the organization with the environment (Wilden et al., 2013).

Many studies demonstrated a positive relation between alignment competencies and dynamic capabilities. The result from the survey that was done in the study of Yu-Yuan Hung et al. (2007) suggest that organizational alignment significantly and positively contributes to organizational dynamic capabilities. This result was also consistent with the result of Lee and Dale (1998) and Zairi (1997) that demonstrated that organizational alignment significantly and positively contributes to organizational dynamic capability. The aforementioned studies reveal that there is a positive relation between alignment competencies and dynamic capabilities, therefore we can establish the following hypothesis: **H1: Alignment competencies contributes positively to dynamic capabilities.**

The study on three different EMR implementations by Walraven et al. (2019) also underlines the importance of inclusion of different stakeholder groups in co-evolutionary processes. To have efficacious dynamics the inclusion of heterogeneous actors in co-evolutionary dynamics is theorized by Walraven et al. (2019) as a necessary component. According to Bridoux et al. (2017) a heterogeneous group that consists of both reciprocators and individualists has the potential to change a capability faster than either type of homogeneous groups which supports the evolutionary adequacy in a highly dynamic environment. Gonzalez and de Melo (2019) underline the importance of heterogeneous actors by stating "[…]organisations have difficulties in constructing an organisational context focused on learning and knowledge sharing, which supports dynamic capabilities due to a lack of cohesion among individuals" (p. 2). This is also underlined by Mackey et al. (2006) stating "all show that [….] and learning all collapse as the attributes of agents collapse from heterogeneous to homogeneous" (p. 9). According to Allen and Varga (2006) the capabilities of the overall system will result from the connected capabilities of the participating elements. In their work the system refers to an organization and the participating elements refer to the agents. In their work Allen and Varga (2006) compare an IS somehow as the infrastructure of the firm.

This infrastructure then allows the information to flow to and between the different agents within the organization. Allen and Varga (2006) considers that evolution is driven most strongly by individuals in the firm, whose IS co-evolves through their interaction with other agents. With the information that flows to the agents, the agent knows what is happening and has the information necessary for his criteria of decision so he can improve his behaviour accordingly for successful co-evolution.

The aforementioned studies reveal that interconnections between heterogeneous employees leads to efficacious dynamics. Therefore we can establish the following hypotheses:

H2: Interconnections between heterogeneous employees positively moderates the relation between alignment competencies and dynamic capabilities.

According to Gottschalg and Zollo (2017) motivation and behaviour in alignment processes can influence in a degree to which organizations are able to sustain a competitive advantage within a highly dynamic environments. Also according to Walraven et al. (2019) the motivation of human actors are at the fundament of COISA. This also supported in the findings of the studies of Amarilli et al. (2017) where he states *"Different initiatives aimed at innovating the IS failed mainly due to the inability of the CIO to create a common language with business managers and to face the scepticism of the end users"* (p. 10). Our third and last hypothesis is:

H3: Alignment motivation positively moderates the relation between alignment competencies and dynamic capabilities.

The result of this literature review has led to the conceptual model in Figure 1. The conceptual model in figure 1 also contains the aforementioned hypothesis in black. The model represents alignment competencies, alignment motivation and interconnections between heterogeneous employees as the different parts of Co-evolutionary IS alignment. Also in the model is shown that there is a direct relation between Alignment competencies and Dynamic capabilities. Alignment motivation and interconnections between heterogeneous employees are represent as moderators on the relation between Alignment competencies and Dynamic capabilities.
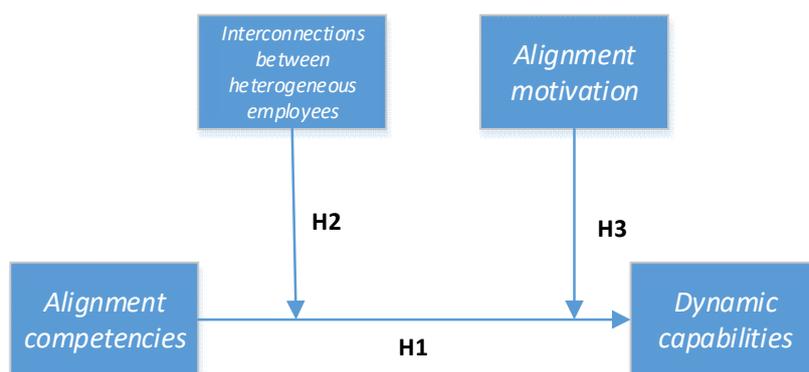
Figure 1: Conceptualization of Co-evolutionary IS alignment

2.4.   Objective of the follow-up research

The objective of this research is to deploy an online survey to find out whether Co-evolutionary IS alignment has a positive impact on the dynamic capabilities of organization that reside in the public sector, which has a rapidly changing environment, as resulted from the literature review. The target group in this research will consist of employees that operated on the verge of Business and IT. Their organisation has to operate within the (semi-) public sector in the Netherlands.

From a practical point of view this research could help organizations that reside in a rapidly changing environment to improve on their ability to integrate, build, and reconfigure internal and external competencies to be successful in these rapidly changing environments (Teece et al., 1997).

This research is within a research field that has not been explored much and thus needs follow-up research to develop furthermore.

From a theoretical point of view it will contribute to perceiving information systems as a socio-technical system and placing it in the context of the (semi-) public sector which has not been explored much. Furthermore the result of this research will also contribute quantitative evidence on the conceptualization of Co-evolutionary IS alignment, while in the present we only have qualitative evidence available.

3. Methodology

In this chapter we will explain the methodological approach. First we will start on elaborating on the approach of the conceptual design. Then we will be elaborating on the approach of the technical design which includes how the data will be collected. Afterwards we will elaborated on the approach of how the data will we analysed. We will end the chapter by elaborating on the measures taken to reach validity, reliability and ethical aspects.

3.1.   Conceptual design: select the research method(s)

The research question of this research is: **What is the impact of COISA on the dynamic capabilities of complex organizations in the public sector?**

There are different research philosophies that are accepted for answering research questions. Saunders et al. (2016) explains in his book about pragmatism, positivism, postmodernism, critical realism and interpretivism and stated that each philosophy has its own specific ontology, epistemology, axiology. For example the positivistic philosophy is focused on observing and measurable facts while the interpretive philosophy is focused on perceptions and interpretations (Saunders et al., 2016). For this research the positivist perspective is more suitable because the research is focused on measuring the influence of COISA on Dynamic capabilities and not on perceptions of the influence of COISA on Dynamic capabilities.

To answer the research question we designed three hypotheses in the theoretical framework. To test these three hypotheses we need to search for relations between variables. With an inductive research the aim is to develop a theory, but in our research we aim to find relations between the variables alignment competencies, interconnections between heterogeneous employees, alignment motivation and dynamic capabilities. Therefore a deductive research is more suitable.

In this research a quantitative approach is used to test the hypotheses, because according to Saunders et al. (2016) the advantage of a quantitative approach is that hypotheses can be tested. This methodology for the quantitative approach will be a survey. A survey is aimed at specific relationships between variables and is suitable for producing models of these relationships. With a survey it is possible to retain a lot of information from different sources. These sources will come from the network of the students that are participating in this research.

3.2.   Technical design: elaboration of the method

The variables of the relationships that are investigated in this research can be divided into dependent, independent and moderating variables. The independent variable in this research is the alignment competencies, the dependent variable is the dynamic capabilities and the moderating variables are the interconnections between heterogeneous employees and alignment motivation.

Survey

Like we state in the previous chapter, the gathering of the data will be done by an online survey. The survey will be distributed online, because this has some advantages (Sincero, 2012, consulted on 31 October 2019, https://explorable.com/online-surveys). First of all, ease of data gathering, automation in data input and handling, increase of response rates and minimal costs. Of course there are also a couple of challenges to an online survey. An example is the inability to reach challenging population. For reliability the population of our respondents will consist of organisations in the (semi-) public sector and they will all have access to the internet. Another challenge could be survey fraud. Our aims is to try to counter this by approaching each respondents separately and explaining the scope of our research and ask them if they would like to cooperate. Reliability is made possible by using close-ended questions in the survey.

The questions will be measured on a seven-point Likert-scale, anchored at 1='strongly disagree' to 7='strongly agree'. The respondents will answer all the questions with the same value so it will be easier to compare respondents and the use of a Likert-scale has the advantage that it is possible to measure what the relation is between two variables. Another example of a downside of an online survey is that the respondents could interpret questions of the survey in a different way. This could have as a result that questions could be misunderstood by the respondent or socially accepted answers could be given. To prevent this misunderstanding the questions about COISA have been validated in a Q-sort session during a pre-test. During this Q-sort session the participants were asked to link the questions to the concepts of COISA. These concepts are alignment motivation, interconnections between heterogeneous employees and alignment competencies. Alignment competencies were divided into three "sub concepts", namely orchestrational alignment competency, strategic alignment competency and operational alignment competency. The Q-sort session consisted of two validation parts. In the first part the questions were validated by some teachers from the Open University After this validation the necessary adjustments were made. In the second part the questions where validated by the students that are participating in the research. The question in the second parts were the adjusted questions that were the result of the first part.

Most studies focus on capabilities for (product) innovation that are specific to manufacturing firms (Hogan et al., 2011) but product innovation is different than service innovation *"because services are intangible, heterogeneous, non-stockable and co-produced with clients"* (Janssen et al., 2016, p2). Organisations that operate in the public sector usually provide services and not products. Because our research aims at organisations in the (semi-) public sector, service innovation is better suited to this research. Janssen et al. (2016) created a model of dynamic capabilities for service innovation. This models allows the identification of capabilities that are specific to service innovation and are general enough to be conceptually relevant for all types of firms. This model is used in our research because it was validated for quality by expert reviews and also pre-tested. Furthermore it allowed us to measure the aspects of dynamic capabilities, namely sensing user need, sensing (technological) options, conceptualizing, coproducing and orchestrating and scaling and stretching. In the online survey the respondents will also be asked to rate questions on a seven-point interval scale, anchored at 1='very strongly disagree' to 7='very strongly disagree.

Sample technique

According to Saunders et al. (2016) *"The sampling frame for any probability sample is a complete list of all the cases in the population from which your sample will be drawn"* (p. 277). The population for our research is not know that is why we will generalise non-probability samples about the population, furthermore the samplingm is done by self-selection. We publicised through socialvmedia the need for cases by asking the respondants to take part. We did this in two ways. Firsty we send all respondents we found a personal invitation and secondly we put up a general post on social media with an invitation for participation. The response of the respondants is used for data collection. We tried to promote this by explaining the scope of our research and hoped they agree by their feelings or opinion for the research question or stated objective.

Sample size

According to Saunders et al. (2016) for all non-probability sampling techniques there are no rules. For a general study Creswell (2013) suggests performing between 5 and 30 interviews.

Because we are going to use PLS-SEM for our data analysis, our minimum should be a 10 fold of the largest amount of structural paths according to Hair et al. (2017). In our model the largest amount is 6 structural paths for the construct Dynamic capabilities. This means we should have a minimum of $6*10 = 60$ samples.

Furthermore for a quantitative research normally a confidence interval of .95 is used, which is equal to a 95 percent level of certainty. In this research we also used a confidence interval of .95.

3.3.   Data analysis

To analyse the data we used the Partial least squares path modelling (PLS-SEM) method. (PLS-SEM) allows conducting complex analysis with multiple relations and variables. PLS-SEM is preferred over CB-SEM for prediction and explanation of targets constructs (Hair et al., 2017). Predication and explanation of target constructs is exactly what we will be performing in our quantitative study. The software we will be using for PLS-SEM is the Smart PLS software.

3.4.   Reflection w.r.t. validity, reliability and ethical aspects

The approach of respondents will be done as an external researcher. This research will be dependent of the goodwill and willingness of the approached respondent. The ethical principles used in the study, from Saunders et al. (2016) are:

Integrity and objectivity

The survey will be in English and will be clear and understandable. To increase reliability all the question will be on a Likert-scale. Each respondents will be approached separately. The scope of our research will be explained and we will ask them if they would like to cooperate. The respondents were also not paid or compensated in any way.

Respect and voluntary participation

The respondents will be treated with respect. No obligations will be assigned. Norms and values will be accounted for. Approached respondents will have the right to decline participation.

Privacy

All collected data will be treated as confidential. No personal information will be obligated to fill in the survey. The name of the organisation will be obligated to make sure that we do not have a duplicate data set. To be assured we complied with GDPR regulations we only made the questionnaire available to be filled in through hosting on Open University servers. The data only left specified European servers and in an anonymized form.

4. Data analysis

In this chapter we analysed the data we collected with the online survey. Then the three hypothesis that are formulated in the theoretical framework were tested. The analysis is performed with partial least squares path modelling (PLS-SEM) which allows conducting complex analysis with multiple relations and variables. The software that is used for PLS-SEM is the Smart PLS software.

4.1.   Data examination

In this section we started with the examination of the data. According to (Hair et al., 2017) the raw data should be checked for inconsistencies like missing values and irregularities like outliers.

Missing values
According to Hair et al. (2017) when the amount of missing data on a survey exceeds 15% the observation is removed from the data file. From all of the partially completed surveys all had more than 15% data missing, so all were removed from the data file.

Outliers
According to Hair et al. (2017) we should also check for outliers. Outliers are extreme responses to a particular question or an extreme response to all questions. In our survey we used a Liker-scale from 1 to 7 for measurement which made findings outliers very simple. We imported the raw data into EXCEL to analyse for outlier. We could not find any outliers after reviewing the raw data.

Minimal sample size
According to Hair et al. (2017) the minimum sample size should equal to the *"10-times rule"*. According to this rules the minimum sample size should be a tenfold of the largest amount of structural paths. In our model the largest amount is 6 structural paths for the construct Dynamic capabilities. This means we should have a minimum of *"six (structural paths)"* multiplied by *"10-time rule"* which dictates a minimum sample size of 60 samples. The online survey yielded 66 useable responses, which is above the minimum sample size. Because we only have 6 respondents more than the minimum of 60 respondents, it should be noted that the risk of type II errors increases. A type II error is also known as a false negative and occurs when a null hypothesis which is really false, fails to be rejected by a researcher. The researcher concludes that there is not a significant effect, when actually there really is a significant effect (Hair et al., 2019).

Respondents
The online survey yielded 161 responses, 71 complete responses and 90 partially completed. The scope of our research is aimed at various organisations in the (semi)-public sector. Unfortunately we received 5 responses from organisations outside the (semi)-public sector, so we had to delete them from the data file. We also had redundant response from 4 organisations but due to limited response rate we choose to keep them in the data file. Eventually we ended with 66 useful responses for the research. To have an overview of the representation of the respondents we divided them in to global groups. The grouping can be found in figure 2.

Respondents grouping
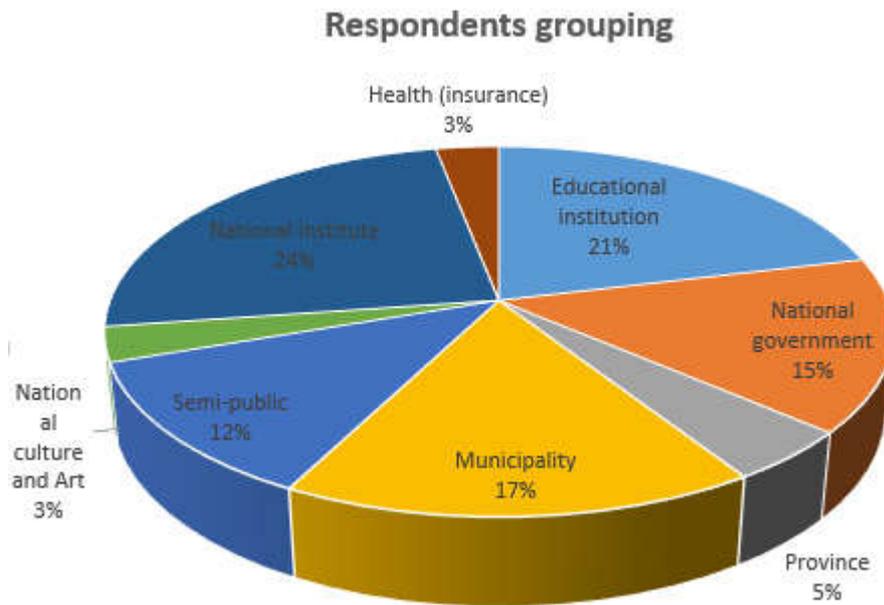
Figure 2 Grouping respondents

The response on the survey consists of respondents that operated on the verge of Business and IT that operate in the (semi-) public sector: 24% are employed in a national institute, 21% are employed in an educational institute, 17% are employed in a municipality, 15% are employed in the national government, 12% are employed in a semi-public organisation, 5% are employed in a Provence, 3% are employed in national culture and art and 3% are employed in Health (insurance).

4.1 Assessment of the reflective measurement model

Before we could asses the model we first had to create a model. This was done by importing the filtered data into SmartPLS. Then the model was created on base of the conceptual model that we developed in the theoretical framework. Below in figure 3 we can see the model we ended up within SmartPLS.

Figure 3 Reflective measurement model

AlignmComp (Alignment Competencies), *InterComHeterEmpy* (Interconnections between heterogeneous employees) and *AlignMot* (Alignment Motivation) are reflectively linked as an exogenous latent variable, explaining the endogenous latent variable *DynCap* (Dynamic Capabilities). Furthermore *InterComHeterEmpty* and *AlignMot* are defined as a moderating effect on the relation between *AlignmComp* and *DynCap*.

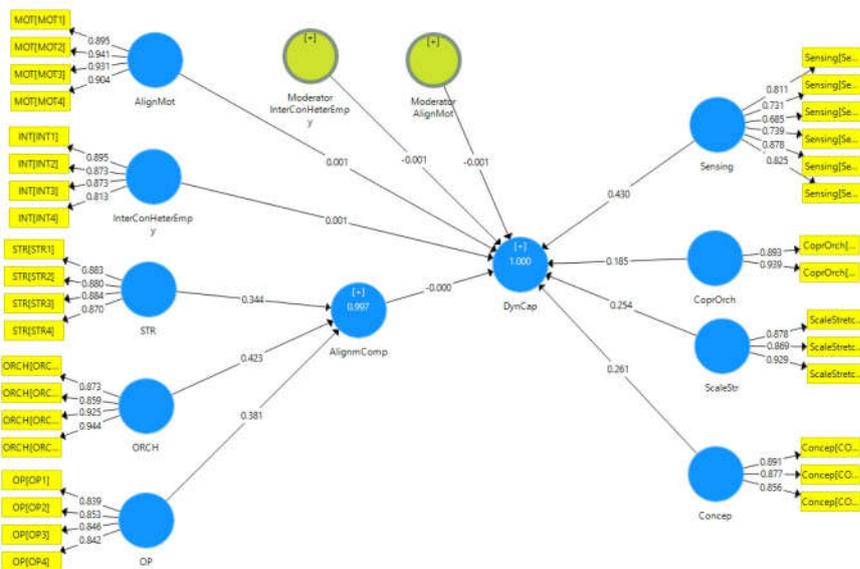In order to provide support for the measures' reliability and validity certain indicators need to be assessed. For reflective measurement models the convergent validity, internal consistent reliability and discriminant validity should be evaluated. The results are shown in table 1. In this table bold values do not meet the set criteria. These values will be discussed in the coming sections.

For the assessment of the convergent validity the outer loadings and the average variance extracted (AVE) should be evaluated according to Hair et al. (2017). In his book he argues respectively thresholds > 0.70 and > 0.50 for these indicators. During the measurement of the outer loadings the indicator *Sensing 3* had a value of 0,6868, this is below the threshold value of 0.70 (Hair et al., 2017). Hair et al. (2019) states *"Loadings above 0.708 are recommended, as they indicate that the construct explains more than 50 per cent of the indicator's variance, thus providing acceptable item reliability"* (p8). This value should have been removed if the deletion leads to an increase in composite reliability and AVE above the suggested threshold value. Because the composite reliability and AVE where already above the suggested threshold, it was not necessary to delete this indicator.

For the assessment of the internal consistency reliability the Cronbach's Alpha and Composite reliability should be evaluated (Hair et al., 2019). In his paper Hair et al. (2019) argues respectively thresholds between 0.60 – 0.95 and between 0.60 – 0.90 are acceptable for these indicators in exploratory research. According to Hair et al. (2019) generally higher values for composite reliability and Cronbach's Alpha indicate higher reliability. Values between 0.70 and 0.90 range from satisfactory to good values above 0.95 and higher are problematic according to Hair et al. (2017) because *"they indicate that all the indicator variables are measuring the same phenomenon and are therefore not likely to be a valid measure of the construct"* (p. 13). In our result the construct *AlignMot* has a composite reliability of 0.955 and a Cronbach's Alpha of 0.938. To be sure that we had a valid measure of the constructs we checked the items that assemble the indicators. We did this for all the indicators that had a composite reliability outside the range of 0.70 – 0.90. We ended up not changing anything to the items for the construct *AlignMot* because we could not find any redundant items that could be deleted to improve the composite reliability. Furthermore according to Hair et al. (2019) the construct's true reliability is viewed as within the two extreme values of composite reliability and the Cronbach's alpha.

According to Hair et al. (2017) for the assessment of the discriminant validity the heterotrait-monotrait ratio of correlations (HTMT) should be evaluated. In his book he argues that the HTMT values should be significantly different from 1. As can be seen in table 1 we had no issues regarding the HTMT values.

We can conclude that all reflective model criteria have been met, providing support for the measures' reliability and validity.

Table 1 Measurement model evaluation

Latent variable	Indicators	Convergent validity		Internal consistent Reliability		Discriminant Validity
		Outer loadings	AVE	Composite reliability	Cronbach's Alpha	
		>0.70	>0.50	0.60 - 0.90	0.60 - 0.95	HTMT confidence interval does not include 1
OP	OP[OP1]	0,8381				
	OP[OP2]	0,8511	0,714	0,909	0,867	YES
	OP[OP3]	0,8472				
	OP[OP4]	0,8442				
InterConHeterEmpy	INT[INT1]	0,8953				
	INT[INT2]	0,8731	0,747	0,922	0,887	YES
	INT[INT3]	0,8723				
	INT[INT4]	0,8135				
AlignMot	MOT[MOT1]	0,8945				
	MOT[MOT2]	0,9408	0,842	**0,955**	0,938	YES
	MOT[MOT3]	0,9314				
	MOT[MOT4]	0,9037				
STR	STR[STR1]	0,8802				
	STR[STR2]	0,8771	0,773	0,931	0,902	YES
	STR[STR3]	0,8851				
	STR[STR4]	0,8736				
ORCH	ORCH[ORCH1]	0,8711				
	ORCH[ORCH2]	0,8603	0,812	0,945	0,922	YES
	ORCH[ORCH3]	0,9253				
	ORCH[ORCH4]	0,9441				
Concep	Concep[CONCEP1]	0,8905				
	Concep[CONCEP2]	0,8773	0,765	0,907	0,847	YES
	Concep[CONCEP3]	0,8562				
Sensing	Sensing[Sensing1]	0,8109				
	Sensing[Sensing2]	0,7313				
	Sensing[Sensing3]	**0,6868**	0,61	0,903	0,87	YES
	Sensing[Sensing4]	0,7382				
	Sensing[Sensing5]	0,8774				
	Sensing[Sensing6]	0,8244				
CoprOrch	CoprOrch[CoprOrch1]	0,8917	0,84	0,913	0,813	YES
	CoprOrch[CoprOrch2]	0,9402				
ScaleStr	ScaleStretch[ScaleStretch1]	0,8784				
	ScaleStretch[ScaleStretch2]	0,8691	0,796	0,921	0,872	YES
	ScaleStretch[ScaleStretch3]	0,9285				

4.2 Assessment of the structural model

After assessing the reflective measurement model we have to evaluate the structural model. To create the structural model we had to create latent variables for the second order constructs. We did this by replacing the *DynCap* constructs by a latent value for *DynCap*. See below figure 4 for the structural model.
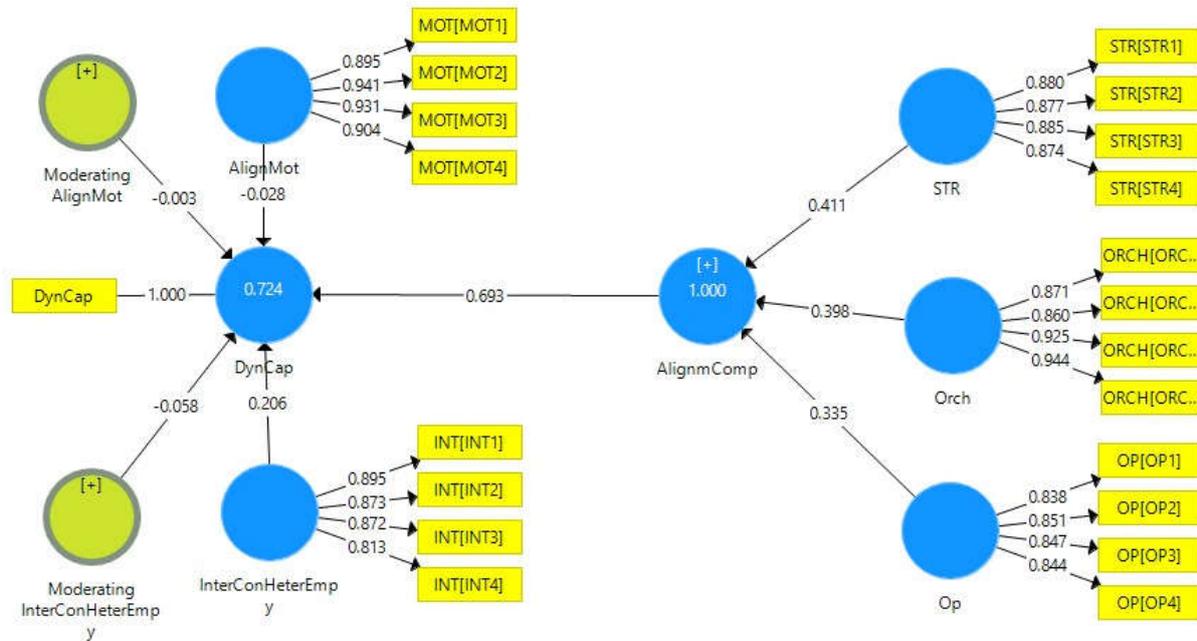
Figure 4 Structural model

For determination of the relevance of the constructs the outer loadings and outer weights need to be analysed. Before we could do this we had to replace the first order constructs with indicators. This indicator should consist of the latent value of the constructs.
In the result of table 2 we can see that the indicators *CopOrch* and *ScaleStr* are not significant, but according to Hair et al. (2017) when an indicator weight is not significant but the corresponding outer loading is above 0.5, or statistically significant, the indicator should be retained.

Table 2 Significance and relevance

Indicator	Outer Loading (> 0,5)	Significance (p-value < 0,05)
Concep	0,788	NO
CopOrch	0,858	YES
ScaleStr	0,783	NO
Sensing	0,951	YES
OP	0,829	YES
ORCH	0,84	YES
STR	0,939	YES

The structural model is analysed to test the impact or effect of the exogenous variables on the endogenous variable (Hair et al., 2017). The current study has three independent variables *AlignmComp* (alignment competencies), *InterConHeterEmpy* (interconnections between heterogeneous IS stakeholders) and *AlignMot* (alignment motivation) and a dependent variable *DynCap* (dynamic capabilities). Typically, structural model has five main criteria to be evaluated. These are; collinearity (VIF) variance explained (R2), effect size (f2), predictive relevance (Q2) and path coefficient (β) and result of hypotheses testing (Hair et al., 2017). In our model the moderators (*AlignMot* and *InterConHeterEmpy*) are measured reflectively. According to Hair et al. (2017) when the objective is to reveal whether the moderators effect is significant on the relationship between the independent and dependent variable, the two-stage approach is preferred for a reflective measurement model, that is why we used the two-stage approach during our evaluation. Table 3 and 4 displays the results of the structural model, containing the five criteria for evaluation the study model.

Table 3 Collinearity assessment

Relationship	VIF
AlignMot --> DynCap	2,292
InterConHeterEmpy --> DynCap	3,423
AlignmComp --> DynCap	2,799
Orch --> AlignmComp	1,816
Str --> AlignmComp	2,772
Op --> AlignmComp	2,111

Table 4 Results of hypothesis testing

Hypothesis	Relationship	Path Coefficient	std Error	T statistics	P value	Significance (p <0,05)	R2	f2	Q2
Direct relationships									
H1	AlignmComp -> DynCap	0,693	0,116	5,975	0,000	YES	0,724	0,619	0,648
Indirect relationships									
H2	AlignmComp * InterConHeterEmpy -> DynCap	-0,058	0,090	0,646	0,976	NO		0,006	
H3	AlignmComp * Alignmot -> DynCap	-0,003	0,111	0,030	0,519	NO		0,000	

To be sure the model does not bias the regression results the model an assessment is done for collinearity among the predictors constructs. According to Hair et al. (2019) VIF values above 5 indicate probable collinearity issues among the predictors constructs. From table 2 we can see that all VIF values are clearly below the threshold of 5. Therefore collinearity among the predictors constructs is not a issue in the structural model.

According to Shmueli and Koppius (2011) by examining the variance of the endogenous construct we can examine the models explanatory power. According to Hair et al. (2019) higher R2 values indicating a greater explanatory power. The R2 indicator has no static threshold value according to Hair et al. (2017), however it is common to judge in general value 0.25 as weak, 0.50 as moderate and 0.75 to be considered as substantial.

From table 3 the coefficient of determination (R2) of the endogenous construct *DynCap* is considered substantial and acceptable. The three sets of exogenous constructs collectively explained 75% of the variance in *DynCap*.

The change in the value of R2 when a certain exogenous being omitted from the model is known as effect size (f2). This can be used to evaluate if the omitted construct has a substantive impact on the endogenous construct. According to Hair et al. (2017) values of 0.02, 0.15 and 0.35 respectively represent small, medium and large effects. From table 3 it is interesting to note that *AlignmComp* has a large effect (0.619) on *DynCap* while *Alignmot* and *InterConHeterEmpy* have respectively small (0.001) and medium (0.045) effect size in the model.

For assessing the predictive accuracy of the model we examine Stone-Geisser's Q2 value (Geisser, 1974). When the Q2 value is larger than zero for a specific reflective endogenous construct it indicates predictive relevance for a particular dependent construct. As seen in table 3 the Q2 value is greater than 0, indicating the predictive results showed that the path models accuracy is acceptable with Q2 value of 0.648. in Table 6, the Q2 value is greater than 0, indicating the predictive relevance of factor (*AlignmComp*) on *DynCap* behavior.

The final step is to assess the significance of the relationships and developed hypotheses. Significance of the path coefficients is evaluated based on their P-value. We assume a significance level at 5%, meaning that P values should be below 0.05 to be concluded significantly. The findings of path model and hypotheses testing are exhibited in table 4.

H1 Alignment competencies contributes positively to dynamic capability

As seen in table 4 the exogenous variables has a positive coefficient with the endogenous variable.

According to hypothesis H1 there is a positive effect of *AlignMot* on *DynCap*. This effect is also significant (β-.003; t=0.030; p<0.05); thus H1 is supported.

H2 Interconnections between heterogeneous employees positively moderates the relation between alignment competencies and dynamic capabilities.

We will assess the size of the moderating effect of *InterConHeterEmpy* on the relationship between *AlignmComp* and *DynCap* by looking at the Simple Slope in figure 3. The relationship between *AlingComp* and *DynCap* is positive for all three lines as is recognizable by their positive slope. This means that higher level of alignment competencies go hand in hand with higher levels of dynamic capabilities.

The upper line, which represents a high level of the moderator construct *InterConHeterEmpy,* has a flatter slope while the lower line, which represent a low level of the moderator construct *InterConHeterEmpy*, has a steeper slope. This makes sense since the interaction effect is negative.

The simple slope does support the negative interaction effect: Higher levels of interconnections between heterogeneous employees entail a weaker relationship, 0.206 (simple effect) plus -0.058 (interaction effect) = +0.148, between alignment competencies and dynamic capabilities. While lower levels of interconnections between heterogeneous employees lead to a stronger relationship, 0.206 (simple effect) minus -0.058 (interaction effect) = +0.264, between alignment competencies and dynamic capabilities.
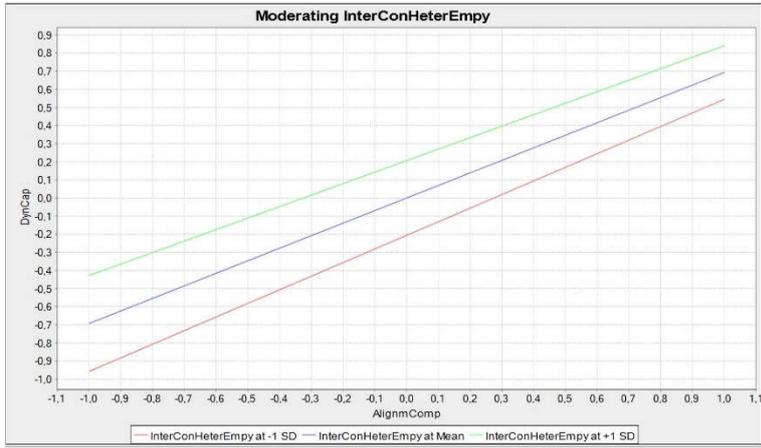
Figure 5 Simple Slope InterConHeterEmpy

As seen in table 4 *Alingmot*Alignmot*AlignmComp* is not significant (β-.003; t=0.030; p>0.05); thus hypothesis H2 is not supported.

H3 Alignment motivation positively moderates the relation between alignment competencies and dynamic capabilities.

We will assess the size of the moderating effect of *AlingMot* on the relationship between *AlignmComp* and *DynCap* by looking at the Simple Slope in figure 4. The relationship between *AlingComp* and *DynCap* is positive for all three lines as is recognizable by their positive slope. This means that higher level of alignment competencies go hand in hand with higher levels of dynamic capabilities.

The upper line, which represents a high level of the moderator construct *Alignmot*, has a flatter slope while the lower line, which represent a low level of the moderator construct *Alignmot*, has a steeper slope. This makes sense since the interaction effect is negative.

The simple slope does support the negative interaction effect: Higher levels of alignment motivation entail a weaker relationship, -0.028 (simple effect) plus -0.003 (interaction effect) = -0.031, between alignment competencies and dynamic capabilities. While lower levels of alignment motivation lead to a stronger relationship, -0.028 (simple effect) minus -0.003 (interaction effect) = -0.025, between alignment competencies and dynamic capabilities.
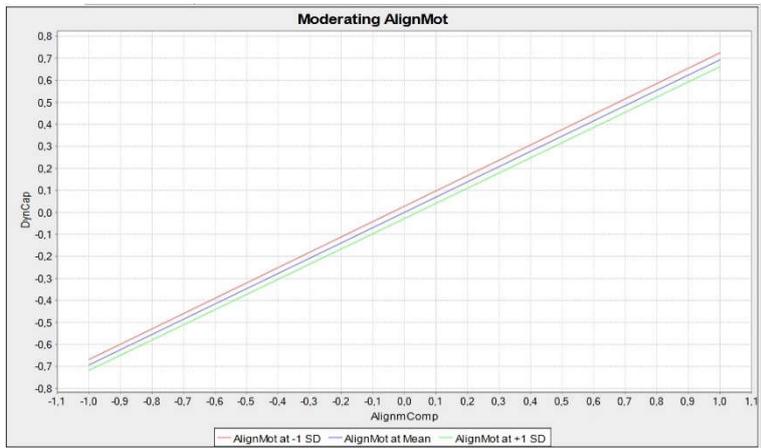

Figure 6 Simple Slope AlignMot

As seen in table 4 *Alingmot* InterConHeterEmpy* is not significant (β-.058; t=0.646; p>0.05); thus hypothesis H3 is not supported.

5. Conclusions, discussion and recommendations

Vander Elst and De Rynck (2014) research concludes that organizations in the public sector face an extra challenge to reach a certain degree of BITA. COISA focuses on simultaneous and continuous evolution in both IT- and business domain, and the interaction between these domains which could have an effect on reconfiguring internal and external competences to address rapidly changing environments, to reach the desired adaptiveness. There is no further research about the application of COISA in the public sector and the effect on dynamic capabilities.

5.1.   Conclusions

The purpose of this research was to find out if COISA has an influence on the dynamic capabilities of complex organization in the public sector. Furthermore we also tried to research the moderating role of Alignment motivation and Interconnections between heterogeneous employees. To investigate this we did a statistical research on complex organization in the public sector.

The research question of this study is as follows *"What is the impact of COISA on the dynamic capabilities of complex organizations in the public sector?"* To answer this research question accordingly we need to dive into the conceptualization of COISA, which consist of three separate sub-components. Each component is also linked to a hypothesis. We answered the research question in three separate sections. In each section we started with the answer and then linked the result of the empirical data to the literature.

How does COISA influence the dynamic capabilities?
From the results we can conclude that COISA has an influence on dynamic capabilities. This influence is also positive. The found effect is similar to findings from other studies (Lee & Dale, 1998; Yu-Yuan Hung et al., 2007; Zairi, 1997)
        Other studies, such as Yu-Yuan Hung et al. (2007) which studied the influence of organizational process alignment on organizational performance using the dynamic capability approach using the SEM method, also found supportive evidence. Although this research is not representative to our research because it was conducted on high-tech companies in Taiwan it does confirm that that organizational process alignment significantly and positively contributes to organizational dynamic capability. The results also correspond to the research from Lee and Dale (1998), that did a case study on a corporate organisation that is involved in the servicing of capital equipment in the UK, and Zairi (1997) who also demonstrated that organizational alignment significantly and positively contributes to organizational dynamic capability.

To what degree is the influence of COISA on dynamic capabilities moderated by Alignment motivation?
From the research the results of Alignment motivation prove to be not significant, which means that the moderating role of Alignment motivation cannot be concluded.
        If we look, not considering the not-significant results, to the results of the statistical analysis we can conclude that the Dynamic capabilities are inferior when heterogeneous IS stakeholders are motivated to actively engage in two-way alignment interactions within and between alignment competencies. This outcome is contrary to the expectations based on the literature (Allen & Varga, 2006; Gottschalg & Zollo, 2017; Walraven et al., 2019).

The result are in contrast to the result of Gottschalg and Zollo (2017) where motivation and behaviour in alignment processes can influence in a degree to which organizations are able to sustain a competitive advantage. According to Walraven et al. (2019) the motivation of human actors are at the fundament of COISA and an agent with no interest in a particular area will not contribute to its evolution (Allen & Varga, 2006). That is why according to Luftman et al. (1999) appropriate prioritization and effective communications is necessary for achieving alignment.

The reason that our result did not match the literature can be hard to identify. One reason for example could be that the research of Amarilli et al. (2017) did not test predications but rather aimed at understanding through a case study. Also the organisations from their case study did not operate in the public sector. Furthermore the research of Gottschalg and Zollo (2017) focuses only on motivations(Extrinsic, Hedonic and Normative intrinsic) of individuals which is only part of the operationalization of our research and the relationship between alignment motivation and dynamic capabilities is direct and not moderating as in our research.

To what degree is the influence of COISA on dynamic capabilities moderated by Interconnections between heterogeneous employees?

From the research the results of Interconnection between heterogeneous employees prove to be not significant, which means that the moderating role of Interconnection between heterogeneous employees cannot be proven.

If we look, not considering the not-significant results, to the results of the statistical analysis we can conclude that the dynamic capabilities are inferior when heterogeneous IS stakeholders have means to engage in two-way alignment interactions within and between alignment processes. This outcome is contrary to the expectations based on the literature (Allen & Varga, 2006; Bridoux et al., 2017; Gonzalez & de Melo, 2019; Walraven et al., 2019)

The result are in contrast to the result of the multiple case study by Walraven et al. (2019) which underlines the importance of inclusion of different stakeholder groups in co-evolutionary processes which enables improvement in target areas integrally addressing internal and external complexity. Also the work of Bridoux et al. (2017) which found that a heterogeneous group that consists of both reciprocators and individualists has the potential to change a capability faster than either type of homogeneous groups which supports the evolutionary adequacy in a highly dynamic environment. According to Allen and Varga (2006) the capabilities of the overall system(an organisation) will result from the connected capabilities of the participating elements(agents) and that evolution is driven most strongly by individuals in the firm, whose IS co-evolves through their interaction with other agents. These working relationships and effective communications are necessary for achieving alignment (Luftman et al., 1999).

The reason that our result did not match the literature can be hard to identify. One reason for example could be that the research of Gonzalez and de Melo (2019) focuses on the characteristics of teamwork (autonomy, cohesion and integration). Their operationalization is different from our research and the relationship between the interconnection and dynamic capabilities is direct and not moderating as in our research.

5.2.   Recommendations for practice

Organisations that operate in the public sector, that are large and have difficulties to adapt to changing environment, and have not invested in alignment competencies, could use alignment competencies to improve on simultaneous and continuous evolution in both IT- and business domain and the interaction between these domains. This could have an effect on reconfiguring internal and external competences to address rapidly changing environments(Teece et al., 1997), to reach the desired adaptiveness.

This current study provides several notable contributions. Firstly, alignment competencies have a positive impact on the dynamic capabilities in rapidly changing environments. Secondly, this research has unfortunately also shown us, while not proven, that alignment motivation and interconnections between heterogeneous employees could have a negative effect on the influence of alignment competencies on the dynamic capabilities. It is unfortunate because the literature (Allen & Varga, 2006; Bridoux et al., 2017; Gonzalez & de Melo, 2019; Gottschalg & Zollo, 2017; Walraven et al., 2019) and empirical evidence do not match for the (semi-) public sector. This means, till further research, that it is only certain (on base of this research) that improving alignment competencies will improve the dynamic capabilities of organisations. While a change in alignment motivation and interconnections between heterogeneous employees could maybe have a negative effect on the dynamic capabilities.

5.3.   Recommendations for further research

The response on the online survey yielded a modest 71 complete responses. The scope of our research is aimed at various organisations in the (semi-) public sector primarily in the Netherlands. Unfortunately we received 5 responses from organisations outside the (semi-) public sector, so we had to delete them from the data file. We also had double response from 4 organisations but due to limited response we choose to keep them in the data file. Eventually we ended with 66 useful observations for the research.

While this study assesses the impact of COISA on dynamic capabilities, this study itself is not free from limitations. Our study sample consist of homogeneous organisations in the (semi-) public sector primarily in the Netherlands which rules out extraneous factors associated with different organizations in different industries. This means that care must be taken when generalizing results to other business sectors. An example is the difference in results between our work and the work of Yu-Yuan Hung et al. (2007) that also investigated the same subject aimed at high-tech organisations and not organisations in the public sector and the case study of Amarilli et al. (2017) that aimed at organisations outside the public sector, further research is recommended.

Further research in other business sectors on the influence of alignment competencies on dynamic capabilities could help to generalize the results of our work to different sectors. Like the work of Yu-Yuan Hung et al. (2007), that used information provided by China Credit Information Service database which top administrators are widely believed to provide reliable information, it could improve the credibility of the results if a comparable database is used in a further research to get the most appropriate organisations for this topic.

Another limitation of our study is that we only had 6 respondents more than the minimum of 60 respondents which means that the risk of type II errors increases. When a type II error occurs a researcher concludes there is not a significant effect, when actually there really is. Another quantitative research on the influence of alignment competencies on

dynamic capabilities in the public sector, with more respondents is recommended. This could confirm the significant effect in the results of this current research.

Further quantitative research in the public sector could confirm the results of our research regarding alignment motivation because all of the research in our theoretical framework was based on case studies. Further research could also investigate the direct effect of alignment motivation and interconnections between heterogeneous employees on dynamic capabilities because the moderating effect in our research proved to be not significant.

Another limitation of our study is that we used a survey which provided us statistical results. Quantitative research checks data, whether it is true what was assumed in advance but it limited us to go in to depth with respondents. Going into depth provides confirmation that the respondent understands our question and we understand exactly what the respondent meant. Also a survey could be answered by somebody else than the researcher imagined, but a qualitative approach like an in depth-interview provides certainty that the respondent is able to provide the data that is necessary. While this is a guess it could explain the difference between the literature and the empirical data.

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7. Appendix 1 Report pre-test survey

The pre-test was conducted using 5 respondents which answered the survey questions as well as additional questions regarding the survey.

This led to an assessment of the survey on five aspects, namely:

- The introduction
- The questions
- The answers
- Length of survey
- Survey in general

The introduction
The introduction was overall considered clear, but improvements could be made introducing the Likert-scale style answering as well as clarifying the privacy aspects of the survey. As such the Introduction will be adjusted to include information on how the survey should be filled out, and links to the OU website regarding the privacy statements.

The questions
Questions were deemed clear, though background information could be optionally provided for those who lack context. This information will be added to the survey in an optional expandable text form on each question.

The answers
The different answer style for the first few questions was considered 'too long' by some, and others claimed it wasn't always logical to match the questions with answers. As the last part of the answers; 'given internal and external changes' is static, it seems logical to include it in the questions rather than the answers. This should resolve the long and confusing answer style used for those questions.

Length of survey
The vast-majority referred to the length of the survey as 'acceptable'. One used considerable more time due translation, but a multi-language style survey would endanger its validity and is therefore not considered an option. An updated indication in minutes will be included in the introduction.

Survey in general
Small-remarks were given such as writing abbreviations in full, were given and are logical changes to apply to the survey. One questions how relevant certain questions are given the specific sector, but as this can be very dependent on the respondent's context it was not considered a reason for change.

Quality of pre-test data
Out of the five respondents, four produced usable results. One had only filled '1' in all text fields regarding the pre-test and was thus ruled out.

8. Appendix 2 Survey

Demographic

Which organisation do you work for?

Please specify the business unit / department you work for.

What is your job title?

How long have you been working at your current organization?

Strategic alignment competencies	Never	Way too infrequently	Too infrequently	Somewhat in line with frequencies of changes	Moderately in line with frequencies of changes	Mostly in line with frequencies of changes	Completely in line with frequencies of changes
Our organization periodically performs strategic IT planning processes (e.g., prioritizing IT projects).	1	2	3	4	5	6	7
Our organization frequently adjusts strategic goals to better adapt to changing conditions.	1	2	3	4	5	6	7
Our organization continuously works on creating the right conditions to enable implementation of strategic goals in relation to IT (e.g., setting up program structures and creating roadmaps)	1	2	3	4	5	6	7
When making strategic IT investment decisions, our organization actively considers strategic goals from different departments, roles, and perspectives.	1	2	3	4	5	6	7

Orchestrational alignment competencies	Never	Way too infrequently	Too infrequently	Somewhat in line with frequencies of changes	Moderately in line with frequencies of changes	Mostly in line with frequencies of changes	Completely in line with frequencies of changes
Our organization continuously works on maintaining architectural principles and standards to guide systems development and maintenance projects.	1	2	3	4	5	6	7
Our organization continuously works on maintaining overall coherence between different processes, roles, and IT components.	1	2	3	4	5	6	7
When making architectural decisions, our organization actively considers coherence with strategic principles and goals.	1	2	3	4	5	6	7
Our organization actively works on ensuring relevance and topicality of architectural practices, principles and standards and makes changes accordingly.	1	2	3	4	5	6	7

Operational alignment competencies	Never	Way too infrequently to leverage any opportunities for improvement	To the degree that we leverage some opportunities for improvement	To the degree that we leverage a moderate amount of opportunities for improvement	To the degree that we leverage a moderate amount of opportunities for improvement	To the degree that we leverage a considerable amount of opportunities for improvement	To the degree that we leverage (almost) all opportunities for improvement
Overall, end users spend efforts in recommending changes to IT in use to better fit their works	1	2	3	4	5	6	7
Overall, end users spend efforts on changing their tasks so that these better fit the IT in use	1	2	3	4	5	6	7
Our organization continuously works on implementing and improving IT systems in operational settings to the degree that we leverage (almost) all opportunities for improvement	1	2	3	4	5	6	7

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our organization continuously evaluates implemented IT systems for alignment with business processes and working routines	1	2	3	4	5	6	7

Alignment motivation	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our organization ensures adequate stakeholder participation in IT development and -improvement efforts	1	2	3	4	5	6	7
In our organization, IS/IT people and line people from various departments periodically attend cross-functional meetings	1	2	3	4	5	6	7
Our organization takes conscious action to improve informal connections across functions and departments	1	2	3	4	5	6	7
We have a dedicated platform where we share information across functions and departments, related to IT alignment efforts	1	2	3	4	5	6	7

Interconnections between heterogeneous employees	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our employees are intrinsically motivated to continuously leverage and improve IT initiatives	1	2	3	4	5	6	7
Generally, our employees are enthusiastic to contribute to IT initiatives	1	2	3	4	5	6	7
Our employees generally feel stimulated to engage in dialogues related to IT initiatives	1	2	3	4	5	6	7
Our employees have clear reasons to actively collaborate with other stakeholders on leveraging and improving IT initiatives	1	2	3	4	5	6	7

Sensing user needs and (technological) options	Very strongly disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Very strongly agree
We systematically observe and evaluate the needs of our customers	1	2	3	4	5	6	7
We analyse the actual use of our services	1	2	3	4	5	6	7
Our organization is strong in distinguishing different groups of users and market segments	1	2	3	4	5	6	7
Staying up-to-date with promising new services and technologies is important for our organization	1	2	3	4	5	6	7
In order to identify possibilities for new services, we use different information sources	1	2	3	4	5	6	7
We follow which technologies our competitors use	1	2	3	4	5	6	7

Conceptualizing	Very strongly disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Very strongly agree
We are innovative in coming up with ideas for new service concepts	1	2	3	4	5	6	7
Our organization experiments with new service concepts	1	2	3	4	5	6	7
We align new service offerings with our current business and processes	1	2	3	4	5	6	7

Coproducing and orchestrating	Very strongly disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Very strongly agree
Collaboration with other organizations helps us in improving or introducing new services	1	2	3	4	5	6	7
Our organization is strong in coordinating service innovation activities involving several parties	1	2	3	4	5	6	7

Scaling and stretching	Very strongly disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Very strongly agree
In the development of new services, we take into account our branding strategy	1	2	3	4	5	6	7

Our organization is actively engaged in promoting its new services	1	2	3	4	5	6	7
We introduce new services by following our marketing plan	1	2	3	4	5	6	7