Collaboration between subsidiaries in construction industry

An empirical study to collaboration between subsidiaries with different disciplines in construction industry and the influence of Organizational Climate, Trust and Agreements

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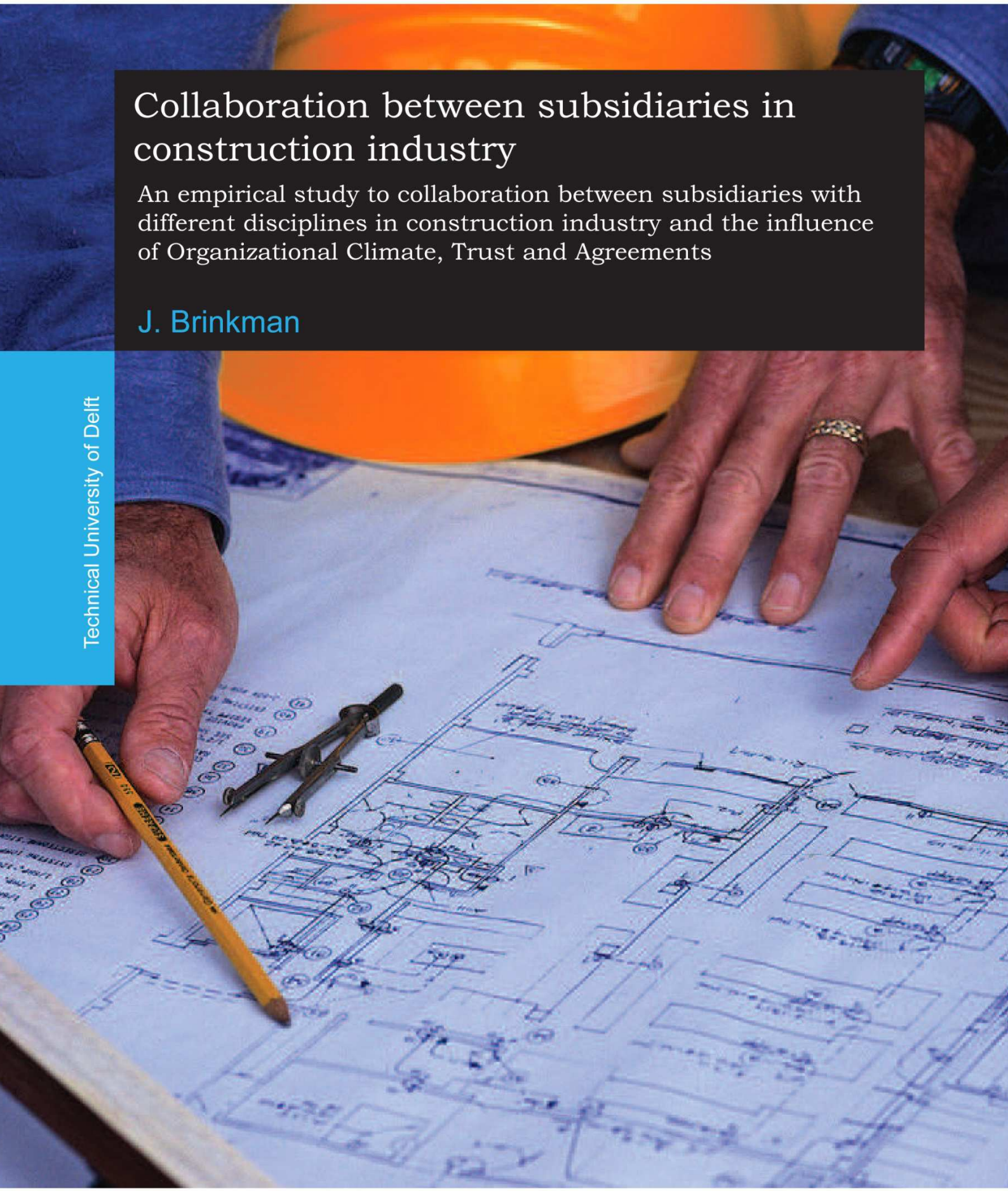

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Collaboration between subsidiaries in the construction industry

An empirical study to collaboration between subsidiaries with different disciplines in the construction industry and the influences of Organizational Climate, Trust and making Agreements

By

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This thesis is confidential and cannot be made public until December 31, 2013.

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Preface

This thesis is written as a part of my graduation project for the Technical University of Delft and with it, I finish my master Construction Management Engineering at the faculty of Civil Engineering. During my studies on Construction Management, a lot of different subjects were discussed. Among them were for instance project management, process management but also forms of collaboration and collaborative design. I often read papers on projects, success or failure, which were going into depth on these different topics. I noticed however that whenever project successes were discussed, collaboration between the different partners within the project was always a factor that influenced this success. For me, this was the reason why I wanted to know more about this topic; what is collaboration? It triggered my interest into research on collaboration and soon I became very enthusiastic on learning more and more.

In my search for a graduation assignment I found the company BAM Utiliteitsbouw BV and BAM Techniek BV, two subsidiaries of de Koninklijke BAM NV. who wanted to look closer at their way of collaboration. These two different companies, housing in one building, became a case study in this research. A special thanks goes out to my colleagues from BAM Utiliteitsbouw and BAM Techniek, who were always willing to help me and provide me with insight in the current situation. And off course especially Michael Venderbos, who could always find time, even in this turbulent time of change for the company BAM Utiliteitsbouw.

I would like to thank my graduation committee for their guidance, and especially Marian Bosch-Rekveld for the daily counselling. Also, I would like to thank Elise Kuip, Thomas Frederikse and Marian Bosch-Rekveld for translating the Organizational Climate Measurement into Dutch. But mostly, I want to thank Laurens Rook for the guidance through the world of statistics, who without this research would have taken a year longer and would be a lot less valid.

And last but not least, all the lovely people around me who helped me cope with the stress and insecurity of graduation, you know who you are!

Enjoy reading,

Jara Brinkman
Delft, 09 December 2013

Summary

Keywords: collaboration, organizational climate, compatibility, subsidiaries, construction industry

In the construction industry, a trend can be spotted; projects are becoming larger and more complex than ever before. Not only Design and Construct contracts become more common, the DBFM contracts[1] are also in an uprising. These forms of contracts and the complexity of the projects require a different approach in collaboration of the parties involved. Not only does the construction industry become more complex, also the profit margins become smaller and competition is very severe as well. This means that companies need to be very clever, especially in the first phases of the building cycle. But, clear understanding of what collaboration actually is and how it can be influenced, is often lacking. This is also the case for the special relation that subsidiaries have. Subsidiaries working in the same operating field are often indispensable partners for each other, something which is enforced by the higher management of the holding company. However, clear thought into the practical implications of this collaboration is not clear thought through. And the quality of this collaboration is not always what is expected. Collaboration between these parties is necessary to gain the advantage that is needed in this difficult market. Collaboration between subsidiaries is a subject which is not often discussed in research and this thesis will provide an insight in this knowledge gap. This study also continuous the research of Patterson et al. on organisational climate in relation to collaboration and organisation change.

The subjects of this research are the subsidiaries BAM Utiliteitsbouw and BAM Techniek. By using interviews and observations, the problems around these subsidiaries could be described. Problems in collaboration between subsidiaries in construction industry are diverse. Differences can be spotted in the way the organizations are organized and operate. The problems can be categorized into structural, procedural, financial and professional problems, as well as problems regarding status and legitimacy. The objective of this study is to contribute to policy design for dealing with the collaboration between subsidiaries from different disciplines in construction industry.

The main research question that is answered in this thesis is; *How does organizational climate influence the collaboration between subsidiaries working in different disciplines of the construction industry and how is this collaboration influenced by agreements*? The first step is to assess literature of the different knowledge fields. Different specified collaboration theories were compared and a set of most important factors was extracted. Linkages were made between the knowledge fields and new insights were gained, which led to a theoretical framework. This led to a conceptual model which described the relationship between compatibility (based on organizational climate), trust and making agreements in relation to collaboration. Validated sets of questions, subtracted from the literature studies, were used to design a survey in order to test the conceptual framework. In total, 276 surveys were send out to specially selected employees from 18 different offices of both BAM Utiliteitsbouw and BAM Techniek. Out of these invites, 171 employees responded (62%) and four different collaboration combinations were reviewed. The data analysis that was conducted started with sorting all the data. The factor analysis subtracted all important factors and validated the measures that were used. The

[1] Design, Build, Finance and Maintain contracts

relations between the factors were first mapped by a correlation matrix. The design of the regression analysis was based on the significant influences that showed in the correlation matrix. Additional analyses were needed to accept or reject claims made in the conceptual model.

Collaboration Model for subsidiaries with different disciplines in construction industry

The analysis of the data led to an unexpected insight into the relationship between Organizational Climate, Trust and Agreements, on the dependent variables Soft Collaboration and Hard Collaboration. This can be seen as the main contribution of this research; a collaboration model for subsidiaries with different disciplines in construction industry. The numbers in the collaboration model are corresponding with the numbers of the correlation matrix. Besides the fact that this model will be discussed, it is also made visible in Figure A. Important to notice is the deviation that is made in Collaboration (Soft and Hard). This is an important discovery in this research.

The main effects on Soft Collaboration are Trust and Agreements. Trust is in all cases the most important factor (β=.46, $p< .001$). Agreements also shows to have a strong and significant influence (β=.14, $p< .053$). The last main effect on Soft Collaboration is Clarity of Organizational Goals (β=.15, $p< .050$). Clarity of Organizational Goals reflects the employee's degree of understanding of the organization's goals and policies, as well as the requirements of their job. These main findings clearly indicate a positive effect of all these variables.

Interactive Effects. The regression revealed a significant linear interaction of Agreements X Innovation and Flexibility (β=.30, $p< .044$). It showed that when there is a climate of low Innovation and Flexibility, the Soft Collaboration benefits from a high level of Agreements, and the opposite situation; when there is a climate of high Innovation and Flexibility, the Soft Collaboration benefits from a low level of Agreements. Also the combined variable of Agreements X Innovation and Flexibility X Clarity of Organizational Goals showed to be highly significant (β=.40 and $p< .001$). We found this three-way interaction between Agreements, Innovation and Flexibility and Clarity of Organizational Goals that was not already foreseen in the theoretical framework. First of all, all collaborations are benefiting from a high level of Agreements. The combination of High Innovation and Flexibility and High Clarity of Organizational Goals is the best combination for achieving High Collaboration. For the dependent variable Soft Collaboration, the independent variable Clarity is more important over the independent variable Innovation and Flexibility by just a bit.

The main effects of the independent variables on Hard Collaboration are Trust (β=.39, $p< .001$), Agreements (β=.13, $p< .070$), Clarity of Organizational Goals (β=.16, $p< .057$) and Innovation and Flexibility (β=.29, $p< .009$). When the variable of Soft Collaboration was added to the regression analysis (β=.46, $p< .001$), the significance of the independent variables changed. This indicated that Soft Collaboration worked as a mediation variable.

Interactive Effects. Again, the combined variable of Agreements X Innovation and Flexibility X Clarity of Organizational Goals showed to have a positive and significant effect (β=.39 and $p< .002$). First of all, all collaborations are benefiting from a high level of Agreements concerning Hard Collaboration. The combination of high Innovation and Flexibility and high Clarity of Organizational Goals seems to be the best combination for achieving high Collaboration. A distinction can be made between the importance of Innovation and Flexibility and Clarity of Organizational Goals. Clarity of Organizational Goals seems to be less important over Innovation and Flexibility, since the absence of high Clarity shows a higher level of Collaboration then the absence of Innovation. This is just the other way around of what we witnessed concerning Soft Collaboration.

Two variables are working through Soft Collaboration, on Hard Collaboration; these are the variables Trust and Agreements X Clarity of Organizational Goals X Innovation and Flexibility. For Trust this is a partial mediation and for the combined variable it is a full mediation. Partial mediation means that the variable both influences the dependent variable directly, as indirectly through the mediation variable. This is true for Trust.

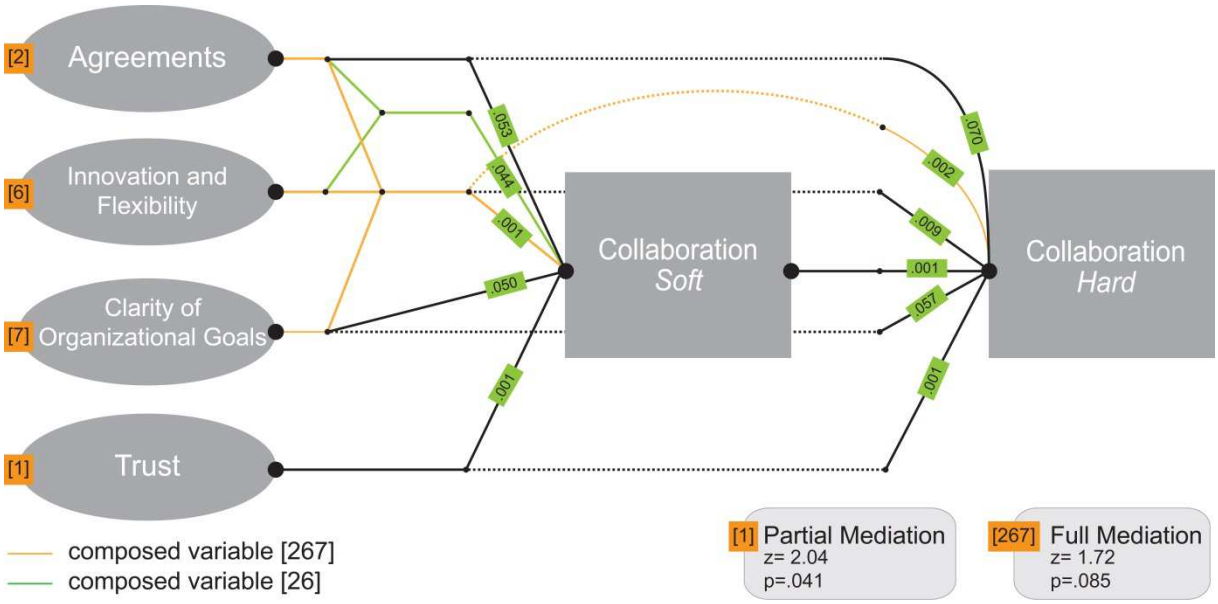


Figure A Collaboration model (own ill., 2013)

The connection between organizational climate and collaboration is often made, and where regarding safety and customer oriented climates a lot of research has been done, a knowledge gap exists concerning organizational climate in relation to collaboration (Schneider, Ehrhart, & Macey, 2013). It is unknown which organizational climate factors are most important for an environment in which collaboration could flourish. This study proposed that when the differences between the most prominent organizational climate factors were small this benefits the collaboration. This statement was based on previous research (Hansen & Nohria, 2004; C. Hardy, Lawrence, & Grant, 2005; Hord, 1986; Meng, Sun, & Jones, 2011; Patel, Pettitt, & Wilson, 2012). The results of this data set were inconclusive about the hypothesis whether differences in organizational climate do negatively or positively influence the collaboration of subsidiaries. However, there are some organizational climate factors which have been proven to be very important for an environment in which good collaboration could flourish. Clarity of Organizational Goals and Innovation and Flexibility are the most important organizational factors. Zooming in on the operating companies within the research group, differences show. Were within the subsidiary of Techniek, the factors Tradition and Involvement have a negative influence on collaboration, Utiliteitsbouw shows a positive influence of those same factors. This difference can be explained by the difference in organizational climate.

The literature research concluded that making agreements on mutual objectives, communication, equity and project process all contribute to better collaboration (Klein Woolthuis, Hillebrand, & Nooteboom, 2005). Correlation analysis showed than when looking at this particular situation, Trust and Agreements positively influences each other. Also the regression analysis showed over and over again, that making Agreements have a positive influence on collaboration. In this study the statement was also made that trust has a negative influence on the decision to make agreements on collaboration. In this study, based on the regression analyses and a case study on open ended questions, it can be concluded that this hypothesis is false. Trust and Agreements both positively influence each other. But for the relationship of trust on collaboration, all regression analysis showed the indisputably significant relation between Trust and Collaboration. This would confirm earlier observations from Meng et al.(2011), Patel et al. (2012) and Sarkar et al. (1998) that trust is one of the main important elements of good collaboration. Last it was proposed that when differences in Organizational Climate are smaller, this would lead to a higher level of Trust. The data in the present study does not provide a positive answer to this hypothesis. ANOVA tests concluded that a higher

number of Organizational Climate differences leads to a higher level of Trust. Hereby the hypothesis is rejected.

Good collaboration can be described as *the process of the achievement of the pre-stated goal, based on high group effectiveness, high group efficiency, and high productivity, with the commitment of resources to the process and the goal, and which satisfies the individuals working on the process.* This research clearly states the influence of the *Organizational Climate* variables *Clarity of Organizational Goals* and *Innovation and Flexibility* to the degree of collaboration between subsidiaries with different disciplines in construction industry. In separate cases, Tradition and Involvement can also influence the degree of Collaboration, in a negative way. In line with the expectations, the research points to the importance of making Agreements about collaboration. These Agreements should be made on the factors most important to collaboration in construction industry *Continuous improvement, Trust, Devotion, Objective or Goal Alignment, Collaboration Support, Agreements and Communication.*

Based on this study recommendations can be made for the implementation of gained knowledge. The survey that was designed for this study can (in a slimmed down version) be used to assess the current state of the collaboration. Based on the outcome of this assessment a strategy can be composed. The interaction between the factors determines the course of action that needs to be taken. Trust can be built based on agreements that are easily made and kept. This sets the trust cycle in motion. Furthermore, some of the easier things to manage is the factor Clarity of Organizational Goals. When Agreements are made between the subsidiaries about the six most important subjects of collaboration, these need to be clearly communicated throughout the company. It needs to be clear to all employees that the goals of the collaboration support the goals of the separate subsidiaries. Leadership in change is important. Key-characters who support this change should be assigned and they should inspire employees in believing and supporting these goals.

Further research on this topic could be conducted on a larger scale on the differences in organizational climate and the relation to collaboration. Also the relation between organizational climate differences and the impact on the performance of the employees could be something worth investigating. To really be able to validate this research on subsidiaries in the construction industry, this research should be repeated on other collaborating subsidiaries, from different companies and in different disciplines.

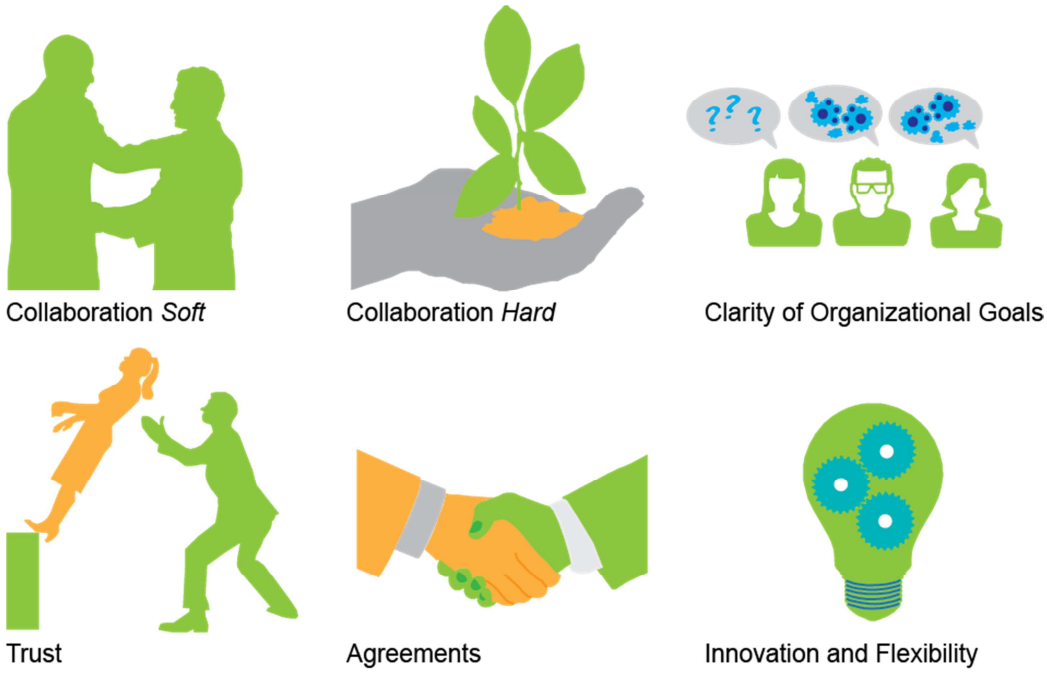


Figure B The six most important factors for collaboration (own ill., 2013)

Samenvatting

Samenwerking tussen dochterondernemingen in de bouwsector

Een empirisch onderzoek naar organisatie klimaten tussen samenwerkende dochterondernemingen, het ontbreken van het maken van afspraken, en het effect daarvan op hun mate van samenwerking. *Steekwoorden: samenwerking, organisatieklimaat, verenigbaarheid, dochterondernemingen, bouwsector.*

Wanneer we naar de bouwsector kijken kan er een trend kan worden. Niet alleen worden Design and Construct contracten steeds normaler, ook DBFM contracten komen steeds vaker voor. Deze contractvormen en de complexiteit die met deze projecten gepaard gaat vragen om een andere aanpak in de samenwerking met alle betrokken partijen. Naast het feit dat de projecten steeds complexer worden, wordt ook de winstmarge steeds kleiner en de concurrentie steeds heftiger. Dit betekent dat bouwbedrijven nog slimmer moeten zijn in samenwerking, voornamelijk aan het begin van het bouwproces. Helaas is er niet altijd bij iedereen een duidelijk beeld van wat samenwerking (in engels: collaboration, niet cooperation) eigenlijk is. Dit geldt ook duidelijk voor de speciale band in samenwerking die dochterondernemingen hebben. Dochterondernemingen die in hetzelfde werkveld werken, maar met andere specialiteiten, zijn vaak tot elkaar veroordeeld als partners. Iets wat van bovenaf uit het moederbedrijf is opgelegd. En over de praktische zaken van deze samenwerking is soms nog niet goed nagedacht. Ook de kwaliteit van deze samenwerking laat soms te wensen over, iets wat we niet zouden verwachten. Wel is het steeds belangrijker dat deze partijen dichter tot elkaar komen en beter samenwerken, om zo een voordeel uit deze samenwerking te halen en een strategisch voordeel te creëren in deze moeilijke markt. Samenwerking tussen dochterondernemingen is een onderwerp dat niet vaak besproken is in de literatuur over samenwerking en dit onderzoek zal een inzicht geven daar waar hier momenteel nog een gebrek aan kennis is. Daarnaast gaat dit onderzoek ook door op het onderzoek van Patterson et al. naar het klimaat van de organisatie in relatie tot samenwerking en veranderingen in de organisatie.

Het onderzoeksobject van dit onderzoek zijn de dochteronderneming BAM Utiliteitsbouw en BAM Techniek. Door middel van interviews en observaties konden de problemen omtrent de samenwerking tussen Techniek en Utiliteitsbouw worden omschreven. Problemen in samenwerking tussen dochterondernemingen in de bouwwereld zijn divers en kunnen gecategoriseerd worden in problemen in structuur, procedures, financieel, beroepsmatig en status-gerelateerde problemen. Het doel van dit onderzoek is bij te dragen aan een beleid over het omgaan met samenwerking tussen dochterondernemingen van verschillende disciplines.

De hoofdvraag van het onderzoek is: *Hoe beïnvloed het organisatie klimaat de samenwerking tussen dochterondernemingen van verschillende disciplines, werkend in de bouwsector en hoe wordt deze samenwerking beïnvloed door het gemis aan afspraken.* Eerst zijn door middel van literatuur

onderzoek de verschillende onderzoeksvelden verkend. Theorieën vanuit verschillende invalshoeken over samenwerking zijn met elkaar vergeleken en daaruit is een set van meest belangrijke factoren voor samenwerking samengesteld. Er zijn linken gelegd tussen de verschillende kennisvelden waaruit nieuwe inzichten zijn ontstaan en een theoretisch kader is afgebakend. Hieruit is een concept model voor samenwerking uit voortgekomen. Dit concept ontwerp omschrijft de relatie tussen gelijkheid (gebaseerd op organisatie klimaat), vertrouwen en het maken van afspraken over de samenwerking. Gevalideerde sets met vragen zijn ingezet voor het ontwerpen van een vragenlijst om het concept ontwerp te toetsen. In totaal zijn er 276 vragenlijsten uitgestuurd naar speciaal geselecteerde werknemers uit alle lagen van het management, werkend in de tenderfase, van 18 verschillende kantoren van zowel BAM Utiliteitsbouw als BAM Techniek. Van deze uitnodigingen hebben 171 werknemers (62%) de vragenlijst ingevuld en konden vier verschillende samenwerkingverbanden worden onderzocht. De data analyse die vervolgens is uitgevoerd startte met het reorganiseren van de data. Vervolgens heeft de factor analyse de meest belangrijke factoren naar boven gebracht en is hiermee de validiteit van de meetmethodes aangetoond. De relatie tussen de meest belangrijke factoren is in eerste instantie in kaart gebracht middels een correlatie analyse, waarop ook het ontwerp voor de regressie analyse is gebaseerd. Deze regressie analyse toonde hoe significant en op welke manier de factoren invloed hadden om samenwerking. Door middel van toegevoegde analyses is er een antwoord kunnen geven op alle gestelde hypotheses.

Samenwerkingsmodel voor dochterondernemingen met verschillende disciplines in de bouwsector

De analyse van de dataset leidde tot een onverwacht inzicht in de relatie tussen het klimaat van de organisatie, vertrouwen, het maken van afspraken en de afhankelijke variabelen “zachte kant van samenwerking”, en “harde kant van samenwerking”. Dit model kan worden gezien als de belangrijkste bijdrage van dit onderzoek; een samenwerkingsmodel voor dochterondernemingen met verschillende disciplines in de bouwsector. De getallen binnen het model corresponderen met de nummers van de factoren in de correlatie matrix. Naast dat dit model hier zal worden besproken is hij inzichtelijk gemaakt in Figuur B.

De hoofdeffecten op de zachte kant van samenwerking zijn vertrouwen en het maken van afspraken. Vertrouwen is in alle gevallen de meest belangrijke factor (β=.46, p< .001). De factor Aspraken toont ook aan een sterke relatie en een significante invloed te hebben op samenwerking (β=.14, p<.053). Het laatste hoofdeffect op de zachte kant is de factor Duidelijkheid van organisatorische doelen (β=.15, p< .050). Al deze hoofeffecten hebben een positieve relatie tot de zachte kant van samenwerking.

Interactie effecten; de regressie-analyse toont ook een significante lineaire interactie tussen het maken van afspraken, en Innovatie en Flexibiliteit (β=.30, p< .044). Het laat zien dat wanneer er een klimaat heerst van lage Innovatie en Flexibiliteit, de zachte kant van samenwerking baat heeft bij een hoge mate van het vastleggen van afspraken. Wanneer er sprake is van een klimaat met een hoge Innovatie en Flexibiliteit, heeft de zachte kant van de samenwerking baat bij een mindere mate van afspraken maken. Hiernaast heeft ook de combinatie van factoren Afspraken X Duidelijkheid van Organisatorische doelen X Innovatie en Flexibiliteit aangetoond een significante invloed te hebben (β=.40 and p< .001). Deze drieweg-interactie was nog niet voorzien in het theoretisch kader. Allereerst is het duidelijk, dat alle samenwerkingsverbanden baat hebben bij een hoge mate van het maken van afspraken. De combinatie van hoge Innovatie en Flexibiliteit en hoge Duidelijkheid van organisatorische doelen is de beste combinatie voor het bereiken van een goede samenwerking, in combinatie met een hoge mate van het maken van afspraken. Voor de afhankelijke variabele “zachte samenwerking” is de onafhankelijk variabele Duidelijkheid van organisatorische doelen belangrijker, dan de variabele Innovatie en flexibiliteit.

Het hoofeffect op de afhankelijke variabele “harde kant van samenwerking” zijn vertrouwen (β=.39, p<.001), het maken van afspraken (β=.13, p<.070), Duidelijkheid van organisatorische doelen (β=.16, p<.057) en Innovatie en Flexibiliteit (β=.29, p<.009). Wanneer de variabele “zachte kant van

samenwerking" aan de regressie analyse wordt toegevoegd (β=.46, *p*<.001), verandert de significantie van een aantal van de onafhankelijke variabelen. Dit is een indicatie dat "zachte samenwerking" zou kunnen fungeren als een mediatie variabele.

Interactie effecten; opnieuw laat de regressie analyse zien dat ze significante invloed hebben op een afhankelijke variabele. De eerdere ontdekte combinatie van Afspraken X Duidelijkheid van Organisatorische doelen X Innovatie en Flexibiliteit toont opnieuw aan een zeer significante invloed te hebben (β=.39 , *p*< .002). Weer laat de analyse in deze gecombineerde variabele zien dat een hoge mate van het maken van afspraken altijd een positieve invloed heeft op een goede samenwerking. Daarnaast is duidelijk dat hier Duidelijkheid van organisatorische doelen net minder invloed heeft op samenwerking dan Innovatie en Flexibiliteit. Dit is net andersom dan bij de afhankelijke variabele "zachte samenwerking".

Er zijn twee variabelen die door "zachte samenwerking" invloed hebben op harde samenwerking. Hier wordt "zachte samenwerking" een mediatie variabele. Dit geldt voor de samengestelde variabele Afspraken X Duidelijkheid van Organisatorische doelen X Innovatie en Flexibiliteit als volledige mediatie, en voor vertrouwen als gedeeltelijke mediatie. Gedeeltelijke mediatie betekent dat de variabele zowel direct op de afhankelijke variabele "harde samenwerking" werkt, als via de variabele "zachte samenwerking".

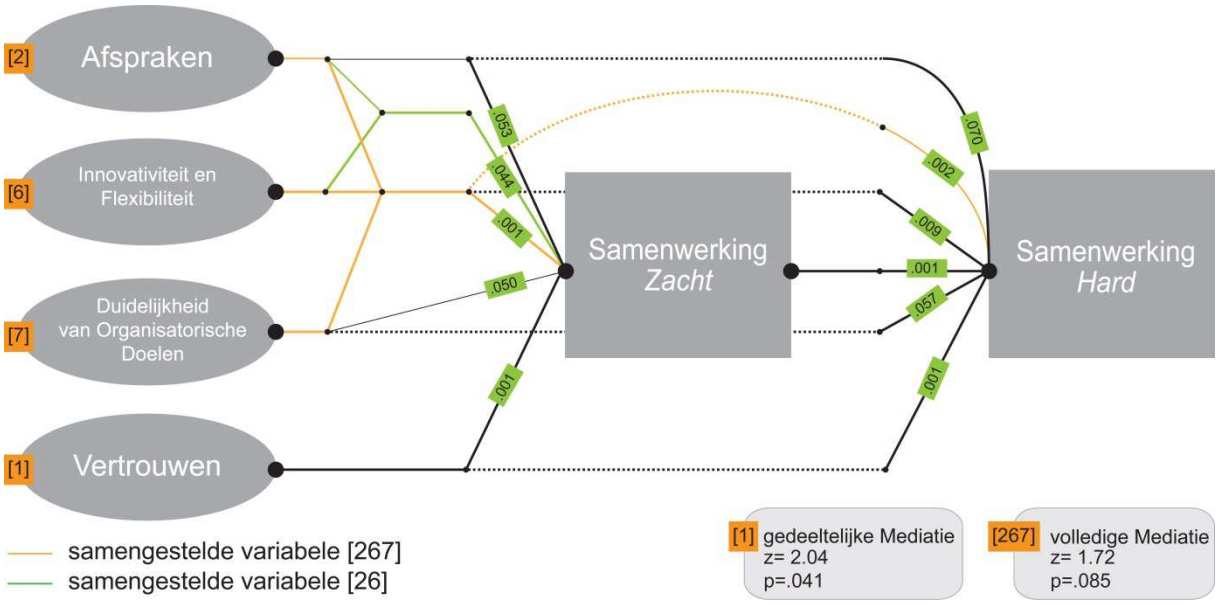


Figure C Samenwerkingsmodel (eigen ill., 2013)

De samenhang tussen het klimaat van de organisatie en samenwerking wordt vaak gemaakt, maar waar wanneer het veiligheid of klantvriendelijkheid betreft al veel onderzoek is gedaan, bestaat er een hiaat in kennis waar het gaat om klimaat van de organisatie aangaande samenwerking (Schneider, Ehrhart, & Macey, 2013). Het is onbekend welke factoren van organisatieklimaat (het meest) belangrijk zijn om een omgeving te creëren waar goede samenwerking kan floreren. In deze studie wordt gesteld dat wanneer het verschil in het organisatie klimaat van beide organisaties klein is, dit ten goede komt aan de samenwerking. Deze uitspraak werd gebaseerd op basis van eerdere onderzoeken (Hanssen & Nohria, 2004; Hardy, Lawrence, & Grant, 2005; Hord, 1986; Meng, Sun, & Johnsen, 2011; Patel, Pettitt, & Wilson, 2012). De resultaten van het huidige onderzoek laten zien dat verschillen in klimaat niet negatief of positief de samenwerking tussen dochterondernemingen beïnvloeden. Wel zijn er klimaatfactoren gevonden van welke bewezen is dat ze zeer belangrijk zijn voor de omgeving waarin goede samenwerking mogelijk is. Duidelijkheid van organisatorische doelen en Innovatie en Flexibiliteit zijn de twee meest belangrijke factoren wanneer er wordt gekeken naar de

totale data set. Wanneer er wordt ingezoomd op de twee afzonderlijke dochterondernemingen kunnen er verschillen worden onderscheiden. Waar binnen de gehele data set geen significante invloed wordt gedetecteerd van de factoren Traditie en Betrokkenheid, wordt deze wel waargenomen binnen de werkmaatschappijen Techniek en Utiliteitsbouw. Bij Techniek hebben deze factoren een negatieve invloed op samenwerking, en bij Utiliteitsbouw heeft dit en klein positief effect.

Uit de literatuurstudie komt naar voren dat het maken van afspraken over gezamenlijke doelstellingen, communicatie, billijkheid en project processen allemaal bijdragen aan een betere samenwerking. Dit komt overeen met het onderzoek van Klein Woolthuis, Hillebrand & Nooteboom (2005), dat stelt dat vertrouwen en contracten een surrogaat voor elkaar kunnen zijn. De regressie analyse toont dat het maken van afspraken een positieve invloed heeft op de samenwerking. In dit onderzoek is tevens het statement gemaakt dat vertrouwen een positieve invloed heeft op samenwerking, en een negatieve invloed op het maken van afspraken. In deze studie, gebaseerd op regressie analyses en een casestudie op open vragen vanuit de vragenlijst, kan worden geconcludeerd dat deze hypothese onjuist is. Echter toont de studie wel aan dat vertrouwen en het maken van afspraken beiden een positieve invloed op elkaar hebben. De regressie analyse toont onbetwistbaar de positieve relatie tussen vertrouwen en de kwaliteit in samenwerking. Dit bevestigt het eerdere onderzoek naar de relatie tussen vertrouwen en samenwerking van Mengt et al.(2011), Patel et al. (2012) en Sarkar et al. (1998), waarin wordt gesteld dat vertrouwen een van de belangrijkste ingrediënten is voor een goede samenwerking. Daarnaast stelde deze studie voor, dat wanneer verschillen in organisatieklimaat kleiner zijn, het vertrouwen binnen de samenwerking groter wordt. Data analyse uit deze studie toont aan dat hier geen positief antwoord op kan worden geven en naar aanleiding daarvan wordt de hypothese dan ook verworpen.

Goede samenwerking kan worden beschreven als het proces van het bereiken van de vooraf gesteld doelen, verworven door een hoge groepseffectiviteit, een hoge productiviteit, met het committeren van middelen ten behoeve van het proces en naar tevredenheid van de individuen werkend in het proces. Dit onderzoek stelt duidelijk vast dat de invloed van het klimaat van de organisatie via de variabelen Duidelijkheid van Organisatorische doelen en Innovatie en Flexibiliteit een positieve invloed heeft op de mate van samenwerking tussen dochterondernemingen met verschillende disciplines in de bouwsector. In afzonderlijke zaken spelen ook traditie en betrokkenheid hierin een rol, zij het een negatieve zin. De resultaten laten zien dat vertrouwen in elkaar en het maken van afspraken in dit geval geen surrogaat voor elkaar zijn, en dat ze zelfs een positief effect op elkaar zouden kunnen hebben. In lijn met de verwachtingen toont dit onderzoek het belang van het maken van afspraken over samenwerking tussen dochterondernemingen. Deze afspraken zouden moeten worden gemaakt op de factoren die het meest belangrijk zijn voor een goede samenwerking; *continue verbetering, vertrouwen, toewijding, uitlijning van doelen of doelstellingen, ondersteuning van de samenwerking, en communicatie.*

Naar aanleiding van dit onderzoek kunnen een aantal aanbevelingen worden gedaan omtrent de implementatie. De vragenlijst die is ontworpen voor dit onderzoek kan in een afgeslankte vorm worden gebruikt als tool om de huidige situatie van de samenwerking vast te stellen. Naar aanleiding hiervan kan een strategie worden opgezet. De interactie tussen de verschillende factoren is bepalend voor de stappen die dienen te worden genomen. Vertrouwen kan worden opgebouwd door Afspraken te gebruiken. Begin bij het maken van makkelijke afspraken en zet zo de “trust cycle” in werking. Ook is de factor Duidelijkheid van Organisatorische Doelen makkelijker te beïnvloeden dan bijvoorbeeld Innovatie en Flexibiliteit. Wanneer de dochterondernemingen op alle zes belangrijke onderwerpen afspraken hebben gemaakt is het evident dat dit helder en duidelijk naar de werknemers wordt gecommuniceerd. Werknemers moeten begrijpen dat zij met het nastreven van de doelen van de samenwerking, ook de doelen van de eigen organisatie nastreven. Hiervoor moeten hoofdrolspelers met een grote draagkracht worden aangewezen.

Voor verder onderzoek, kan er op een grotere schaal worden gekeken naar de verschillen in organisatie klimaat in relatie tot samenwerking. Dit onderzoek heeft geen antwoord kunnen geven op

deze vraag. Voor de validatie van dit onderzoek dient dit onderzoek te worden herhaald op grotere schaal en onder andere dochterondernemingen van andere bedrijven en wellicht met andere disciplines.



Figure D De zes meest belangrijke factoren omtrent samenwerking (eigen ill., 2013)

List of Figures

Figure A Collaboration model (own ill., 2013) xiii
Figure B The six most important factors for collaboration (own ill., 2013) xiv
Figure C Samenwerkingsmodel (eigen ill., 2013) xvii
Figure D De zes meest belangrijke factoren omtrent samenwerking (eigen ill., 2013) xix
Figure 1 Collaboration (own ill., 2013) 2
Figure 2 Chapter index (own ill., 2013) 3
Figure 3 Different levels within Royal BAM Group NV. (own ill., 2013) 6
Figure 4 Steps in the research project (own ill. 2013) 11
Figure 5 Survey research, in the research spectrum, derived from (Christiaans et al., 2004, p. 38) 11
Figure 6 People in organizations, climate and culture (own ill., 2013) 14
Figure 7 Collaboration in two pictures (own ill., 2013) 16
Figure 7 Working situation (own picture, 2013) 19
Figure 9 Clustering of factors and criteria based on Meng et al. (own ill, 20130) 21
Figure 10 Contracting relationship continuum (Cheung et al., 2003, p. 335) 23
Figure 11 Trust in organizations (own ill., 2013) 24
Figure 12 Conceptual Design (own ill., 2013) 26
Figure 13 Research Framework, (own ill., 2013) 30
Figure 14 Collaboration between the Offices of Utiliteitsbouw and Techniek (own ill., 2013) 32
Figure 15 Six most important factors (own ill., 2013) 37
Figure 16 Collaboration Model (own ill., 2013) 42
Figure 17 Collaboration Model Operating Company BAM Utiliteitsbouw (own ill., 2013) 44
Figure 18 Collaboration Model Operating Company BAM Techniek (own ill., 2013) 45
Figure 18 Collaboration Model (own ill., 2013) 52
Figure 20 The improvement wheel (Hutton, 2000, p. xv) 53
Figure 21 Assisting model for making the state of collaboration insightful (own ill., 2013) 55
Figure 22 Current Situation Roadmap (own ill., 2013) 64
Figure 23 Step one, Roadmap (own ill., 2013) 64
Figure 24 Step two, Roadmap (own ill., 2013) 65
Figure 25 Step three, Roadmap (own ill., 2013) 66
Figure 26 Step four, Roadmap (own ill., 2013) 66
Figure 27 Step five and six, Roadmap (own ill., 2013) 67
Figure 28 Step seven, Roadmap (own ill., 2013) 68
Figure 29 Step eight and nine, Roadmap (own ill., 2013) 68
Figure 30 Ideal state, Roadmap (own ill., 2013) 69

List of Tables

Table 1 Summary Problem Statement 8
Table 2 Names and Location of Collaborating Subsidiaries involved in the research 34
Table 3 Correlation Matrix 39
Table 4 Result of Regression Analysis with Dependent Variable: Soft Collaboration and Hard Collaboration (n= Full BAM) 40
Table 5 Number of Differences in Organizational Climate factors versus Rate of Collaboration 45

List of Graphs

Graph 1 Profile of Collaboration Den Haag & West (own ill., 2013) more can be found in Appendix M 47
Graph 2 Organizational Climate Profile Collaboration Utiliteitsbouw Den Haag and Techniek West 62
Graph 3 Results Soft Collaboration and Hard Collaboration 63
Graph 4 Trust level of Utiliteitsbouw Den Haag and Techniek West 63

List of Contents

Preface ix
Summary xi
Collaboration Model for subsidiaries with different disciplines in construction industry xii
Samenvatting xv
Samenwerkingsmodel voor dochterondernemingen met verschillende disciplines in de bouwsector xvi
Introduction 1
Research Design 5
2.1 Situation Sketch 5
2.2 Problem Analysis 7
2.2.1 Problems regarding Organizational Climate and Culture 7
2.2.2 No Agreements made 7
2.2.3 Positive notes 8
2.2.3 Summary of problem statement 8
2.3 Research Objective and Research Questions 8
2.4. Definition, Scope and Research Object 9
2.5 Research Methodology 10
2.5.1 Theoretical background 10
2.5.2 Research Approach 10
2.5.3 Research Methods 11
2.5.4 Data Gathering 12
Theoretical Framework / Conceptual Design 13
3.1 Organizational Climate and Culture 14
3.1.1 Organizational Culture 14
3.1.2 Organizational Climate 14
3.1.3 Measuring Organizational Climate 15
3.2 Collaboration 16
3.2.1 Different theories and viewpoints on collaboration 17
3.2.2 Good Collaboration 20
3.2.3 Differences and similarities in theories 20
3.2.4 Organizational climate and collaboration 21

3.3 Partnering Charts 22
3.3.1 Theory on Partnering 22
3.4 Trust 24
3.4.2 Trust and Organizational Climate 25
3.4.1 Measuring trust 26
3.5 Conceptual Design 26
3.5 Tree-diagrams of key concepts 26
3.6 Preliminary conclusion 27
Good Collaboration 27
Factors that affect good collaboration 27
Conducting the Research 29
4.1 Research Framework 29
4.2 Getting the response you want 29
Digital questionnaire 30
4.3 Survey Design 30
4.4 Information Gathering 31
Data Analysis 33
5.1 Method 33
5.1.1Participants and Procedure 33
5.1.2 Measures 34
5.2 Results 36
5.2.1 Confirmatory Factor Analysis and Level Analysis 36
5.2.2 Results for BAM 38
Descriptive Stastics 38
5.2.3 Results for Utiliteitsbouw and Techniek 42
5.3 Additional Analysis 45
5.3.1 Hypothesis 1 45
5.3.2 Hypothesis 2 46
5.3.5 Hypothesis 5 47
5.4 Preliminary Conclusions 47
Discussion and Conclusion 49
6.1 Discussion 49
6.1.1 Theoretical Implications 49
6.1.2 Managerial Implications 52
6.1.3 Roadmap 54
6.2 Conclusion 59
6.3 Limitations and suggestions for further research 60
Strategy for improving the rate of collaboration for BAM Den Haag – West 61

7.1 Description of the current situation 61
7.2 Strategy 64
7.3 Summary and Conclusion 69
Bibliography 71

1

Introduction

Everywhere in the world people are working together. Ever since the times of the hunter-gatherers, the *Homo* understood that with working together one can accomplish more than alone. Collaboration is not just something of this time; it is something mankind has always done. Collaboration is a word that is often used, but a very clear understanding of what collaboration actually is, is missing. Almost everybody seems to understand the importance of collaboration but the real interpretation remains vague. According to Patel et al. collaboration in the simplest sense of the word can be seen as "*two or more people engaged in interaction with each other, within a single episode or series of episodes, working towards common goals" (Patel et al., 2012, p. 1).* In a research from the human resource management point of view, the more elaborate definition was drawn; *Collaboration is defined as an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal (Bedwell et al., 2012, p. 130).* Here explicitly the word *process* is added, which points out the part that collaboration is never a product but rather an active process that can evolve over the course of time.

The reason why people would want to work in collaboration varies, but from a business point of view the advantages are quite clear. According to Hansen and Nohria (2004), the competitive advantages one can gain from collaboration can vary from business to business, but they can all include: *"(1) cost savings through the transfer of best practices, (2) better decision making, (3) increased value through the sharing of expertise and product among subsidiaries,(4) innovation through the combination of cross-pollination of ideas and (5) enhanced capacity for collective action that involves dispersed units" (Hansen & Nohria, 2004, p. 23)*. And these advantages could be even bigger when the firms have related businesses or if they are subsidiaries. Collaboration between different companies is a subject that is already under discussion for a longer time, and collaboration between different disciplines is something that has been under investigation as well, but mostly in the design phases of the project. And the special relationship subsidiaries have towards each other and the collaboration between these subsidiaries is not something that has often been looked at.

Subsidiaries operating within the same working field (in this research construction) have a special relationship with each other. Subsidiaries are separate companies, operating with their own accounting. In the past, subsidiaries could often be seen as little copies of the parent company, but according to Gammelgaard et al. this has been changed. Nowadays subsidiaries are viewed as "*units*

that are decentralized and differentiated in terms of relationships with subsidiaries. In principle, each relationship between a parent company and a subsidiary, or between one subsidiary and another is unique in terms of the scale and scope of activities, resource flows, strategic mandates, and autonomy" (Gammelgaard, McDonald, Stephan, Tuselmann, & Dorrenbacher, 2012, p. 1159). Subsidiaries need to generate their own profit, and can therefore be seen as companies with different interests. On the other hand, subsidiaries operate under the same name, and sometimes the client may not even notice the difference between subsidiaries. The collaboration between subsidiaries is not always that obvious as one would expect. Collaboration is even more difficult is when the subsidiaries have different disciplines. It can also be the case that subsidiaries are the result of an acquisition by the holding company. In this case it is often that the company culture of one varies from the other. According to theory about the challenge of merging, "*people define themselves not only on the basis of their individual characteristics and their interpersonal relations (i.e. personal identity) but also in term of characteristics of an in-group to which they belong" (Giessner, Tendayi Viki, Otten, Terry, & Tauber, 2006)*. The difference in corporate in-group culture and the difference in discipline are two factors that could influence the collaboration.

Because of the nature of the work that is done by construction companies, the organisation structure is often project based. These projects are executed by teams that can vary in composition. Not every project is done by the same team, and this makes collaboration between these disciplines from a knowledge-management point of view difficult. Not always will the knowledge that is gained from one project automatically be implemented in the next. On the other hand, the subsidiaries also work together on a more permanent basis, mainly on higher management levels. The relationship between the chief-executives of the subsidiaries is different than on project levels.



Figure 1 Collaboration (own ill., 2013)

In the recent economic crisis, margins have become smaller and the room to make profit has diminished. According to the a market review based on the European market, the deteriorating economic outlook has negatively affected building permits and initiatives of new building projects (Alderman & Shelbourne, 2012). In Europe, in 2011 the construction output has been declined to 16% less than this was in 2007. Where the larger construction companies can make the difference is within integrated contracts, where they can fully integrate all the knowledge they have in-house. These contracts are becoming more common and collaboration within these projects is evident to fully be able to profit from this advantage. Some disadvantages of collaborative working practices are noticed by Hughes et al. They mention *"many firms spend a lot in negotiating collaborative working arrangements based on the promise of a certain volume of work, but then the spending programme turns out not to be as high as promised. Some frameworks are well known for being very expensive for getting into even though no projects flowed from them"(Hughes, Hillebrandt, Greenwood, & Kwawu, 2006, p. 96).*

The problem of collaborating subsidiaries is an acknowledged problem in the Netherlands, and several companies are working on it. For example Strukton, who published on March 2013 to be willing to work at the collaboration of the different subsidiaries "Bouw" and "Worksphere"(Kuit, 2013). But also other sectors like the healthcare-sector or the educational sectors are trying to improve their way of collaboration (PGO support, 2011). Other building companies like Heijmans, and consortium organisations like A4all (Boskalis, Heijmans & VolkerWessels), are doing research on collaboration in general, collaboration in joint ventures and collaboration influenced by cultural differences within the

organisation. Even the Dutch government is trying to find ways to enhance the willingness of their employees to work together and to find common interests to realize operational excellence (De Werkmaatschappij, 2013). Clearly there is a market demand for information on this topic.

For this research, the subsidiaries of Utiliteitsbouw and Techniek of the BAM Holding NV will be the object of my study. BAM Utiliteitsbouw is active in building any buildings, dwelling project excluded. BAM Techniek provides for all mechanical and technical installations in buildings. They often work together on project but also execute projects with other partners. They have a preferred supplier relation which is imposed from the holding company.

The research report will contain the chapters as can be seen in Figure 2. They roughly follow the research phases that will be completed during this research. For a more elaborate description of the research phases, see section 2.5. In the following chapter, the research design will be elaborated. The next steps are setting the theoretical framework and designing the conceptual model in the chapter Theoretical Framework. After this, the executing of the research can start. During chapter 4, the Research Execution will be discussed and Chapter 5 will show the results of the research. The results will be the input for the theoretical implications and managerial implications made in chapter 6, as a part of the discussion. The conclusion and recommendations will follow. To show how this research could be employed in real word situations, the last chapters shows a case study. Supporting figures and tables to this research can be found in a separate report containing all the appendices.

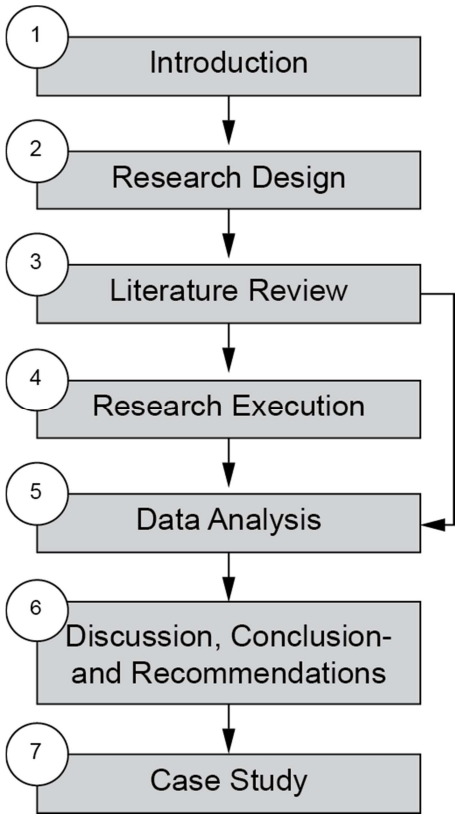


Figure 2 Chapter index (own ill., 2013)

2

Research Design

In this section, an overview will be given of the conducted research. The chapter starts with a sketch of the situation of the holding company, which is the subject of this study. After this, the problem will be further explored during the problem analysis, using the interviews which can be found in Appendix B. The research objective and the problem questions will follow from the problem analysis. The research scope will delineate the research project and can be found in section 2.4. This chapter will end with the explanation of the research methodology.

2.1 Situation Sketch

Due to mergers and acquisitions, construction companies have grown larger and larger over the years. The assumption that these subsidiaries are automatically working closely together is a mistake. The different subsidiaries have different backgrounds, different disciplines, different design strategies and different corporate cultures. And furthermore, since they all need to make their own profit, they operate under different interests. On the outside they appear to be one company, but it will take a lot of effort before these companies will really become one corporate culture, if this even happens at all. (Nahavandi & Malekzadeh, 1988).

One of such companies is BAM, which is the focus company of this research. The Royal BAM Groep NV. is the holding company for several subsidiary companies. The four sectors of these subsidiaries are Building (Bouw), Real Estate (Vastgoed), Infra (Infra) and PPP (Pps). Under these sectors, several BVs are organised. Next to this, BAM is also organized by countries (Netherlands, Belgium, UK, Ireland, Germany and Worldwide), each country having several regional offices. All of these separate offices are different corporate entities. Some of these subsidiaries are in overlapping sectors. For instance, BAM Utiliteitsbouw BV. is active in both the sector Building and Real Estate. This means the company is a very complex organisation, and there is yet no full insight in how close the ties between these subsidiaries are (see Appendix A – Figure 1).

BAM Utiliteitsbouw and BAM Techniek both act as contractors. BAM Utiliteitsbouw focusses on building engineering and BAM Techniek focusses on the installations within the building. Since buildings become more and more complex and the proft become smaller and smaller, the integration between construction and installations becomes more important. Nowadays, in some utility buildings, the installations can take up more than 50% of the total budget. This means that the installations

become larger and more important and the relationship between these disciplines is changing. The relationship between the two companies in project-teams used to be one of contractor to sub-contractor. But with the emerging growth and importance of installations within the building industry, this relationship is sometimes reversed. This changing relation to each other is difficult for the employees to handle.

Both the companies operate under the same name, namely BAM. But they are in fact two different companies. Not all regional offices are working from the same building, most of them are in separate buildings in different cities. BAM Utiliteitsbouw Den Haag and BAM Techniek West are experimenting with housing on one location and even moved to a new building during this research. This can already be seen as an advantage in contrary to other subsidiaries in other regions. The directors of the acquisition departments both subsidiaries see the collaboration as important. But, in their own words, due to the recent recession the improvements in collaboration are under pressure and it is easy to fall back into old habits. More conflicts between the subsidiaries arise and the there is no clear solution to this.

The collaboration between BAM Utiliteitsbouw and BAM Techniek is not always a fact. It mostly depends on the client whether BAM Utiliteitsbouw is free to select his own sub-contractor or secondary contractor. In the vision of the Royal BAM NV., BAM Techniek and BAM Utiliteitsbouw should be each other's preferred partner for collaboration. This means that if the opportunity arises, the two subsidiaries work together on projects. When new projects come in, they make an assessment regarding time and capacity, whether it is possible to work together. But they will always first come to each other with new work.

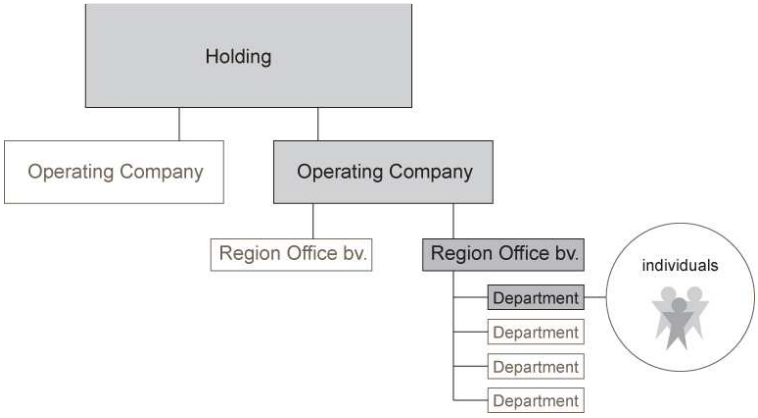


Figure 3 Different levels within Royal BAM Group NV. (own ill., 2013)

Furthermore, within the BAM Utiliteitsbouw Regio Den Haag, different departments exist. These originate from the different phases within the designing and realization phases. These different departments have thus different tasks within the realization process of a project. The employees working in these departments have contact with each other, from BAM Utiliteitsbouw to BAM Techniek and vice versa. The feeling about collaboration between the two subsidiaries differentiates between the departments and sometimes even per person. Some departments think the collaboration is excellent, and other departments do not even want to work with each other anymore, and rather select another partner. Figure 3 shows the different levels at which the employees could work together. The Royal BAM Group nv. is the holding, then follow the operating companies (like Utiliteitsbouw), then follow the Regional Offices (like Region Den Haag or Region West), then follows the different departments and then the individuals working on these departments. Collaboration takes place on all these levels.

There is a difference in the process steps that BAM Utiliteitsbouw and BAM Techniek go through in their process of handling a project (see Appendix A – Figure 2 and 3). Each of the steps in the phases could be handled by a different project team. However, sometimes BAM Utiliteitsbouw tries to

implement the knowledge of the next phases earlier into the project, by integrating someone from this phase into the project team of the prior phase. By this, the phases blend in a little bit. With BAM Techniek, these phases are strictly separated. They do try to move along with BAM Utiliteitsbouw with implementing knowledge from other phases into the acquisition phase, but in reality it does not really happen. Which would explain why sometimes the “not invented here” syndrome is shown during the realization phases. Appendix A – Figure 3 shows the process steps that are taken in the life-cycle of BAM Techniek. It can be seen clearly that the models of these processes do not match one-to-one.

2.2 Problem Analysis

Two subsidiaries of the Royal BAM NV. are described in the prior paragraph. But this still does not give insight on why the collaboration between these subsidiaries is difficult. Interviews were held with employees representing the entire organisation of both BAM Utiliteitsbouw and BAM Techniek to gain a more deeper understanding. The interviews can be found in Appendix B. The items that came up more than once are listed and categorized below.

2.2.1 Problems regarding Organizational Climate and Culture

Looking at the organizational charts, differences can be spotted in the way the organization is organised. The organizational structure of the companies is different. This can be seen in the way the design phases are separated, how different phases are integrated and how knowledge between the different departments is shared. Talking to employees it can be noted that the decision-making powers between the subsidiary management levels vary. Employees mention this creates difficulties for the collaboration of employees from the same level, since they cannot make agreements with each other. Also an important factor is in-group behaviour. The communication between the departments is often lacking and the consequence is that they do not understand each other’s decisions. A lack of insight in each other’s process also creates problems. The lack of insight and the difference in decision making results in distrust and hesitance in openness towards one another.

Culture (or organizational culture**)** also plays a role in the problems about collaboration between building engineering and mechanical & technical engineering. Traditionally, the project leaders from building engineering take the lead on a project. BAM Utiliteitsbouw plays the part of the head-contractor and BAM Techniek plays the role of sub-contractor. But nowadays some (or most) projects are based on a Design & Build contract and within these contracts the subsidiaries should operate on an equal level. This is sometimes hard for the employees of building engineering, who automatically are inclined to play the head-contractor role. This can be insulting to the employees of mechanical & technical engineering.

2.2.2 No Agreements made

Out of the interviews the subject of making agreements can be extracted. Both subsidiaries agree that not always agreements are made for collaboration beforehand. Supposedly this leads to a lot of uncertainties during the collaboration process. All employees say this originates from the general conception: “Well, we are sister companies, so we don’t have to make agreements or sign contracts beforehand. After all, in the end, we are one company”. The most common agreements normal companies or partners share with each other, are not made here. They miss agreements on: (1) goals, (2) conflicts settlement, (3) profit/loss distribution and (4) role description. Furthermore, there are no consequences when agreements are broken. This lack of agreements is really characteristic for the relationship between subsidiaries.

Feedback sessions about collaboration are not always held, and when they are held they do not focus enough on the collaboration process but just on the result. Also the feedback does not always get reflected back to the employees who worked on the project.

It is also the question whether the two subsidiaries really **share the same goal** during the projects. Since the two companies are “sentenced” to one another for collaboration, they have to work together. The two subsidiaries have the power to make an inventory and say: “We do not have enough

time/manpower to do this job". The other party is then free to choose another contractor to do the job. But when they work together during tender phases, some projects seem to get a preferred treatment in comparison to others. There is no consensus between the subsidiaries on the importance of the project. Methods differ between the subsidiaries on how to prioritize the importance of the projects and the information sharing about this. Furthermore, the subsidiaries have to make their own profit. So somewhere in the back of their mind they will try to protect their own profit.

2.2.3 Positive notes

During the interviews, also positive feedback was given on the collaboration between the two subsidiaries. Both the regional managers from the services tracks of BAM explained that by **taking the client as a starting point**, consensus could be reached on how to deal with the client. And agreements on how to solve the client's problem can be made. Still sometimes the people working on lower management levels could argue with each other, but by showing them from a higher management level how it's done (**good leadership**).

2.2.3 Summary of problem statement

Looking at the barriers to collaboration that Hardy et al. (1992) categorized during their study to Community Care Management, a lot of similarities can be spotted. The problems that were spotted are categorized and can be found in Table 1.

Table 1 Summary Problem Statement

Category	Problem
Structural	Inter-organizational complexity
Procedural	Differences in planning and cycles
Financial	Separate Funding
Professional	In ideologies and values Professional self-interest Conflicting views about interests and goals
Status and Legitimacy	Organizational self-interest

The literature topics that can be distinguished from these problems are *organizational climate, organizational culture, collaboration and partnering.*

2.3 Research Objective and Research Questions

Previous research on collaboration in construction management mostly focussed on inter-firm collaboration (Barlow & Jashapara, 1998; Bresnen & Marshall, 2000; Cheung, Ng, Wong, & Suen, 2003; Meng et al., 2011; Sarkar, Aulakh, & Tamer Cavusgil, 1998). The special relationship subsidiaries have towards each other is often overlooked in construction. Since a lot of research on collaboration has already been done, the goal of this research is to focus on filling this knowledge gap on inter-subsidiary collaboration and how the existing knowledge could be applied in improving the current situation.

To summarize, the research goal can be described as follows: *To contribute to the development of a policy dealing with collaboration between subsidiaries from different disciplines.*

To specify this for the company which presented this problem, a roadmap for overcoming the differences between the desired and the current situation will be presented. This roadmap will explain which factors should be altered and which steps should be taken towards a better collaboration with the other subsidiary.

To be able to reach the research goal, it is important to precisely formulate the research question. This question will be the base of the conducted research and will be answered throughout the research. The main question will be supported by sub-questions, to solidify the answer.

The main research question is formulated as follows: *How does organizational climate influence the collaboration between subsidiaries working in different disciplines of the construction industry and how is this collaboration influenced by agreements?*

The sub-questions that will be supportive in answering the main question are:
- What is good collaboration?
- What factors affect good collaboration?
- What are the differences in organizational climate between collaborating subsidiaries within one holding, in the Netherlands?
- Could the knowledge gained by this comparison be employed in creating a good collaboration between the subsidiaries?
- How do agreements made in partnering charts help in coming closer to good collaboration?

2.4. Definition, Scope and Research Object

Stating definitions of the key concepts used in the problem statement, the research goal and the research question will help to limit and structure the research project. This will be done for the key concepts organizational climate, collaboration and organizational change. Furthermore the research domain and the assertion will be defined.

For the purpose of this research project "organizational climate" is understood to be *"shared perceptions organizational members have about their organization and work environment" (Robbins & Judge, 2012, p. 245)*. According to Robbins and Judge organizational climate can be explained as team spirit in the organizational level. And it originates from the organizational culture, which is understood to be *"a system of shared meaning held by members that distinguishes the organization from other organizations" (Robbins & Judge, 2012, p. 243).* According to Schneider, Brief and Guzza (1996), the culture and climate together can be described as "the feel" of an organization. For this research project, collaboration will be understood to be *"an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal" (Bedwell et al., 2012, p. 130).* These theories will be further elaborated on in chapter 3.

Furthermore, the words "subsidiary", "holdings" and "different disciplines" have been addressed in this research report regarding the *research domain*. These will be defined here as well. A subsidiary is defined as a company which is completely or partly owned and partly or wholly controlled by another company. The subsidiary can be a company, corporation or limited liability company. The controlling entity is called its parent company, or holding company (Financial Times Lexicon, Merriam Webster Dictionary, & Oxford Dictionaries, 2013). For the purpose of this research project "disciplines" is understood to be the knowledge or wisdom associated with one academic field of study or profession. A discipline incorporates types of knowledge, expertise, skills, people, projects, communities, problems, challenges, studies, inquiry, approaches and research areas that are strongly associated with academic areas of study (Wikipedia, 2013). To narrow down the research for this research project only the sub-category of disciplines "building engineering" and "technical and mechanical installation engineering" will be taken into account. This is because the researcher has access to the employees of these departments.

Scope can be explained as *"the extent of the area or subject matter that something deals with or to which it is relevant" (Oxford University Press, 2013).* Stating the scope involves setting boundaries for the project. It states what will be left out of the project and where the focus is on. Stating all project boundaries together will give insight to the extent of the research. Since the collaboration between the subsidiaries occurs on multiple levels within the organization and in multiple phases of the building process, this research will only focus on one phase. The integration of the disciplines has the most advantages in the first phase of a project, here the integration of the disciplines could be most of use. This is why the tender phase is the phase to focus on. Furthermore, for the level of management the focus will be on all the managerial levels.

The research will take place within the following boundaries:

- Individual roles and individual characteristics of the persons involved in the organization will be excluded from the research.
- The research is conducted towards the tender phase The survey will be distributed on all management levels
- The geographical boundaries of the project are The Netherlands

Next, the research object is determined. The research objects in this case are all the regional offices from BAM Utiliteitsbouw and BAM Techniek. First an inventory is made whether these regional offices take part in collaboration with another subsidiary. If this is the case, the regional office is suitable to take part in the research. Still, to be absolutely specific, the study will look at the regional offices of a subsidiary-based construction company. To be able to participate in the research, this regional company needs to be:

- Responsible for their own profit
- Have taken part in a joint project with another subsidiary from a different discipline (either Utiliteitsbouw working with Techniek or Techniek working with Utiliteitsbouw)
- They need to be operated individually and not be dependent on each other for daily operations

2.5 Research Methodology

This paragraph will explain how the research will be conducted. First the theoretical background will be set. Next the research framework will be introduced, which will show how the different theories will be used within the research. The research methods will be presented. Finally the collection of data will be discussed.

2.5.1 Theoretical background

When looking at the theoretical background of research, two philosophies can be described, namely interpretivism and logical positivism. The research philosophy is used to describe the worldview and the perceptions of the researcher according to the criteria that determine the validity of the research. On one hand, the two philosophies seem to conflict with each other but on the other hand they are also complementary to each other. Logical positivism assumes that when patterns of cause and effect exist, they exist outside the mind of the researcher. Even when the researcher would not see it, it would still be there. Interpretivisms assume that all individuals experience the same event differently and the meanings can only be understood through social constructions by researchers. What all researches do admit, if you were to be a positivist or an interpretivists, is that *"the artefacts we build to understand the world (theories, frameworks, constructs etc.) are socially constructed. Even those who believe in an objective reality understand fully that no fool proof way of knowing this reality exists (Weber, 2004).* This would assume that true objective research is impossible, but on the other hand that there is need to strive to be as objective as possible. During this research, neither views are adopted, but rather a combination of both. The understanding is made, that some things are true, whether we like it or not, and some things are true or false, depending on how one would look at it. It is evident to keep in mind that sometimes, what is true for one is not necessarily true for someone else. This needs to be taken into account when the questionnaire is drafted.

2.5.2 Research Approach

The nature of the research is automatically linked to the research objective, the research questions and preconditions like time, money and available support (Christiaans, Fraaij, De Graaf, & Hendriks, 2004). The research will be both exploratory and explanatory. It will be a problem-analysing research. It is an organizational problem which can be defined as the tension between the current and the desired situation. By matching the data analysis with the existing literature,a policy can be written on how to overcome this before mentioned problem. This means the research is set up as a practice-oriented research project. It is meant to provide knowledge and information that can contribute to a successful intervention in order to change an existing situation (Verschuren & Doorewaard, 2010, p.

45). The intended outcome of the research is a policy how to deal with the differences in organizational climate and the degree of collaboration, in order to enhance the organizational performance of joint collaboration.

The steps that will be taken during this research are the following, and are made visual in Figure 4. First, during the exploratory phase, some qualitative research in the form of interviews was conducted to be able to formulate a research problem. Also the research question, the objectives, approach and methodology were designed. Second, literature research will be conducted to provide for a conceptual framework. Data will be collected by surveys and interviews (both quantitative and qualitative research) to be able to test the hypothesis drawn from the conceptual framework. This will be step three. The following step is to analyze the empirical findings from the survey research and compare them with the theoretical findings. The last step is to draw conclusions, write a discussion and recommendations. Besides this, the findings are composed in such a way that new policy recommendations are made for dealing with the gap between the desired and the current situation.

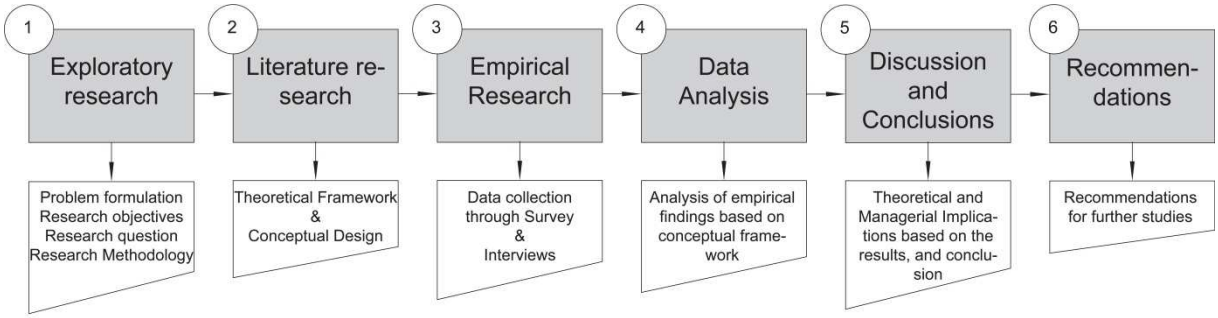


Figure 4 Steps in the research project (own ill. 2013)

The data will be collected through a (a cross-sectional research) survey. Roughly, data collection methods can be split up in two main categories; qualitative research and quantitative research. According to Christiaans et al. quantitative research makes use of techniques for statistical data-analysis to be able to make generalizing claims on the bases of the research results. This is a broad research rather than in depth. Qualitative analysis on the other hand, is set up as a research which is dedicated to unique situations, which can be meaningful in the specified context. Qualitative research mainly uses descriptive methods. As can be seen in Figure 5, the survey research can make use of both quantitative and qualitative research.

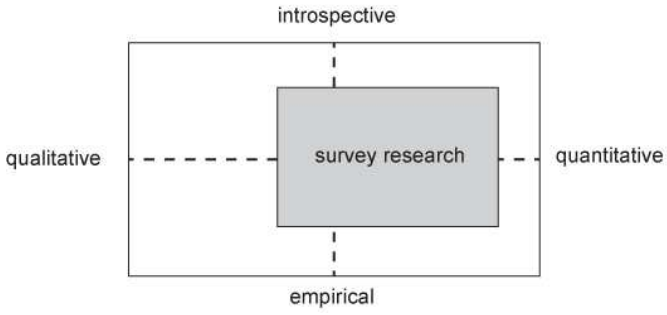


Figure 5 Survey research, in the research spectrum, derived from (Christiaans et al., 2004, p. 38)

2.5.3 Research Methods

The assumption is made that the investigated collaboration problem originates (among others) from an organizational climate difference. The first step of the research is to investigate the difference in organizational climate between the subsidiaries from the same holding, by using the Organizational

Climate Measure (OCM). This method will be further elaborated on in the chapter 3. This could be seen as a quantitative analysis. Besides the measurement of the Organizational Climate, the degree of collaboration should be emphasized. The next object that is included in the questionnaire is how the regional offices use agreements to support their collaboration and how they think about making agreements. The interrelated issue between making agreements, organizational climate, collaboration and partnering is trust. This is incorporated in the questionnaire as well. During chapter 3, different theories on collaboration will form the basis of a tree-diagram which will provide the input criteria for the questionnaire. The same will be done for trust and for agreements. The theories on these subjects will be combined to one questionnaire.

The second step is to analyze the data collected from this research, to recognize differences and to link these to collaboration policy theories. Hereby the gap between the desired situation and the current situation could be limited. The recommendation that will be made from that can be implemented on the case of BAM Techniek and BAM Utiliteitsbouw.

BAM Techniek Regio West and BAM Utiliteitsbouw Regio Den Haag could be seen as a case study. The subsidiaries will both also be included in the qualitative research but will undergo some more extensive research including open interviews. This means that both quantitative research and qualitative research will be used during this research project.

2.5.4 Data Gathering

Survey

The first part of this research paper is a broad research. It is set out to explain a witnessed phenomenon and to find empirical evidence for the described situation. Surveys are commonly used when the researcher tries to gain an overall picture of a comprehensive phenomenon spread out over a stretch of time and/or space. Thus using the survey for the collection of data seems to be fitting. Furthermore when one would use the theory on the assessment of the organizational climate, the survey is most used in previous research which would indicate that it would be best suitable here. There are different variations of surveys and for this research the cross-sectional research will be chosen. This is a type of survey for which material is gathered at a certain moment in time from one and the same group. For the groups, see 2.4 research object. The amounts of candidates that will be included in the research are the regional offices of two different subsidiaries of one company (namely BAM). Since the organizational climate is something that needs to be measured over the entire organization and not only on higher management, there needs to be specific information accompanied with the survey to eventually get the right respondents to the survey. The specific management levels from which information about the organizational climate is needed will be elaborated further within the literature research and specified during chapter 4.

Case study

Case studies can help reveal even more information about the subject and situation. According to "Designing a research project", "*the case study is a research strategy in which the research tries to gain profound and full insight into one or several objects or processes that are confined in time and space"(Verschuren & Doorewaard, 2010, p. 178).* The case study is supportive on the survey and should help to enlighten some of the results of the data analysis.

3

Theoretical Framework / Conceptual Design

During the design of the theoretical framework or the conceptual design, all the key concepts will be explained . The conceptual design consists of a set of assumed causal relationships between the core concepts of the research project. In this chapter, first all the core concepts will be discussed. All the core concepts will be presented, which will result in the final paragraph, where the conceptual design can be found. Designing a conceptual design is important according to Verschuren and Doorewaard. "*It helps the researcher to demarcate clearly his or her research subject, and most importantly, the conceptual model supports the researcher to formulate the assumed relationships between the core concepts correctly, and to link the research project to an existing theory" (Verschuren & Doorewaard, 2010, p. 267).*

One overlapping concept in these key concepts is the concept of an organization. The Oxford Online Dictionary describes an organization as: "*an organized group of people with a particular purpose such as a business or government department" (Oxford University Press, 2013).* Pfeffer and Salancik talk about organizations in their book *The external control of Organizations: A Resource Dependent Perspective*. They see organizations as a result of interactions and activities of a coalition of groups and interest. From this everybody is attempting to obtain something from the collective by interacting with others, each with its own preferences and objectives. According to them: "*Organizations, then, are quasi-markets, in which organizational participants are most critical to the organization's continued survival" (Pfeffer & Salancik, 1978).* The view that organizations are like markets is a concept that has been adopted by many other researchers and will be adopted here as well. The organization is the object in the theories that are going to be discussed below, namely organizational climate and culture, collaboration and partnering.



Figure 6 People in organizations, climate and culture (own ill., 2013)

3.1 Organizational Climate and Culture

The term organizational climate was first introduced in this report during the chapter Research Design. Organizational climate is a concept originating in the 1970's. Only recently researchers presented an organizational climate measure (Patterson et al., 2005). In order to validate this measure research studies about organizational climate were conducted. The studies show that organizational climate cannot be seen separately from organizational culture. This concept will be further explained in the following paragraph.

3.1.1 Organizational Culture

Organizational culture can be seen as "*a system of shared meanings held by members that distinguishes the organization from other organizations"(Robbins & Judge, 2012, p. 243).* According to Schneider et al. (1996) culture captures a less conscious, more subtle psychology of the workplace. Believes of the top managers is a large part of what constitutes the culture of an organization. It can be expressed by what is believed to be "valued by" or "believed in" by the organization. In another piece Schneider describes that organizational culture is defined by shared values, common assumptions, and patterns of beliefs held by organizational members (Schneider, 2000). According to Robbins & Judge there are seven characteristics that capture the essence of organizational culture, namely (1) innovations and risk taking, (2) attention to detail, (3) outcome orientation, (4) people orientation, (5) team orientation, (6) aggressiveness and (7) stability. Organizational culture is a descriptive term, which means that it describes how people perceive the organizational culture, not how they feel about it. In most organizations there is one dominant culture and several sub-cultures. Besides the boundary-defining role of culture, culture also creates some sort of identity for members of an organization. Furthermore, it commits people to shared goals and not only act in self-interest. And last, culture enhances the stability of the social system and it functions as a sense-making control system that guides and shapes the attitudes and behaviour of employees. However, there are downsides on having a strong organizational culture; it could become institutionalized (become a value for itself and not for what is produces); it could become a barrier to change; it could become a barrier to diversity; and it could become a barrier for mergers and acquisitions (Robbins & Judge, 2012). The connection with the climate of the organization is: "*Climate reflects the tangibles that produce a culture, the kinds of things that happen to and around employees that they are able to describe" (Schneider et al., 1996, p. 5) .* For example, when people talk about the "feel" of an organization they say things like: "it feels like a dynamic place to work" or they say "it feels like people are stuck here". What they describe as a feel is a combination of the culture and the climate.

3.1.2 Organizational Climate

Where the culture could be described by the values that defines the organization, the climate can be seen as the interpretations of these values by the employees of that same organization. It can be seen in the actions of the employees, but also in the organization systems etcetera. Robbins & Judge see the organizational climate as the *"shared perceptions organizational members have about their organization and work environment"* (2012, p. 245). Sometimes, one can be really inspired by other colleagues, or, on the other hand, be demotivated and depressed by the surroundings. This can be

referred to as “the spirit” of the organization. A positive overall workplace climate has strong benefits. It can enhance job satisfactions, employee involvement, commitment and motivations of the employees and most importantly, it is linked to higher customer satisfaction and financial performance (ie. organizational performance). Schneider et al. mentions four key climate dimensions: (1) The nature of interpersonal relationships, (2) the nature of hierarchy, (3) the nature of work and (4) the focus on support and rewards. These are retrieved from McGregor’s view on climate which focusses on beliefs, and the view of other researchers, who focus more on company’s goals. Patterson et al. (2005) describes organizational climate as something that focusses rather on the organization than on the individual. According to Schneider (2000) the organizational climate represents the descriptions of the things that happen to the employees. He suggests that climate is behaviourally oriented. He also mentions that organizational culture comes to light when employees are asked why certain patterns exist.

3.1.3 Measuring Organizational Climate

Different researchers tried to describe means to measure the organizational climate or the organizational culture. Because of the overlap in organizational culture and climate researchers have always found it difficult to describe a right measurement method for organizational climate. Patterson et al.(2005) developed the Organizational Climate Measure (OCM) to measure the organizational climate. A measurement for organizational climate should measure the entire organization and not only the unit or the department. It should be clear to the interviewee what the subject of research is. Also, measures of organizational climate should asses all members of the workforce and not only higher management.

The method Patterson et al. validated during their research is based on the “competing values model” by Quinn & Rohrbaugh (1981). Quinn and Rohrbaugh tried to describe a framework to explicitly define effectiveness of an organization. According to Quin and Rohrbaugh several theories have suggested that organizational effectiveness is the central theme in organizational theory and that it is difficult to conceive of a theory of organizations that does not include the concept of effectiveness. However, describing the effectiveness has proven to be difficult. No common accepted definition of effectiveness has emerged yet. Already three concepts of organizational behaviour existed, which were competing with each other. Quinn and Rorhbaugh added one more and they will be discussed below.

The rational systems model, by Alvin W. Gouldner. Quinn & Rohrbaugh describe that according to Scott, “*emphasis of the rational systems model due to mechanistic, instrumental bias, is on the number of units produced in a given time (productivity) and the number of units produced for a given number if inputs (efficiency)” (Scott, 1977, p. 73). The* **natural systems model**, by Alvin W. Gouldner, is also called the human relations approach, and it considers not only the production itself but also the actions the employees need to fulfil in order to come to the production. The **open systems model**, by W. Richard Scott, ”*includes system-elaborating as well as system-maintaining functions and it emphasizes adaptability and resource acquisition” (Scott, 1977, p. 73).* And last, the **Internal process model**, by Quinn and Rohrbaugh, “*...it places a great deal of emphasis on people and control and would stress the role of information management an communications (as means) and stability and control (as ends) in the assessment of effectiveness” (Quinn & Rohrbaugh, 1981, p. 134).*

According to Quinn and Rohrbaugh, the organizational effectiveness can be sorted according to three sets of competing values; (1) the organizational focus (on people vs. organization), (2) the organizational structure (flexibility vs. control) and (3) organizational means and ends. All these competing values are either one or the other (see Appendix C – Figure 1). Companies need to choose where there focus lies and how they are going to build their strategies. The four models can be placed into the four quadrants of the model of the three dimensional representation of effectiveness criteria.

The reason why Patterson et al. decided to use this model as the framework for their measurement tool is because it represents four major schools of study on organizational effectiveness. These are the socio-technical and humans relations schools (human relations approach) (Emery & Trist, 1965;

McGregor, 1960), the Tayloristic concern (internal process approach)(Quinn & Rohrbaugh, 1981), the emphasis on the interaction and adaption of the organization in its environment (the open systems approach) (Shipper & White, 1983) and the rational economic model of organizational functioning with emphasis on productivity and goal achievement (the rational model) (Clinebell, 1984; Hall, 1980).

The climate dimensions Patterson et al. use in their measurement tool are derived from this model and the other important literature that was most frequently utilized between 1960 and 2000 on organizational climate. All dimensions can be found in Appendix H Key concepts. Appendix D shows all the questions involved in the OCM.

Patterson et al. do have suggestions for future use of the OCM. They conclude that using all 17 scales of the OCM is not practical and it may seem that the research lacks focus. They suggest using only two scales, or only two quadrants, to focus the research. It is suggested to look at merger and acquisitions in further research to look at the similarities and differences in the organization. Organizational change could be a topic of research as well.



Figure 7 Collaboration in two pictures (own ill., 2013)

3.2 Collaboration

As mentioned in the introduction, collaboration is something that is done every day, for instance in a household situation when one is cooking dinner for the family and another is setting the table simultaneously. However, a consensus about collaboration between researchers is not easily reached. Collaboration in the most essential sense of the word can be seen as "*the action of working with someone to produce something" (Oxford University Press, 2013).* According to Patel et al. "*a critical success factor for any community – at work and outside work – is the extent to which it can coordinate itself to communicate and achieve common goals: on other words, to collaborate" (2012, p. 1).* For decades, researchers have tried to make a distinction between cooperation and collaboration. *A synthesis of Research on Organizational Collaboration* by S.M. Hord (1986) sketches the differences between collaboration and corporation and uses previous research to come to an understanding about the differences and similarities.

Cooperation
- from the latin: cooperationem "a working together," from cooperari "to work together," from com-"with" + operari "to work" , (Harper, 2001)
- two or more individuals or organisations reach some mutual agreement, but their work together does not progress beyond this level (New England Program in Teacher Education, 1973)
- cooperation is a term that assumes two or more parties each with separate and autonomous programs (Hoyt, 1978)

Collaboration
- from the latin: collaborare "work with," from com- "with" + labore "to work" , (Harper, 2001) and also from the French 1860', *traitorous cooperation with an occupying enemy.*
- development of the model of joint planning, joint implementation agree to work

together in making all such programs more successful, joint evaluation between individuals or organizations (New England Program in Teacher Education, 1973)
- collaboration is a term that implies the parties involved share responsibility and authority for basic policy decision making (Hoyt, 1978)

By looking at these definitions it can be concluded that collaboration and cooperation are two different things. When diving into all the different definitions of collaboration, they have all some essentials in common. Kolfschoten listed some of these definitions for her thesis about *Theoretical foundation of Collaboration Engineering (Kolfschoten, 2007, p. 3)* and found three similarities:

- Most definitions specify the activity in collaboration as interaction, working together or joint effort
- Most specify a goal or outcome to which this activity is directed
- Most use and adjective that implies a shared, commons status of the goal.

It is noted that collaboration itself is never the end goal. The collaboration always leads towards something bigger than just the collaboration itself. Collaboration could therefore be viewed as a process rather than an activity. Collaboration can evolve over time. This is why, for this paper, the definition of collaboration from Bedwell is used: *"an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal" (Bedwell et al., 2012, p. 130).* According to Kolfschoten, it is not required that people support or even like this goal.

3.2.1 Different theories and viewpoints on collaboration

Now collaboration has been defined, research can be done on what influences it. Different researchers listed several ex-ante and process related terms that need to be met in order to come to collaboration.

Hord provides a list of essentials for collaboration;

1. *Needs and interests:* the extent to which organizations share interests and needs before joining is a major determinant for their propensity to work together. Each party needs to have a sense of possible gain. When gain is mutual and interest is sufficiently heightened, collaboration is possible.
2. *Time:* The necessary time must be devoted to joint endeavours and a greater amount of time is needed for collaboration than cooperation
3. *Energy*: Collaboration requires effort. Outreaching- & action-taking individuals are needed to initiate and sustain the collaborative spirit.
4. *Communication:* Large- and small group meetings are a constant requirement. Frequent interactions at all levels across both organizations are a necessity.
5. *Recourses:* Collaborating organizations share funds, staff and other resources. The rewards or the expected outcome must be worth the investment from both the parties.
6. *Organizational factors:* Collaborating individuals within an organization will promote similar activities between organizations. While the organizations are the framework, it are the individuals who do the actual work.
7. *Control:* When participants are willing to relinquish personal control and assume more risk, they create a more flexible environment and can come closer to collaboration.
8. *Perceptions:* Checking the perceptions of others involved contributes to the collaborating climate. It is vital for individuals in each organization to be willing to view the world from the standpoint of others. This empathy enhances all the other points.
9. *Leadership:* Strong leaders who express an enthusiastic, positive example of collaboration on many levels encourage overall collaboration in the organizations.

10. *Personal traits:* “if there is any personality characteristic needed to function in the [collaborating] approach, it is probably simple patience”. That should be added persistence- and willingness to share.

Sarkar et al. describe a framework for collaboration in which relational bonding is central. But trust and commitment seem to be essential to collaboration as well according to most researchers. Many different researchers have tried to describe what collaboration is and what makes it work. Sarkar et al. (1998) tried to understand based on previous literature what drives collaboration and came up with three things that were missing in existing literature. The existing literature has described structural aspects that frame collaboration and the intrinsic compatibility of those involved in collaboration. As well as the behavioural processes that characterizes the relationship. But it failed to describe collaboration between loosely structured organizations were the bureaucratic lines of control are missing. Second, it is important to understand what lies behind the interrelatedness of trust and commitment that is manifested by their significant inter-correlations in the literature. And third, not only the impact of ex-ante and collaborative processes but also the mechanisms of interactions should be included in research. Sarkar describes a model which reflects “*the premise that the relational strength of a collaboration (which is reflects on a set of ex-ante variables, namely resource interdependence, termination costs, role clarity and compatibility) and determines collaborative behavioural process in relationship (shared decision making and relational transparency). Behavioural processes together with relational bonding determines performance” (Sarkar et al., 1998, p. 86).*

Research indicates that this model is almost accurate (see Appendix C – Figure 2). As the literature already predicts, role clarity has a positive influence on participative decision making and thus a significant influence on performance. However, it does not influence relational bonding as expected. Contrasting with literature, high termination costs can have a negative influence on the bonds between the collaborating companies. But it seems compatibility has a strong influence on relational bonding, which again has a strong influence on both relational transparency and shared decision-making which leads to a higher performance level.

Another research by Patel et al. (2012) tried to describe all factors included in collaborative work in order to conduct a collaboration support tool. They came up with a table of factors and sub-factors which, according to their extensive literature research, contains all factors involved in collaborative work. During this research they came across several barriers to collaborative working. The types of barriers they distinguished are: *(1) non-supportive organization, (2) inadequate supply chain and partnering arrangements, (3) weak management, (4) poorly received, planned or managed projects, (5) technology orientation, (6) inadequate knowledge management and last (7) unacceptable costs.* The entire table is depicted in Appendix C – Table 1.

Both Hansen & Nohria (2004) and Hardy et al. (*2005*) have another view on collaboration. Hansen & Nohria focus on the need to ask for help or give help and Hardy et al. focus on conversations, language and the collective identity. Both theories will be shortly reviewed.

According to Hansen & Nohria, inter-unit collaboration can lead to value creation. But several barriers could obstruct this value creating collaboration. The first barrier is *the unwillingness to seek input and learn from others*. The reason for this could be *“sometimes it is the norm in a unit that people are expected to fix their own problems. In other cases formal and informal reward systems may give more credit for heroic individual efforts than for collaborative effort” (Hansen & Nohria, 2004, p. 24).* This could be because of “in-group bias”, which means that people overvalue their own group and undervalue non-members. The second barrier is the inability to seek and find expertise. Other than in the first barrier, here the employee does want to seek help, but does not know where to find it. Technology such as electronic search engines, data bases or benchmark systems could help to overcome this barrier. The third barrier is the unwillingness to help. The employee who is asked for help is non-responsive. This is called a “horder-of-expertise problem”. The fourth and last barrier is the inability to work together and transfer knowledge. Here the employees know to ask for and find

expertise, but they cannot transfer the knowledge because of the "stranger" problem. The employees need to already have relationships with each other in order to understand each other. There are several ways to overcome these barriers, depending on the exact problem. These solutions can be found in different management methods. Leadership, setting values and goals could help people to overcome the unwillingness to seek for help. Human Resource procedures could help hiring people who have the inclination to search and offer help. This could increase the collaborative behaviour inside the organization. The last set of methods is the cross-unit mechanism. Here the *cultivations of connectors, the development of electronic yellow pages and the development of bench-mark systems.* This could overcome the last barrier where people are unable to work together and transfer knowledge. Hansen and Nohria developed a set of questions to measure what the exact problem in the organization is. Appendix C – Figure 3 shows the entire framework Hansen and Nohria designed regarding these barriers to collaboration..

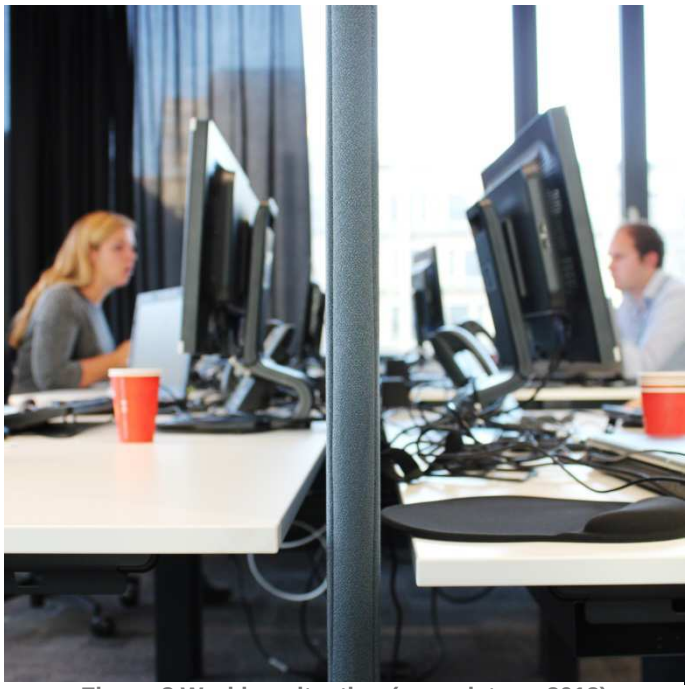


Figure 8 Working situation (own picture, 2013)

Hardy et al (2005) mention researchers are always interested in identifying the factors and processes that lead to successful collaboration because of the clear benefits. According to their model, "*effective collaboration results from a two-stage process in which participants engage in conversations that can include not only face-to-face dialogue but also a variety of other discursive practices such as memo's, letters, e-mail, and minutes and meetings" (C. Hardy et al., 2005, p. 59).* They mention that first; the emphasis is on the importance of discursively constructed collective identity in the achievement of effective collaboration. During the second stage, this collective identity is "*translated through further conversations into innovative and synergistic action" (C. Hardy et al., 2005, p. 59).* The central idea is that discursive processes produce a collective identity, which could lead to various forms of collective action, and could potentially lead to effective collaboration as well. Hardy et al mention a quote by Cerulo: "*Collective identities are important since it addresses the 'we-ness' of a group, stressing the similarities or shared attributes around which group members coalesce"* (Cerulo, 1997, p. 386). The common constructions of this theory can be seen in Appendix C – Figure 4. "*In order for effective collaboration to occur, participants must engage in conversations that produce resources to make sense of the issue and related matters in terms on which there is general agreement (C. Hardy et al., 2005, p. 66).* This emphasis on conversations, language and discourses is different from other theories, but can be seen as complimentary to these theories rather than contradictory.

A model for the measurement of supply chain collaboration is called the Maturity model for supply chain relationships (see Appendix E). The researchers (Meng et al., 2011) describe a maturity model, based on several literature studies (Hines (1994), Best Practice in Partnering Group (2003), Strategic Forum for Construction (2003), Larson(1995) , Ellison and Millar (1995), Construction Industry Institute(2007)), with four levels of maturity. The model contains of eight assessment criteria: *Procurement, Objectives, Trusts, Collaboration, Communication, Problem Solving, Risk Allocation and Continuous Improvement*. Each of these eight assessment criteria has four levels they can be rated on. The higher an organization scores, the more mature the collaboration is. The first Level represents an extreme position dominated by self-interest and mistrust. At Level two, the parties are mainly

interested in their own objectives and interest and at Level three the alignment of the objectives and goals is limited to only one single project. At Level four, the relationship is more mature and the alignment of objectives lies over a series of projects, with focus on the long-term projects. Meng et al. describe a procedure for the complete assessment of the maturity level of the collaborating parties. This comprehensive procedure consists of six steps which include team establishment, team training, data collecting and analysis, assessment workshop, score calculation and a feedback report. During this research, not all these steps will be covered.

3.2.2 Good Collaboration

During the previous section, several theories on collaboration were discussed, each with their own approach (Hansen & Nohria, 2004; C. Hardy et al., 2005; Hord, 1986; Kolfschoten, 2007; Patel et al., 2012; Sarkar et al., 1998). But consensus about on exactly what good or effective collaboration is has not been reached yet.

The thesis *Theoretical Foundations for Collaboration Engineering* from Kolfschoten (2007), is about collaboration in the knowledge economy. She states that in complex problem solving situations collaboration is essential for the creation of knowledge and innovations, which are two important factors for the success of organizations in the knowledge economy. Since Kolfschoten also sees collaboration as a process rather than an activity. The dimensions she used to measure the quality of collaboration will be discussed. She mentions several quality dimensions for collaboration. The first dimension is *group effectiveness.* According to Kolfschoten, "*an important indicator for the quality of a collaboration process is that the group goal, specified in the design, is achieved and that the results of the collaboration process meet the requirements set in the design" (Kolfschoten, 2007, p. 33).* The second dimension is group efficiency; efficiency is the difference in the net amount of resources used (real resource expense) compared to the planned amount of resources (intended resource expense). The third dimension, productivity, can be seen as the balance between results and resources used. The fourth dimension, commitment of resources, is the force that binds the individual to spend resources (time, effort, knowledge and physical resources) to achieve the group goal. The fifth and last one is satisfaction, the affective positive arousal towards the process and the results. All five dimensions are listed below and can thus be used to describe the collaboration process quality.

1) Group effectiveness
2) Group efficiency
3) Productivity
4) Commitment of resources
5) Satisfaction

Earlier in the paper we stated that collaboration was a process and the result of this process was the achievement of the pre-stated goal. Thus, good collaboration can be seen as achievement of the goal, based on high group effectiveness, high group efficiency, high productivity, the commitment of resources to the process and the goal, and the satisfaction of the individuals who worked on the process.

3.2.3 Differences and similarities in theories

Looking back at all discussed theories that were discussed, an overview will be made of the differences and similarities that can be found in the different theories. The different factors and criteria of the theories are clustered to find similarities within the theories (Appendix C – Figure 5). The difference between some theories is that some were narrowed down to one topic, some were more generalizing about the process of collaboration, and some were more generalizing about the potential outcome of collaboration. This needs to be considered when comparing the theories. For a complete overview of the comparison of all the theories, check Appendix C – Figure 6.

The theory of Meng et al. describes the different maturity levels. This theory is very compatible with this research in trying to describe and measure the "degree of collaboration" between the subsidiaries.

Only two factors were missing according to the literature research. Eventually, the dimensions (minus 2) of Meng et al. were copied for the dimensions, and the different criteria obtained from other theories were placed under these dimensions. The following set of dimensions and criteria can then be distinguished, as can be seen in Figure 9.

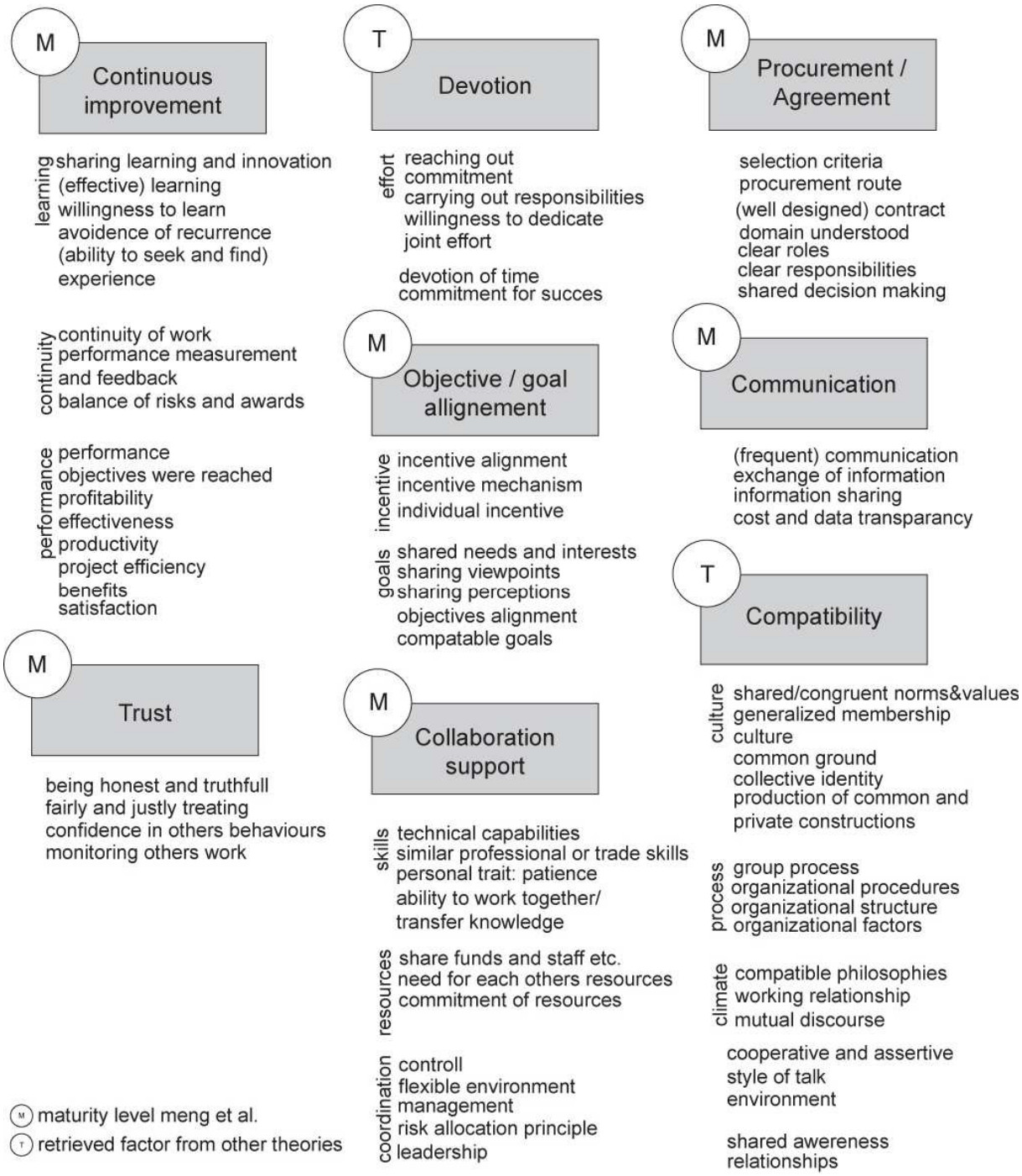


Figure 9 Clustering of factors and criteria based on Meng et al. (own ill, 20130)

3.2.4 Organizational climate and collaboration

The assumption that is made, as in previous research (Fey & Beamish, 2001; Sarkar et al., 1998), is that compatibility between the collaboration partners is important for good collaboration. Some literature specifically mentions that compatibility is a condition for collaboration and other researches

mention criteria that would fit in with compatibility. Compatibility in culture, process, and climate is important for the performance and continuous improvement of the collaboration, especially when the collaboration is not for one project but for a longer period of time. The hypothesis is made is that when partners are more compatible on the area of organizational climate, the "degree of collaboration" will be higher.

H1: When collaboration partners are more compatible (more alike) on the area of organizational climate, the degree of collaboration will be higher.

3.3 Partnering Charts

One of the problems mentioned in the problem analysis is the lack of agreements made beforehand. In other working situations like joint ventures, companies intercept this problem by preparing a partnering chart. The common conception of employees of a subsidiary is that making agreements on collaboration is not necessary, since in the end "we are all one company". However, it was already seen that many different researches mentioned the aligning of incentives and objectives and making overall agreements on collaboration as an essential starting point for collaboration (Hord, 1986; Legler & Reischl, 2003; Patel et al., 2012) During this chapter, theories on working with partnering charts will be discussed and in the end, a proposition on working with partnering charts is made.

3.3.1 Theory on Partnering

"*Partnering is not a contract but an attempt to establish non-adversarial working relationships among project participants through mutual commitment and open communication. It also serves to create an environment that fosters cooperation and teamwork*" (Cheung et al., 2003). Bennet and Jayes looked into the financial benefits of partnering and conclude that partnering workshops and other related partnering efforts can achieve savings up to about ten per cent of total costs.

Cheung et al. mention that Black et al identified that mutual trust, effective communication, commitment from senior management, clear understanding of different parties' roles, consistency of objectives, and flexibility to change are all essential factors for successful partnering. However, the non-compromising tendering process, poor perceptions of the partnering process, lack of knowledge and skill to adopt partnering and non-commitment of the parties all work against the concept of partnering. In the end, the attitude of the participants remains fundamental.

According to Nooteboom (1994), setting limits on collaboration could sometimes be appropriate, but does not suggests this for all cases. Setting limits on the collaboration (making statements about the duration and the goal of the collaboration) would restrict the prospect on the collaboration and the willingness to sacrifice for the sake of the collaboration. Then the parties are more inclined to look for the short-term advantages. "*It is precisely the open-end perspective of the collaboration that gives willingness to sacrifice"* (Nooteboom, 1994, p. 119).

When the relationship develops, both partners should be more willing to give guarantees for continuity, where openness is important as well. Partners should develop a common language as a basis for further collaboration. These actions should all contribute to more symmetry between the partners. But when the relationship is taken for granted after a while, it could be good to redefine the relationship in terms of guarantees and the limits of the collaboration. Arrangements could be made on what is expected of one another and in what things one is left free.

According to '*The seven pillars of partnering'(Benett & Jayes, 1998)* Partnering Agreement is a critical success factor in partnering as being the commitment of all partners at all levels to make the project a success. It is a means that could be used to guide the relationships between the partners.

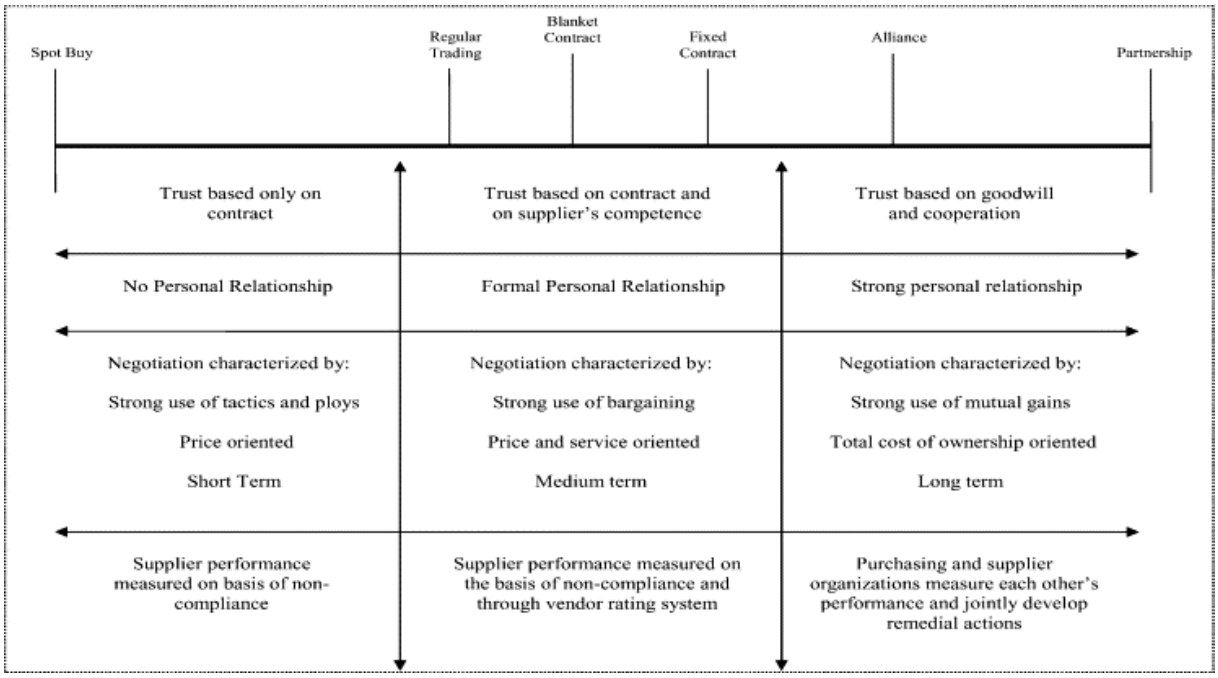


Figure 10 Contracting relationship continuum (Cheung et al., 2003, p. 335)

Benett and Jayes describe that the first generation partnering was based on three project team principles. The first (1) was agreeing mutual objectives to take into account the interest of all firms involved. The second (2) was making decisions openly and resolving problems in a way that was jointly agreed at the start of a project; and the last principle was aiming for targets that provide continuous measurable improvements in performance from project to project. This however, is only the first step. Together with members of the reading construction forum partnering tasks force, Benett and Jayes produced the seven pillars of partnering, which lead to a second generation partnering. They define partnering as: "*Partnering is a set of strategic actions which embody the mutual objectives of a number of firms achieved by cooperative decision making aimed at using feedback to continuously improve their joint performance".* The seven pillars of partnering are (1) Strategy, (2) Membership, (3) Equity, (4) Integration, (5) Benchmarks, (6) Project Processes and (7) Feedback. The interrelation between these variables can be found in Appendix C – Figure 7.

The question is whether collaboration differs that much from partnering. It was stated that collaboration is the process of working jointly towards a common goal. Partnering was described as a set of strategic actions to meet objectives during a process of continuous improvement. These do not differ that much from each other. Two different approaches on how to deal with Partnering were found. On one hand, Nooteboom mentions that setting limits on partnering could destroy the willingness to sacrifice. And on the other hand, Benett and Jayes and Cheung et al. do talk about a partnering chart and how agreements made beforehand can help. Cheung et al. used a questionnaire to monitor the partnering and to discuss this in monthly meetings. This questionnaire involves all aspects most essential to partnering. It combines the hard aspects, soft aspects, the attitude oriented, performance-oriented and the process oriented items.

H2: Using Partnering Charts has a positive influence on intra organisational collaboration.



Figure 11 Trust in organizations (own ill., 2013)

3.4 Trust

Trust has often been discussed in other literature. Since trust is a returning factor in all theories on collaboration and in partnering, the factor trust deserves extra attention. The researchers Dietz and Den Hartog did research on measuring trust in organizations (Dietz & Den Hartog, 2006). They made a distinction between different types of trust based on referring to party "A" (the trustor) and party "B" (the trustee). A research published in the Quarterly Journal of Economics (Glaeser, Laibson, & Scheinkman, 2000) mentions that it is important to know what is being measured when looking at trust. They observe a difference between trustworthiness and trust. To find somebody trustworthy does not automatically mean that this person is trusted. To measure if someone is trusting, one can best ask him about his past trusting behaviours. If the question is whether someone is trustworthy, one should ask him if he trusts others. This difference in trustworthiness and trust is also described in Dietz and Den Hartog, they state: "*trustworthiness is a quality that the trustee has, while trusting is something that the trustor does"(Dietz & Den Hartog, 2006, p. 559)*. According to Dietz and Den Hartog, while referring to several studies, trust can be broken down into three parts: trust as a belief, trust as a decision and trust as an action. Trust as a belief is more about how the other party, and how him/her actions would affect you. Trust as a decision is more about the trustor, how willing is he/she to trust? The last one, trust as an action, is about engaging in any of the trust-informed risk-taking behaviours. Another way trust can be broken down is to who the trust relationship is referring, for instance if he/she is your subordinate, your peer or your superordinate. Furthermore, trust exists of multiple parts. Dietz and Den Hartog reflected on different literature and found four attributes of the trustee that appear most often, namely; ability, benevolence (or goodwill), integrity and predictability.

Trust was also discussed by Klein Woolthuis et al. (Klein Woolthuis et al., 2005) referring to trust in relationship to contracts and the impact it has on one's relationship. They mention two types of trust, competence trust (referring to ones competences) and intentional trust (referring to ones intentions). The research of Klein Woolthuis et al. only took intentional trust into account. The main question they tried to answer in their research is whether trust and contracts are substitutes, complements, or both. And if so, do contracts precede trust or do they follow it? Klein Woolthuis et al tried to find insights on the "why" part of this question. Using four different case studies, they made an inventory on how trust, dependence and contract completeness related to the project outcome. They drew multiple conclusions. In one case, it showed that trust can successfully substitute a contract. In this case, the degree of trust made up for the incomplete contract and they showed a very efficient and successful relationship. According to Klein Woolthuis et al. this case showed that "*a contract can be interpreted as a sign of commitment and tool for coordination*" (Klein Woolthuis et al., 2005, p. 832). A different case showed that contracts are not always effective when it comes to reaching positive outcomes and that contracts do not always form effective safeguards to ensure a successful professional relationship. Klein Woolthuis et al. state that contracts and trust actually complement each other. When trust is in place, the most effective and efficient assessment of risk and potential hazards can be

made. Followed by the best agreements on how to deal with them. Also, trust may be needed prior to the agreeing on a contract and to be willing to invest in a relationship. The last case Klein Woolthuis et al discussed showed that the complete absence of a contract does not always mean that the partners trust each other. Klein Woolthuis et al conclude with the statements that in general, trust precedes contracts and that they saw no case in which contracts could be a base for trust. Another conclusion was that trust and contracts can be both substitutes and complements. Contracts can be used for coordination, as a safeguard for contingencies and as a sign of commitment. Contracts are not only used to state that hard project promises are met and only in a legal fashion, contracts are also used as a guideline for the social engagements. However, this research is limited both geographical because all companies are based in one country and quantitative as the number of cases is limited. To fully be able to trust these results, a lot more cases need to be researched.

The research paper *Nurturing Collaborative Relations* from Vangen and Huxham , point to the cyclical aspect of trust. Three aspects are important; expectation forming, risk taking and vulnerability. "*It is argued that trust is best understood in terms of the ability to form expectations about aims and partner's future behaviours in relation to those aims" (Vangen & Huxham, 2003, p. 10).* They argue that in the early stages of collaboration, future-based trust is gained through agreements, in which trust serves as a substitute for formal contracts. "*Each time partners act together, they take a risk and and form expectations about the intended outcome and the way others will contribute to achieving it. Each time an outcome meets expectations, trusting attitudes are reinforced. The outcome becomes a part of the history of the relationship, increasing the change that partners will have positive expectations about joint actions in the future. The increased trust reduces the sense of risk for these future actions"(Vangen & Huxham, 2003, p. 11).* The conclusion is that the most preferred method of dealing with trust or the lack of trust is the small-wins strategy, in which trust is built incrementally.

In the case of BAM Utiliteitsbouw Regional Den Haag en BAM Techniek Regio West, the reason for the employees of both subsidiaries not to make agreements on collaboration was they said: "we are in the end all one family, one BAM company, we are each other's sisters!". This displayes a sort of trust. On one hand, the employees trust that everything will be OK, since they are subsidiaries. On the other hand, they might think that agreements or suggesting to make agreements will send a signal they do not trust each other. According to Klein Woolthuis et al. trust should precede contracts and contracts could be used in complementary to each other, when contracts are not interpreted as a strict legal safeguard. In this context, the possible low confidence in the actual trust between the subsidiaries has a negative influence on drafting written agreements about collaboration. In that sense, one could say that trust has a negative influence on the decision to make agreements on collaboration. However, trust is very important for the collaboration itself. This leads to the following propositions:

H3: Trust has a negative influence on the decision to make agreements on collaboration.

H4: Trust between the subsidiaries has a positive influence on collaboration in general.

3.4.2 Trust and Organizational Climate

The relationship between organizational climate and trust is relative simple. In a research on the relationship of key factors in the process of collaboration (2003) Legler and Thomas found empirical evidence, that greater diversity leads to more conflicts and friction (in contrary to what they originally thought when they stated that more diversity would lead to a more creative working process and thus a better result). These conflicts and friction could lead to a less positive climate. Furthermore, lecturer Robert Cialdini mentions that people are more likely to trust someone who is more alike to themselves. This would also mean that the more similar the organizational climate, the higher the level of trust between the subsidiaries. This leads to the following proposition:

H5: The more similar the levels of Organizational Climate, the higher the level of trust.

3.4.1 Measuring trust

According to Dietz and Den Hartog there are five things a researcher needs to keep in mind when measuring trust.

(1) Which form of trust is being measured (belief, decision or action)
(2) What is the content of the belief (the four content components)
(3) What is/are the source(s) of the belief (characteristics of the trustee, the trustor, their relationship and broader situational constraints)
(4) What is the identity of the referent (who is being trusted?)
(5) Some additional methodological observations on the wording of the items

For this research the most important factors are the belief of the trustee in the other partner (in this case another subsidiary). And also the decision from the trustor to actively trust is important, the willingness to take the risk to trust someone. Dietz and Den Hartog compared several organizational trust measures with each other. And from this outcome, a set of questions will be used in the questionnaire.

3.5 Conceptual Design

The set of propositions together could be summarized by a scheme (Figure 122). While in paragraph 3.2 the theory on collaboration was discussed, not all aspects of collaboration are included in this conceptual design. Since this research project is not extensive enough to cover all subjects, only three will be included in the conceptual design.

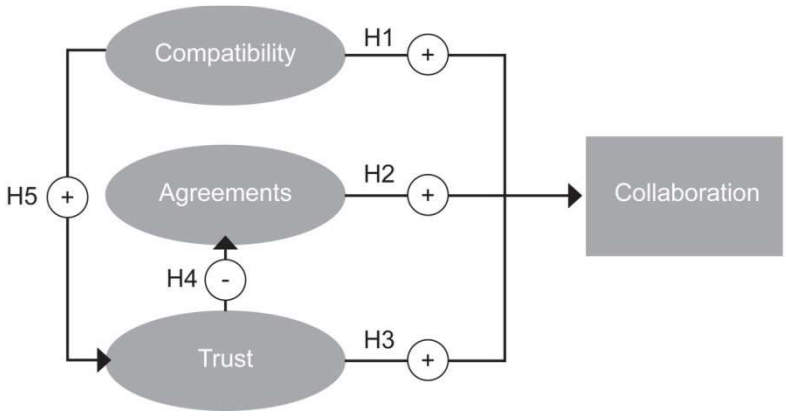


Figure 12 Conceptual Design (own ill., 2013)

It is noted that collaboration is influenced by far more factors than shown in the conceptual design and that all these factors have ties and are influenced by them. But for this investigation the focus will be on Compatibility, Agreements and Trust and how these are influenced by one another.

3.5 Tree-diagrams of key concepts

Besides defining the key concepts, they should also be discussed with the support of tree-diagrams. By doing this, the research project can be delineated. In this section, the diagram will only show the categories or sub-categories that will be involved in the research and will form the input for the research questionnaire.

For the measurement method which could validate the organizational climate, the theory of Patterson et al. will be used. They describe an Organisational Climate Measure which will be used to find the differences in organizational climates between the subsidiaries. This Organisational Climate Measure can be found in the paper *"Validating the organizational climate measure: link to managerial practices, productivity and innovation" (Patterson et al., 2005).* For the key concept organizational climate, only the aspect welfare will be excluded from the research. For the key concept collaboration, the measurement tool of Cheung et al. (Cheung et al., 2003) will be used for the measuring of partnering.

This measurement method is the most compatible with the research that was conducted on the literature(Hansen & Nohria, 2004; C. Hardy et al., 2005; Hord, 1986; Kolfschoten, 2007; Patel et al., 2012; Sarkar et al., 1998; Simatupang & Sridharan, 2005) but is still concise enough to use.

The factors and dimensions used for the questions relating Agreements are not subtracted from a standard questionnaire. The questions are based on the literature study on Partnering and on the interviews conducted at the start of this research. Also, Legler and Reischl (2003) mentioned written agreements in their research on the relationship of key factors and included the following subjects in their questionnaire: mission statement, statement of goals/objectives, procedures of implementing collaboration activities and rules of operation. These sources are the basis of the questions about Agreements. The tables of Key-Concepts in Appendix H will show which of the aspects of the literature studies and will be implemented into the survey.

3.6 Preliminary conclusion

During this literature study, two of the five supporting questions to the main questions of this thesis were answered. The concise version of the answers can be found in this preliminary conclusion.

Good Collaboration

In order to know what effects good collaboration it is important to have a clear understanding what exactly is good collaboration. This is an important question for this research. During the literature research it became clear that the subject of collaboration is widely covered, but the quality of collaboration is not often discussed. It can be concluded that good collaboration could be described as *the process of the achievement of the pre-stated goal, based on high group effectiveness, high group efficiency, and high productivity, with the commitment of resources to the process and the goal, and which satisfies the individuals working on the process.*

Factors that affect good collaboration

In order to know how to influence collaboration, another important question was which factors were influencing the process of collaboration. When conducting the research, it was noted that the list of papers written on collaboration is endless. This meant a consideration needed to be made which literature to include. This research shows an overview and comparison of literature on collaboration in the construction industry, collaboration in partnerships, collaboration in a supply chain and collaboration focused on results. The focus of the literature research was on conducting a set of factors and sub-factors influencing collaboration. Eight different researches were compared and of the eight main factors, all factors were found in at least three or more researches. The eight factors which were found to be main important to collaboration were *Continuous improvement, Trust, Devotion, Objective or Goal Alignment, Collaboration Support, Agreements, Communication and Compatibility.*

4

Conducting the Research

This chapter will elaborate on the design of the data gathering method. In section 2.5 about the research methodology it was explained why the survey was chosen. Here the design and the structure of the survey will be shown.

4.1 Research Framework

The research framework, according to Verschuren en Doorewaard (2010), will help to ensure the research objective will be achieved. "*A research framework is a schematic representation of the research objective and includes the appropriate steps that need to be taken in order to achieve it"* (Verschuren & Doorewaard, 2010, p. 65). This framework can be found in Figure 13. The research objective has already been determined during chapter 2. The research objective is derived from the research goal. In this case, the research objective will be to contribute to the development of a policy and they will follow from the results of the research on the propositions. Based on the literature studies and the results of the research on the propositions the discussion and conclusion is written.

A desired situation is drafted from the literature study. The survey research is prepared in such a way it can measure the current situation. Since there is access to the regional offices of particular one company, this access will be used during the research. More insights can be gathered by using interviews and open questions to accompany the survey.

Earlier it was stated that for the rating of the organizational climate, it is crucial to indicate which (part of an) organization the questionnaire is referring to. And furthermore it is very important to gain information from all layers of management. This means that from every subsidiary, at least five till ten employees should fill out the questionnaire. For BAM Utiliteitsbouw over 180 invites were send out and for BAM Techniek over 80.

4.2 Getting the response you want

Literature about surveys tells us that the choice of the medium in which one sends his survey is important for the response rate. A meta-analysis research about the response rates differences between e-mail and regular mail surveys shows that the difference in response rate is about 20% in favour of the mailed survey (Shih & Fan, 2009). However, looking closely into the data used for this research it shows that the one set of data about company surveys showed a totally different view

(namely 68% e-mail respondents and 38% mail respondents). This provides some doubt if the results research it shows that the one set of data about company surveys showed a totally different view (namely 68% e-mail respondents and 38% mail respondents). This provides some doubt if the results of this research should be applied to choose whether to work with electronic surveys or with mailed surveys. In consultation with the company where the survey will be distributed, it is decided that the survey will be emailed.

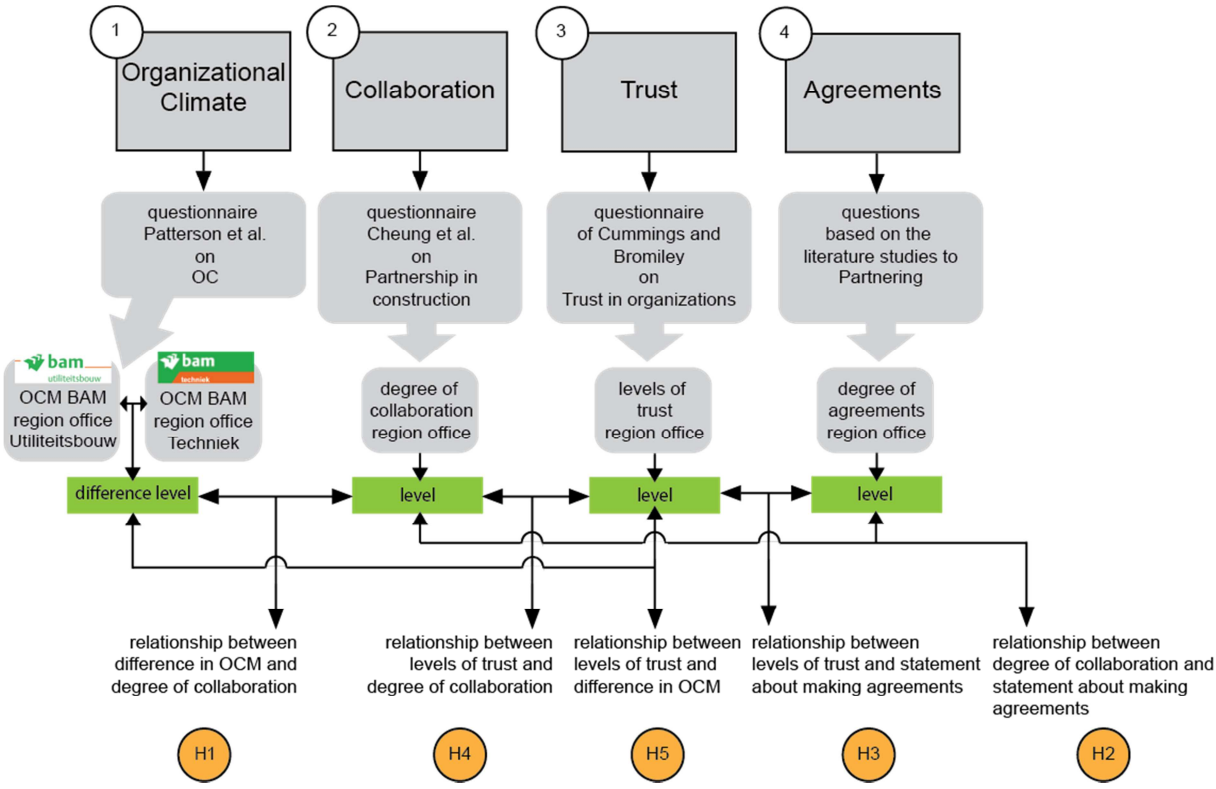


Figure 13 Research Framework, (own ill., 2013)

Digital questionnaire

Actions that would provide a higher response rate, according to Edwards et al. (2009), could be a combination of using non-monetary incentives, shorter e-questionnaires, including a statement that others had responded, an a more interesting topic. The action increased the amount of respondents by more than a half. Also using a lottery with immediate notification of results, an offer of survey results and using a whit background increased the amount by a third. Personalised e-questionnaires, using simple headers and giving a deadlines also helps. The odds of response tripled when a picture was included in an e-mail. Edwards et al. warn the researchers to use the term “survey” in the e-mail subject line; this will decrease the amount of respondents. These tips and tricks were used in retrieving as many responses as possible.

4.3 Survey Design

While designing the survey for this research a number of things were important. Firstly, the measurement of the separate factors needed to be as objective as possible. Since the goal of this research was not to produce a tool to measure these factors, there was no time to fully validate this set of questions. Therefore it was decided to use validated sets of questions, subtracted from previous research.

Another important fact was that the survey should be applicable to all levels of management within the BAM holding. Therefore the survey had to be as straightforward and simple as possible, that no mistakes could be made in interpreting the questions. This is also why it was chosen to translate all

validated surveys into Dutch, the native language of the employees. For the most important factor, Organizational Climate, five different people made translations and these were used to rewrite this measurement tool into Dutch.

The longer the survey, the less likely people are to complete the survey. The size of the survey of Organizational Climate alone was already quite extensive. This is why the rest of the questions on Trust, Agreements and Collaboration needed to be as concise as possible. Paragraph 5.1.2 will elaborate more on the measures that were used in this survey.

4.4 Information Gathering

The surveys were distributed through the managers responsible for the tenderphase. At BAM Utiliteitsbouw this is called Hoofd Bedrijfsbureau and at BAM Techniek this is called Unit Manager. In the most ideal situation, all the members of the project teams of the tender phase will participate in the research. An inventory of the project team tells us that the size of this group will not be larger than 10 per office. A number of 10 respondents per regional office is not sufficient to be able to validate organizational climate. This is why the attempt will be to get 20 respondents per regional office, with at least 5 employees involved in the tender procedure. The managers responsible for the tender phase will be the key persons to guide the research through to the right employees. Lectures about “the power of persuasion” teach us that a couple of things are important; these facts will be kept in mind when handing out the questionnaires. For example, telling employees the other region office already participated could be an incentive for someone to also participate. The email that was sent towards the Unitmanagers and Heads of Bedrijfsbureau can be found in Appendix I.

To test our Hypotheses, collaborating offices of both BAM Techniek and BAM Utiliteitsbouw need to fill in the survey. A part of the survey is about their own department and another part of the survey is specifically about the collaboration with the partner. From both BAM Techniek as BAM Utiliteitsbouw, an indication was made beforehand to see which offices would collaborate most with each other. The participants were asked to fill out the questionnaire for specifically this office. This means that there are roughly two groups within the participants, one from BAM Techniek and one from BAM Utiliteitsbouw. The other groups that can be distinguished are the collaboration, which are coupled offices of BAM Techniek and BAM Utiliteitsbouw.

In the Figure 14, all the collaboration combinations are mapped out. The most prominent collaboration are shown. The more specialised offices of BAM Techniek do not show a connection, since the collaboration they have is too sporadic.

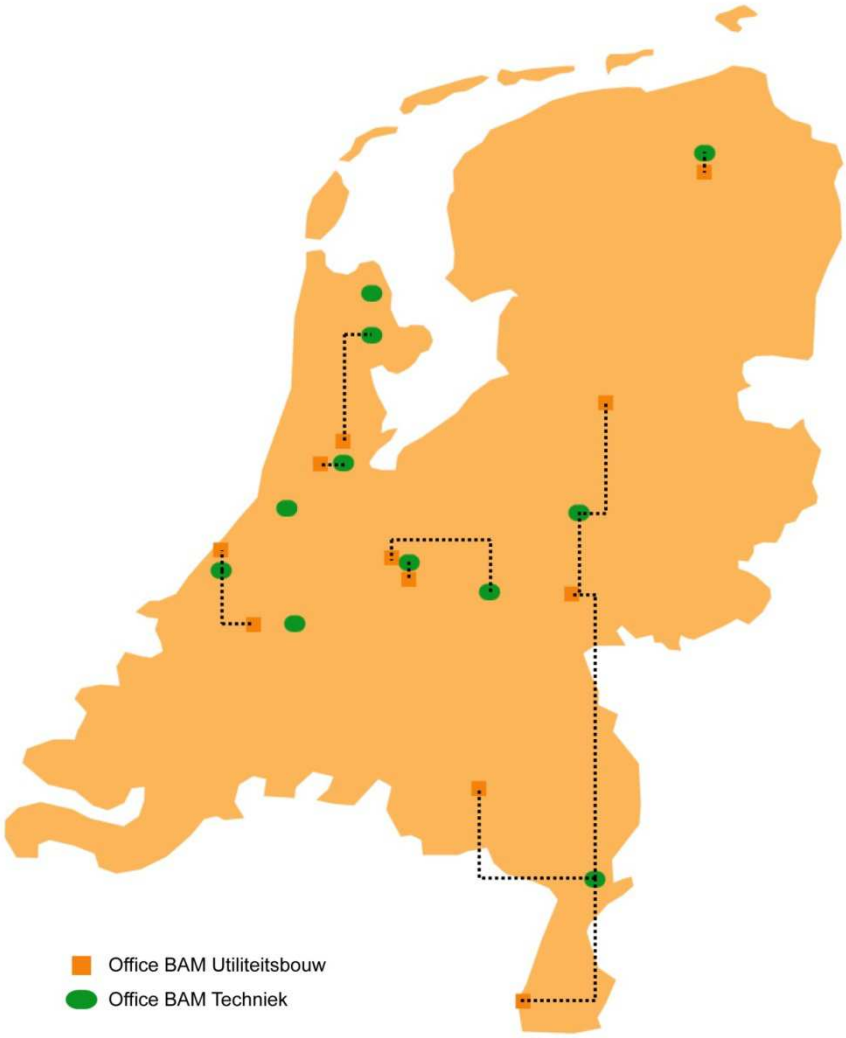


Figure 14 Collaboration between the Offices of Utiliteitsbouw and Techniek (own ill., 2013)

5

Data Analysis

The different steps in the analyses are described in this chapter. During the previous chapter the data preparation methods were described. The second step is to test the hypothesis. In the conceptual model, statements were made about the causal relations between different variables. During these hypotheses, the variable Collaboration was always the dependent one (the one that was being influenced). The other variables (Trust, OC and Agreements) were the independent ones. However, some statements were also made about the relationship between these variables mutually

5.1 Method

All the participants, procedures and measurements methods will be discussed in this paragraph.

5.1.1Participants and Procedure

Participants were employees of BAM Utiliteitsbouw and BAM Techniek, chosen by the Unit managers and Head of Bedrijfsbureau of the particular office. They participated in a survey, which was distributed through an email. One part of this group had experience working together with the other subsidiary, the other group did not. In order to get sufficient employees to fill out the survey to get a good view of the organizational climate, this reference group was included. Unit managers and Head of Bedrijfbureaus from each different regional office of the two different operating companies were asked to produce a list of 10 people working together with the other subsidiary during the tender phase, and 10 random people from that office. The unit managers were asked to give a list of people with a variety in management level (like the Organizational Climate Measure suggests). The participants had to fill out a questionnaire which took about 30 minutes.

The sample consisted of 276 employees distributed over 21 offices. Of these offices 11 belonged to the operation company BAM Utiliteitsbouw and 10 to the operation company BAM Techniek. The total response rate for the online survey was 62% (171 employees from 18 offices). The response rate for Utiliteitsbouw was 68% and for Techniek was 57%. Table 3 shows the participating offices, with the according number of invites send out and respondents received. Of these respondents, 94% was male and the average age was 44 years (SD=9.87). Participants were asked about their function, 24% of the participants were low in the organization, 57% in middle management and 19% was higher management.

For exploring the data, the book of Andy Field “Discovering statistics using SPSS” is used. A method or exploration of the data is suggested. The Kolmogorov-Smirnov test will check whether the data one has collected is normally distributed. The general data about age, sex and function were all not normally distributed. The percentage on the Sex, D(100) = ,54, p<,01, the age D(100) = ,10 p<,05 and function D(100)= 0,139 p<,01. This means that all are significantly non-normal. Also for all the test results on the questions concerning the Organizational Climate, the degree of Collaboration, the level of Trust and the questions on Agreements, all variables showed that they were not normally distributed according to the K-S test.

Table 2 Names and Location of Collaborating Subsidiaries involved in the research

Location	People selected	Surveys completed	Name	Name	Survey completed	People selected	Location
Den Haag	**20**	**16**	**Ubouw Den Haag**	**Techniek West**	**8**	**16**	**Den Haag**
Rotterdam	19	11	Ubouw Rotterdam	Techniek West			Den Haag
Amsterdam	20	11	Ubouw Amsterdam	Techniek Amsterdam	0	3	Amsterdam
Arnhem	**20**	**13**	**Ubouw Arnhem**	**Techniek Oost**	**6**	**10**	**Apeldoorn**
Zwolle	14	8	Ubouw Oost	Techniek Oost			Apeldoorn
Eindhoven	13	8	Ubouw Eindhoven	Techniek Zuidoost	6	12	Roermond
Maastricht	20	7	Ubouw Maastricht	Techniek Zuidoost			Roermond
Groningen	18	9	Ubouw Noord	Techniek Noord Oost	4	12	Groningen
Utrecht	**17**	**12**	**Ubouw Utrecht**	**Techniek Midden**	**8**	**15**	**Veenendaal**
Bunnik	18	15	Ubouw Grote Projecten	Techniek Grote Projecten	0	0	Bunnik
Amsterdam	**15**	**12**	**Ubouw Noordwest**	**Techniek Noordwest**	**7**	**14**	**Benningbroek**
Rotterdam			Ubouw Rotterdam	Techniek Industrie	5	10	Rotterdam
	194	123	Totaal	Totaal	48	82	

5.1.2 Measures

To keep the survey as simple as possible, all questions were asked in the native language of the participant. In this case Dutch. Since all questionnaires used were originally English, these needed to be translated. The complete survey can be found in Appendix J.

Collaboration. Collaboration was measured using a 4 point Likert scale (1=definitely false, 2=mostly false, 3=mostly true 4=definitely true). The method of Cheung et al. for the measurement of the collaboration in partnering was used (see Appendix F). Some questions were slightly altered (the word programme for the word collaboration). Collaboration was split into two components, Hard and Soft (*Hard: M=2.72, SD=.50 and Soft: M=2.89, SD=.51).* The questions concerning Soft collaboration were concerning the more human aspects of collaboration, for example: "*I feel that the working relationships between all individuals are based on honestly, openness, and integrity*". The questions on Hard Collaboration were concerning the more defined aspects of collaboration, for example: "*I feel that my organisation is achieving reasonable commercial success from this collaboration*".

Organizational Climate. Organizational Climate was measured using the validated Organizational Climate Measurement by Patterson et al. (see Appendix D). The 4-point Likert scale that was suggested for the questionnaire was used. For the translation of the OCM, 5 different translations were used. The most straightforward and simple option was chosen. In total 17 sets of questions divided into four quadrants were included in the survey. The four quadrants were *Human Relations, Internal Process, Open Systems and Rational Goal.*

[1] Human Relations. For the quadrant Human Relations a set of statements was used, subdivided into the subjects *Autonomy, Integration, Involvement, Supervisory Support, Training* and *Welfare.* The employees of BAM needed to rank how much they agreed with these statements. They could choose from the 4-point Likert scale (1=definitely false, 2=mostly false, 3=mostly true 4=definitely true). An example of a statement about Autonomy is: *"Management let people make their own decisions much of the time".* When performing a Principal Component factor analyses (restricted on finding 6 components) on these six variables only two of these components showed. These were the components of *Autonomy* and *Involvement*. Both components showed sufficient Crohnbachs Alpha scores (respectactly .72 and .78) and thus will be involved in the further research.

[2] Internal Process. The quadrant Internal Process consists of the two sub-categories *Formalization* and *Tradition*. Again, statements were posed that should be judged according to the 4-point Likert scale. An example of a statement for *Formalization*s is: "*It is considered extremely important here to follow the rules".* When performing a Principal Component Analyses (limited on finding two components) these two components were clearly visible in the results. The Crohnbach's Alpha on Tradition was more than sufficient (.80) but the Alpha of Formalization is actually too low (.66). This means only *Tradition* is included into further research.

[3] *Open Systems.* For *Open Systems* statements were made about the sub-categories *Innovation and Flexibility, Outward Focus* and *Reflexivity.* Examples of statements for reflexivity are "*In this organization, objectives are modified in light of changing circumstances"* and "*There are regular discussions as to whether people in the organization are working effectively together"*. Once again these statements needed to be judged. Only one of these components was found when executing a Principal Component analyses (fixed on finding 3 components). This was the component of *Innovation and Flexibility*. The Crohnbach's Alpha was also sufficient (>.7). Thus, *Innovation and Flexibility* will be involved in further research.

[4] *Rational Goal.* The last quadrant of the Organizational Climate measurement consists of six sub-categories: *Clarity of Organizational Goals, Efficiency, Effort, Performance Feedback, Pressure to Produce* and *Quality.* The statements that needed to be ranked consisted for example for *Pressure to Produce* the question: "*People are expected to do too much in a day"*. Again, in the Principal Component analyses (fixed on finding 6 components) only 2 components were significantly shown. These were *Clarity of Organizational Goal* (Alpha .88) and *Pressure to Produce* (Alpha .74). These two components are going to be involved in further research.

Trust. Trust was measured using a validated set of questions from the article "*The organizational Trust Inventory"* by Cummings and Bromiley (1996) (see Appendix G). They involve all the components of trust (integrity, predictability, benevolence). The 4-point Likert scale from the Organizational Climate measure was implemented into this measurement, to make the total survey as simple as possible (*M=2.90, SD=.46*).

Agreements. Agreements was measured using a set of 5 questions, asking for facts. Again, the 4-point Likert scale was used. The questions were concerning overall agreements, agreements on

importance of the project, agreements on mutual goals, agreements on how to deal with contracts etc. (*M=2.88, SD=.53).* For agreements one open question was posed, were employees could react on the question "*Why do you think no agreements are made about collaboration between BAM Utiliteitsbouw and BAM Techniek*".

5.2 Results

Before the hypotheses could be tested, some tests needed to be conducted in order the check whether a regression analysis could be executed. These are factor analyses and an analysis to check for interrater consistency. For the latter, the methods of ICC and Rwg(j) were used. After conducting these analyses, the correlation, regression and mediation analyses will be discussed.

5.2.1 Confirmatory Factor Analysis and Level Analysis

In order to test whether the measurement instruments were valid, a Principal Component analyses was conducted. Furthermore the consistency within the groups was measured using ICC (intra class correlation coefficient) and Rwg(j). For the tables on factor analysis, see Appendix K, in which all factor analyses are elaborately discussed and the tables are shown.

Collaboration. For the measurement of the degree of Collaboration, a non-validated list of questions was used. For the validation of this measurement method, a Principal Component analysis was conducted on all 10 items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .86 ('great' according to Field (2009), and all KMO values for individuals were > .839, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (45) = 540.560, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. Two components had eigenvalues over Kaiser's criterion of 1 and in combination explained 58,048% of the variance. The items that cluster on the same components suggest that component 1 represents the Hard side of Collaboration, and component 2 represents the Soft side of Collaboration. When the Crohnbachs alpha is measured, both components show >0,8, which is sufficient or even very good.

Organizational Climate. Like the title of the paper by Patterson et al suggests, the OCM (Organizational Climate Measure) is a validated method the chart the organizational climate. However, this does not mean that this doesn't need to be validated for this research. Because of the large amount of questions and the relatively limited amount of participants, the validation of this scale is problematic.

[1] *Human Relations*. When performing a Principal Component factor analyses (restricted on finding 6 components) on these six variables only two of these components showed. These were the components of *Autonomy* and *Involvement*. Both components showed sufficient Crohnbachs Alpha scores (.72 and .78).

[2] *Internal Process.* The quadrant of *Internal Process* consists of two variables. When performing a PCA (limited on finding two components) these two components were clearly visible in the results. The Crohnbach's Alpha on *Tradition* was more than sufficient (.80) but the Alpha of *Formalization* is actually too low (.66). This means only *Tradition* is included into further research.

[3] *Open Systems.* Only one of the three components was found when executing a PCA (fixed on finding 3 components). This was the component of Innovation and Flexibility. The Crohnbach's Alpha was also sufficient (>.7).

[4] *Rational Goal.* The last quadrant consists of six factors. Again, in PCA (fixed on finding six components) only two components were significantly shown. These were *Clarity of Organizational Goal*s (Alpha .88) and *Pressure to Produce* (Alpha .74).

Trust. For the measurement of *Trust*, a validated list of questions was used. But for the validation of this measurement method, still a PCA was conducted on all 11 items with orthogonal rotation (varimax). According to the literature, the questions were based on three components (*Integrity, Predictability and Benevolence).* From these three components, only one significantly showed in the PCA. The component *Integrity* will be chosen to select for further analysis. The Kaiser-Meyer-Olkin

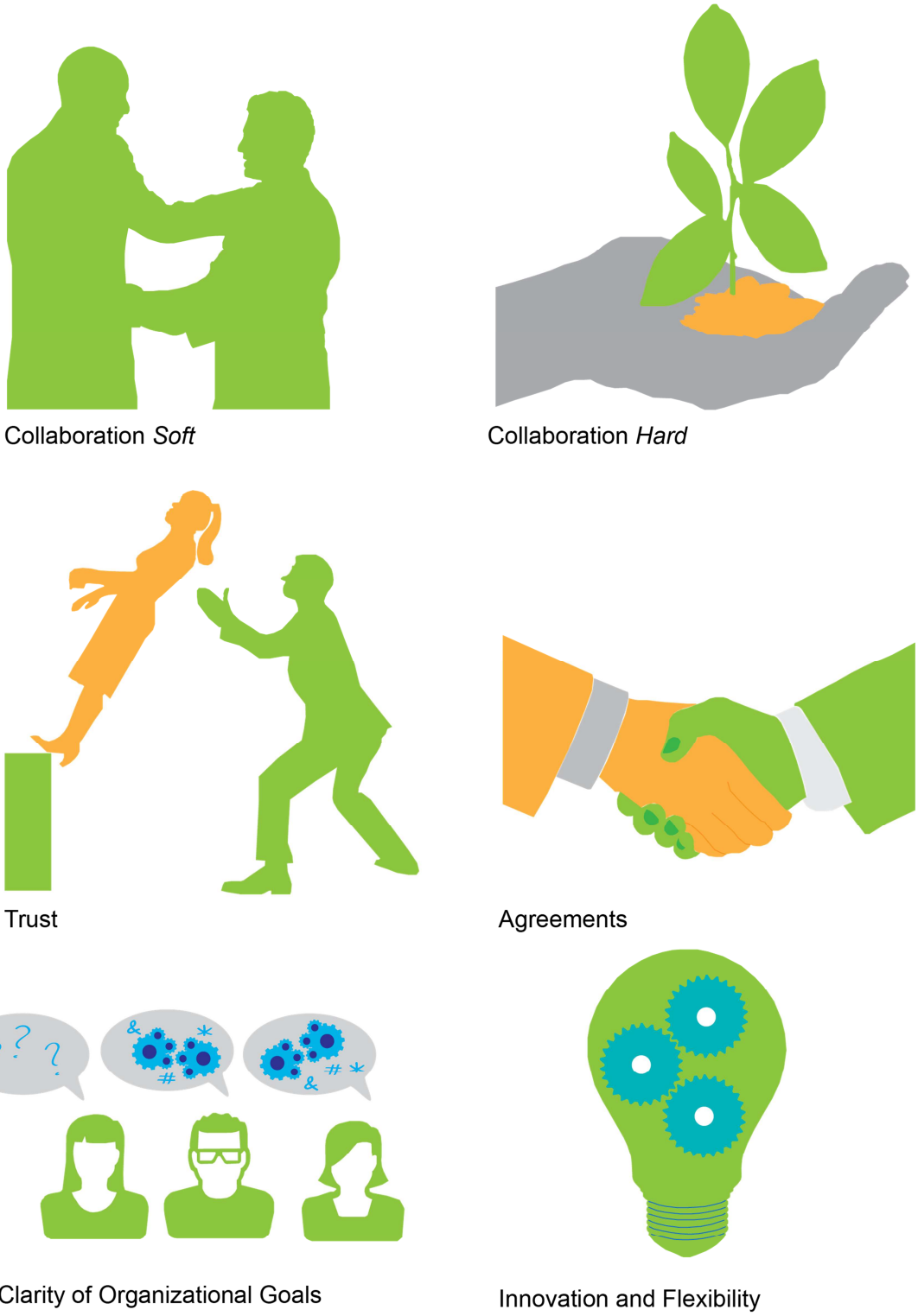


Figure 15 Six most important factors (own ill., 2013)

measure was verified the sampling adequacy for the analysis, KMO = .83 ('great' according to Field (2009), and all KMO values for individuals were > .785, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (55) = 441.025, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. One component with an eigenvalue over Kaiser's criterion was found and explained 52,652% of the variance. The reliability analysis, the Crohnbach's Alpha= .846, which is excellent.

Agreements. A non-validated list of questions was used to analyse the variable *Agreements*. The principal component analyses was conducted on the 5 questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .80 ('great' according to Field (2009), and all KMO values for individuals were > .739, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (10) = 189,970, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain the eigenvalues or the component in the data. Only one component was found with an eigenvalue over Kaiser's criterion of 1 and explained 58,4% of the variance. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,919, which explains 58,383% of the total correlation. The Crohnbach's Alpha is well above the restricted .7 (.819), which means that the scale is also validated.

For the measurement of the consistency within the different groups, the method of Intraclass Correlations was used (ICC). Intraclass correlations measures the relationship between two variables that measure the same thing (i.e. variables within the same class). They do so by comparing the between-unit ration to the total variance. According to Schneider et al. (2013) an ICC of .7 is deemed adequate to be seeing something as a group. This also takes into account the group size. For group sizes smaller than 5 these numbers are very difficult to achieve. When the ICC is conducted, only the two groups *BAM Utiliteitsbouw* and *BAM Techniek* showed as a consistent enough group. All the different offices showed deviations. Not one office showed a consistent enough result to be able to be seen as an one group.
Another method for assessing the inter rater agreements of the different groups is rwg(j). When the rwg(j) value for a group is >.70, it may be assumed that the individuals within the group answered the questions consistently enough to assess them as a group. The rwg(j) analysis for the different offices pointed out that almost all offices showed rwg(j) values of >.70. Only the offices of BAM Techniek Regio Noord didn't show a high enough value. This can be explained by the fact that from this office only three complete questionnaires were received. Two different standard deviations were used to check for the rwg(j), one normal standard deviation and one, calculating that people would answer questions politely for organizational climate about the colleagues (LeBreton and Senter, 2008). Both analyses shows sufficient results. The complete results of these studies can be found in Appendix L – Table 3.

5.2.2 Results for BAM

Descriptive Stastics
To make an indication of what we can find during a regression analysis, first a correlation matrix was conducted (see Appendix L – Table 2). This correlation matrix shows the correlation factor including the corresponding relevance of this correlation. This correlation was conducted for the entire set of data (n=Full BAM, n=171) but also for the two different operating companies (Utiliteitsbouw and Techniek). De most striking outcomes will be discussed.

A definite correlation can be found between *Agreements* and *Trust*. When more agreements are made, more trust can be found between the collaborating parties (r=.379, *p*<0.01). Also, climates with a high *Involvement* had positive influence on *Trust* in the other party (r=.216, *p*<0.01). *Trust* also shows to have large influence on both the dependent variables *Soft*- and *Hard Collaboration* (r=.562, *p*<0.01 and r=.444, *p*<0.01). Making agreements is another variable which seems to have high influence on both *Soft*-, en *Hard Collaboration* (r=.390, *p*<0.01 and r=.395, *p*<0.01). Organizational Climate factors who show high correlation with the dependent variables are *Involvement* (*Soft:* r=.325, *p*<0.01 and *Hard:* r=.327, *p*<0.01), *Innovation and Flexibility* (*Soft:* r=.294, *p*<0.01 and *Hard:* r=.450, *p*<0.01), and *Clarity of Organizational Goals* (*Soft:* r=.351, *p*<0.01 and *Hard:* r=.396, *p*<0.01).Besides these independent variables, also the correlation between *Soft*- and *Hard Collaboration* was measured and showed to be very significant (r=.649, *p*<0.01). This could be an indication that *Soft Collaboration* could function as a mediating variable in the regression model.

Table 3 Correlation Matrix

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1 Trust	2.90	.46	-									
2 Agreements	2.88	.53	,379**	-								
3 Autonomy	2.93	.45	0,135	-0,015	-							
4 Involvement	2.85	.42	,216**	,193*	,357**	-						
5 Tradition	2.06	.56	-0,045	-,174*	-,161*	-,445**	-					
6 Innovation and Flexibility	2.71	.54	0,099	,357**	0,066	,494**	-,576**	-				
7 Clarity of Organizational Goals	2.76	.54	,171*	,197*	0,081	,559**	-,316**	,537**	-			
8 Pressure to Produce	2.68	.43	0,013	-0,006	-0,11	-0,028	-0,13	0,006	-0,036	-		
9 Collaboration_Soft	2.89	.51	,562**	,390**	0,066	,325**	-0,105	,294**	,351**	-0,126	-	
10 Collaboration_Hard	2.72	.50	,444**	,395**	-0,063	,327**	-,244**	,450**	,396**	0,021	,649**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Soft Collaboration

Before conducting a regression analysis, the variables were all centred, so the regression analysis would give the most consisting and valid outcomes. All outcomes of this regression analysis can be found in Table 4. When conducting a regression analysis with Soft Collaboration as dependent variable, the following results show. First the main effects will be discussed. "*A main effect is the effect of one independent variable on the dependent variable, ignoring the effects of all other independent variables"* (Hanover College, 2013). The main effect of *Trust* on *Soft Collaboration* was highly significant (β=.46, *p*< .001). The independent variable *Agreements* showed also a significant effect (β=.14, *p*< .053). The last variable which showed significant influence on *Soft Collaboration* is *Clarity of Organizational Goals* (β=.15, *p*< .050).

Interactive Effects. Besides main effects, also the interaction effects of the independent variables will be discussed. "*Interaction effects represent the combined effects of variables on the dependent variables"* (Hanover College, 2013). This means that when interaction effects occur the impact of one variable depends on the level of the other variable. Combined variables were composed and the analysis was run again. The hypothesis already predicted interaction effects between *Agreements* and *Trust*, and between *Organizational Climate* and *Trust*. The regression revealed a significant linear interaction of *Agreements X Innovation and Flexibility* (β=.30, *p*< .044). A linear two-way interaction model was plotted and showed the relationship between these two variables (Appendix L – Table 5). It showed that when there is a climate of low *Innovation and Flexibility*, the *Soft Collaboration* benefits from a high level of *Agreements*. The other way around, when there is a climate of high *Innovation and Flexibility*, the *Soft Collaboration* benefits from a low level of *Agreements*. Overall, *Soft Collaboration* benefits most from a High Level of Agreements in combination with a low level of *Innovation*. Also the combined variable of *Agreements X Innovation and Flexibility X Clarity of Organizational Goals* showed to be highly significant with β=.40 and *p*< .001. A three-way interaction between *Agreements, Innovation and Flexibility and Clarity of Organizational Goals* was found that was not already foreseen in the theoretical framework. This combination of variables indicates that there are several combinations of levels of variables which could lead to a higher or lower level of *Collaboration* (see Appendix L – Table 6). First of all, all people seem to be benefiting from a high level of trust, since the slopes of all lines are positively reacting on high *Trust* and high *Collaboration*. The combination of high *Innovation and Flexibility* and high *Clarity of Organizational Goals* seems to be the best combination for achieving high *Collaboration*. All other combinations reach in combination with high *Trust*, lower levels of *Collaboration*. The worst possible situation is when there is a climate of low *Innovation and Flexibility* and low *Clarity*. For the dependent variable of *Soft Collaboration*, the independent variable of *Clarity* seems to more important, over the independent variable of *Innovation and Flexibility* by just a bit. The two slopes are almost identical; however, a small difference puts the line of low *Innovation* and high *Clarity* at a higher starting and ending point than the line for low *Clarity* and high *Innovation*.

Hard Collaboration

The main effect of the independent variables on Hard Collaboration were some different from what was found for *Soft Collaboration*. The variables that showed for both *Soft*- and *Hard Collaboration* significant influence were *Trust* (β=.39, *p*< .001) and *Agreements* (β=.13, *p*< .070) and also the Organizational Climate variable *Clarity of Organizational Goals* (β=.16, *p*< .057). The variable that is new introduced that had significant influence is *Innovation and Flexibility* (β=.29, *p*< .009). When the variable of *Soft Collaboration* was added to the regression analysis, the significance of the independent variables changed. *Soft Collaboration* showed highly significant (β=.46, *p*< .001).

Interactive Effects. The same analysis was conducted for the combined variable with *Hard Collaboration* as the dependent variable. Again, the combined variable of *Agreements X Innovation and Flexibility X Clarity of Organizational Goals* showed to be highly significant with β=.39 and *p*< .002. This three-way interaction of variables indicates that there are several combinations of levels of variables which could lead to a higher or lower level of *Collaboration* (see Appendix L – Table 7). First of all, all people seem to be benefiting from a high level of *Agreements* concerning *Hard Collaboration*, since the slope of all lines are positively reacting on high *Agreements* and high *Collaboration*. The combination of high *Innovation and Flexibility* and high *Clarity of Organizational Goals* seems to be the best combination for achieving high *Collaboration*. All other combinations reach in combination with high *Trust*, lower levels of *Collaboration*. The worst possible situation is when there is a climate of low *Innovation and Flexibility* and low *Clarity*. The level of *Agreements* also seems to have less of an influence for this situation. The difference between low *Agreements* and high *Agreements* is less definite in this climate. Also a distinction can be made between the importance of *Innovation and Flexibility* and *Clarity of Organizational Goals*. The latter seems to be less important, since the absence of high *Clarity* shows a higher level of *Collaboration* then the absence of *Innovation*. This is just the other way around of what we witnessed concerning *Soft Collaboration.*

Table 4 Result of Regression Analysis with Dependent Variable: Soft Collaboration and Hard Collaboration (n= Full BAM)

Dependent Variable	**Soft Collaboration**	**Hard Collaboration**
	β	**β**
Step 1: Controls		
Autonomy	-0,032	-0,13
Involvement	0,109	0,08
Tradition	0,088	0,01
Pressure to Produce	-0,087	0,04
Step 2: Main Effects		
Trust	0,46***	0,34***
Agreements	0,14†	0,13†
Clarity of Organizational Goals	0,16*	0,16†
Innovations and Flexibility	0,13	0,28*
Step 3: Linear Interaction		
Agreements X Innovations and Flexibility	0,30*	-0,13
Step 4: Non-Linear Effects		
Agreements X Innovations and Flexibility X Clarity of Organizational Goals	0,40**	0,26†

† p<.10
* p<.05
** P<.01
*** P<.001

Mediation Analyses

When conducting the regression analyses, there were some indications that variables could be working on *Hard Collaboration*, through *Soft Collaboration*. This is called mediation. Throughout the analyses two of these mediations were found. One is a complete mediation and one is a partial mediation.

Partial Mediation Model. A correlation between *Soft-* and *Hard Collaboration* was established during the descriptive analyses (r=.649, p<0.01). Also the first condition for mediation was met: a significant main effect of *Trust* on *Soft Collaboration* β=.46, p< .001. Then the second condition was met: a significant main effect of *Trust* on *Hard Collaboration* β=.39, p< .001. Adding *Soft Collaboration* to the model, it led to a drop of β size of the effect of *Trust* on *Hard Collaboration*, β=.13, p< .075 in favour of: a significant effect of *Soft Collaboration* on *Hard Collaboration*, β=.44, p< .001. A Sobel test revealed that this indirect effect was significant, z = 2.04, p < .041. Thus this means *Soft Collaboration* served as a partial mediator of the effect of *Trust* on *Hard Collaboration.* This is called partial mediation due to the fact that when *Soft Collaboration* was added to the regression analysis as an independent variable, the other independent variable *Trust* still showed some significant influence. When the independent variable would have no significant influence at all after adding the mediation variable, this would mean there is full mediation.

Full Mediation Model. The correlation between *Soft-* and *Hard Collaboration* was already established during the descriptive analyses. Also the first condition for mediation was met: a significant three-way interaction of *Agreements X Innovation and Flexibility X Clarity of Organizational Goals* on *Soft Collaboration* β=.40 and p< .001. Then the second condition was met: a significant three-way interaction of *Agreements X Innovation and Flexibility X Clarity on Hard Collaboration* β=-.34 and p< .004. Adding *Soft Collaboration* to the model led to a drop of β size of the effect of *Agreements X Innovation and Flexibility X Clarity on Hard Collaboration* on *Hard Collaboration*, β=.22, p< .172 in favour of: a significant effect of *Soft Collaboration* on *Hard Collaboration*, β=.44, p< .001. A Sobel test revealed that this indirect effect was significant, z = 1.72, p < .085. Thus, *Soft Collaboration* served as a full mediator of the effect of *Agreements X Innovation and Flexibility X Clarity of Organizational Goals* on *Hard Collaboration*.

Model

A model to describe this collaboration is drafted and can be found in Figure 16 (which is the same as figure A in the summary). It can be seen that the factors *Trust* and *Agreements X Innovation and Flexibility X Clarity of Organizational Goals* have the most significant influence. Just like the influence *Soft Collaboration* has on *Hard Collaboration*.

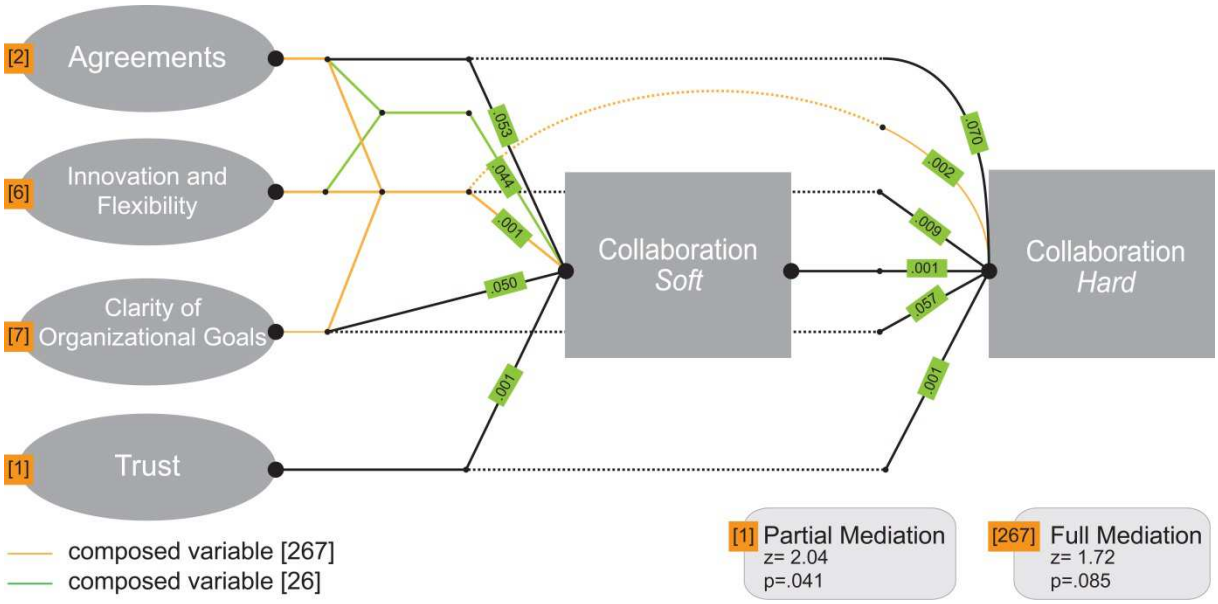


Figure 16 Collaboration Model (own ill., 2013)

5.2.3 Results for Utiliteitsbouw and Techniek

Descriptive Statistics

In general, de correlation matrix for Utiliteitsbouw and Techniek didn't show a lot of difference from the correlation matrix of all the cases together. However, some striking differences came to light. Comparing Utiliteitsbouw to the general data, it can be noted that *Tradition* doesn't have any influence on Collaboration at all. The rest of the numbers show almost the same results as the general data did. For Techniek, this is a little bit different. Were Utiliteitsbouw showed to be not influenced by Tradition at all, Techniek shows that these variables highly significantly negatively correlate on both *Soft Collaboration* (r=-.43, *p*<.01) and *Hard Collaboration* (r=-.54, *p*<.01). Also *Involvement* doesn't show any effect *on Soft Collaboration* where this correlation is present at both the full data set as Utiliteitsbouw. All the results of the correlation analyses can be found in Appendix L – Table 8 and 9. Next, the results of the regression analysis of both the separate data sets of BAM Utiliteitsbouw and BAM Techniek will be discussed. All the results of the regression analyses can be found depictured in Figure 12 and Figure 13 and in numbers in Appendix L – Table 10 and 11.

Soft Collaboration

Utiliteitsbouw

The regression analysis was also conducted on the data set of the operating company Utiliteitsbouw (recoded Utiliteitsbouw with 1, and Techniek with 0 for the entire data set). This means that for this analysis the factor Utiliteitsbouw offices a new factor in the regression analysis is added. The main effects of the independent variables on *Soft Collaboration* were *Trust* (β=.41 and *p*< .001) and *Clarity of Organizational Goals* (β=.31 and *p*< .012).

Interactive Effects. Also some interactive effects of the independent variables on *Soft Collaboration* were researched. For these interaction effects, the effects of all the normal variables were combined with the factor for the operating company. It showed that in combination with the operation company, *Tradition* (β=.18 and *p*< .035) and *Involvement* (β=.15 and *p*< .035) showed significant influence. These did not show yet in the regression analyses of the Full BAM company. Note that both of these variables are positive.

Techniek

For Techniek, the regression analysis showed the following results: the main effects of the independent variables on *Soft Collaboration* is the variable of *Trust* (β=.52 and *p*< .001). Also the

variable *Agreements* shows significant results (β=.24 and *p*< .005), just like *Clarity of Organizational Goals* (β=.21 and *p*< .005).

Interactive Effects. When the factor for the operation company Techniek was added, it showed some additional interactive effects, for example *Tradition* (β=-.22 and *p*< .033), and *Involvement* (β=-.20 and *p*< .036). Note that were for Utiliteitsbouw these regression factors were positive, here with Techniek, these factors are negative. This could be an explanation why these were not found at the regression analyses of the data set of Full BAM.

Hard Collaboration

Utiliteitsbouw

The main effects of the independent variables on Hard Collaboration were the factor for the *Trust* (β=.41 and *p*< .020) and also *Agreements* (β=.28 and *p*< .058) showed significant influence. Also, when Soft Collaboration was added as a factor, it showed significant influence (β=.54 and *p*< .001).

Interactive Effects. Combining the factor for the Operating Company Utiliteitsbouw to the other variables, not significant effects showed for Hard Collaboration.

Techniek

The main effect on Hard Collaboration for the operating company Techniek were the variables of *Trust* (β=.49 and *p*< .001) and *Innovation and Flexibility* (β=.26 and *p*< .015).

Interactive Effects. Some interactive effects of the factor Operating Company Techniek with other variables showed in the regression analysis. Again the factors *Tradition* (β=-.19 and *p*< .059) showed.

Mediation Analyses

Again when a look is taken at the table containing the results of the regression analysis for both the operating companies, the hypothesis arise that mediation could be in place. Once again we conducted the Sobel tests to see whether these mediation factors were significant enough. For the data set of operation company Techniek, a full mediation and a partial mediation was found. For the data set of operating company Utiliteitsbouw, just one partial mediation variable was found.

Operating company Utiliteitsbouw

Partial Mediation Model. A correlation between *Soft* and *Hard Collaboration* was established during the correlation analyses (r=.645, *p*<0.01). Also the first condition for mediation was met: a significant main effect of *Trust* on *Soft Collaboration* β=.41, *p*< .001. Then the second condition was met: a significant main effect of *Trust* on *Hard Collaboration* β=.31, *p*< .020. Adding *Soft Collaboration* to the model led to a drop of β size of the effect of *Trust* on *Hard Collaboration*, β=.07, *p*< .062 in favour of: a significant effect of *Soft Collaboration* on *Hard Collaboration*, β=.54, *p*< .001. A Sobel test revealed that this indirect effect was significant, $z = 2.75$, $p < .006$. Thus this means *Soft Collaboration* served as a partial mediator of the effect of *Trust* on *Hard Collaboration*.

Operating company Techniek

Partial Mediation. A correlation between *Soft-,* and *Hard Collaboration* was established during the descriptive analyses (r=.698, *p*<0.01). Also the first condition for mediation was met: a significant main effect of *Trust* on *Soft Collaboration* β=.52, *p*< .001. The second condition was also met: a significant main effect of *Trust* on *Hard Collaboration* β=.49, *p*< .001. Adding *Soft Collaboration* to the model led to a drop of β size of the effect of *Trust* on *Hard Collaboration*, β=.26, *p*< .003 in favour of: a significant effect of *Soft Collaboration* on *Hard Collaboration*, β=.41, *p*< .001. A Sobel test revealed that this indirect effect was significant, $z = 3.71$, $p < .0002$. Thus this means *Soft Collaboration* served as a partial mediator of the effect of *Trust* on *Hard Collaboration.*

Full Mediation Model. A correlation between *Soft* and *Hard Collaboration* was established during the descriptive analyses (r=.698, *p*<0.01). Also the first condition for mediation was met: a significant three-way interaction of *Tradition X Factor Operating Company Techniek* on *Soft*

Collaboration β=-.22 and *p*< .033. Then the second condition was met: a significant two-way interaction of *Tradition X Factor Operating Company Techniek* on *Hard Collaboration* β=-.19 and *p*< .059. Adding *Soft Collaboration* to the model led to a drop of β size of the effect of *Tradition X Factor Operating Company Techniek* on *Hard Collaboration*, β=-.07, *p*< .448 in favour of: a significant effect of *Soft Collaboration* on *Hard Collaboration*, β=.41, *p*< .001. A Sobel test revealed that this indirect effect was significant, *z* = -2.05, *p* < .004. Thus, *Soft Collaboration* served as a full mediator of the effect of *Tradition X Factor Operating Company Techniek* on *Hard Collaboration*.

Models

Two different models depicturing the collaboration were composed. The differences that were described in the previous analyses can be spotted between the two operating companies. Models can be found in Figure 177 and Figure 188. These differences appeared since now, not the entire data set was used, but strictly the data set for BAM Utiliteitsbouw or BAM Techniek. The two additional factors to the model are *Involvement* and *Tradition,* which already showed significant in the correlation matrix but was not visible in the regression analysis. Here, the factors showed an opposite relation for both operating companies. When these models are compared to the original model, some differences can be spotted as well. The model for Utiliteitsbouw shows that making Agreements has only influence on Hard Collaboration, where with Techniek making Agreements is only important for the Soft Collaboration (which then again influences Hard Collaboration again). Trust still proves to be very important for both Soft- as Hard Collaboration; Clarity of Organizational Goals is just as important for Utiliteitsbouw as it is for Techniek. Composed variables are not included in this model.

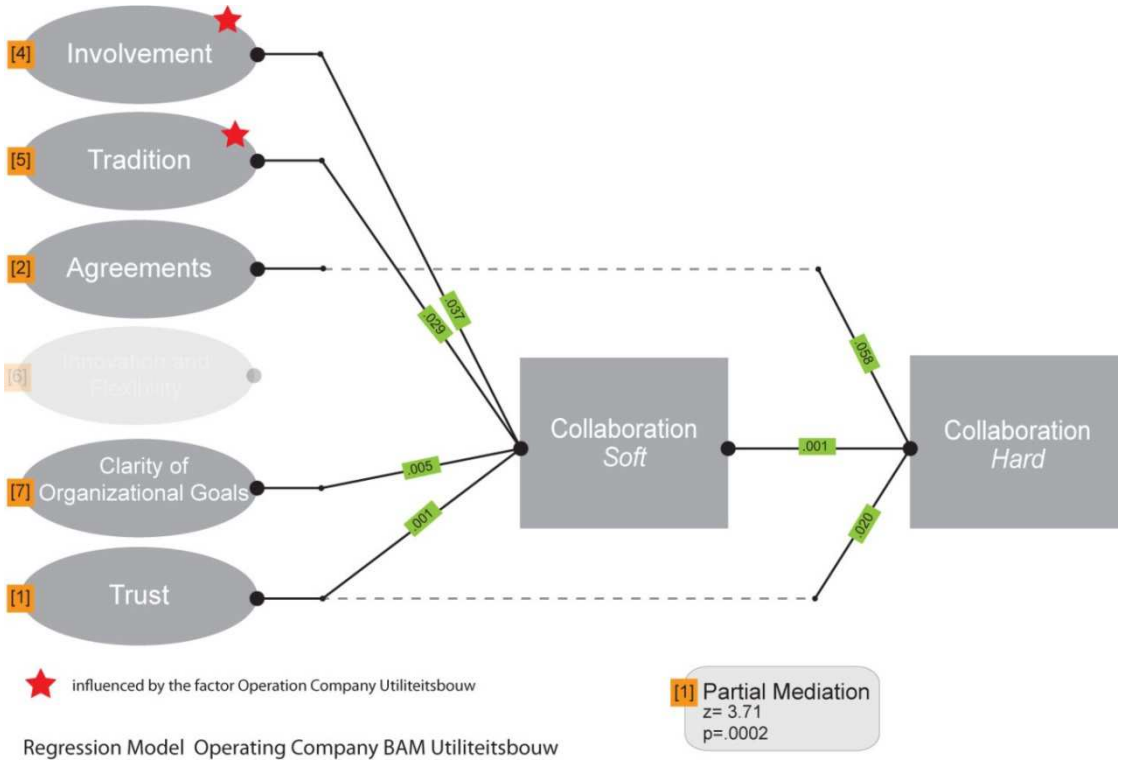


Figure 17 Collaboration Model Operating Company BAM Utiliteitsbouw (own ill., 2013)

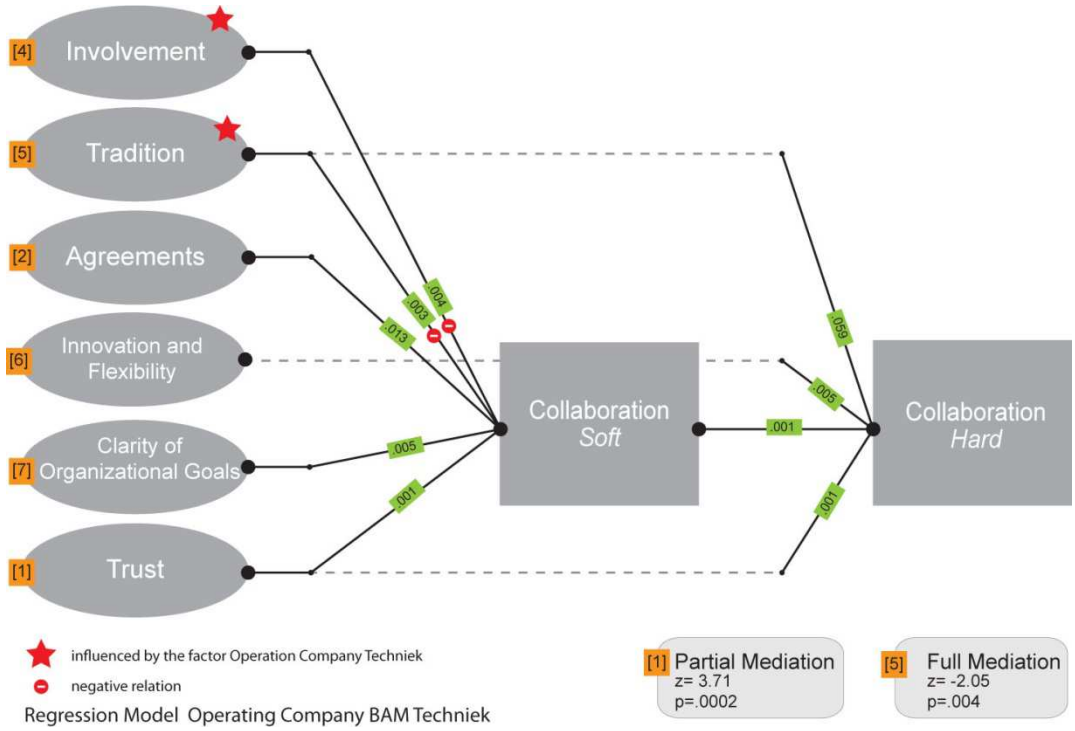


Figure 18 Collaboration Model Operating Company BAM Techniek (own ill., 2013)

5.3 Additional Analysis

Looking at the initial hypotheses, it can be noted that some of the hypotheses are still left unanswered. To be able the answer to these hypotheses, some additional analyses are needed. For these additional analyses, the differences in organizational climate between the four collaborating subsidiaries will be investigated. This will be done by analysis based on Mann-Whitney tests, and ANOVA-tests. The different statements are covered in the next paragraphs.

5.3.1 Hypothesis 1

The statement was made that when the differences in organizational climate were small, the collaboration would be positively influenced by this. A case study is made of all of the different offices of Utiliteitsbouw and Techniek (see Appendix M), the four most prominent collaborations and of some geographical groups. First, the OC of all the different offices was profiled. The differences between the operating companies Utiliteitsbouw and Techniek was researched through a Mann-Whitney test. Only one small size effect difference could be spotted (on Autonomy).

A Mann-Whitney test was also conducted on all these collaboration combinations in order to find whether significant differences in Organizational Climate could be found within the collaborations. It appeared that on two of the four collaborations a significant difference could be detected. The corresponding factor *Hard Collaboration* of these collaboration combinations in relation to the number of differences found, did not show a conclusive answer to this hypothesis.

Table 5 Number of Differences in Organizational Climate factors versus Rate of Collaboration

Collaboration	# of Differences	Rate of Collaboration (Hard)
Noordwest & Noordwest	1	2.56
Arnhem & Oost	3	2.90
Den Haag & West	0	2.65
Utrecht and Midden	0	2.70

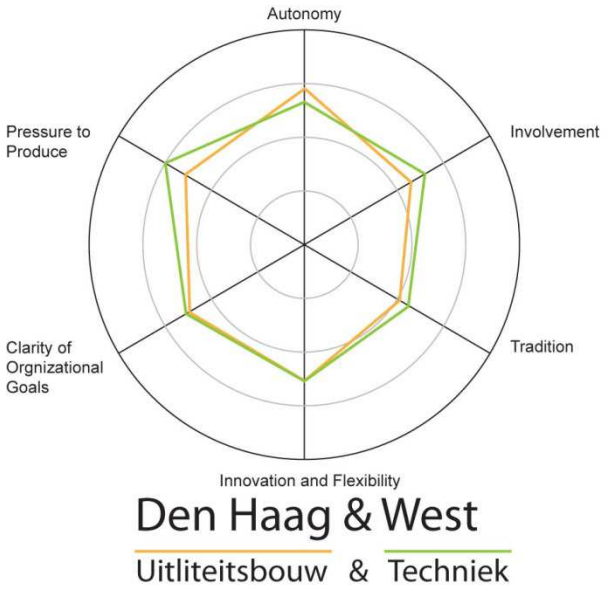
Concluding, it can be said that based on the results of the analysis of this data set, no conclusion can be drawn. There was no significant effect of differences in Organizational Climate on Collaboration,

F(2,74)=1.22, *ns,* ω=.19. However, there are some organizational climate factors which have been proven to be very important in for an environment in which good collaboration is possible. Clarity of Organizational Goals and Innovation and Flexibility are the most important organizational factors. This can also be seen when looking at the separate data sets. For both Arnhem&Oost, the levels of Clarity of Organizational Goals and Innovation and Flexibility are quite high.

5.3.2 Hypothesis 2

Another hypothesis was that Trust has a negative influence on making Agreements about Collaboration. This did not automatically show during the regression analysis. Even, the opposite of this hypothesis would make more sense when a look is taken at the correlation matrix, where Trust and Agreements are correlating positively, and with a very high significance (r=.379, p<0.01). When conducting a regression analysis with Agreements as the dependent variable and Trust and the six remaining Organizational Climate factors as the independent variables, it could be seen that Agreements is positively influenced by Trust (β=.359, p< .001). The other way around, when Trust takes the place of the dependent, Agreements also shows to have a positive influence on Trust (β=.392, p< .001). This means one must think that hypothesis 3 *Trust has a negative influence on the decision to make agreements on collaboration,* is false. However, this regression analysis could only test whether Trust in the other party does or doesn't have a positive or negative influence on the Agreements made. The hypothesis clearly also stated the decision to make Agreements. During the survey, the participants had the possibility to fill out the open ended question: "*When you have answered one of these questions with Definitely False of Mostly False, what do you think is the reason that no agreements are made on collaboration*? The answers that were conducted were divers (see Appendix M- Table 7). The answer that was used on both the side of Techniek as Utiliteitsbouw, was a form of incompetence (skills and capacity). The lack of openness about the financial situation was also a returning answer on both sides (organizational self-interest). The fact that the financial structure of both subsidiaries BAM Techniek and BAM Utiliteitsbouw are not facilitating these kinds of arrangements is mostly seen as a reason on the side of BAM Utiliteitsbouw. Both sides mention trust or distrust a couple of times, but those do not have the upper hand at all. This also does not support or hypothesis. This means that the hypothesis is officially false.

A question that appeared during the data analysis is whether the organizational culture could be influenced by the geographical factor of where these offices are located. And the question that followed was: could there be something like a geographical profile? When comparing the offices in geographical groups, five groups were created. A look was taken at the standard deviations between the different organizational climate variables, and if different profiles could be spotted. Interesting was that the factor for *Tradition* varied the most over all the different groups. In some geographical groups, *Tradition* was more important for Utiliteitsbouw (Oost, Arnhem, Utrecht en Grote Projecten) were in other regions *Tradition* was much higher valued by Techniek (West, Industrie, Roermond, NoordWest). The profile that showed the most distinction was the one in the North (Groningen offices), where *Tradition* is low and *Innovation and Flexibility* is high. In the end, no special profiles could be appointed through this data. The distinctions between the groups are not large enough to be able to speak of different geographical profiles. The different groups all show the same relations between the variables (as can be seen in Appendix M - Table 6). To make a solid statement about this, a ICC, Rwg(j) analysis should be conducted in order to test whether these groups show a large enough interrater consistency. After this, the Mann-Whitney test could prove whether there are significant enough differences to speak of geographical profiles. This could be conducted in further research.



Collaboration

	Soft	Hard
Utiliteitsbouw	2.75	2.49
Techniek	2.69	2.89
Mean	2.73	2.65

Agreements

Utiliteitsbouw	2.89
Techniek	2.71
Mean	2.81

Trust

Utiliteitsbouw	2.94
Techniek	2.43

Graph 1 Profile of Collaboration Den Haag & West (own ill., 2013) more can be found in Appendix M

5.3.5 Hypothesis 5

The last additional analysis that has been made is concerning the fifth hypothesis. In the conceptual model it is stated that differences in Organizational Climate also influences the level of Trust. It is stated that when differences are smaller, trust is higher. Again, the Mann-Whitney tests that were conducted to check hypothesis 1 were used. When plotting this to the level of Trust it displays a diverse picture. A one-way ANOVA test was executed in order to see whether the difference in Organizational Climate had a significant effect on the rate of Trust. For this measurement we took the individual rating for Trust as the dependent variable, and the number of differences as the independent variable. There was a significant effect of differences in Organizational Climate on Trust, $F(2,79)=3.42$, $p<.05$, $\omega=.24$. There was also a significant linear trend $F(1,79)=4.96$, $p<.05$, $\omega=.18$, indicating that when the number of Organizational Climate differences is higher, the Trust level increased proportionally. This is the opposite of what was proposed in the hypothesis. This is why, the hypothesis is rejected. This relation is not something that has been seen in other studies. This is why, to be able to really make a statement on this subject, further research is necessary.

5.4 Preliminary Conclusions

In construction industry, the most important organizational climate factors are those that showed most consistency within the factor analysis. These were autonomy, involvement, tradition, innovation and flexibility, clarity of organizational goals and pressure to produce. Furthermore it can be said that the construction industry views collaboration on two different levels: *Hard Collaboration* and *Soft Collaboration*. Where *Soft Collaboration* involves the more human aspects of collaboration and *Hard Collaboration* involves the more straightforward aspects (eg. the profitability of the collaboration). For trust the factor Integrity is most consistent. Honesty and purity in their actions is most important in trusting the collaborating party.

First of all it is important to understand that *Soft collaboration* is sometimes a mediation factor between other factors and Hard collaboration. This means that the more “human” factors of collaboration also in construction industry have great influence on the actual outcome of this collaboration. This also means that the model becomes a little bit more complicated. According to the regression analysis, the factors influencing *Soft Collaboration* are *Trust*, level of *Agreements* and *Clarity of Organizational Goals*. Also, a combination of factors was influencing *Soft collaboration*. Namely *Agreements* X *Innovation and Flexibility* and *Agreements* X *Innovation and Flexibility* X *Clarity of Organizational Goals*. When collaboration takes place in an environment where *Innovation and Flexibility* is low, the collaboration benefits from a good set of agreements. When the environment of the collaboration has a high level of

Innovation and Flexibility, less agreement would be benefitting to the collaboration. Also, a high level *of Agreements* seems to always be in favour for creating a good working *Soft collaboration*.

The main effects on *Hard Collaboration* are *Trust*, level *of Agreements*, *Clarity of Organizational Goals* and *Innovation and Flexibility*. Also, *Soft Collaboration* showed to have a significant positive influence. The interactive effect that were seen before on *Soft Collaboration*, show again on *Hard Collaboration* (this factor was *Agreements* X *Clarity of Organizational Goals* X *Innovation and Flexibility*). However, the influence is not exactly the same. For *Hard Collaboration*, *Innovation and Flexibility* seems to be the more important factor, over *Clarity of Organizational Goals*. This is the other way around for the influence of this composed factor on *Soft Collaboration*.

Soft Collaboration works as a mediation variable for *Hard Collaboration*. For *Trust*, this is a partial mediation, meaning that it works both direct and indirect through *Soft Collaboration* on *Hard Collaboration*. For the combined factor *Agreements* X *Innovation and Flexibility* X *Clarity of Organizational Goals* it is a full mediation, meaning this factor works completely through *Soft Collaboration* on *Hard Collaboration*.

Differences between the operating companies Utiliteitsbouw and Techniek are found. The reason some of the effects didn't show on the analyses of the full BAM data set, is that some have opposite directions, which make them unseen in the complete data set. For instance, where Utiliteitsbouw shows not to be influenced by *Tradition*, Techniek shows to be negatively influenced by this factor in the correlation matrix. The regression analysis shows that the main factors on Utiliteitsbouw for *Soft Collaboration* are *Trust* and *Clarity of Organizational Goals*. The factors *Tradition* and *Involvement* show significant positive influence on *Soft Collaboration*, but only inside the data-set of Utiliteitsbouw. The main effects on *Hard Collaboration* for this data set were *Trust* and *Agreements*. Surprisingly, *Autonomy* showed to have a positive influence within the data set of Utiliteitsbouw, on *Hard Collaboration*.
For Techniek, the numbers looked a little different. Still *Trust* and *Agreements* showed, and also here *Tradition* and *Involvement* were found. However, those have a negative influence on the factor *Soft Collaboration* for the data set Techniek. This means that in an environment where traditions are valued, the collaboration is negatively influence on the side of Techniek, and positively influence by the side of Utiliteitsbouw. This also goes for *Involvement*. An environment where *Involvement* is high is a positive influence on collaboration from the side of Utiliteitsbouw, and a negative influence on the side of Techniek. But again, for both models, Soft Collaboration worked as a mediation factor for Hard Collaboration.

Through additional analyses, the remaining hypotheses were trying to be cleared. However, the data set did not show consistent enough results to be able to make statements about hypothesis 1, the relation between Organizational Climate differences and Collaboration. The analyses that were conducted for hypothesis five (the relation between Organizational Climate differences and Trust) showed an opposite results than was expected. Therefore, both the hypothesis one and five are rejected.

6

Discussion and Conclusion

This report contains an exploratory and explanatory study to the collaboration between subsidiaries from different disciplines in the construction industry. This research was conducted in order to contribute to a policy on dealing with collaboration between subsidiaries in the construction industry.

The main research question was defined as follows:

How does organizational climate influence the collaboration between subsidiaries working in different disciplines of the construction industry and how is this collaboration influenced by agreements?

6.1 Discussion

This paragraph provides room for interpretations, explains the implications of the findings of this research and gives suggestions for further research. The most important finding is that Collaboration can be split up in two parts; the soft, intangible part about human interactions (communication, appreciation etc.), and the other, harder, part, about the facts, numbers and the outcome of the collaboration (reaching goals, profit etc.). The “soft part” influences the hard part of collaboration almost one on one. This is a very interesting fact to keep in mind when trying to excel in collaboration. It is also in line with previous research on negotiation techniques (Pruitt, 1983; Van de Vliet & Janssen, 2001). Furthermore this study proves that Organizational Climate factors are highly influencing both the collaboration parts. During this chapter the theoretical and managerial implications will be elaborated on.

6.1.1 Theoretical Implications

Good Collaboration

It became clear during the literature research that the subject of collaboration is widely covered. Much is written and said about collaboration, but the quality of collaboration is not often discussed. In order to know which variables effect good collaboration it is important to define what good collaboration exactly is. It is concluded that good collaboration can be described as *the process of the achievement of the pre-stated goal, based on high group effectiveness, high group efficiency, and high productivity, with the commitment of resources to the process and the goal, and which satisfies the individuals working on the process.*

Factors that affect good collaboration

The list of papers written on collaboration is endless; which meant an analysis needed to be made which literature to include and which not. This research shows an overview and comparison of literature on collaboration in the construction industry, collaboration in partnerships, collaboration in a supply chain and collaboration focused on results. The focus of the literature research was on conducting a set of factors and sub-factors influencing collaboration. Eight different researches were compared and all eight main factors that were found showed in at least three or more researches. The eight factors that are particular important to collaboration are *Continuous improvement, Trust, Devotion, Objective or Goal Alignment, Collaboration Support, Agreements, Communication and Compatibility.* This research implemented several measurement tools into the survey (Cheung et al., 2003; Cummings & Bromiley, 1996; Patterson et al., 2005). The results of the analysis show that two different factors can be distinguished in collaboration between subsidiaries: the factors Hard Collaboration and Soft Collaboration. Where Soft Collaboration is concerning the more "social" parts of the collaboration, Hard Collaboration is concerning the more solid parts (e.g. the profitability of the collaboration).

Differences in organizational climate

The connection between organizational climate and collaboration is often made. A lot of research has been done regarding safety and customer oriented climate, however a knowledge gap exists concerning organizational climate in relation to collaboration (Schneider et al., 2013). It was yet unknown which organizational climate factors are the most important for an environment in which collaboration can flourish. The study proposed that when the differences between the most prominent organizational climate factors were small it would benefit the collaboration. However, this hypothesis (H1) did not mention which Organizational Climate factors it would be concerning.

H1: When collaboration partners are more compatible (more alike) on the area of organizational climate, the degree of collaboration will be higher.

This hypothesis could not be proven since the data analysis could not provide a significant answer due to the small data set. Therefore the hypothesis can neither be rejected nor accepted. The differences in organizational climate do not solely negatively or positively influence the collaboration of subsidiaries. To be able to make statements about this relationship, more collaborations need to be covered. However, there are some organizational climate factors which have been proven to be very important for an environment in which good collaboration is possible. Clarity of Organizational Goals and Innovation and Flexibility are the most important organizational factors. Zooming in on the operating companies within the research group, some differences show. The factors Tradition and Involvement have a negative influence on collaboration within the Techniek subsidiary, but Utiliteitsbouw shows a positive influence of these same factors. This difference should be kept in mind when drafting a policy.

Tension between Agreements and Trust

Conducting literature studies on Trust in relation to Collaboration leads to several different insights. The survey measured the belief in integrity of the other party. The interviews that were conducted in the beginning of the research suggest that it is expected that trust should be in place (note the word "should"), and thus making agreements would be a sign of disrespect. This is confirmed by research (Klein Woolthuis et al., 2005) that a contract and trust could be substitutes of each other depending on the situation. The literature research concluded that making agreements on mutual objectives, communication, strategy, membership, equity, integration, project process and feedback all contribute to better collaboration. Correlation analysis shows that when looking at this particular situation, Trust and Agreements influences each other positively. Also, the regression analysis shows over and over again that making Agreements has a positive influence on collaboration. Which means that hypothesis two is proven to be true:

H2: *Using Partnering Charts has a positive influence on intra organizational collaboration*

Agreements in combination with Clarity of Organizational Goals and Innovation and Flexibility are a combination of factors which influence Hard Collaboration through the mediation variable Soft Collaboration. It was proposed that Trust has a positive influence on Collaboration and a negative influence on Agreements. The complete hypothesis was;

H3: Trust has a negative influence on the decision to make agreements on collaboration.

This question is not easily answered by looking at the relationship between Agreements and Trust. In this study, based on the regression analyses and a case study on open ended questions, it can be concluded that this hypothesis is false. Trust and Agreements both positively influence each other and the case study did not inextricably establish that this relation was there. Therefore, hypothesis three is rejected. However, the second hypothesis concerning Trust cannot be denied to be true;

H4: Trust between the subsidiaries has a positive influence on collaboration in general.

All regression analyses show the indisputably significant relation between Trust and Collaboration. This confirms earlier observations from Mengt et al.(2011), Patel et al. (2012) and Sarkar et al. (1998) that trust is one of the main important elements of good collaboration. Last it was proposed that when differences in Organizational Climate are smaller it leads to a higher level of Trust.

H5: The more similar the levels of Organizational Climate, the higher the level of Trust

The data cannot confirm this hypothesis. The analysis shows a positive linear relation between the numbers of differences and the level of trust. This means that this hypothesis is rejected as well. However, the rejection of this hypothesis does not automatically means that the opposite is true. Again, for valid conformation of this statement a larger number of cases should be entered in the research.

Collaboration Model for subsidiaries with different disciplines in construction industry

The analysis of the data led to an unexpected insight into the influence *Organizational Climate*, *Trust* and *Agreements* have on the dependent variables *Soft Collaboration* and *Hard Collaboration*. This is the main contribution of this research; a collaboration model for subsidiaries with different disciplines in construction industry. The numbers in the collaboration model are corresponding with the numbers of the correlation matrix.

Soft Collaboration: The main effects on *Soft Collaboration* are *Trust* and *Agreements*. *Trust* is in all cases the most important factor. *Agreements* also show to have a strong and significant influence. The last main effect on *Soft Collaboration* is *Clarity of Organizational Goals*. These main findings clearly indicate a positive effect of all these variables. Main effects are supplemented by interactive effects. Interactive Effects; The regression revealed a significant linear interaction of *Agreements* X *Innovation and Flexibility*. It shows that when there is a climate of low *Innovation and Flexibility*, the *Soft Collaboration* benefits from a high level *of Agreements*, and the other way around; when there is a climate of *high Innovation and Flexibility*, the *Soft Collaboration* benefits from a low level of *Agreements*. Also the combined variable of *Agreements* X *Innovation and Flexibility* X *Clarity of Organizational Goals* shows to be highly significant. This three-way interaction between *Agreements*, *Innovation and Flexibility* and *Clarity of Organizational Goals* was not foreseen in the theoretical framework. First of all, all collaborations are benefiting from a high level of *Agreements*. The combination of high *Innovation and Flexibility* and high *Clarity of Organizational Goals* is the best combination for achieving high *Collaboration*. For the dependent variable of *Soft Collaboration*, the independent variable of *Clarity* is slightly more important over the independent variable of *Innovation and Flexibility*.

Hard Collaboration: The main effects of the independent variables on *Hard Collaboration* are *Trust, Agreements, Clarity of Organizational Goals* and a new one*, Innovation and Flexibility*. When the variable of *Soft Collaboration* is added to the regression analysis, the significance of the independent

variables change. This indicated that *Soft Collaboration* works as a mediation variable. Interactive Effects; Again, the combined variable of *Agreements* X *Innovation and Flexibility* X *Clarity of Organizational Goals* shows a positive and significant effect. First of all, all collaboration are benefiting from a high level of *Agreement*s concerning *Hard Collaboration*. The combination of high *Innovation and Flexibility* and high *Clarity of Organizational Goals* seems to be the best combination for achieving high *Collaboration*. A difference is distinguished in the importance *of Innovation and Flexibility* and *Clarity of Organizational Goals*. *Clarity of Organizational Goals* is slightly less important than *Innovation and Flexibility*, since the absence of high *Clarity* shows a higher level of *Collaboration* then the absence of *Innovation*. This is the opposite of what is witnessed concerning *Soft Collaboration*.

Mediation Effects: Two variables are working on *Hard Collaboration* through *Soft Collaboration* ; these are the variables *Trust* and *Agreements* X *Clarity of Organizational Goals X Innovation and Flexibility*. For *Trust* this is a partial mediation and for the combined variable, a full mediation. Partial mediation means that the variable both influences the dependent variable directly, as indirectly through the mediation variable. This is true for Trust.

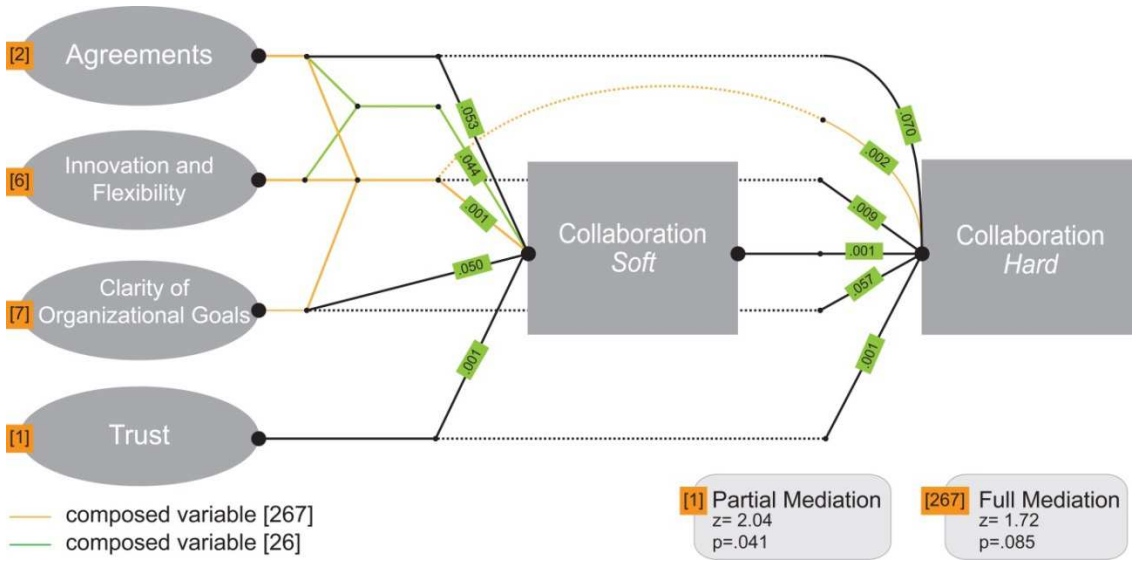


Figure 19 Collaboration Model (own ill., 2013)

- Collaboration is split up in two parts: Soft and Hard Collaboration.
- Soft Collaboration works as a mediation variable on Hard Collaboration.
- Trust and Agreements are no substitutes of each other but rather positively influence each other.
- Trust is the most important factor regarding inter subsidiary collaboration.
- Clarity of Organizational Goals and Flexibility and Innovation are the two Organizational Climate factors influencing Collaboration.

6.1.2 Managerial Implications

The goal of this research thesis will be completed with this paragraph,. The goal was *to contribute to the development of a policy dealing with collaboration between subsidiaries from different disciplines.* This paragraph introduces a roadmap based on the model that was produced by the data analysis and the literature study. Using parts of the survey that was designed for this research (Appendix J), the current state of the collaboration for which the strategy will be designed can be assessed. A better environment for collaboration could be created by checking the current state with the best and worst

situation on the most important factors. All statements about the different states a collaboration could be in are retrieved from literature studies that were performed for the conceptual model.

Organizational Change

Change is not simple or easy and should be well planned and thought off according to several pieces of literature on change (Hutton, 2000; Robbins & Judge, 2012). According to Robbins and Judge, it is important to keep in mind a number of things. First, there could be some resistance to change. This could be because "*our egos are fragile, and we often see change as threatening"* (Robbins & Judge, 2012, p. 259). These fears or restrains can be split up in individual sources or organizational sources. There are eight tactics that could help dealing with this resistance to change; education and communication, participation, building support and commitment, develop positive relationships, implementing changes fairly, manipulation and co-optation, selecting people who accept change and coercing. Robbins and Judge describe four different methods to manage organizational change. Lewin's classic three-step model, Kotter's eight step plan (an expansion of the three-step model), action research and organizational development. Hutton proposes to use an improvement wheel (with steps assessment, planning, implementation, monitoring etc. on the way to continuous improvement, see Figure 20 20). This plan for creating an environment for good collaboration is based on the Lewin's, Kotter's and Hutton's action plan for change.

In order for this change to work, according to Kotter (1996), a sense of urgency is needed. Second, the change must be led by a coalition with enough power to do so. The new vision should also be known throughout the entire organization and short term wins should be created that move toward the new vision. It is also important to make necessary adjustments when needed and make sure, there is a leader who propagates this new vision, and leads by example.

The change itself will have the form of the improvement wheel; the current situation must be assessed, an approach should be chosen and planned, which should be implemented and monitored and after a while the situation should be assessed again to establish the current situation at that time. Then, this cycle starts again.

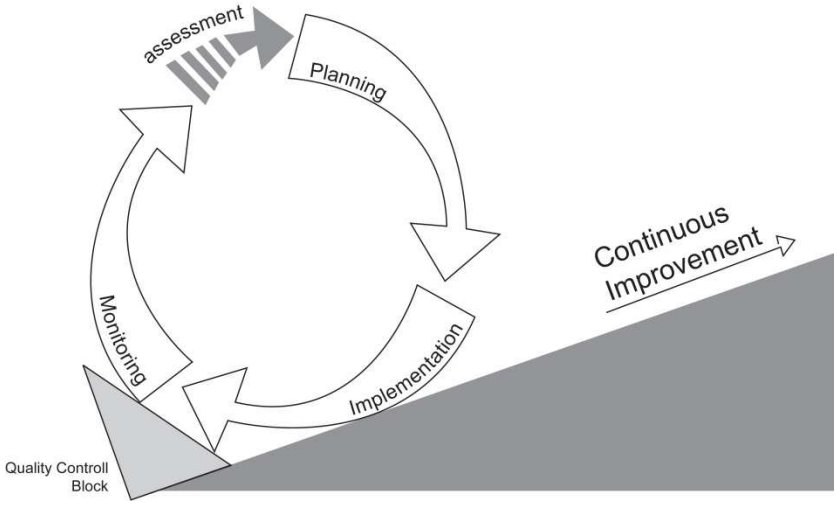


Figure 20 The improvement wheel (Hutton, 2000, p. xv)

This also agrees with the unfreezing, movement and refreezing stages of Lewin. This can clearly be seen as a process. According to De Bruijn, Ten Heuvelhof and In 't Veld (2010) there are some essentials to keep in mind when working in a process of complex decision making; keep the process open, make sure the core values of the partners are protected, keep speed in the process and fourth, make sure the process is substantive enough. Having said this, the process of implementing the change towards creating a better environment will look as follows:

1. Create a sense of urgency and understanding within the subsidiaries for this change
2. Assign key-players to lead this change on both sides of the subsidiaries
3. Assess the current situation, determine the steps that need to be taken within the period of movement
4. Implement the plan into the collaboration on both subsidiaries, than refreeze the situation again, until the new vision becomes the stable situation
5. Keep monitoring the process
6. Start again with assessing the current situation

The determination of which steps needed to be taken within the period of movement can be done according to the roadmap in Figure 21. By using the survey designed for this research (in a slimmed down version) as a tool for measuring the current state of the rate of collaboration, the model in Figure 21 can be used to make this insightful. The next step is to assess what factor should be assessed first, and how to turn the collaboration from the current situation, into the best possible environment for a flourishing collaboration. The description of all levels of all factors can be found in the next paragraphs.

6.1.3 Roadmap

A few aspects are important when a strategy is drafted and these will be mentioned below. Some of the factors are influencing the collaboration as a combined variable; therefore, these relations need to be kept in mind when creating a strategy. The relationships between the variables can be found in Appendix L – Figure 5,6,7. In this strategy, it is assumed (like mentioned in the theoretical implications and previous quoted literature) trust can result from making agreements. Since making Agreements is easier to influence than Trust, this is the first step to take. It is important to understand that some factors are easier influenced than others. For instance, trust is not something that someone can just put into place, but it is easier to manage when it concerns agreements or stating the organizational goals. The higher the levels of all factors, the higher the rate of collaboration. Maybe it is not possible that all factors reach the "best situation" box (*Collaboration)*. This could be the case for some exterior factors, if the holding company is not willing to foresee in some of the necessary steps (e.g. shared funds and cost data transparency). The goal should be to get the factors as close to the "best situation" as possible, to keep assessing the current situation and restate the goals. Chapter 7 shows an example of a strategy based on this model.

Agreements

Agreements is a very important factor to achieve good collaboration in the model for collaboration of subsidiaries. This study showed the relation between trust and agreements. Keeping agreements creates precedents which lead to being valued as an integer partner, something which is also recommended in previous studies. "*Future-based trust as such is gained through agreements, made in the early stages of a collaboration, in which trust serves as a substitute for formal contracts"* (Bradach & Eccles, 1989; Gulati, 1995; Vangen & Huxham, 2003, p. 11). This is why the study suggests starting with an easy set of agreements which are easy to keep. This is the small-win strategy, which builds trust incrementally. This will lead to more trust between the partners and making more openness and communication possible. This will make it easier to make more agreements during the next project. It is not necessary to redraft these agreements time after time; partnering charts can be drafted, and then adjusted when needed. But it is important that every member of the team that is in the collaboration knows and understands these agreements. It is also important to understand that breaking your agreements has consequences. Breaking previously made agreements are disastrous for the trust in the relationship.

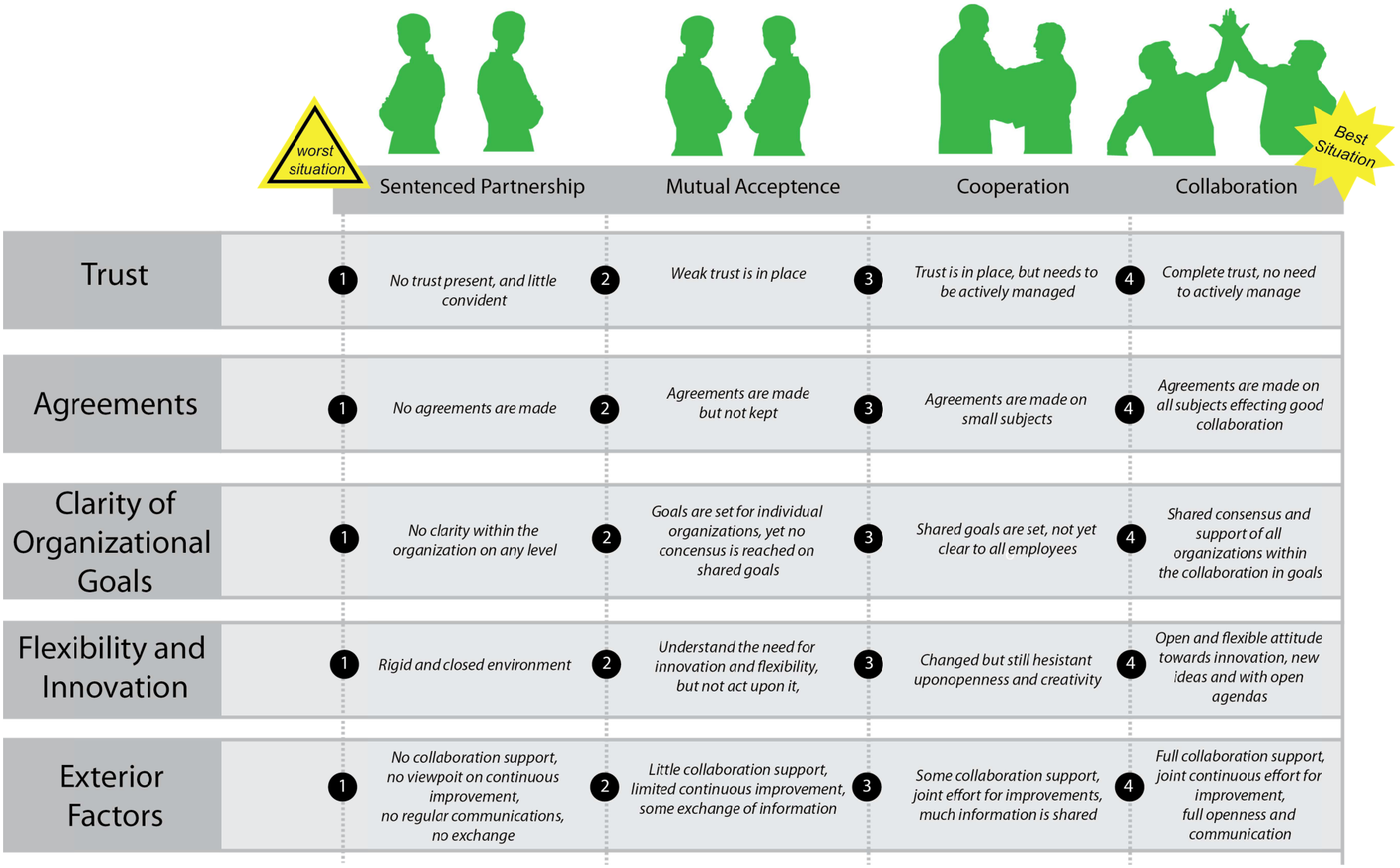


Figure 21 Assisting model for making the state of collaboration insightful (own ill., 2013)

Agreements should be made on;
- Continuous Improvement
- Devotion
- Objective or Goal Alignment
- Collaboration Support
- Communication

1. *Worst situation*: no agreements are made and conflicts arise over things employees thought were discussed and agreed upon, but were actually not defined as such.
2. *Situation 2*: Agreements are made but are broken, since there are no consequences sustaining the agreements. This leads to even more distrust
3. *Situation 3*: Agreements are made on the smaller issues concerning the partnership. This is a starting point for building real trust.
4. *Best situation*: Agreements on the above mentioned points are made and sustained by the collaborating partners. The Agreements are made up in concise and understandable language and create trust under the participating employees.

Still, it is possible that collaboration and conflicts can co-exist. Albeit on matters outside off the project (Hudson, Hardy, Henwood, & Wistow, 2006).

Trust

According to the model for collaboration between subsidiaries, Trust is the most important factor for good collaboration. Unfortunately, trust is hard to gain and easy to lose. Klein Woolthuis et al. mention the relationship between trust and contracts and identify different cases. A building trust loop is explained in the review of Vangen and Huxham, (2003). Eventually, the goal is to come from the state were weak trust is in place and one needs to be active managing this trust, to a situation where trust is present and the management of trust is modest.

Nurture the trust that is built by keeping an eye on the aspects of the collaboration process; communication, power imbalances and credit recognition.

1. *Worst situation*: There is no trust between the subsidiaries and little confidence in the other party. The trustor does not take action to trust and the trustee does not show trustworthy behaviour. This trust should be actively managed.
2. *Situation 2*: Trust is still weak but the employees see the need to change this situation.
3. *Situation 3*: Trust is taken to another level were Trust is in place but it needs to be actively managed. Both parties understand it is not only important that the other party is trustworthy, but also to give trust. It is an active attitude towards trusting the other party.
4. *Ideal Situation*: in an ideal situation, the two subsidiaries trust each other completely and the trust is based on previous actions. There is no need to actively manage this trust. However, when new members engage in the collaboration they need to be brought up to speed to the guiding rules.

Clarity of Organizational Goals

Clarity of Organizational Goals is seen as a very important factor for the collaboration model. The gravity of this is also mentioned many times in other literature. In 1992, Hardy et al wrote: "*The importance of a sufficient clarity of purpose in an inter-agency context is that the stated aims and objectives give expression to both the mutual 'gains' and the separate agency 'losses', and in the process therefore, the degrees of organisational self-interest and altruism with the joint venture entails" (B. Hardy et al., 1992, p. 214).* However, this subject balances between flexibility and explicit definitions. In this case, broad visions are better than blueprints (Hudson et al., 2006). It is important to keep managing the agenda for collaboration.

1. *Worst situation*: There is no clarity of organizational goals; the goals are neither clear to the organization nor to the employees.
2. *Situation 2*: Goals are set for the individual organizations and are communicated to the employees. However, no consensus is reached toward shared organizational goals.
3. *Situation 3*: Shared goals for the collaboration are set but are not yet clear to all employees involved.
4. *Best situation*: There is a shared understanding of organizational goals towards the collaboration which is supported by all employees.

Innovation and Flexibility

Innovation and Flexibility is a factor which is not often mentioned in collaboration theories. However, the model presented by this study shows it is an important factor to keep in mind when deciding your strategy towards a better collaboration. Like the explanations next to the model suggest, it is important to assess whether the collaboration takes place in an environment where Innovation and Flexibility is high or low. When Innovation and Flexibility is low, the collaboration will benefit from a higher level of Agreements. But when Innovation and Flexibility is high, the collaboration will benefit from a lower level of collaboration. Therefore it is important that the environment is properly assessed before designing a strategy. Considerations need to be made whether to first act on Innovation and Flexibility or to act on Agreements.

1. *Worst situation*: the environment in which the collaboration takes place is rigid and not open to new ideas.
2. *Situation 2*: The employees and management understand the reason for Innovation and Flexibility but do not act as such.
3. *Situation 3*. The environment becomes more open to change and new ideas. However, employees are still hesitant to act upon it but they are searching for new ways of working together.
4. *Best situation*: The collaboration partners have an open and flexible attitude towards Innovation. There is a flexible environment open for new ideas and communication and actively aware of the process steps.

Additional factors to the model

Some factors are not included in the research design, but are mentioned in the literature study. They are not included in the collaboration model but cannot be ignored when constructing a policy. These factors are collaboration support, continuous improvement and communication.

Collaboration support: During the literature study, collaboration support appeared in several stages and forms. Figure 9 shows the three different categories; skills, resources and coordination. Some support mechanisms should be in place in order to work together in good collaboration;

Skills:
Important factors are the technical capabilities of the employees (in machines and software). They should be instructed to work with the machines and software and the people should have the skills to work together. For instance they should be able to transfer knowledge to each other.

Resources:
There is a need to share funds and staff during a collaboration. It is advised to use a single fund for the collaboration project. There should also be a need for each' others resources. When the subsidiaries need each other to reach a certain goal, it improves the willingness to work together. A commitment and allocation of resources should be confirmed at the beginning of the collaboration.

Coordination:
Control mechanisms should exist. Regular controls and updates during collaboration is important and can establish trust between the partners. Also, leadership is more than just management and it is

advised to lead by example. It is important to pay attention to the soft factors of collaboration and not to focus solely on the hard factors of collaboration.

1. *Worst situation:* There is no collaboration support in place. Skills are lacking, technical capabilities are not compatible. No shared resources and no coordination. No commitment of resources.
2. *Situation 2:* There is an understanding that these factors are important, but no direct actions are undertaken. The level of skills is still below standard. Where it concerns Recourses; they are limitedly shared. The coordination of the staff is still solely on individual basis, and not based on joined activities. The commitment of resources is still too occasional and does not show confidence.
3. *Situation 3:* The skills, recourses and coordination are all adjusted to fit one another but are not systematically in place. Resources are allocated in most cases.
4. *Best situation:* All skillsets, recourses and coordination are adjusted to each other and operating smoothly. Full commitment of recourses.

Continuous improvement: Contributing to good collaboration means striving for continuous improvement. This means continuity within the project, feedback on performance, improving performance and learning from the collaboration.

Learning:
Improvement starts with eagerness to learn. Searching and asking for help follows from the drive to learn. Wanting to learn and wanting to help is occupies a large part of the process of evolving the collaboration.

Continuity:
When there is continuity in the flow of projects, the willingness for improvement increases. Improvements will have more effect when the continuity is higher, which will also lead to a higher willingness to improve. Also, good performance feedback mechanisms should be in place, to be able to objectively qualify the collaboration.

Performance:
Objectives should be determined at the beginning of any project. This simplifies quality control and makes sure the objectives will be reached. Working towards a goal is generally easier than without. A quality of good collaboration is not only to reach ones goal, but also to do this in an effective manner. It is more efficient to achieve the same amount of work with fewer resources. Making sure that the collaboration is profitable for both partners important.

1. *Worst situation:* Continuous improvement is not on the agenda. There is no learning, continuous flow of projects or performance measurement.
2. *Situation 2:* There is limited interest to improvement. Continuity is an option and some performance measures are in place.
3. *Situation 3:* There are joint efforts for improving the quality of work. Employees are willing to learn and help and performance is measured.
4. *Best situation:* There is continuous effort for improvement. And a continuous flow of projects is in place. Feedback mechanisms are in place and the feedback is shared with all employees working on the previous project to ensure a learning curve. Performance is made public to other employees, so the importance of the collaboration is portrayed.

Communication: Make sure employees communicate frequently; talk to each other, make regular appointments and discuss problems and share successes. Exchanging information is important for good collaboration and openness of information is required. It is important to share all crucial information which also accounts for cost data.

1. *Worst situation:* There are no regular meetings, information is not openly exchanged and there is no insight in the cost data. Employees are not eager to walk over or call each other.
2. *Situation 2:* There is some exchange in information, little transparency in cost data and meetings on project progress are held sporadically.
3. *Situation 3:* Much of the information on the project is openly shared. The cost data is shared transparently and regular meetings are held. However, employees still do not easily walk up or call their colleagues.
4. *Best situation:* All crucial information is openly shared. There is open book accounting in place on all collaboration parties and people are easily talking to their colleagues.

Summary of Managerial Implications

The most important things to remember from this research in the light of managerial implications are the following.

- Stick to the six proposed steps regarding change in organizations.
- The most logical steps to take in moving up your factors that influence collaboration is(1) Agreements, (2) Clarity of Organizational Goals, (3) Trust, (4) Exterior Factors, (5) Innovation and Flexibility.

6.2 Conclusion

This research tried to prove the causal relationship between factors of Organizational Climate and Collaboration and these factors were found. It is not the difference in organizational climate factors of the collaborating parties that influence the collaboration, but rather the level of the most important climate-factors that predict the rate of collaboration. This, however, does not mean that there are no incremental differences between the companies. These differences do exist; but they do not influence the collaboration directly.

Good collaboration could be described as *the process of the achievement of the pre-stated goal, based on high group effectiveness, high group efficiency, and high productivity, with the commitment of resources to the process and the goal, and which satisfies the individuals working on the process.* Another very interesting aspect of this research is that is showed that people value collaboration on two different levels; the soft parts of collaboration (communication, appreciation etc.) and the hard parts of collaboration (reaching goals, making profit etc.). The soft part is highly significantly influencing the hard part. This means that changing or improving these soft parts clearly influence the eventual result of the collaboration. This is a very interesting discovery for strategies trying to improve collaboration.

This research clearly states the influence of the *Organizational Climate* variables *Clarity of Organizational Goals* and *Innovation and Flexibility* to the degree of collaboration between subsidiaries with different disciplines in construction industry. In separate cases, Tradition and Involvement can also influence the degree of Collaboration in a negative way. Where tradition has a negative influence for the operating company Techniek, it has a positive influence for the operating company Utiliteitsbouw. It is shown that two operating companies deal differently with collaboration due to the organizational climate.

The results show that *Trust* and *Agreements* are in this case no substitutes of each other, and there could even be a positive feedback loop in place. In line with the expectations, the research points to the importance of making Agreements about collaboration. This is an important aspect of the relevance of this research. Making agreements is an essential part of collaborating and should never be forgotten. These Agreements should be made on the factors most important to collaboration in construction industry *Continuous improvement, Devotion, Objective or Goal Alignment, Collaboration Support and Communication.* This could be implemented in all current collaborations in order to improve the state of the collaboration. Using the roadmap to reach insight in the current state of collaboration can help to create a strategy to improve the collaboration. The four stages of

collaboration between subsidiaries (*sentenced partnership, mutual acceptance, cooperation and collaboration*) can also be used as a communication tool.

It must be stated as a final remark that the “true leader” of an organization must believe in this collaboration and has to actively promote this collaboration as a key-player. Otherwise all the different steps to improve collaboration can be designed, but they won’t be for much use. It is important for the employees to see a leader who not only speaks but also acts upon the set of Organizational Goals.

6.3 Limitations and suggestions for further research

This research and the results provide a new insight into collaboration between subsidiaries in the construction industry. The implications this research provides could be used in providing a policy in dealing with collaborations between subsidiaries. However, this is only the beginning of research on collaboration between subsidiaries. Further research on this subject could be undertaken, including recommendations based on the limitations that are linked to this research.

- The first hypothesis of this research is left unanswered. The number of collaborations and the data it provided was insufficient to make a clear statement about this hypothesis. This research should be repeated on a larger number of collaborations in order to make a statement about this hypothesis.
- During the literature studies a number of factors influencing good collaboration were established, however, this study did not take all of these factors into account when conducting the research. The factors that were included were cross-reverenced with the problems that were witnessed. In further research, the other important factors communication, continuous improvement and collaboration support should also be included.
- Important when conducting this research was the objective measurement of the different factors Collaboration, Agreements, Organizational Climates and Trust. For all of these factors (Agreements excluded) standardized and validated measurement tools were used. However, the subjects of this research were solely part of one holding company and only two different disciplines of this holding company were taken into account. To be able to fully validate this model, this research should be expanded on other holding companies and other different disciplines.
- Furthermore, the questions on Agreements did not take all the factors into account which were defined to be the most important for good collaboration. To be able to make recommendations which Agreements would be most important in order to improve collaboration, further research could be conducted to more specific sets of agreements.
- With more time, this research could have been more into depth into the different organizational climate profiles and the differences between the two subsidiaries. Momentarily, the research only focused on the organizational climate factors that were most presents in the entire data set. Future research could be conducted to different Organizational profiles and how these profiles could help improving understanding the collaborating partner.
- A very strange result showed in the analysis for the relationship between Organizational Climate and Trust. It showed that the more different the subsidiaries are in certain organizational climate factors, the higher the trust levels are. In order to really say something valid about this relationship, a separate research should be conducted on this relationship.
- As was mentioned during the chapter of additional analysis, an ICC and Rwg(j) calculation could be conducted to validate whether the geographical profiles do or do not exist.

7

Strategy for improving the rate of collaboration for BAM Den Haag – West

This chapter shows a case study which will explain the model and roadmap produced by this research in a real world situation. A strategy for the improvement of collaboration between subsidiaries will be constructed.

7.1 Description of the current situation

The subject of this case study is BAM Utiliteitsbouw Den Haag and BAM Techniek West. These two operating companies are situated in the same office. This is a unique situation compared with the other operation companies of BAM. Even during this research, some changes in the housing situation were made. Both offices moved from the office where they had their separate floors, to an office where employees from several operating companies of the BAM are situated. Flexible working is introduced as well, which means that nowadays one can find employees from several operating companies working on the same floor.

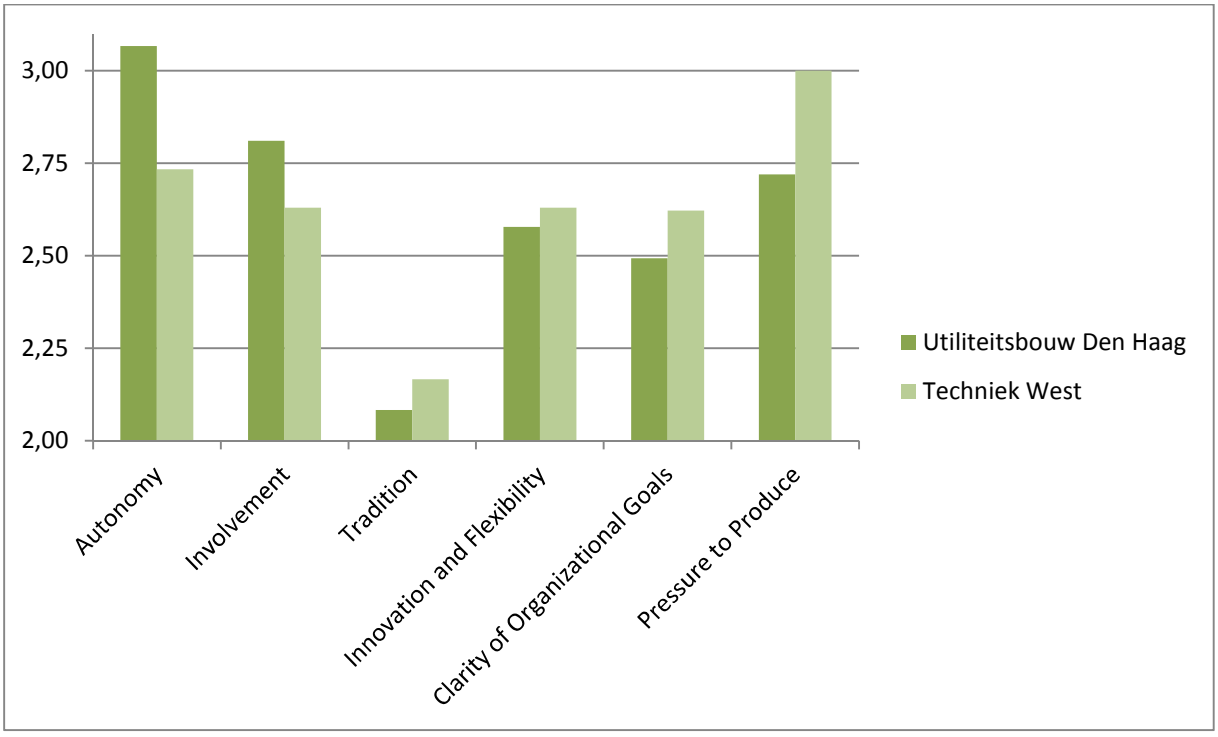
The first step of designing a strategy is to assess the current state of this collaboration. This could be done by using the results of the survey tool and by simultaneously cross-referencing them with the stages that are described in the Managerial Implications. The survey tool can be supplemented by observations on the workplace.

Some tables will be presented that give an insight of the current state of this collaboration. Graph 2 describes the organizational climate profile of both subsidiaries[2]. When looking at this entire profile,

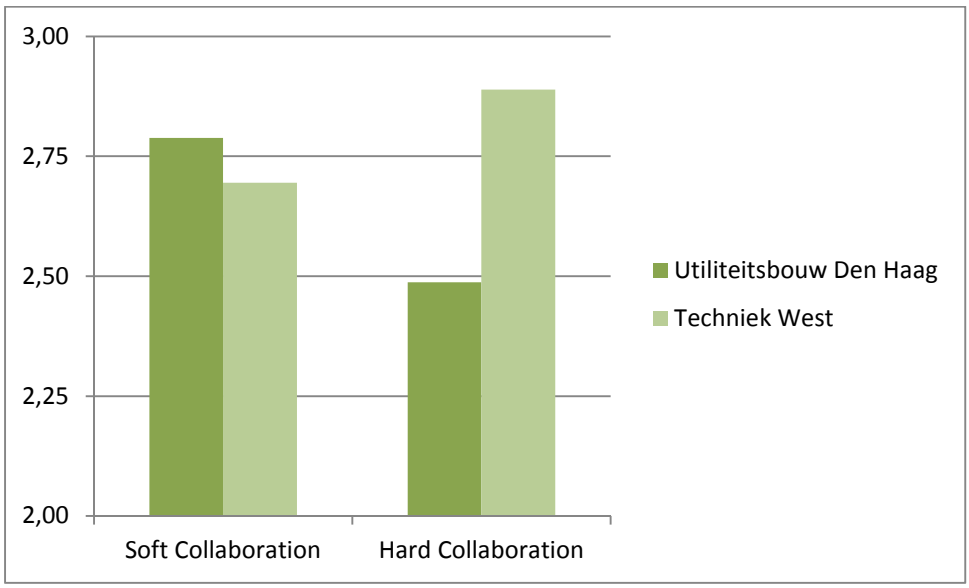
[2] *It is important to notice that the difference between the number 2 and 3 as an outcome of the survey is very large. Outcome 2 means that most employees disagree with the statements and 3 means that most employees agree with the statements. The number 2,5 can be seen a neutral.*

the clearest differences can be spotted in the Organizational Climate factors that do not have the most effect on collaboration. These are Autonomy and Pressure to Produce. During the presentation of these results, both subsidiaries agreed they understood and recognized these differences. Techniek feels the differences in Pressure to Produce and notices that this is sometimes a problem in organizing the agendas. The differences in Autonomy could be the answer why some employees feel there is a difference in decision-making powers. Even though these are not factors that are implemented in the collaboration model, these are factors that should be taken into account when drafting agreements. Looking at the factors that are important for collaboration, Innovation and Flexibility and Clarity of Organizational Goals, it could be stated that these are not that high. For Utiliteitsbouw, the Organizational Goals are not clear to most employees. Observations made in the workplace support these findings, but also other observations are also made. For instance, communication at BAM Techniek is mostly a lot more direct and straightforward and without room for interpretation than at BAM Utiliteitsbouw. At BAM Utiliteitsbouw communication is more open and less hierarchical. This supports the findings that the hierarchy works different in Utiliteitsbouw and Techniek. For BAM Techniek it is more important to follow certain rules and procedures, where at Utiliteitsbouw the process seems to be a more creative. However, BAM Utiliteitsbouw seems to be very strict with deadlines and agreements, where BAM Techniek sometimes needs more room to breathe. This supports the findings that the pressure to produce is higher at BAM Techniek and that for both the subsidiaries Innovation and Flexibility is low.

Graph 2 Organizational Climate Profile Collaboration Utiliteitsbouw Den Haag and Techniek West

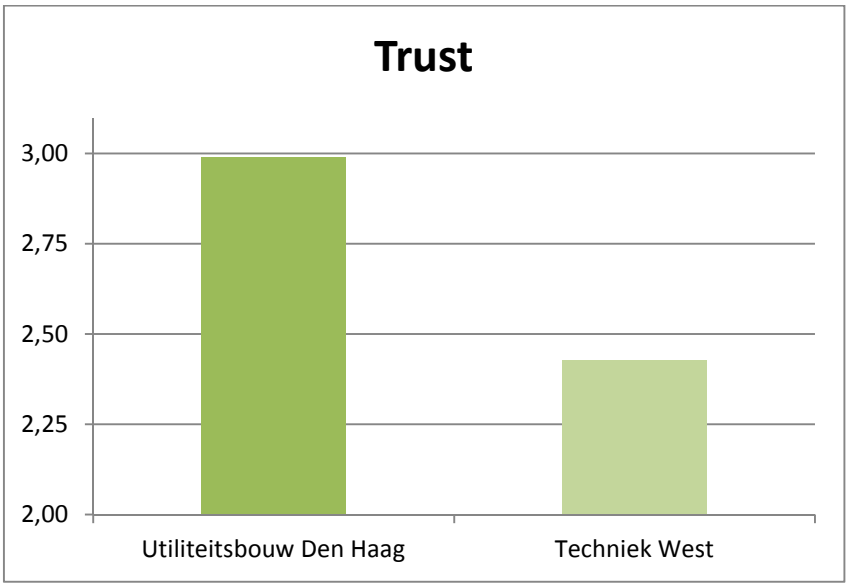


Graph 3 Results Soft Collaboration and Hard Collaboration



The results of the survey on the dependent factors for Collaboration show that Utiliteitsbouw Den Haag agrees that this collaboration is not up to their standards on quality, achieving their company goals etc. BAM Techniek is more positive about these hard sides of the collaboration (see Graph 3). On the other side, BAM Techniek is less positive about the soft side of the collaboration. This could be explained by the traditional roles of contractor and subcontractor and the fact that BAM Techniek would like these traditional roles to disappear. However the employees of Techniek should act more like managers and less like technicians to achieve this. Communication (again) plays a role in this. Where Utiliteitsbouw sometimes openly criticizes the employees of BAM Techniek, the colleagues of BAM Techniek will never do this. However, unexpected results show regarding Trust (see Graph 4).

Graph 4 Trust level of Utiliteitsbouw Den Haag and Techniek West



According to the model this factor influences both soft en hard collaboration the most. There is a striking difference between BAM Utiliteitsbouw Den Haag en BAM Techniek West. Techniek is overall not trusting Utiliteitsbouw, whilst Utiliteitsbouw seems to have overall trust in Techniek. The Roadmap provides in a strategy to overcome this gap.

7.2 Strategy

This paragraph presents the strategy how to turn this collaboration into a competitive advantage in the building construction market. The current situation is presented in a managerial road map, and on the basis of a number of steps, the current situation is shifted towards the ideal situation, in which collaboration could flourish.

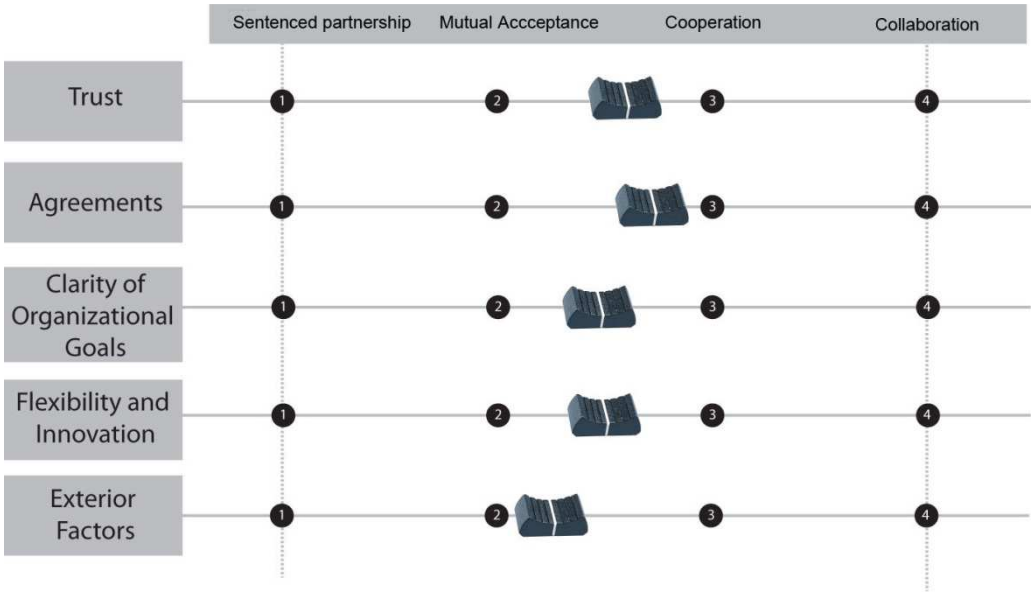


Figure 22 Current Situation Roadmap (own ill., 2013)

The starting point is to “State the current situation” (see Figure 22). Figure 22 is based on the survey tool and on insights in the organization and that of the collaboration partner. A rendering of the state of the collaboration can be made with the use of the roadmap (see Figure 21). Start with **agreeing on this current situation** and making it shared knowledge. As was mentioned in the Managerial Implications, **key-players** with a large support-base on both sides of the subsidiaries should be chosen to lead this transition. A **sense of urgency** is needed when a change needs to be made. This sense of urgency needs to be felt by all employees involved. This period is called “Unfreezing”. Key-players can be deployed in creating this sense of urgency.

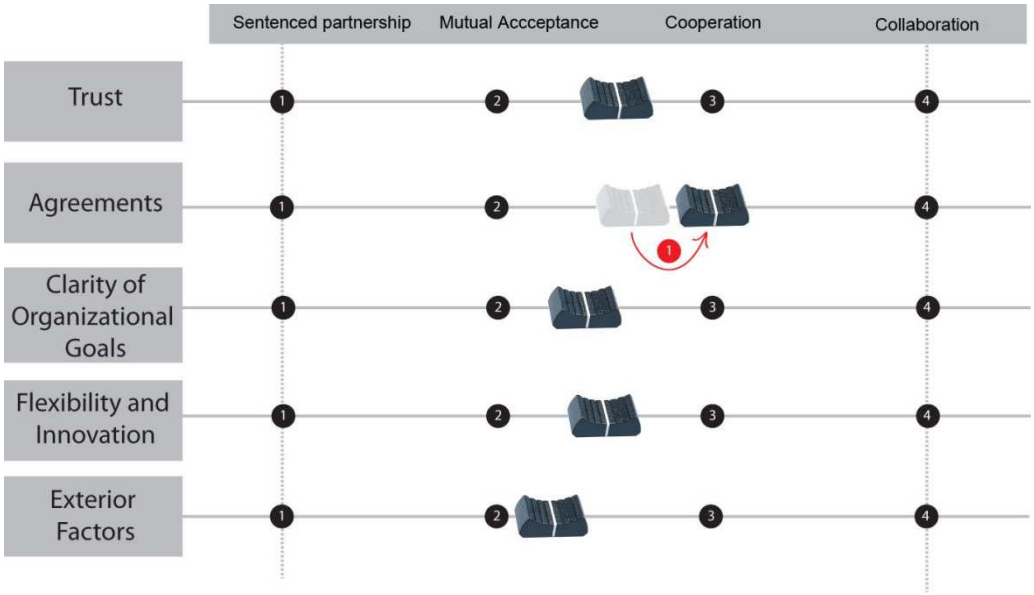


Figure 23 Step one, Roadmap (own ill., 2013)

1. The first movement on the board is to start working on making agreements. This will start the trust building cycle and is relatively simple. Agreements should be made on all factors that influence good collaboration. In order to do so, a **brainstorm session** on all those subjects could help setting goals and creating space for open communication on these subjects. The Organizational Climate factors outside the “collaboration model” and the roadmap, but which show significant difference should also be taken into account since these factors could contribute to lesser goals. The goal is not to come to mutual climate or culture factors levels, but to understand each other and learn to work with this.

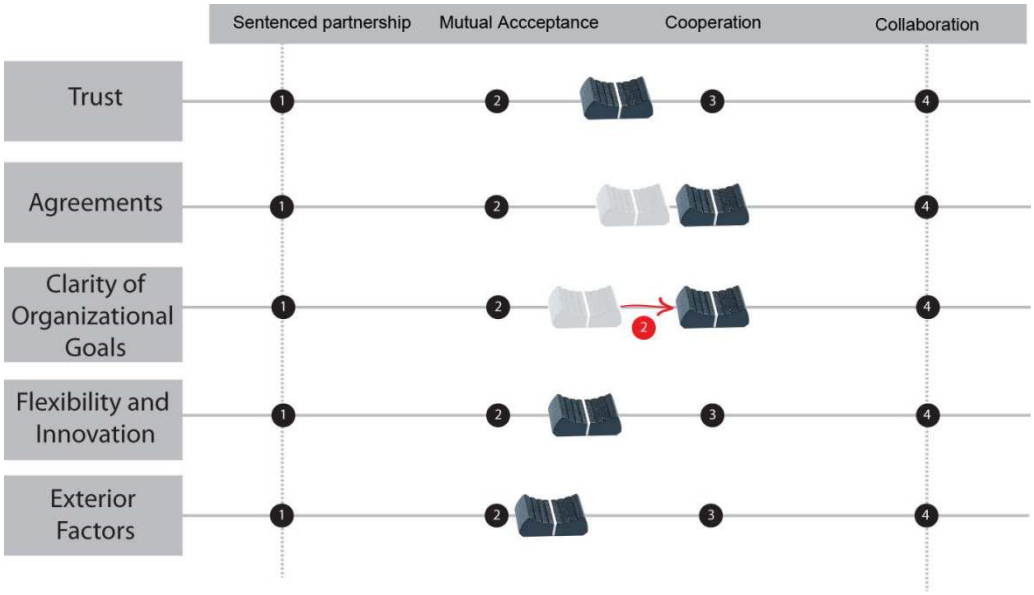


Figure 24 Step two, Roadmap (own ill., 2013)

2. The second step contains stating your mutual goals and makes them clear to the rest of the organization. Not just for one project but also for the on-going process of collaboration. During this step it is eminent that Goals should be expressed to all employees. This needs to be expressed by one voice and through multiple channels. But most important, the chosen key-players to promote this change must be active in talking to people and show them the motivation to change. There needs to be a very clear **common goal**.

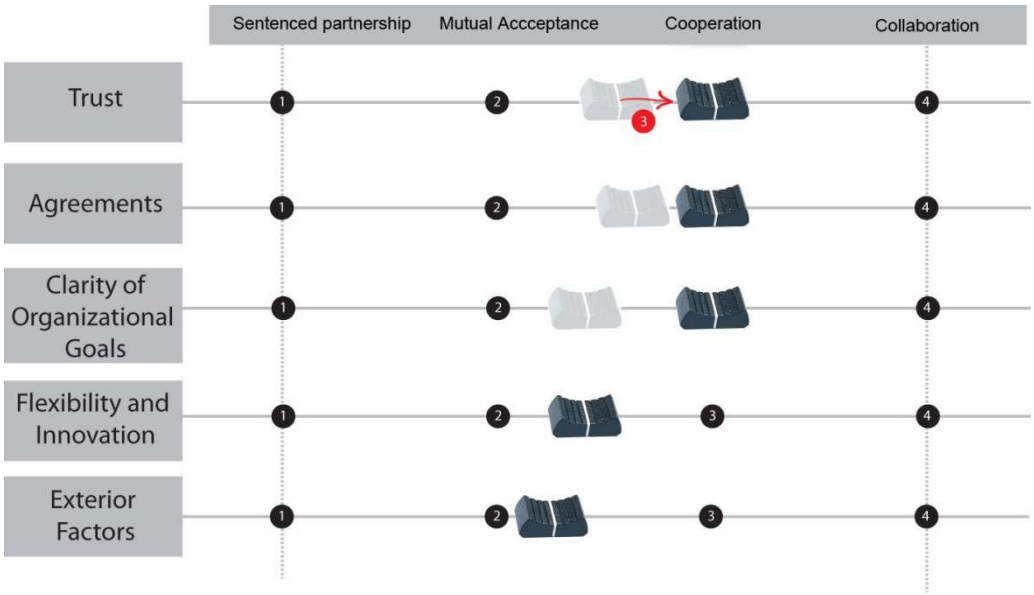


Figure 25 Step three, Roadmap (own ill., 2013)

3. Address the situation of the deviation of Trust between the subsidiaries. Make sure that by credit recognition and keeping the negotiated agreements between the two partners the **trust grows**. For instance, create a common digital newsletter to address all the successes of the collaboration. Use this for the credit recognition on both sides of the organizations. And celebrate victories together.

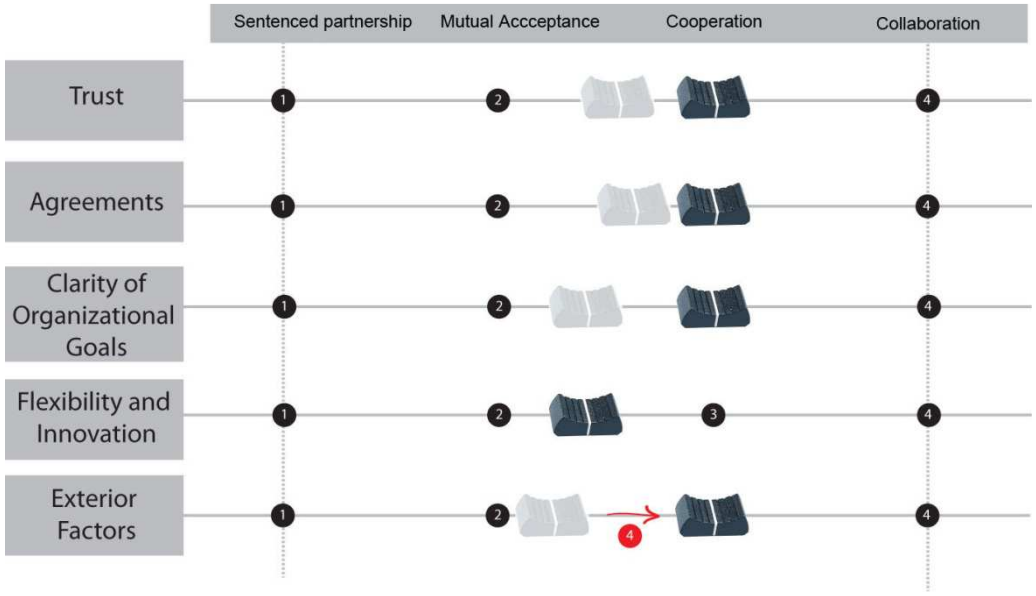


Figure 26 Step four, Roadmap (own ill., 2013)

4. The fourth step concerns the exterior factors to the model; collaboration support, continuous improvement and communication. These changes are either very simple or very hard. An assessment should be made whether the employees working in collaboration are skilled enough to work in collaboration and match the skillset of the other co-workers. The **resources** time and money should **be adjusted to another** and control mechanisms to control the quality of the collaboration should be in place. To reach stage 3 (*cooperation)*, **joint effort of improving the quality** of work is needed. Employees should be willing to teach and learn and this should be promoted by management. Encourage employees **to want to be better** and

deliver higher quality and seek help from another. **Sharing information** openly is taken a risk that will be rewarded.

This would be a good moment for “refreezing” the situation. Let the employees get used to the new situation and let it become the new standard. When everything is settled and the employees have been accustomed to the new standard, this cycle could start again. This could be after a timespan of half a year.

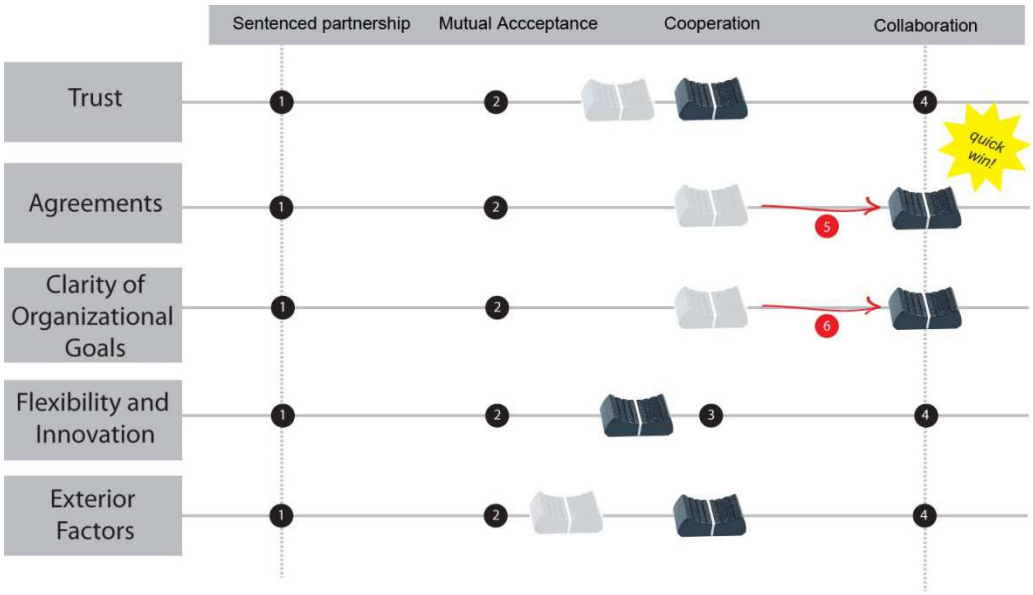


Figure 27 Step five and six, Roadmap (own ill., 2013)

5. Assess whether **the key-players** to lead the change are still in place and still have the **necessary support base** for achieving this change. The key-players need to be deployed to “unfreeze” the status quo of the collaboration and make all employees ready for the change. Room exists for **making more extensive Agreements** on the Collaboration when trust is up to a higher level. Making these Agreements is also a start to move up a level in Exterior Factors. Moving up in Agreements together with Clarity of Organizational Goals is a logical step, since one of the points to make agreements about is the goal alignment. At the end of this step, there is a shared **understanding of the mutual goal** that is pursued on both sides of the subsidiaries. It is very important all employees understand that the goals of the collaboration support the goals of the subsidiary they are employed at.

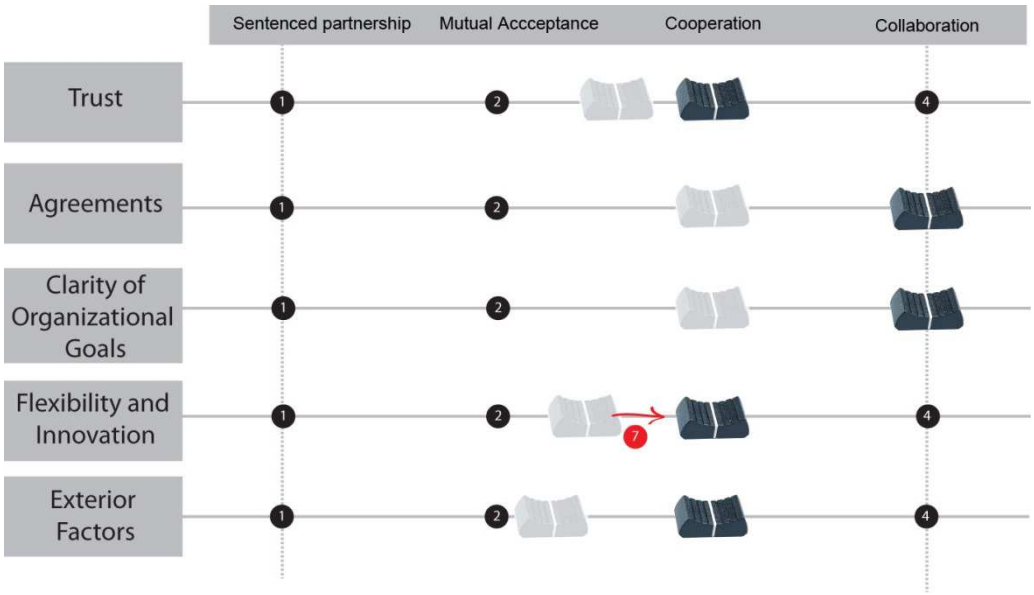


Figure 28 Step seven, Roadmap (own ill., 2013)

6. Changing the innovation and flexibility of the organization is the most difficult step on this board. This is an organizational climate factor which is not that easy to influence. The new situation should be **the Planned Flexibility stage**; where there is still no true flexibility. Personal flexibility of the employees and the managers are linear correlated to the flexibility of the organization. The implementation of HNW (Het Nieuwe Werken) is, according to research facility TNO[3], already a step into the direction of a more flexible work environment where innovation and creativity is possible. To pursue the project goal, a balance is needed between following project blueprints and flexibility to help each other. A well-known example for promoting flexibility and creativity is Google who encourages employees to work 1/5th of their time on their own projects of which they think it will improve the company.

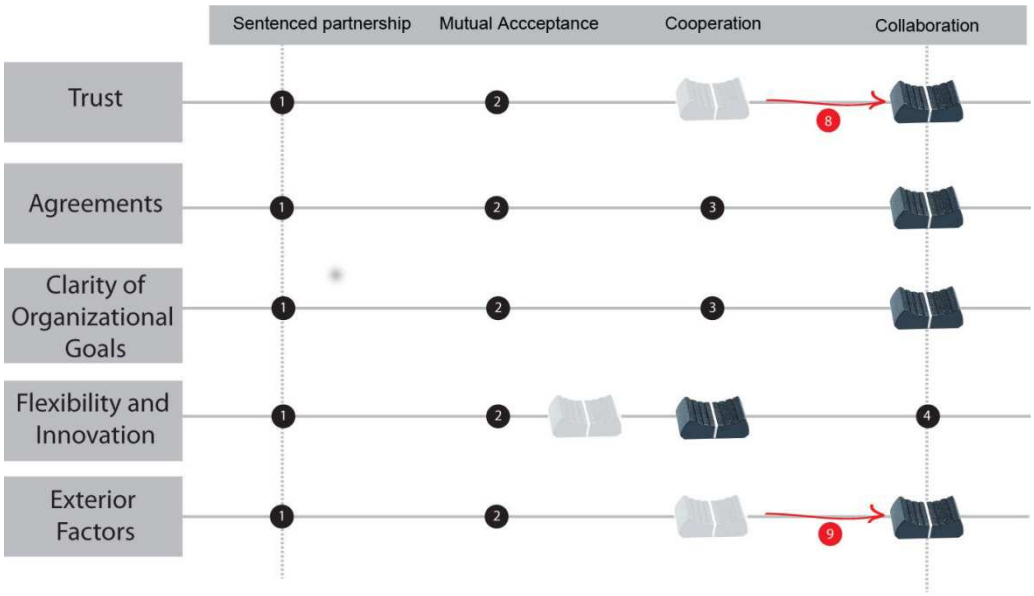


Figure 29 Step eight and nine, Roadmap (own ill., 2013)

[3] Dutch Organization for applied scientific research

7. In a previous step (step 5), the agreements were looked at for the second time. Within these agreements already some work is done for steps 8 en 9. First of all, agreements were made on subjects regarding the exterior factors. Furthermore the partnering charts provided the needed confidence for the employees to move into the last trusting stage. The key-players promoting this collaboration should keep advocating the necessity of open and straightforward communication and cost data transparency. A continuous effort for improvement should be in place. Just like the adjusted resources, skillset and coordination of the projects.

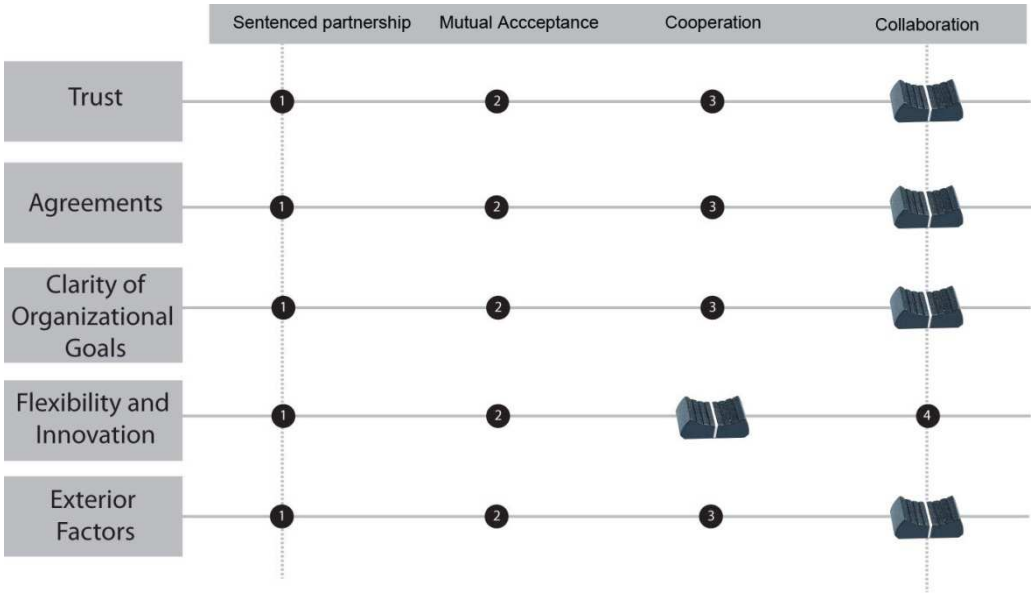


Figure 30 Ideal state, Roadmap (own ill., 2013)

8. It is not easy to estimate whether an organization is capable of really changing the organizational climate towards innovation and flexibility. A silver bullet for leveraging culture for competitive advantage still does not exist and the best executives know and understand this truth.

7.3 Summary and Conclusion

This chapter showed an example of how the theoretical findings of this research can be employed in a real world situation. This final paragraph will give an overview of which steps have been taken and why. But generally it can be said that the goal of every strategy should be to get the factors of the model as high as possible; to get the factors as close to the “collaboration” state. Sometimes this is not possible because of exterior factors. If this is the case; do not focus on the things that cannot be done, focus on the things that can be done. One of the most important mechanisms working within this strategy is the trust building cycle. This is why it is important that every strategy starts by stating agreements in a brainstorm session, even if the collaboration already has some.

Step 1

Make an overview of the current state of the collaboration and agree upon this state. *Important: the common knowledge and mutual agreements on these kinds of subjects is important when starting a process of change.*

Step 2

Organize a brainstorm session where all factors import for collaboration are addressed. Make sure the product of this brainstorm session is a partnering chart and key characters to lead the change. *Important: make sure the partnering chart is truly supported by all parties and individuals involved. It is also important that no other characters are active within the organizational who have a larger support base than the key-characters and who are cheering against this collaboration.*

Step 3 and 4
The factors easiest to change should be addressed first, since the small-win strategy is needed for the trust building cycle. Start with Agreements and Clarity of Organizational Goals. These two factors are also supportive of each other. This could be accompanied by the factor Exterior Factors, depending of the initial screening of the current state of this factor. When the holding company is very rigid and do not want to give in into the changes, this could be difficult. *Important: the small win strategy is a key strategy in this model. In the first stages of this change agreements need to be made that are easy to keep and built trust.*

Step 5
Since trust is the most important factor of the model, this needs to be addressed as soon as possible. The trust building cycle must be activated and credit recognition is a very important method to do so. *Important: Step 5 can only be taken after successfully implement step 3 and 4.*

Step 6
Innovation and Flexibility is the most difficult factor to adjust. Try to reach the state of planned flexibility. Let the key-characters leading this change be an example of this. The flexibility of the organization is linear correlated to the flexibility of the employees.

Step 7
Refreeze the state of the collaboration again. Let the employees get used to the new status quo of collaboration.

Repeat step 2, 3, 4, 5, 6 and 7
In order to reach higher states of collaboration, keep repeating these steps. Always start a period of change with an “unfreezing” brainstorm session and always use key-characters to lead this change. Keep openly communicating about the process of change and remember that collaboration is also a process. Eventually, this collaboration will reach the common goal that was set in the beginning of the brainstorm session.

8

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Appendices for the master thesis: Collaboration between subsidiaries in construction industry

An empirical study to collaboration in construction industry and the influence of Organizatinal Climate, Trust and Agreements

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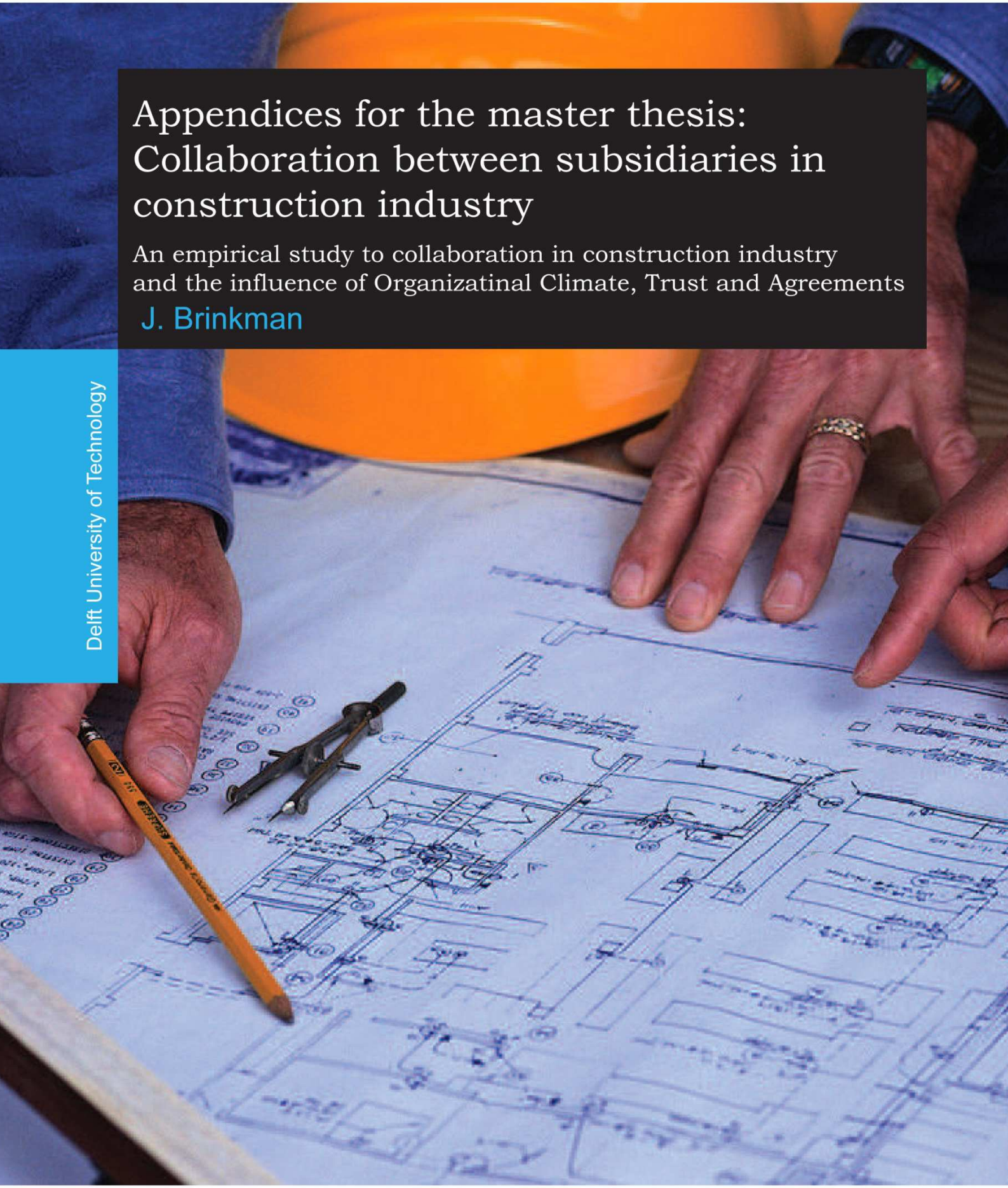

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Appendices

Collaboration between subsidiaries in the construction industry

An empirical study to collaboration between subsidiaries with different disciplines in construction industry and the influences of Organizational Climate, Trust and making Agreements

By

Jara Brinkman

in partial fulfillment of the requirements for the degree of

Master of Science

at the Delft University of Technology,
to be defended publicly on 19 December 2013

Thesis committee:	Prof. dr. ir. M.J.C.M Hertogh	TU Delft
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	Ir. M. Venderbos	BAM Utiliteitsbouw
	H. van Hoven	BAM Techniek

This thesis is confidential and cannot be made public until December 31, 2013.

An electronic version of this thesis is available at http://repository.tudelft.nl/.

TU Delft Delft University of Technology

List of Figures

Appendix A
Figure 1 Different departments of BAM Holding NV. (Royal BAM Group, 2012) 1
Figure 2 Processes BAM Utiliteitsbouw (Utiliteitsbouw, 2013) 2
Figure 3 Processes BAM Techniek (BAM Techniek, 2012) 2

Appendix B
Figure 1 Feedback session Tender Evaluation (own ill., 2013) 12

Appendix C
Figure 1 Summary of the competing value sets and effectiveness models (Quinn & Rohrbaugh, 1981, p. 136) 13
Figure 2 Proposed Model with mean-summated scales (Sarkar, Aulakh, & Tamer Cavusgil, 1998, p. 94) 14
Figure 3 A framework for creating value through inter-unit collaboration (Hansen & Nohria, 2004, p. 25) 14
Figure 4 A model of collective identity, conversations and effective inter-organizational collaboration (Hardy, Lawrence, & Grant, 2005, p. 62) 15
Figure 5 Clustering of factors and criteria (own ill., 2013) 15
Figure 6 Overview different theories on collaboration, linking dimensions and factors (own ill., 2013) 16
Figure 7 The seven pillars of partnering interrelating (Benett & Jayes, 1998, p. 4) 16

Appendix D
Figure 1 Organizational Climate Measure (Patterson et al., 2005, pg. 405-407) 19

Appendix L
Figure 1 Research Model including Direct and Moderating Effects on Soft and Hard Collaboration (n=Full BAM) 54

Appendix M
Figure 1 All different Organizational Climate profiles of the BAM Utiliteitsbouw offices (own ill., 2013) 64
Figure 2 All different Organizational Climate profiles of BAM Utiliteitsbouw combined (own ill., 2013) 65
Figure 3 All different Organizational Climate profiles of the BAM Techniek offices (own ill., 2013) 66
Figure 4 All different Organizational Climate profiles of BAM Techniek combined (own ill., 2013) 67
Figure 5 Organizational Climate profile (based on mean) of the collaboration between office Utiliteitsbouw Amsterdam and Techniek Noordwest (own ill., 2013) 69
Figure 6 Organizational Climate profile of the collaboration between office Utiliteitsbouw Arnhem and Techniek Oost (own ill., 2013) 72
Figure 7 Organizational Climate profile of the collaboration between office Utiliteitsbouw Den Haag and Techniek West (own ill., 2013) 74
Figure 8 Organizational Climate profile of the collaboration between office Utiliteitsbouw Utrecht and Techniek Midden (own ill., 2013) 77
Figure 9 Differences in Organizational Climate versus Rate of Collaboration 79
Figure 10 Differences in Organizational Climate versus Trust 81
Figure 11 Organizational Climate profile based on geographical factors 82

List of Tables

Appendix C
Table 1 Main Factors and Sub Factors of Collaboration (Patel, Pettitt, & Wilson, 2012, p. 3) 14

Appendix E
Table 1 Maturity Model (Meng, Sun, & Jones, 2011, p. 100) 20

Appendix F
Table 1 questions on partnering by Cheung et al. (Cheung, Ng, Wong, & Suen, 2003, p. 342) 21

Appendix G
Table 1 Questionnaire on Trust (Dietz & Den Hartog, 2006, p. Appendix 2) 22

Appendix H
Table 1 Key Concept Organizational Climate (Patterson et al., 2005) 23
Table 2 Key Concept Collaboration based on Meng et al (2011) and various other theories. 24
Table 3 Key Concept Trust (Dietz and Den Hartog) 24

Appendix K
Table 1 Component Matrix on Trust 37
Table 2 Component Matrix on Collaboration 39
Table 3 Component Matrix on Agreements 40
Table 4 Component Matrix OCM - Autonomy 41
Table 5 Component Matrix OCM - Involvement 42
Table 6 Component Matrix OCM - Formalization 43
Table 7 Component Matrix OCM - Tradition 44
Table 8 Component Matrix OCM - Innovation and Flexibility 44
Table 9 Component Matrix OCM - Clarity of Organizational Goals 45
Table 10 Component Matrix OCM - Pressure to Produce 46

Appendix L
Table 1 Means table, Utiliteitsbouw and Techniek 47
Table 2 Correlation Matrix (all cases) 48
Table 3 Intraclass Correlation Coefficients and Rwg (j) calculations 50
Table 4 Result of Regression Analysis with Dependent Variable: Soft Collaboration and Hard Collaboration (n= Full BAM) 52
Table 5 Linear Two-way Interaction of Office level Innovation and Flexibility on Agreements made - Soft Collaboration (n=Full BAM) 52
Table 6 Linear Three-way Interaction of Office level Innovation and Flexibility X Clarity of Organizational Goals X Agreements - Soft Collaboration (n=Full BAM) 53
Table 7 Linear Three-way interaction of Office level of Innovation and Flexibility X Clarity of Organizational Goals X Agreements made - Hard Collaboration (n=Full BAM) 54
Table 8 Correlation Matrix (N=BAM Utiliteitsbouw) 55
Table 9 Correlation Matrix (N=BAM Techniek) 57
Table 10 Results of Regression Analyses with Dependent Variable: Soft Collaboration and Hard Collaboration (n=BAM Techniek) 59
Table 11 Results of Regression Analyses with dependent Variables: Soft Collaboration and Hard Collaboration (n= BAM Utiliteitsbouw) 60
Table 12 Historgram of Organizational Climate profiles of groups based on geographical factors 60

Appendix M

Table 1 Descriptives of the collaboration 1 69
Table 2 Descriptives of the collaboration 2 72
Table 3 Descriptive of collaboration 3 75
Table 4 Descriptives of the collaboration 4 77
Table 5 Histogram of all Collaboration Profiles 80
Table 6 Historgram of Organizational Climate profiles of groups based on geographical factors 83
Table 7 Count of Answers to the open question: Why would no agreements be made? 84

Appendix N

Table 1 Organizational Climate Profile Collaboration Utiliteitsbouw Den Haag and Techniek West ..... **Error! Bookmark not defined.**
Table 2 Results Soft Collaboration and Hard Collaboration (own ill., 2013) ..... **Error! Bookmark not defined.**
Table 3 Trust level of Utiliteitsbouw Den Haag and Techniek West ..... **Error! Bookmark not defined.**

Contents

List of Figures 5
List of Tables 6
Appendix A: Pictures and Tables chapter 1 1
Appendix B: Interviews 3
Introduction 3
Interview with Albert Bok 4
Interview Patrick van der Knaap 6
Interview with Daan van Krevel 8
Interview with Tinneke Vellekoop 10
Review on Feedback Session on a Tender Project 12
Appendix C: Pictures and Tables of Chapter 2 13
Appendix D: Organizational Climate Measure 17
Appendix E: Maturity Model Meng et al. 20
Appendix F: Cheng et al.; questionnaire on partnering 21
Appendix G: Cummings and Bromely; questionnaire on trust 22
Appendix H: Key Concepts 23
Appendix I: Mailing towards unit managers 25
Appendix J: Questionnaire Design 27
Het klimaat van de organisatie - Onderlinge verhoudingen 29
Integratie 29
Steun van leidinggevenden 30
Appendix K: Factor analyses of Organizational Climate, Trust, Agreements and Collaboration 37
Validating the measurement of Trust 37
Validating the measurement of the degree of Collaboration 38
Validating the measurement of Agreements 39
Validating the measurement Organizational Climate 40
Autonomy 40
Involvement 41
Formalization 42
Tradition 43
Innovation & Flexibility 44
Clarity of Organizational Goals 45
Pressure to Produce 46
Appendix L - Results 47
Appendix M - Case Studies 63
Profiles 63

Mann-Whitney test 68
Collaborations 69
Collaboration Utiliteitsbouw Noordwest and Techniek Noordwest 69
Distribution of data 70
Mann-Whitney tests for the collaboration 70
Collaboration Arnhem and Oost 71
Distribution of data 73
Mann-Whitney tests for collaboration 73
Collaboration Den Haag en West 74
Distribution of data 75
Mann-Whitney tests for the collaboration 76
Collaboration Utrecht en Midden 76
Distribution of data 78
Mann-Whitney tests for the collaboration 78
Conclusion 79
Organizational Climate differences versus Trust 81
Geographical Profiles 82
Why would no Agreements be made? 84
Bibliography 85

A

Appendix A: Pictures and Tables chapter 1

In this appendix all tables an pictures of the first chapter can be found. These are all the tables an pictures that were not produces by the writer of this report.



Figure 1 Different departments of BAM Holding NV. (Royal BAM Group, 2012)

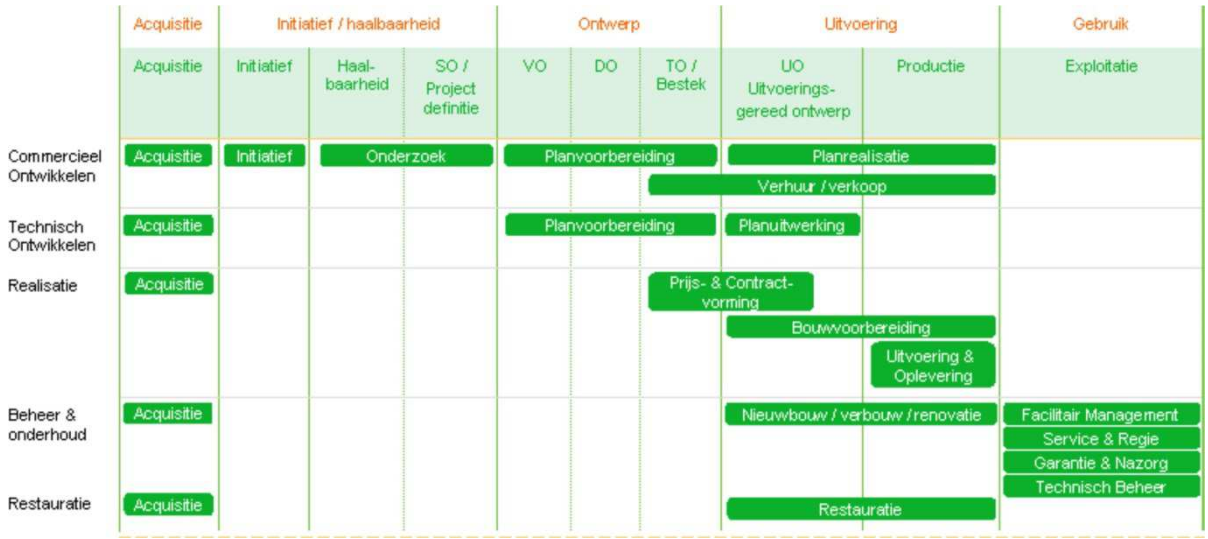


Figure 2 Processes BAM Utiliteitsbouw (Utiliteitsbouw, 2013)

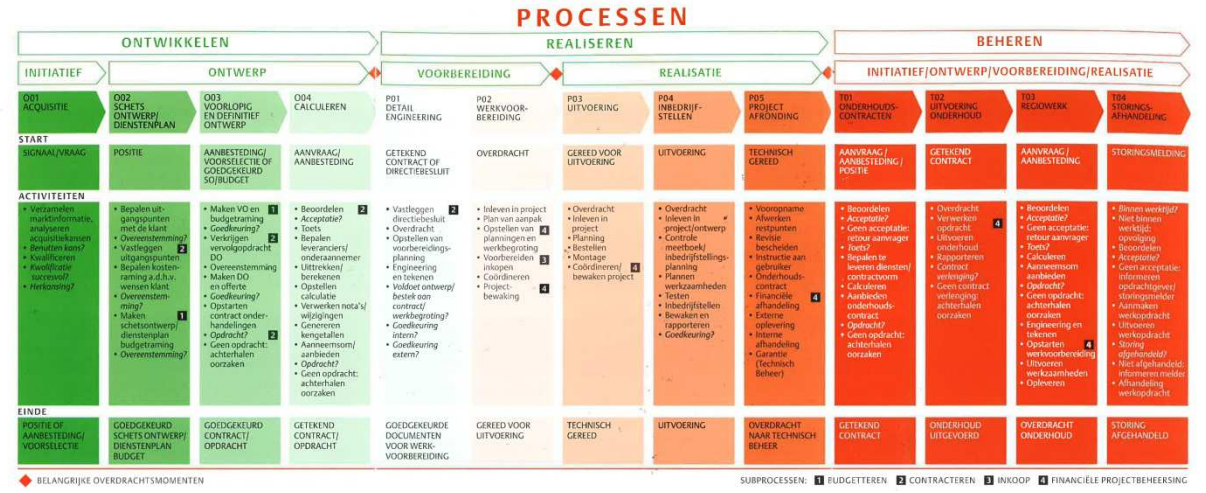


Figure 3 Processes BAM Techniek (BAM Techniek, 2012)

B

Appendix B: Interviews

Introduction
To gain insight into the problems concerning the collaboration between the two subsidiaries, interviews are held with employees from both the side of BAM Utiliteitsbouw and BAM Techniek. To keep an as clear as possible view on the problems, a questionnaire will be used during these interviews. But the interviewee will get the space to enlighten his or her insight in this topic.

The questions that were asked during these sessions are the following:
1. What is your role in the organisation BAM nv.
2. You know I am investigating the collaboration between BAM Techniek and Bam Utiliteitsbouw, why do you think this collaboration is important?
3. What do you momentarily notice on this collaboration?
4. How do you think this collaboration comes into being? Who is the initiator of this collaboration?
5. Under what circumstances does this collaboration exist? (for example, who is responsible for the result, is this collaboration manly in teams or just with individuals?)
6. Where does this collaboration take place? (on project rooms, in personal offices, on the phone etc.)
7. In which part of the building processes do you notice the most collaboration between the subsidiaries?
8. Do you ever feel limited in collaborating by the context in which you work? (for instance, the ICT, the organisation form, the culture)
9. Do you feel like this collaboration is supported by your department? How do you notice this?
10. The moment a project team is collected, on which account does this happen?
11. What do you think, is the biggest problem influencing the collaboration between Ubouw and Techniek?

Besides conducting these interviews, a feedback session on a tender project was held at which I could be present. The review on this feeback session can also be found under Appendix A

Interview with Albert Bok

Albert Bok is a project leader for BAM Utiliteitsbouw. His core business is in the realisation phase but since the recent developments (in new contract forms (D&C or D&E)) he is now also involved in the tendering phase. The vision that is proposed from BAM Utiliteitsbouw, is that there is one spokesperson for the client, from initiation phase through realisation phase. And that is where Albert comes in.

He is convinced that integration from building technology and installation is absolutely a factor for success and that is something that should be done more and better. In the "normal" building processes you see that this is very much separated, in processes and cultures and people. **Integration** is really important. The **quality of the product you deliver can increase, for less cost and within a tighter schedule**. Coordination and collaboration between the different parties is very important.

When within a project a technical installation company is needed, the first party to go to is your subsidiary. This is a type of "truck system", and it is an obligation from the BAM holding. Bok also thinks this is a logical step since you have "inhouse" knowledge and why would you go shopping outdoors? But the bonuses one get from working with a sister company will only reflect on the total company (for instance BAM Utiliteitsbouw bv.) and not on the project the project leader is currently working on. Albert says that you should always do what has been agreed on, on a higher level, since that is beneficial to the whole BAM holding. BAM Utiliteitsbouw will almost allways takes initiative in the collaboration since from origin, the "builder" will be the first party to be selected by the client. But this will also vary when other contract forms will be used.

Bok notices that with BAM Techniek, the design phase is strictly separated from the realisation phase. With BAM Utiliteitsbouw this is not so much the deal, since BAM Utiliteitsbouw is trying to integrate these two processes. People from the realisation phase are involved in the design phase so less information is lost. Also, the client has one spokesperson for the entire project. This is a **big difference in the organisation** structure between BAM Utiliteitsbouw and BAM Techniek. And the second thing is the **difference in hierarchy** between the two organisations. BAM Techniek distinguishes a difference between project leaders and project managers. And BAM Utiliteitsbouw does not. This means that sometimes it is difficult working together since the person you are making agreements with, does not have the authority to make these agreements and are later on reversed by his or her boss. There **are different agreements within the company about the tasks and powers** of the individuals working within a project. Most of the time Bok feels like he is working with individuals, rather than with a team of people when he is collaborating with BAM Techniek. In other examples, it was not even really clear who it is you are working with. The organisation structure of BAM Techniek is entirely not clear to BAM Utiliteitsbouw.

To the question how or where this collaboration takes place, Bok answers that it is the intention of both Utiliteitsbouw and Techniek to walk up to each other as much as possible during the collaboration. But it still feels like two different companies, even though they are located in the same building. BAM Utiliteitsbouw also believes in working in project rooms. This leads to some practical discomforts (not having your own working place, not being able to look at your own documents (ICT)). But what Bok thinks is more concerning, is that he thinks that Techniek doesn't believes in working in these project rooms.

Bok does not think that the context of the collaboration (the ICT, if there is a room available) is limiting in collaborating. If there is a will, there is a way. The only key element that cannot lack is **communication.** He feels that BAM Utilietisbouw is more open for collaboration than BAM Techniek. He feels they have more of an "us" feeling and that things should first be discussed in-house before decisions can be made. And on the other hand, he heard that BAM Techniek feels like they are more treated like a subcontractor than an equal partner.

In origin, a builder is more focussed on processes and planning's. And the focus of a technician is more on details.

Bok thinks it is important to start to get to know your colleagues at the start of a project. To really get to know what their strengths are, really know each other's personalities. When the personal contact is better, it becomes easier to work together and just walk up to one another and discuss things. Momentarily people are selected for a project team on the basis of availability. On the higher levels (Management Team) peoples personalities and team roles does gets taken into account when selecting a team. But on the level of project teams, people are selected based on their availability. Since the two companies are more or less obligated to work with each other, there is no real "getting to know each other" time. They just go straight to working together. This is a critical step that is missing according to Bok.

Bok thinks that **conflicts between "sister companies" are more severe** because in the beginning, **less agreements are made**. Because the conception is that since we are one family and one company that we do not need to make agreements beforehand. But when conflicts do occur, there are no agreements on how to handle these conflicts.

Interview Patrick van der Knaap

Patrick is project leader on project during the phase development and consultancy. He has an electro-technical background. The core-business of BAM Techniek is both electrical engineering and (werkbouwtechnisch) engineering. He works for BAM Techniek for 3 years now, and he notices some improvement in the collaboration. But a lot of steps can still be made. He sees the collaboration with Utiliteitsbouw as important since he notices that if you have a partner that you commonly work with, there is no need to do the same steps over and over again with another partner (*dutch: het wiel opnieuw uitvinden*). You come acquainted with one another and this makes collaboration always easier. The barriers to step into each other's offices are smaller and the distances between the co-workers become smaller (*dutch: kortere lijntjes*). The **efficiency and effectiveness of the collaboration improves when the collaboration is more frequent**. Nowadays, on 60% of the tenders they work on, they work together with BAM Utiliteitsbouw. He notices that the in these projects, BAM Techniek allways works with the same department, were with BAM Utiliteitsbouw the different projects steps are less delimited. Were in the development phase with BAM Techniek no project managers from the realisation phase will be involved, this is certrainly the case for BAM Utiliteitsbouw. This makes it difficult for BAM Techniek to know who they are dealing with. BAM Techniek makes a very big distinction between the two phases of development and realisation. And Patrick says that this is sometimes a problem. This is clearly a **difference in organisation structure and in management choices.**

The initiative for the collaboration between Utiliteitsbouw and Techniek takes place on a management level. When a request from a client comes in, the management decides whether we are going to persue this project together or not. This depends mainly on our level of expertise on the subject and the capacity of people we have in house. And also on a higher level (the board of directors from Koninklijke BAM nv.) on the board of our mother company it is the advice to work together on projects. It would be strange to not get the profit of these projects within the BAM holding.

The relationship between the subsidiaries with which they work differentiates when they work on different projects. And they depend on the type of contract they agree on. Sometimes they work under the relation of head contractor – sub contractor and sometimes they work together on a project as equal partners. Patrick notices that sometimes when they work together as equal partners, Utiliteitsbouw is sometimes still **eager to get into the role of head contractor**. And in this role they question for instance the work BAM Techniek is doing, or the calculations on the price they came up with. And this is never the other way around. This is something that comes from the past and is embedded in the culture of BAM Utiliteitsbouw. They sometimes still have the attitude like they rule the place and they are not going to take advice from a subcontractor like us. And this is something that is really felt by the workers on the project teams. We from BAM Techniek do not criticise on the building engineering aspects of the plan, but it does still happens that they criticise us.

Patrick feels the collaboration mostly takes place in teams. Since you are never working on one project at a time, it is not logical to sit together in a project room for the entire time. It's more logical to work from once own working place and then once or twice a week join each other for a meeting. Patrick can notice that there are two very different cultures between Utiliteitsbouw and Techniek. This can manly be seen in the calculation of the price. There is a difference in methodology of working between Ubouw and Techniek. Within Ubouw they work on an larger scale and Techniek needs to have a lot more detail before they can say anything on the price. Furthermore, the price needs to be determined by higher management, and until they have done a say in this, Patrick can make no statements about it. This is something that is difficult in the collaboration with the project team of BAM Utiliteitsbouw, who can come with a price almost the second they get to the table.

TO the question "does special attention is given to the arrangement of teams?" Patrick answers that this is mostly done by looking at availability and taxability. The responsibility of the project is almost always on 1 person (Hans van Hoven), and I am put forward as the spokesperson of the project. But

working with such a small department (7 persons) means that actually almost always the same people are working on the project.

Patrick mentions that it is evident for the collaboration with Utiliteitsbouw that they should be capable to give numbers (about the price levels) sooner. But this really depends on the higher management of BAM Techniek. They have to come up with the numbers before Patrick can say something to the Utiliteitsbouw department. And sometimes a decision later on in the process affects decisions made earlier on in the process. And this leads to annoying situations and even Patrick notices that. But the same could be true for Utiliteitsbouw. There still is **some distrust and hesitance in openness** toward one another and this can lead to longer processes than necessary.

According to Patrick, the two subsidiaries experience a project on a very different way. And the **feedback on these projects is not always clear**. Only 10-20% of the projects get evaluated and mostly this takes place after they know if they get the job or not (after the result of the tender). And then the evaluation is mostly about the product rather than the process. The evaluation of the collaboration often gets forgotten. And furthermore Patrick thinks that these evaluations should also take place on the lower levels, between the people that have worked together during the process. Than these point of views could be shared and the air could be cleared. Furthermore, some **agreements on how to work together** should be made between the two subsidiaries, within all levels of the cooperation. If milestones would become clearer the collaboration would become easier. Also more **insight in each other design process** could help with the understanding of one another.

Interview with Daan van Krevel

Within BAM Utiliteitsbouw Region Den Haag, Daan van Krevel is responsible for the commercial development. This includes the first steps in the development phases, from acquisition to the preparation. Project development for Desgin&Build contracts during the tender phase.

According to van Krevel, the collaboration between Ubouw and Techniek is really important. Nowadays, between 20 and 50% of the total sum for the development of a building are installations. And in during the maintenance period this number rises to even 70%. This means that especially for the Life Cycle costs of the building, the installations are very important and the **collaboration with Techniek is evident**. When this is organised from the beginning, this could be a big advantage.

Van Krevel notices that in the design phase, **Techniek is always behind on designing**. This is sometimes difficult in the collaboration. This result in Utiliteitsbouw telling Techniek they need to move on and come up with design or a number, or else they need to sort it out later, and Ubouw will make decision without them. If this results into problems later, Techniek must sort it out themselves. Van Krevel sees this will not always be perceived as pleasant. More time should be spend to really know and understand each other's design processes, and design steps. This could help understanding why things happen, or why they can only come up with a calculation on the price this late. There should be more mutual understanding on what the partners ask of each other and what they need.

There is also a difference in the detail work the different subsidiaries do. Utiliteitsbouw is mostly doing the organisational parts of a project, and they hire an architect, an engineer and so forth. Techniek is really designing inhouse and is more focussed on detail and rather than on processes. Van Krevel does feel like BAM Techniek and BAM Utiliteitsbouw are one company. He sees a colleague from BAM Techniek just as much as a colleague as a colleague from BAM Utiliteitsbouw. But that is only in the tender phase the case, he cannot see how this is organized in other phases.

A difference however is the way the **different phases are separated** from each other in Techniek and Ubouw. We try (at Utiliteitsbouw) to involve a project leader as early as possible in the development project. But with Techniek, sometimes when a project manager during the tender phase has made arrangements and negotiations, these are reversed by the project leader in the realisation phase. This is off course frustrating for the project leader from the Ubouw side, who was already invlovled in the process beforehand. Sometimes at Techniek, **people do not keep their agreements and do not hold themselves to the schedule, and that creates frustration**.

And for instance, during the collaboration on our recent project, BAM Techniek thought the collaboration was perfect, were we still see a lot of room for improvement. There is clearly a mismatch in how this collaboration is perceived.

Since everybody also has other tasks beside the project one is working on in collaboration with BAM Techniek, it is difficult to organise a project room. Van Knevel does see the value of working in project rooms. But nowadays the reality is that this does not happen and everybody works from their own office on their own floor.

To the question if he thinks the management team is supportive in this collaboration he needs to think for a while. The answer eventually is yes, but sometimes when there is friction. The problems mainly occur when the construction costs are discussed, and BAM Techniek cannot explain why things have suddenly changed. Also on this level, we sometimes just do not understand each other.

He mentions that sometimes the question arises at BAM Ubouw, if the project they are jointly working on with BAM Techniek, is just as important to them as it is to us. And there is not allways an insight on how things are going with the turnover of BAM Techniek. The fact that they have to make their own profit and answer to their boss in the headquerts in Bunnik, and we have to make our own profit and answer to another boss in the headquarters, makes it sometimes difficult. And there is no shared profit from a single project. They make their own accounting and we make our own. We do not have insights

in how much they make of a project. Not always anyway. This is changing, sometimes at some projects we do make a joint statement about the profit and the losses, but not on every project.

Sometimes there is the feeling that we are sentenced to one another. And Van Krevel thinks that actually you should think for every project: do we need each other and do we have the same interests and goals for this project? This question should be answered at the level of the management team. At the position Van Krevel is in, he is confronted with the collaboration. For him the collaboration is not a choice. It could be the case that we, as BAM Ubouw, need a job. So for us it is an important project. But it could be that BAM Techniek does not need the job or simply does not have as much time as we have. This is difficult and frustrating for the collaboration within the project.

Before the project is really started, the strategy on how to win a project is designed, jointly by BAM Ubouw and BAM Techniek. But it is true, that an arrangement could be made about what the joint goal or the joint interest for the project is or should be.

According to Van Krevel, the project teams are (at Ubouw) selected based on experience. That is the basis. Unfortunately, sometimes the best people are not available. So we also have to look at availability. And we trust that BAM Techniek does the same.

All incoming projects are discussed during the acquisition meeting on the level of the management team, and there the decision is made whether we are going to work together on a project or not.

Interview with Tinneke Vellekoop
The role of Tineke within BAM Utiliteitsbouw is that she responsible for the department which does the maintenance of buildings, but also small renovations.

She thinks the collaboration with BAM Techniek is very important since it helps **us to be able to fully serve our clients**. And that with the collaboration between Techniek and Utiliteitsbouw the **best organizational performances can be realized**.

She experiences the collaboration on the joint maintenance projects and on projects of small renovations as good. She says**: "*We mutually support each other during the projects to find the best solutions for the client*"**. For example, for the Maintenance group there is a monthly meeting were all contracts are discussed and where all opportunities within the market are discussed and where in consultation with each other is decided how we are going to handle the specific case. It is very important to agree on who is actually doing what during a project. The one that is responsible for the project is the one who knows best how to react to the desire of the client. Or the one who knows the client best.

The initiative within the collaboration always originates from the question of the client. If the client wants something which involves installations, we automatically want to involve Techniek in the process and vice versa. But the decision to work together is made internally. The work that is done on the department of Building Services is really small, so the department is really small and teams often consist of two or three people. So people are not really chosen to become a team, since there is not that much choice. On the other hand, people always find each other when they need, it is a more organic process than that it has a solid form.

There is always **one person** who is head **responsible towards the client**, and this is the one who knows the client best. On an operational level, you can see that the people will always do what they do best. So since originally BAM Utiliteitsbouw was always leading constructor on a project, we still often play this role.

At BAM Techniek it is usually the case that when you have built something, you automatically do the maintenance of that building. For BAM Utiliteitsbouw this is not that common and on that department we can still learn a lot from BAM Techniek. And the other way around, when BAM Techniek gets a work, and they see that the fire preventive measurements are off, they ask us for help.

Tineke does recognize that in the end, **you work with people**, not with the organization. And maybe these people match really well with each other on a professional level.

The process of evolving collaboration with each other is something that is going on for some years now, and you can notice that some people are used to the situation and experience it as a good working environment. Where others are used to working with different people from different agencies and have trouble with adapting to this situation. It is a combination of people who've done it before, liked the result and are willing to work with each other again. And on the other hand some **people still see it as an obligation.**

In the end, Tineke thinks, they (Utiliteitsbouw and Techniek) all have the same interests and goals for a project. But they do have different ways how they want to perceive this goal. They have different ways how to interpret the problem and different ways of working towards a solution. But in the end we all need to make profit. Tineke is of opinion that together they are stronger in the market, so it is more important to work together than to try to maintain ones profit. You should look at the result of a project on a project basis, and not on separate parts of building engineering or installation engineering. For her, **one accounting** would be preferred. Also, when a project is important to her, she lets her colleague on the other side know this project is important to her. He can react to this by making it a priority for him too.

The thing that would help to improve the collaboration between Techniek and Utiliteitsbouw, Tineke thinks, lies within **the organization structure**. Now, the two companies are separate private companies, who need to make their own profit and do their own accounting. This means two separate and different financial systems, two cultures, two different ways of organizing. What should be the goal at the end, is **to be able to serve the client as best as possible and make money by doing this the best we can**. And that is where the tension is. But this isn't only the case for the collaboration between BAM Techniek and BAM Utiliteitsbouw, this could also be seen between the departments within Utiliteitsbouw.

Generally speaking, Tineke is very content with the collaboration between Techniek and Utiliteitsbouw.

Review on Feedback Session on a Tender Project

Usually the evaluation of a tender takes place after the result of the tender is presented. However, for this tender the evaluation was done before the results came in. The evaluation was done based on different topics namely (1) organisation of internal processes, (2) pricing, risks&opportunities, (3) optimisations and plan of action and (4) strategy and client approach. During the feedback session all people involved in the project (at higher management level) got the opportunity to enter some do's and don'ts about these topics (written on post-its) on big papers. Do's were usually about what went right and what could've been better. Don'ts were about what went wrong and what should be avoided in the future. Only the information relevant to this research project is registered.



Figure 1 Feedback session Tender Evaluation (own ill., 2013)

The DO'S that were mentioned about this topic were:
- keep communication open, leads to more support for each other's decisions
- discussing the different disciplines with each other. Understanding of each other's actions and eliminate mistakes.
- Sharing information, there is still a lot of knowledge that isn't shared with everyone.
- Held information presentations half way of the project about each other's progress
- Project rooms would be great, if it would be so that everybody working on the project would do so for 100% of the time. This isn't the case and this makes it difficult to work in project rooms. The employees need their own information and offices to do their job.
- Due to the "flat" organisation it became unclear who was responsible for what during this project.
- There is a need for structure, a job-description and who is responsible for what.
- Meetings could be shorter; there was never a clear plan for the meeting, the agendas were ill formulated and communication could be better.
- Milestones could help make insightful who needs information at which moment in time.

The DON'T'S during this project were:
- there were some trust issues concerning the calculations of the price. There is still some distrust about if the right price measurement is used.
- it took BAM Techniek quite some time to come up with a just as detailed cost calculation like BAM U-bouw. But Techniek does need more information to get to a detailed calculation. T is working on a project "Modular Calculating"

C

Appendix C: Pictures and Tables of Chapter 2

In this appendix all pictures and tables can be found that were not produced by the writer of this report, but are supportive to the chapter.

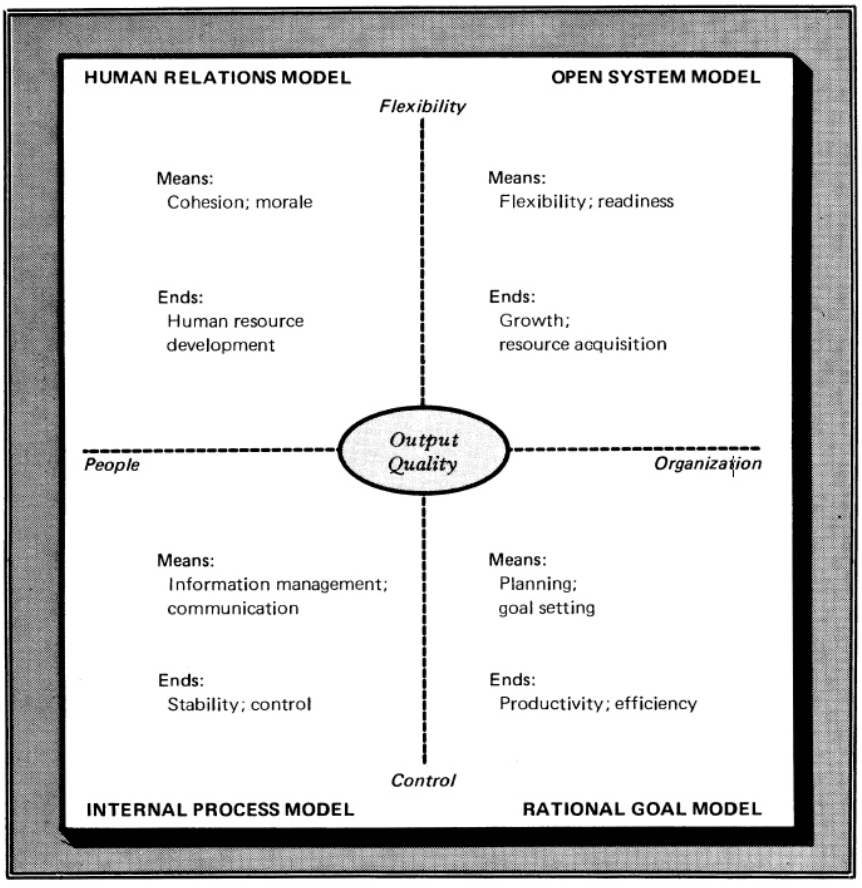


Figure 1 Summary of the competing value sets and effectiveness models (Quinn & Rohrbaugh, 1981, p. 136)

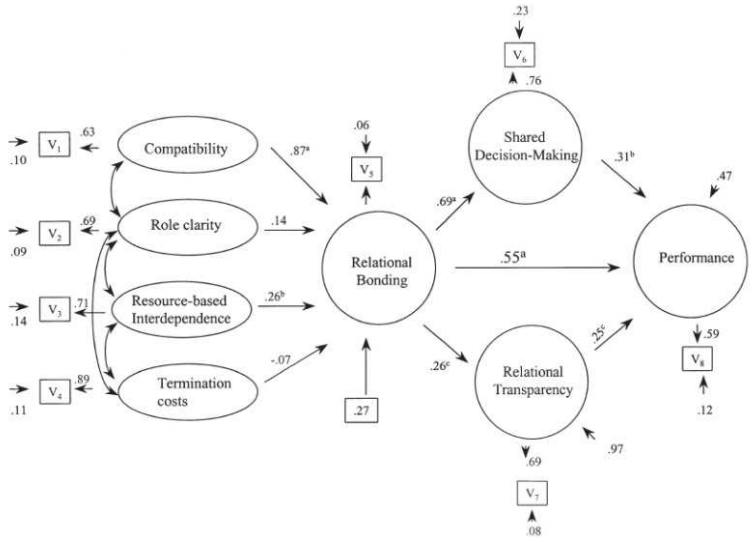


Figure 2 Proposed Model with mean-summated scales (Sarkar, Aulakh, & Tamer Cavusgil, 1998, p. 94)

Main Factors	Sub Factors							
Context	Culture	Environment	Business climate	Organisation structure				
Support	Tools	Networks	Resources	Training	Team Building	Knowledge Management	Error Management	
Task Interaction	Type	Structure	Demands					
Processes	Learning	Coordination	Communication	Decision making				
Teams	Roles	Relationships	Shared Awareness/ knowledge	Common ground	Group Processes	Composition		
Individuals	Skills	Psychological Factors	Wellbeing					
Overreaching Factors	Trust Management	Conflict	Experience	Goals	Incentives	Constraints	Performance	Time

Table 1 Main Factors and Sub Factors of Collaboration (Patel, Pettitt, & Wilson, 2012, p. 3)

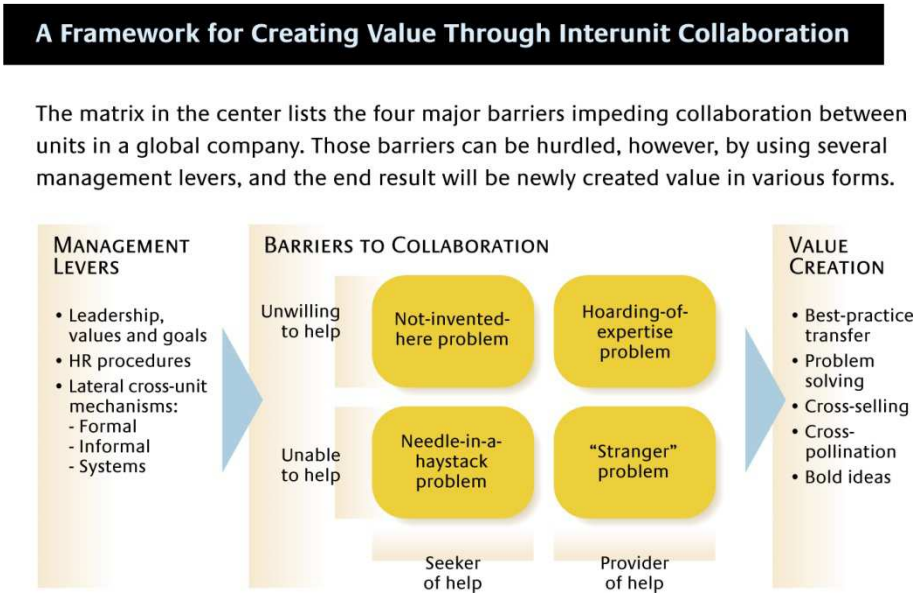


Figure 3 A framework for creating value through inter-unit collaboration (Hansen & Nohria, 2004, p. 25)

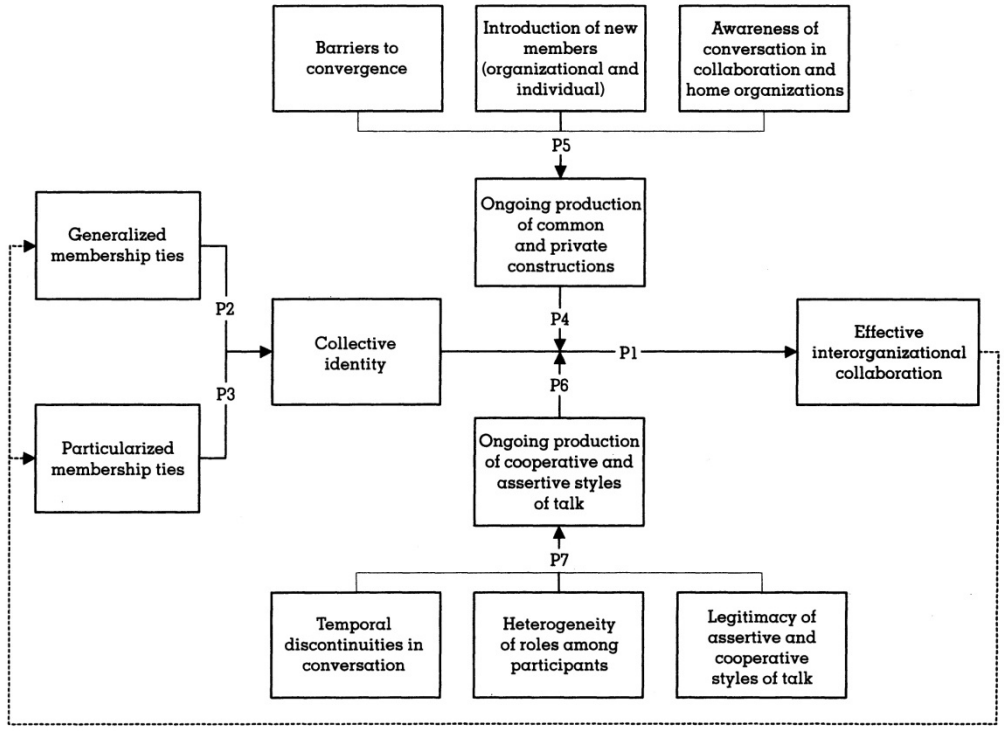


Figure 4 A model of collective identity, conversations and effective inter-organizational collaboration (Hardy, Lawrence, & Grant, 2005, p. 62)

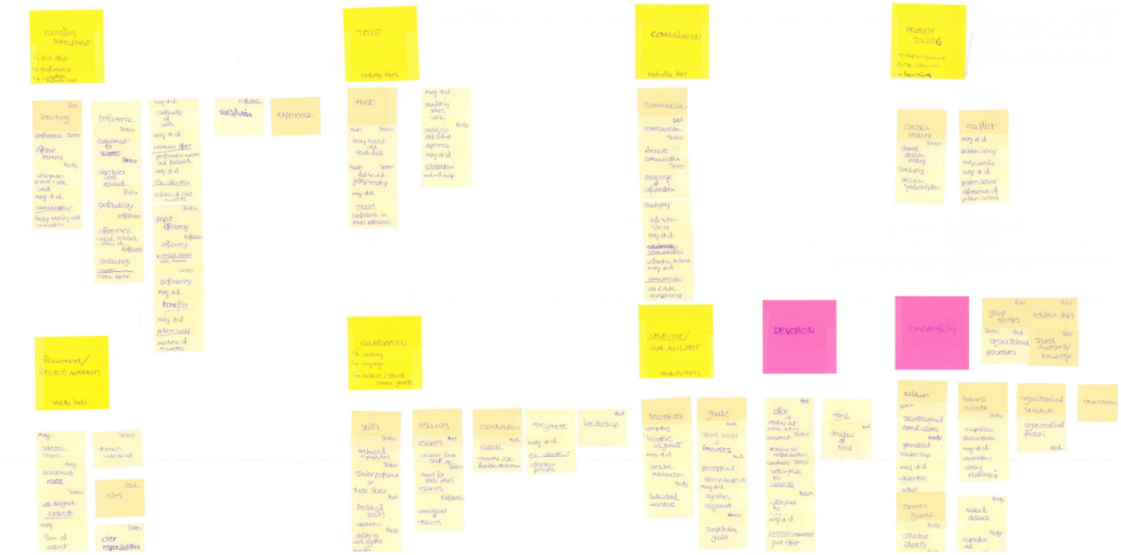


Figure 5 Clustering of factors and criteria (own ill., 2013)

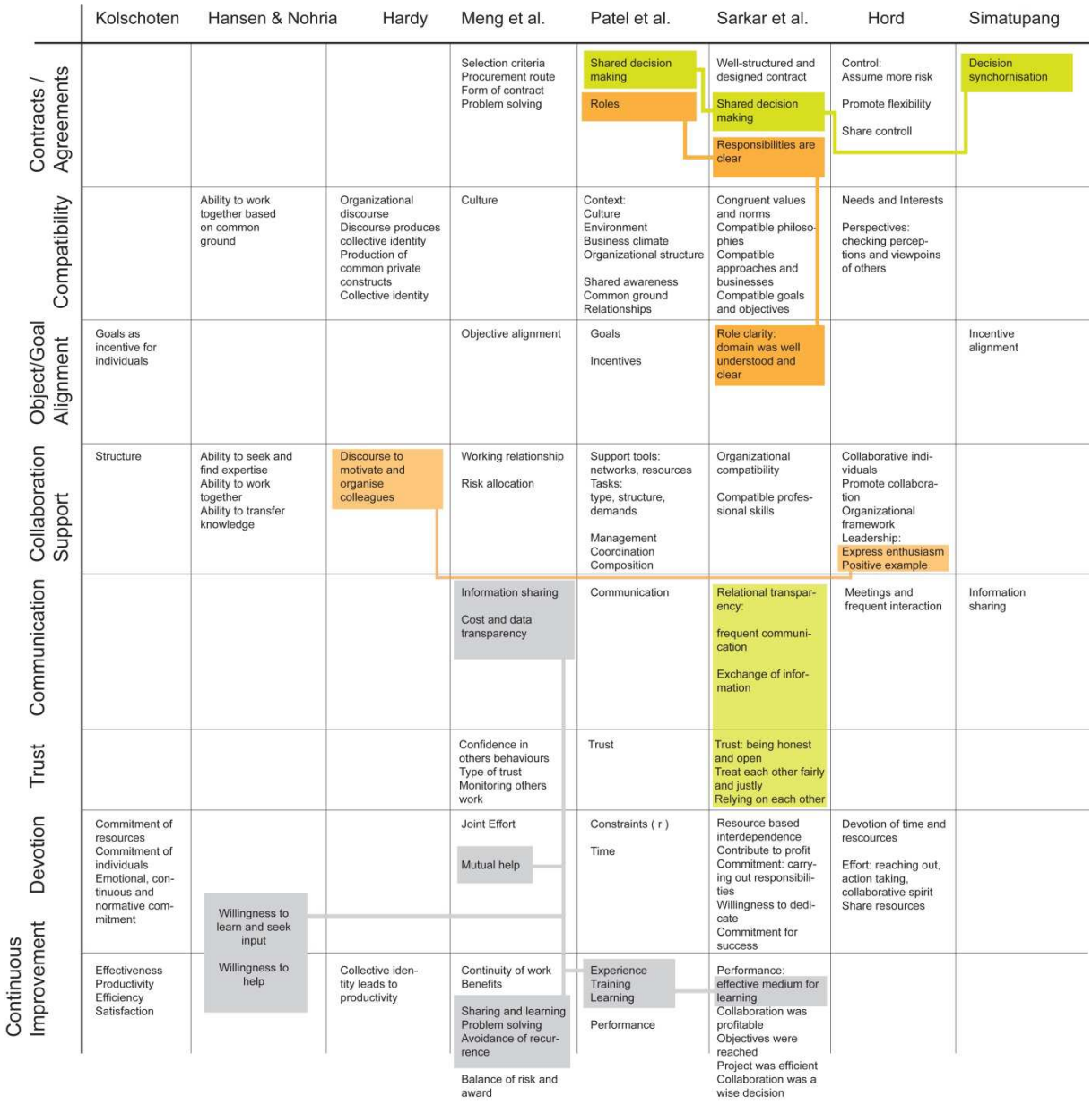


Figure 6 Overview different theories on collaboration, linking dimensions and factors (own ill., 2013)

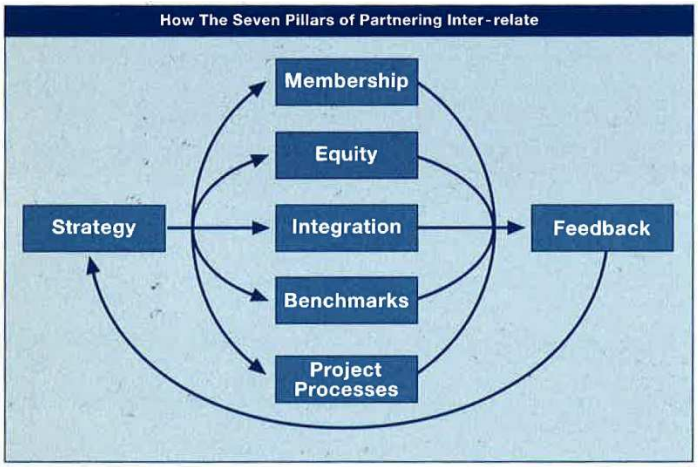


Figure 7 The seven pillars of partnering interrelating (Benett & Jayes, 1998, p. 4)

D

Appendix D: Organizational Climate Measure

Organizational Climate Measure©

The Organizational Climate Measure (OCM) consists of 17 scales, divided in to four quadrants: human relations, internal process, open systems, and rational goal. Items marked with an asterisk (*) are reversed before the scale is calculated. Regression weights quoted are from the confirmatory factor analysis on the second 50 per cent of the data; all are highly statistically significant.

The response scale is: 1 = 'Definitely false', 2 = 'Mostly false', 3 = 'Mostly true', 4 = 'Definitely true'.

Item	Regression weight
Autonomy	
Management let people make their own decisions much of the time	0.585
Management trust people to take work-related decisions without getting permission first	0.556
People at the top tightly control the work of those below them*	0.528
Management keep too tight a reign on the way things are done around here*	0.516
It's important to check things first with the boss before taking a decision*	0.513
Integration	
People are suspicious of other departments*	0.699
There is very little conflict between departments here	0.719
People in different departments are prepared to share information	0.719
Collaboration between departments is very effective	0.728
There is very little respect between some of the departments here*	0.766

Item	Regression weight
Involvement	
Management involve people when decisions are made that affect them	0.633
Changes are made without talking to the people involved in them*	0.752
People don't have any say in decisions which affect their work*	0.739
People feel decisions are frequently made over their heads*	0.738
Information is widely shared	0.695
There are often breakdowns in communication here*	0.744
Supervisory Support	
Supervisors here are really good at understanding peoples' problems	0.749
Supervisors show that they have confidence in those they manage	0.712
Supervisors here are friendly and easy to approach	0.715
Supervisors can be relied upon to give good guidance to people	0.807
Supervisors show an understanding of the people who work for them	0.851
Training	
People are not properly trained when there is a new machine or bit of equipment*	0.765
People receive enough training when it comes to using new equipment	0.804
The company only gives people the minimum amount of training they need to do their job*	0.741
People are strongly encouraged to develop their skills	0.649
Welfare	
This company pays little attention to the interests of employees*	0.729
This company tries to look after its employees	0.907
This company cares about its employees	0.918
This company tries to be fair in its actions towards employees	0.823
Formalization	
It is considered extremely important here to follow the rules	0.676
People can ignore formal procedures and rules if it helps get the job done*	0.640
Everything has to be done by the book	0.591
Its not necessary to follow procedures to the letter around here*	0.650
Nobody gets too upset if people break the rules around here*	0.581
Tradition	
Senior management like to keep to established, traditional ways of doing things	0.688
The way this organization does things has never changed very much	0.469
Management are not interested in trying out new ideas	0.645
Changes in the way things are done here happen very slowly	0.714
Innovation & Flexibility	
New ideas are readily accepted here	0.715
This company is quick to respond when changes need to be made	0.702
Management here are quick to spot the need to do things differently	0.701
This organization is very flexible; it can quickly change procedures to meet new conditions and solve problems as they arise	0.702
Assistance in developing new ideas is readily available	0.682
People in this organization are always searching for new ways of looking at problems	0.716
Outward Focus	
This organization is quite inward looking; it does not concern itself with what is happening in the market place*	0.774
Ways of improving service to the customer are not given much thought*	0.677
Customer needs are not considered top priority here*	0.767
This company is slow to respond to the needs of the customer*	0.652
This organization is continually looking for new opportunities in the market place	0.588

Item	Regression weight
Reflexivity	
In this organization, the way people work together is readily changed in order to improve performance	0.551
The methods used by this organization to get the job done are often discussed	0.747
There are regular discussions as to whether people in the organization are working effectively together	0.664
In this organization, objectives are modified in light of changing circumstances	0.482
In this organization, time is taken to review organizational objectives	0.707
Clarity of Organizational Goals	
People have a good understanding of what the organization is trying to do	0.664
The future direction of the company is clearly communicated to everyone	0.795
People aren't clear about the aims of the company*	0.659
Everyone who works here is well aware of the long-term plans and direction of this company	0.842
There is a strong sense of where the company is going	0.839
Efficiency	
Time and money could be saved if work were better organized*	0.768
Things could be done much more efficiently, if people stopped to think*	0.605
Poor scheduling and planning often result in targets not being met*	0.657
Productivity could be improved if jobs were organized and planned better*	0.829
Effort	
People here always want to perform to the best of their ability	0.660
People are enthusiastic about their work	0.692
People here get by with doing as little as possible*	0.604
People are prepared to make a special effort to do a good job	0.688
People here don't put more effort into their work than they have to*	0.637
Performance Feedback	
People usually receive feedback on the quality of work they have done	0.639
People don't have any idea how well they are doing their job*	0.629
In general, it is hard for someone to measure the quality of their performance*	0.635
People's performance is measured on a regular basis	0.629
The way people do their jobs is rarely assessed*	0.702
Pressure to Produce	
People are expected to do too much in a day	0.583
In general, peoples' workloads are not particularly demanding*	0.647
Management require people to work extremely hard	0.722
People here are under pressure to meet targets	0.585
The pace of work here is pretty relaxed*	0.672
Quality	
This company is always looking to achieve the highest standards of quality	0.791
Quality is taken very seriously here	0.811
People believe the company's success depends on high-quality work	0.649
This company does not have much of a reputation for top-quality products*	0.592

Quadrant	Scales
Human Relations	Autonomy Integration Involvement Supervisory Support Training

Figure 1 Organizational Climate Measure (Patterson et al., 2005, pg. 405-407)

E

Appendix E: Maturity Model Meng et al.

Main criteria	Subcriteria	Level 1	Level 2	Level 3	Level 4
Procurement	Selection criteria	The lowest price	Cost and quality	Multicriteria from short-term perspective	Multicriteria from long-term perspective
	Procurement route	Single-stage tendering	Two-stage tendering	Negotiation or tendering	Direct negotiation
	Form of contract	JCT	JCT/NEC	NEC/PPC 2000/JCT CE	NEC/TPC 2005/JCT CE/ Bespoke contract
Objectives	Objectives alignment	Only self objectives	Mainly self objectives	Mutual objectives in a project	Mutual objectives in the long-term
	Benefits	Win-lose	Win-partial win	Win-win in a single project	Win-win in the long-term
	Continuity of work	No continuity of work	Prospect of future work through tendering	Preferred suppliers	Guarantee for future work
Trust	Type of trust	Contractual trust	Competence trust	Short-term goodwill trust	Long-term goodwill trust
	Confidence in others' behavior	Little confidence	Some confidence	Much confidence	Full confidence
	Monitoring others' work	Checking and double checking	Checking somewhat reduced	Checking greatly reduced	Checking almost unnecessary
Collaboration	Working relationship	Confrontation or arms length	Limited cooperation	Collaboration	Close collaboration
	Culture	Mutual blame	Self defense	Abandon of blame culture	Problem solving focused culture
	Mutual help	No support for the weaker	Support only with the issues related to self-interest	Often support for a weak partner	Always support for a weak partner
Communication	Information exchange	Little information is exchanged openly	Some information is exchanged openly	Much information is exchanged openly	Most information is exchanged openly
	Sharing learning	No sharing learning and innovation	Little sharing learning and innovation	Sharing learning and innovation	Continuous sharing learning and innovation
	Cost data transparency	No cost transparency	Little cost transparency	Open book costing between two parties	Open book costing throughout the whole chain
Problem solving	Early warning	No risk identification, no early warning	Informal risk identification, no early warning	Early warning between two parties	Early warning throughout the whole chain
	Effectiveness	Problems often lead to disputes	Problems sometimes lead to disputes	Many problems are timely resolved at the lowest level	Most problems are timely resolved at the lowest level
	Avoidance of recurrence	Problems often recur	Sometimes problems recur	Few problems are repeated	Rare problems are repeated
Risk allocation	Risk sharing	No risk sharing	Limited risk sharing	Risk sharing greatly increased	Common practice for risk sharing
	Allocation principle	Risk is always allocated to the weak party	Risk is often allocated to the weak party	Risk is allocated to the party best able to manage it in a project	Risk is allocated to the party best able to manage it in the long-term
	Balance of risk and reward	No rewards for the party taking the risk	Some rewards for the party taking the risk	Often appropriate rewards for the party taking the risk	Always appropriate rewards for the party taking the risk
Continuous improvement	Joint effort	No joint effort for improvement	Limited joint effort for improvement	Joint effort for better ways of working	Continuous effort for better ways of working
	Performance measurement and feedback	No common measures; No formal feedback	Limited common measures; irregular but formal feedback	Common measures; regular and formal feedback in a project	Common measures; formal, regular, and continuous feedback
	Incentives	No incentive	Informal incentive	Single incentive	Multiple incentives

Table 1 Maturity Model (Meng, Sun, & Jones, 2011, p. 100)

F

Appendix F: Cheng et al.; questionnaire on partnering

Company : MTRC **Name (Optional):**

Contract: 604 **Month:** March **Year:** 2000

Please complete this questionnaire and return it to _____by _____. Complete those sections relevant to you and consider only your involvement with this single contract, and your relations with other people only in so far as they are connected with this contract.

The questionnaire consists of a series of statements to which you are asked to indicate how much you agree or disagree. Please tick the appropriate box to indicate how you feel at present.

		Strongly Disagree (1)	Slightly Disagree (2)	No Feeling Either Way (3)	Slightly Agree (4)	Strongly Agree (5)
1.	I feel I am working in an environment of trust					
2.	I feel that in the working relationships between all individuals are honesty, openness, and integrity.					
3.	I feel that good communications are being maintained					
4.	I feel that I am working in a united team where relationships are good					
5.	I feel that the contract is achieving the objectives of the programme.					
6.	I feel that the works are being carried out to the expected quality.					
7.	I feel that the team actively considers safety and that the works are being carried out safely.					
8.	I feel that my organisation is achieving reasonable commercial success from this contract.					
9.	I feel I am working in a positive and enjoyable atmosphere, being respected and having job satisfaction.					
10.	I feel that all parties are deploying competent and sufficient resources for the Contract					
11.	I feel that all parties are attributing to minimising all forms of waste from design, construction and interface perspectives.					
12.	I feel that the influence, requirements and needs of 3rd parties are being properly considered					
13.	I feel that disputes are being resolved in accordance with the agreed problem resolution mechanism					

Table 1 questions on partnering by Cheung et al. (Cheung, Ng, Wong, & Suen, 2003, p. 342)

G

Appendix G: Cummings and Bromely; questionnaire on trust

	Trust content
Cummings and Bromiley (1996) – items [a]	
1. We think the people in (__) tell the truth in negotiations	Integrity
2. We think that (__) meets its negotiated obligations to our department	Predictability/competence
3. In our opinion, (__) is reliable	Predictability
4. We think that the people in (__) succeed by stepping on other people	Integrity [r/c]
5. We feel that (__) tries to get the upper hand	Benevolence [r/c]
6. We think that (__) takes advantage of our problems	Benevolence [r/c]
7. We feel that (__) negotiates with us honestly	Integrity
8. We feel that (__) will keep its word	Predictability/integrity
9. We think that (__) does not mislead us	Integrity
10. We feel that (__) tries to get out of its commitments	Integrity [r/c]
11. We feel that (__) negotiates joint expectations fairly	Integrity
12. We feel that (__) takes advantage of people who are vulnerable	Benevolence/integrity [r/c]

Table 1 Questionnaire on Trust (Dietz & Den Hartog, 2006, p. Appendix 2)

H

Appendix H: Key Concepts

This appendix shows the key concepts on which the survey is designed and shows on which variables the conceptual design is build.

A1 – core concept	B - Dimension	C - Aspects
Organizational climate	Human Relations	Autonomy
		Integration
		Involvement
		Supervisory Support
	Internal Processes	Formalization
		Tradition
	Open Systems	Innovation and Flexibility
		Outward Focus
		Reflexivity
	Rational Goal	Clarity of Organizational Goals
		Efficiency
		Effort
		Performance Feedback
		Pressure to Produce
		Quality

Table 1 Key Concept Organizational Climate (Patterson et al., 2005)

A2 – core concept	B – Dimension	C - Aspect	
Collaboration	Continuous Improvement	Learning	Avoidance of recurrence Willingness to learn
		Continuity	Continuity of work
		Performance*	Profitability Balance profit/loss Effectiveness
	Devotion	Effort*	Dedication Commitment Mutual effort
	Objective/Goal Alignment	Incentives	Shared needs and interest
		Goal	Goal alignment Compatible goals Shared viewpoints
	Collaboration Support	Skills*	Technical capabilities

		Resources*	Commitments of resources
		Coordination*	Flexible environment
	Procurement/Agreements*		Selection criteria Contract Role clarity Shared decision making
	Communication*		Clear communication Frequent meetings Information sharing Cost and data transparency
	Compatibility	Culture*	Shared norms and values Private Constructions Collective identity
		Process	Organizational procedures
		Climate*	Mutual discourse Compatible philosophies

* **Aspect which is included into the survey**

Table 2 Key Concept Collaboration based on Meng et al (2011) and various other theories.

A1 – core concept	B - Dimension	C - Aspects
Trust between other departments (belief) (Cummings & Bromiley, 1996)	Integrity	Tell the truth Honesty Do not mislead Keep your commitments Negotiating joint expectations
	Benevolence	Get the upper hand Take advantage of situations
	Competence	Meting obligations
	Predictability	Reliability Keep your word

Table 3 Key Concept Trust (Dietz and Den Hartog)

I

Appendix I: Mailing towards unit managers

(language: dutch)

Geachte heer/mevrouw Achternaam, Beste Voornaam,

Voor mijn afstudeeronderzoek aan de Technische Universiteit van Delft doe ik in samenwerking met BAM Utiliteitsbouw Regio Den Haag en BAM Techniek Regio West onderzoek naar de samenwerking tussen BAM Techniek en BAM Utiliteitsbouw. Mijn onderzoek zal gaan over “het klimaat van de organisatie” en “ afspraken over samenwerking”. De onderzoeksvraag is: Op welke manier beïnvloed het klimaat van een organisatie de samenwerking tussen dochterondernemingen met verschillende disciplines in de bouwsector en hoe wordt deze samenwerking beïnvloed door al dan niet aanwezige afspraken. Het doel van het onderzoek is: een roadmap presenteren hoe in verschillende stappen de samenwerking tussen BAM Techniek en BAM Utiliteitsbouw zou kunnen worden verbeterd om uiteindelijk de prestatie van deze samenwerking te verhogen.

Wat ik u zou willen vragen is of u zou willen meewerken aan dit onderzoek. Tijdens dit onderzoek richt ik me voornamelijk op de tenderfase. Het mooiste zou zijn als u mij van een lijst met namen zou kunnen voorzien, van de werknemers op uw regio kantoor die (wel eens) betrokken zijn bij projecten in de tenderfase. En dan ben ik natuurlijk vooral geïnteresseerd in hen die betrokken zijn geweest bij projecten waarbij er sprake was van samenwerking tussen BAM Utiliteitsbouw en BAM Techniek. Om een zo goed mogelijk beeld te krijgen heb ik informatie nodig van alle lagen van uw regio kantoor. Het zou fantastisch zijn als ik informatie zou kunnen ontvangen van 10 personen per regio vestiging. Verder heb ik om de resultaten goed te kunnen vergelijken ook 10 resultaten van personen van uw regio kantoor nodig van werknemers buiten de tender fase. Het is niet nodig dat zij ervaring hebben met projecten tussen Utiliteitsbouw en Techniek maar het is wel een pre. Daarnaast, om het onderzoek zou zuiver mogelijk te houden, ben ik benieuwd naar de regio vestiging waar u het meest mee samenwerkt. Zodat ik dit voor uw werknemers in de enquête kan verwerken.

Samenvattend, wat ik van u hoop te kunnen ontvangen is:
- lijst met +/- 10 namen van werknemers werkzaam aan tenders, in samenwerking met BAM Utiliteitsbouw
- lijst met 10 aanvullende namen van werknemers werkzaam binnen uw regio kantoor (in totaal dus 20 namen)
- vestiging waar u het meeste mee samenwerkt tijdens de tender fase.

De vorm waarin ik informatie wil verzamelen is een vragenlijst. Nu ben ik me ervan bewust dat mensen over het algemeen niet staan te springen om een vragenlijst in te vullen. Ik zal de vragenlijst via een email verspreiden. Zo kan ik ook bijhouden hoe goed de vragenlijst wordt ingevuld. Mijn vraag aan u is ook om onder uw werknemers te promoten om de vragenlijst in te vullen. De vragenlijst zal worden verstuurd als bij alle regio’s de bouwvak is afgelopen. U zult dan hierover bericht ontvangen. Natuurlijk zullen de uitkomsten van dit onderzoek ook aan u worden gepresenteerd.

Alvast ontzettend bedankt voor uw medewerking en ik wacht uw antwoord af,

Met vriendelijke groet,
Jara Brinkman

Onder begeleiding van
Michael Venderbos (hoofd bedrijfsbureau Bam Utiliteitsbouw - Regio Den Haag)

en Hans van Hoven (hoofd ontwikkeling BAM Techniek - Regio West)

J

Appendix J: Questionnaire Design

(Language: dutch)

Beste collega,

In deze mail vindt u link naar een enquête voor een afstudeer onderzoek aan de TU Delft, in samenwerking met BAM Utiliteitsbouw en BAM Techniek. Tijdens de design-and-built of design-and-construct projecten wordt de samenwerking tussen Ubouw en Techniek steeds belangrijker en komt deze ook steeds vaker voor. Om meer inzicht te krijgen in hoe deze samenwerking te versterken, is dit onderzoek opgezet.

Het management van uw vestiging heeft uw naam doorgegeven als kandidaat om deze enquête in te vullen.

Als er in de vragen wordt gesproken over BAM U/BAM T dient u deze te beantwoorden voor uw **eigen** regio/vestiging. Indien er vragen worden gesteld over BAM T/BAM U dan heeft dit betrekking op de regio Y van BAM T/BAM U.

Voor het onderzoek is het van belang dat u deze enquête helemaal invult en uiterlijk binnen 7 werkdagen na ontvangst afrond. Ik wil u alvast hartelijk danken voor uw tijd en moeite.

Met vriendelijke groet,
Jara Brinkman

Onder begeleiding van
Michael Venderbos (BAM Utiliteitsbouw)
Hans van Hoven (BAM Techniek)

Afstudeeronderzoek naar samenwerking tussen dochteronderneming met verschillende disciplines

Beste collega,

Voor mijn Master Thesis aan de Technische Universiteit van Delft doe ik in samenwerking met BAM Utiliteitsbouw en met BAM Techniek een onderzoek naar de samenwerking tussen BAM Utiliteitsbouw en BAM Techniek. Dit komt enerzijds voort uit mijn interesse naar samenwerking en de theorie erachter, en anderzijds uit de vraag vanuit BAM Utiliteitsbouw regio Den Haag en BAM Techniek Regio West hoe zij hun samenwerking nog meer zouden kunnen versterken. Tijdens deze enquête zult u over 3 verschillende onderwerpen vragen terugvinden (klimaat van de organisatie, samenwerken en het maken van afspraken). Het onderzoek duurt ongeveer 30 minuten.De resultaten van dit onderzoek zullen worden gepubliceerd in een rapport en zal u worden toegestuurd. Uw gegevens zullen vertrouwelijk worden behandeld en zullen niet in andere onderzoeken worden gebruikt.

Alvast hartelijk bedankt voor de samenwerking!

Met vriendelijke groet,
Jara Brinkman

Vragenlijst met betrekking tot de samenwerking tussen BAM Utiliteitsbouw en BAM Techniek

De eerste vragen zullen gaan over wat algemene informatie omtrent uw werksituatie.

Ik werk bij de vestiging

- ○ BAM Utiliteitsbouw regio Noord
- ○ BAM Utiliteitsbouw regio Oost
- ○ BAM Utiliteitsbouw regio Arnhem
- ○ BAM Utiliteitsbouw regio Amsterdam
- ○ BAM Utiliteitsbouw regio Den Haag
- ○ BAM Utiliteitsbouw regio Rotterdam
- ○ BAM Utiliteitsbouw regio Utrecht
- ○ BAM Utiliteitsbouw regio Maastricht
- ○ BAM Utiliteitsbouw regio Grote Projecten
- ○ BAM Utiliteitsbouw regio Eindhoven
- ○ BAM Utiliteitsbouw regio Noordwest

Mijn functie binnen BAM is:

- ○ Directeur
- ○ Hoofd Bedrijfsbureau
- ○ Kostendeskundige
- ○ Calculator

- ○ Inkoper
- ○ Technisch Ontwikkelaar
- ○ Hoofd Productie
- ○ Werkvoorbereider
- ○ Projectmanager
- ○ Projectleider
- ○ Tendermanager
- ○ Anders, namelijk _____

Mijn leeftijd is:

Mijn geslacht is:

- ○ Man
- ○ Vrouw

Het klimaat van de organisatie - Onderlinge verhoudingen

De eerst serie vragen gaan over het klimaat binnen uw werkmaatschappij, binnen uw regio. Als er wordt gesproken over management, organisatie of bedrijf, dan wordt daarmee de regio-vestiging van uw werkmaatschappij bedoeld. Wanneer er wordt gesproken over afdelingen, gaat het over de afdelingen binnen uw eigen werkmaatschappij. Tijdens dit onderzoek wordt er gemeten met de volgende antwoorden schaal:(1) absoluut mee oneens, (2) voornamelijk mee oneens, (3) voornamelijk mee eens, (4) absoluut mee eens.

Autonomie

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Het management laat mensen meestal hun eigen beslissingen maken	○	○	○	○
Het management vertrouwt mensen toe werkgerelateerde beslissingen te nemen zonder vooraf om toestemming te vragen	○	○	○	○
Mensen aan de top besturen strak de bezigheden van degenen onder hen	○	○	○	○
Het management heeft teveel zeggenschap over hoe het werk hier wordt uitgevoerd	○	○	○	○
Het is belangrijk om eerst met de baas te overleggen voordat een beslissing wordt genomen	○	○	○	○

Integratie

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Mensen hier zijn achterdochtig ten op zichte van andere afdelingen binnen Utiliteitsbouwbouw	○	○	○	○
Er zijn hier weinig conflicten tussen afdelingen van Utiliteitsbouw	○	○	○	○

Mensen vanuit verschillende afdelingen binnen Utiliteitsbouw zijn bereid om informatie te delen	○	○	○	○
De samenwerking tussen afdelingen van Utiliteitsbouw is zeer effectief	○	○	○	○
Er is hier erg weinig respect tussen sommige afdelingen binnen Utiliteitsbouw	○	○	○	○

Betrokkenheid

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Het management betrekt de mensen bij beslissingen op wie de beslissing een impact heeft	○	○	○	○
Veranderingen worden gemaakt zonder dat de betrokken mensen gehoord worden	○	○	○	○
Mensen hebben geen enkele stem in beslissingen die hun werk beïnvloedden	○	○	○	○
Mensen hebben het idee dat er vaak over hun hoofd heen beslissingen worden gemaakt	○	○	○	○
Informatie wordt op grote schaal gedeeld	○	○	○	○
Er zijn hier vaak problemen in de communicatie	○	○	○	○

Steun van leidinggevenden

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Leidinggevenden zijn goed in het begrijpen van problemen van de mensen	○	○	○	○
Leidinggevenden laten zien dat zij vertrouwen hebben in degene die zij managen	○	○	○	○
Leidinggevenden zijn vriendelijk en makkelijk te benaderen	○	○	○	○
Men kan er op vertrouwen dat leidinggevenden hun werknemers goed begeleiden	○	○	○	○
De leidinggevenden laten zien dat ze begrip hebben voor de werknemers die voor hen werken	○	○	○	○

Training

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Mensen worden niet fatsoenlijk getraind wanneer er nieuwe machines of gereedschappen zijn	○	○	○	○
Mensen ontvangen hier genoeg training over het omgaan met nieuwe apparatuur	○	○	○	○
Het bedrijf geeft mensen slechts de minimale training die nodig is om hun werk uit te voeren	○	○	○	○
Mensen worden flink gestimuleerd om hun vaardigheden te ontwikkelen	○	○	○	○

Welzijn

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Het bedrijf besteedt weinig aandacht aan de belangen van werknemers	○	○	○	○
Het bedrijf probeert te zorgen voor zijn medewerkers	○	○	○	○
Dit bedrijf geeft om zijn werknemers	○	○	○	○
Dit bedrijf probeert in zijn handelingen redelijk te zijn richting werknemers	○	○	○	○

Formalisering

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Het is hier extreem belangrijk om te regels te volgen	○	○	○	○
Mensen kunnen formele procedures en regels negeren als het helpt om de klus te klaren	○	○	○	○
Alles moet hier volgens het boekje	○	○	○	○
Het is hier niet nodig om procedures tot op de letter nauwkeurig te volgen	○	○	○	○
Niemand wordt te boos als mensen hier de regels breken	○	○	○	○

Traditie

	Absoluut mee oneens	Voornamelijk mee oneens	Voornamelijk mee eens	Absoluut mee eens
Het managementteam houdt vast aan de gevestigde, traditionele manier van werken	○	○	○	○
De manier waarop deze organisatie dingen doet is nooit sterk veranderd	○	○	○	○
Het management is niet geïnteresseerd in het uitproberen van nieuwe ideeën	○	○	○	○
Veranderingen in de manier waarop dingen gedaan worden gaan erg langzaam hier	○	○	○	○

Innovatie en Flexibiliteit

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Nieuwe ideeën worden hier gemakkelijk geaccepteerd	○	○	○	○
Dit bedrijf reageert snel als er veranderingen nodig zijn	○	○	○	○
Het management hier ziet snel de noodzaak om dingen anders te doen	○	○	○	○
Deze organisatie is erg flexibel; er kunnen snel veranderingen in procedures worden doorgevoerd om aan	○	○	○	○

nieuwe voorwaarden te kunnen voldoen of wanneer er problemen zijn ontstaan				
Hulp bij het ontwikkelen van nieuwe ideeën is makkelijk beschikbaar	○	○	○	○
Mensen in deze organisatie zijn altijd op zoek naar nieuwe invalshoeken om naar problemen te kijken	○	○	○	○

Kijk op de buitenwereld

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
De organisatie is erg in zichzelf gekeerd, zij houdt zich niet bezig met wat er op de markt speelt	○	○	○	○
Er wordt niet veel nagedacht over manieren om de service naar klanten te verbeteren	○	○	○	○
Behoeftes van klanten worden hier niet als top prioriteit beschouwd	○	○	○	○
Dit bedrijf reageert langzaam op de behoeftes van de klant	○	○	○	○
Deze organisatie zoekt voortdurend naar nieuwe kansen in de markt	○	○	○	○

Reflexiviteit

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
De methodes die deze organisatie gebruikt om dingen voor elkaar te krijgen worden vaak besproken	○	○	○	○
De effectiviteit van de manier waarop de werknemers in de organisatie samenwerken wordt regelmatig besproken	○	○	○	○
In deze organisatie worden doelen aangepast aan veranderende omstandigheden	○	○	○	○
In deze organisatie wordt de tijd genomen om organisatorische doelen te herzien	○	○	○	○

Duidelijkheid van organisatorische doelen

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Mensen begrijpen goed wat de organisatie probeert te doen	○	○	○	○
De toekomstige richting van het bedrijf wordt duidelijk naar iedereen gecommuniceerd	○	○	○	○
Mensen zijn niet duidelijk over de doelen van dit bedrijf	○	○	○	○
Iedereen die hier werkt is zich bewust van de lange termijnplannen en de koers van het bedrijf	○	○	○	○
Er is een sterk gevoel over waar dit bedrijf heen wil	○	○	○	○

Efficiëntie

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Er kan tijd en geld worden bespaard als het werk beter zou zijn georganiseerd	○	○	○	○
Dingen kunnen efficiënter worden gedaan als mensen zouden stoppen met denken	○	○	○	○
Slechte roostering en planning zorgen er vaak voor dat doelen niet worden gehaald	○	○	○	○
Productiviteit kan worden verbeterd als zaken beter zouden worden georganiseerd en gepland	○	○	○	○

Inspanning

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Mensen willen hier altijd werken op het maximum van hun kunnen	○	○	○	○
Mensen zijn hier enthousiast over hun werk	○	○	○	○
Mensen komen hier weg met zo weinig doen als mogelijk	○	○	○	○
Mensen zijn bereid om zich extra in te spannen om goed werk te leveren	○	○	○	○
Mensen hier zullen zich niet meer inspannen dan strikt noodzakelijk	○	○	○	○

Feedback op functioneren

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Mensen ontvangen normaal gesproken feedback over de kwaliteit van het werk dat ze geleverd hebben	○	○	○	○
Mensen hebben geen idee hoe goed ze hun werk doen	○	○	○	○
Over het algemeen is het moeilijk voor iemand om de kwaliteit van zijn of haar presteren te meten	○	○	○	○
Hoe iemand presteert wordt op regelmatige basis gemeten	○	○	○	○
De manier waarop mensen hun werk doen wordt nauwelijks beoordeeld	○	○	○	○

Werkdruk

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Er wordt meer van mensen verwacht dan dat ze op een dag aankunnen	○	○	○	○
Over het algemeen is de werklast niet bijzonder veeleisend	○	○	○	○

Het management verwacht van mensen dat ze extreem hard werken	○	○	○	○
Mensen staan hier onder druk om hun doelen te halen	○	○	○	○
Het werktempo hier is redelijk relaxed	○	○	○	○

Kwaliteit

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Dit bedrijf wil altijd de hoogste kwaliteitsstandaard halen	○	○	○	○
Kwaliteit wordt hier erg serieus genomen	○	○	○	○
Mensen geloven dat het succes van het bedrijf van de kwaliteit van het werk afhangt	○	○	○	○
Dit bedrijf heeft niet de reputatie voor het leveren van top kwaliteitsproducten	○	○	○	○

Samenwerking

De vragen in dit onderdeel gaan over de samenwerking tussen de dochterondernemingen BAM Utiliteitsbouw en BAM Techniek. Mochten er vragen over projecten voorkomen, dan gaat dit altijd over de projecten uitgevoerd tussen BAM Utiliteitsbouw en BAM Techniek, waar u bij betrokken was. Met de samenwerking wordt hier het samenwerken op het niveau van de beide dochterondernemingen bedoeld, niet op individueel niveau

De afgelopen 2 jaar heb gewerkt aan een project tussen BAM Utiliteitsbouw en BAM Techniek

○ Ja

○ Nee

Tijdens een of meerdere van deze projecten was ik werkzaam in de tenderfase

○ Ja

○ Nee

Vertrouwen

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Wij denken dat mensen bij mensen bij BAM Techniek de waarheid vertellen tijdens onderhandelingen	○	○	○	○
Wij denken dat mensen bij BAM Techniek de overeengekomen verplichtingen naar ons nakomen	○	○	○	○
Naar onze mening, is BAM Techniek betrouwbaar	○	○	○	○
Wij denken dat mensen bij BAM Techniek vooruit komen door over andere mensen heen te lopen	○	○	○	○
Wij hebben het gevoel dat BAM Techniek voordeel probeert te halen uit onze problemen	○	○	○	○
Wij hebben het gevoel dat BAM Techniek probeert de overhand te krijgen	○	○	○	○
Wij hebben het gevoel dat BAM Techniek eerlijk met ons onderhandelt	○	○	○	○
Wij hebben het gevoel dat BAM Techniek zich aan zijn woord zal houden	○	○	○	○
Wij denken dat BAM Techniek ons niet zal misleiden	○	○	○	○

Wij hebben het gevoel dat BAM Techniek onder zijn verplichtingen uit probeert te komen	○	○	○	○
Wij hebben het gevoel dat BAM Techniek misbruikt maakt van kwetsbare mensen	○	○	○	○

Samenwerking

De vragen in dit onderdeel gaan over de samenwerking tussen de dochterondernemingen BAM Utiliteitsbouw en BAM Techniek. Mochten er vragen over projecten voorkomen, dan gaat dit altijd over de projecten uitgevoerd tussen BAM Utiliteitsbouw en BAM Techniek, waar u bij betrokken was. Met de samenwerking wordt hier het samenwerken op het niveau van de beide dochterondernemingen bedoeld, niet op individueel niveau

Samenwerken met BAM Techniek

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Ik heb het gevoel dat alle werkrelaties tussen individuen op een basis van eerlijkheid, openheid , vertrouwen en intergriteit plaats vind	○	○	○	○
Ik heb het gevoel dat er goede communicatie wordt onderhouden	○	○	○	○
Ik heb het gevoel dat met de samenwerking de doelen van de organisaties worden bereikt	○	○	○	○
Ik heb het gevoel dat het gezamenlijk werk wordt uitgevoerd naar de verwachte kwaliteit	○	○	○	○
Ik heb het gevoel dat mijn organisatie naar redelijkheid commercieel succes haalt uit de samenwerking	○	○	○	○
Ik heb het gevoel dat ik in een positieve en aangename omgeving werk, waarin ik wordt gerespecteerd en waaruit ik voldoening haal	○	○	○	○
Ik heb het gevoel dat alle partijen de juist en voldoende middelen inzetten voor de samenwerking	○	○	○	○
Ik heb het gevoel dat alle partijen zich inzetten om verlies zo veel mogelijk te beperken tijdens de ontwerp- en uitvoerings fase	○	○	○	○
Ik heb het gevoel dat de invloeden, de eisen en de wensen van derden goed worden meegnomen in overwegingen en beslissingen tijdens de samenwerking	○	○	○	○
Ik heb het gevoel dat ik werk in een omgeving van vertrouwen	○	○	○	○

Samenwerking

De vragen in dit onderdeel gaan over de samenwerking tussen de dochterondernemingen BAM Utiliteitsbouw en BAM Techniek. Mochten er vragen over projecten voorkomen, dan gaat dit altijd over de projecten uitgevoerd tussen BAM Utiliteitsbouw en BAM Techniek, waar u bij betrokken was. Met de samenwerking wordt hier het samenwerken op het niveau van de beide dochterondernemingen bedoeld, niet op individueel niveau

Afspraken

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Momenteel worden er afspraken gemaakt over de samenwerking	○	○	○	○
Momenteel wordt er vooraf een gezamenlijk doel gesteld voor het specifieke project	○	○	○	○

Momenteel worden er afspraken gemaakt over het verdelen van de kosten en de opbrengsten van de samenwerking	○	○	○	○
Momenteel worden er afspraken gemaakt over het omgaan met conflicten tijdens de samenwerking	○	○	○	○
Momenteel wordt er vooraf besproken hoe belangrijk een project is voor beide dochterondernemingen	○	○	○	○

Mocht u 1 van de vragen hierboven met "absoluut mee oneens" of een "voornamelijk mee oneens" hebben beantwoord, wat is dan volgens u de reden dat er geen afspraken worden gemaakt?

Toekomstige situatie

	absoluut mee oneens	voornamelijk mee oneens	voornamelijk mee eens	absoluut mee eens
Het maken van afspraken is belangrijk voor samenwerking	○	○	○	○
Het maken van afspraken betekent dat we elkaar niet vertrouwen	○	○	○	○
Afspraken maken over de samenwerking tussen BAM Techniek en BAM Utiliteitsbouw zou overbodig moeten zijn	○	○	○	○

Heeft u naar aanleiding van dit onderzoek nog vragen of opmerkingen?

Zou ik u in de toekomst nog mogen benaderen voor een vervolgonderzoek?

○ Ja

○ Nee

Nogmaals ontzettend bedankt voor uw tijd en moeite. De algemene resultaten van het onderzoek en de verwerking hiervan in mijn afstudeerrapport zullen aan u bekend worden gemaakt.

Met vriendelijke groet, Jara Brinkman

K

Appendix K: Factor analyses of Organizational Climate, Trust, Agreements and Collaboration

When performing the Principal Component Analyses on the Organizational Climate quadrants, only a few components significantly showed. The components that were proven valid will be shown below.

Validating the measurement of Trust

For the measurement of Trust, a validated list of questions was used. But for the validation of this measurement method, still a principal component analysis was conducted on all eleven items with orthogonal rotation (varimax). According to the literature, the questions were based on three components (*Integrity, Predictability and Benevolence).* From these three components, only one significantly showed in the PCA. The component Integrity will be chosen to select for further analysis.

The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .83 ('great' according to Field (2009), and all KMO values for individuals were > .785, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (55) = 441.025, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. One component with an eigenvalue over Kaiser's criterion was found and explained 52,652% of the variance. Table 1 shows the factor loadings after rotation. The reliability analysis, the Crohnbach's Alpha= .846, which is excellent.

Table 1 Component Matrix on Trust

Component Matrix on the questions on Trust[a]

	Component Intergrity
1Vertrouwen | Wij denken dat mensen bij mensen bij BAM Techniek de waarheid vertellen tijdens onderhandelingen	,729
7Vertrouwen | Wij hebben het gevoel dat BAM Techniek eerlijk met ons onderhandelt	,721

8Vertrouwen | Wij hebben het gevoel dat BAM Techniek zich aan zijn woord zal houden	,806
9Vertrouwen | Wij denken dat BAM Techniek ons niet zal misleiden	,748
4corr_Vertrouwen | Wij denken dat mensen bij BAM Utiliteitsbouw vooruit komen door over andere mensen heen te lopen	,642
11corr_Vertrouwen | Wij hebben het gevoel dat BAM Utiliteitsbouw misbruikt maakt van kwetsbare mensen	,661
10corr_Vertrouwen | Wij hebben het gevoel dat BAM Utiliteitsbouw onder zijn verplichtingen uit probeert te komen	,737
Eigenvalues	3,652
% of variance	52,177%
Crohnbachs Alpha	,846

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Validating the measurement of the degree of Collaboration

For the measurement of the degree of Collaboration, a non-validated list of questions was used. For the validation of this measurement method, a principal component analysis was conducted on all ten items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .86 ('great' according to Field (2009), and all KMO values for individuals were > .839, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (45) = 540.560, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. Two components had eigenvalues over Kaiser's criterion of 1 and in combination explained 58,048% of the variance. Table 2 shows the factor loadings after rotation. The items that cluster on the same components suggest that component 1 represents the Hard side of Collaboration, and component 2 represents the Soft side of Collaboration. When the Crohnbachs alpha is measured, both components show >0,8, which is sufficient or even very good.

Table 2 Component Matrix on Collaboration

Rotated Component Matrix for the questions on Degree of Collaboration

	Component	
	Hard side of Collaboration	Soft side of Collaboratons
Samenwerken met BAM Techniek | Ik heb het gevoel dat alle werkrelaties tussen individuen op een basis van eerlijkheid, openheid , vertrouwen en intergriteit plaats vind		**,792**
Samenwerken met BAM Techniek | Ik heb het gevoel dat er goede communicatie wordt onderhouden	,423	**,644**
Samenwerken met BAM Techniek | Ik heb het gevoel dat met de samenwerking de doelen van de organisaties worden bereikt	**,651**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat het gezamenlijk werk wordt uitgevoerd naar de verwachte kwaliteit	**,681**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat mijn organisatie naar redelijkheid commercieel succes haalt uit de samenwerking	**,675**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat ik in een positieve en aangename omgeving werk, waarin ik wordt gerespecteerd en waaruit ik voldoening haal		**,809**
Samenwerken met BAM Techniek | Ik heb het gevoel dat alle partijen de juist en voldoende middelen inzetten voor de samenwerking	**,665**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat alle partijen zich inzetten om verlies zo veel mogelijk te beperken tijdens de ontwerp- en uitvoerings fase	**,836**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat de invloeden, de eisen en de wensen van derden goed worden meegenomen in overwegingen en beslissingen tijdens de samenwerking	**,649**	
Samenwerken met BAM Techniek | Ik heb het gevoel dat ik werk in een omgeving van vertrouwen	,475	**,688**
Eigenvalues	4,844	1,108
%of variance	48,442%	11,081%
Crohnbachs Alpha	,833	,807

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Validating the measurement of Agreements

Besides the questions for describing the Organizational Climate, the degree of Collaboration and the trust among the partners, also questions were asked about making agreements about the

collaboration. Again, a non-validated list of questions was used to analyse this. The PCA was conducted on the five questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .80 ('great' according to Field (2009), and all KMO values for individuals were > .739, which is well above the acceptable level of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (10) = 189,970, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain the eigenvalues or the component in the data. Only one component was found with an eigenvalue over Kaiser's criterion of 1 and explained 58,4% of the variance. Table 3 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,919, which explains 58,383% of the total correlation. The Crohnbach's Alpha is well above the restricted .7 (.819), which means that the scale is also validated.

Table 3 Component Matrix on Agreements

Component Matrix on the questions on making Agreements[a]

	Component 1
Samenwerken | Momenteel worden er afspraken gemaakt over de samenwerking	,735
Samenwerken | Momenteel wordt er vooraf een gezamenlijk doel gesteld voor het specifieke project	,835
Samenwerken | Momenteel worden er afspraken gemaakt over het verdelen van de kosten en de opbrengsten van de samenwerking	,793
Samenwerken | Momenteel worden er afspraken gemaakt over het omgaan met conflicten tijdens de samenwerking	,671
Samenwerken | Momenteel wordt er vooraf besproken hoe belangrijk een project is voor beide dochterondernemingen	,777
Eigenvalues	2,919
% of variance	58,383%
Crohnbachs Alpha	,819

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

After the factor analysis is performed, the variables that hung on one factor will be calculated to one variable. These variables will be used for the further analysis.

Validating the measurement Organizational Climate

Autonomy

The principal component analysis was conducted on the four questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .68 ('medicre' according to Field (2009). Bartlett's test of sphericity χ^2 (6) = 170,793, p<0.001, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 4 shows the

factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,244, which explains 56,096% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (,724), which means that the scale is also validated.

Table 4 Component Matrix OCM - Autonomy

Component Matrix[a,b]	
	Component 1
Autonomie | Het management laat mensen meestal hun eigen beslissingen maken	0,8
Autonomie | Het management vertrouwt mensen toe werkgerelateerde beslissingen te nemen zonder vooraf om toestemming te vragen	0,827
Autonomie | Mensen aan de top besturen strak de bezigheden van degenen onder hen	0,742
Autonomie | Mensen aan de top besturen strak de bezigheden van degenen onder hen	0,608
Eigenvalue	2,244
% of variance	56,096
Crohnbach's Alpha	0,724

Involvement

The principal component analyses was conducted on the six questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .80 ('good' according to Field (2009). Bartlett's test of sphericity χ^2 (15) = 261,791, $p<0.001$, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 5 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,909 which explains 48,483% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (,782), which means that the scale is also validated.

Table 5 Component Matrix OCM - Involvement

Component Matrix[a,b]

	Component 1
Betrokkenheid | Het management betrekt de mensen bij beslissingen op wie de beslissing een impact heeft	,718
Betrokkenheid | Informatie wordt op grote schaal gedeeld	,665
Betrokkenheid | Veranderingen worden gemaakt zonder dat de betrokken mensen gehoord worden	,785
Betrokkenheid | Mensen hebben geen enkele stem in beslissingen die hun werk beïnvloedden	,622
Betrokkenheid | Mensen hebben het idee dat er vaak over hun hoofd heen beslissingen worden gemaakt	,762
Betrokkenheid | Er zijn hier vaak problemen in de communicatie	,606
Eigenvalue	2,909
% of variance	48,483
Crohnbach's Alpha	,782

Formalization

The principal component analyses was conducted on the five questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .72 ('good' according to Field (2009). Bartlett's test of sphericity χ^2 (10) = 113,802, p<0.001, indicated that correlations between items were sufficiently large for PCA. All the anti-immage correlations factors are >.696. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 6 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,14 which explains 42,805% of the total correlation. The Crohnbach's Alpha is **below** the restricted ,7 (661), which means that the scale is not validated.

Table 6 Component Matrix OCM - Formalization

Component Matrix[a,b]

	Component 1
Formalisering | Het is hier extreem belangrijk om te regels te volgen	,640
Formalisering | Alles moet hier volgens het boekje	,747
Formalisering | Mensen kunnen formele procedures en regels negeren als het helpt om de klus te klaren	,757
Formalisering | Het is hier niet nodig om procedures tot op de letter nauwkeurig te volgen	,565
Formalisering | Niemand wordt te boos als mensen hier de regels breken	,530
Eigenvalue	2,14
% of variance	42,805
Crohnbach's Alpha	,661

Which means that these factors do show enough correlation, but the measurement scale is not validated. Looking at the "crohnbach's alpha when item is deleted" one can see that no item can be deleted to uplift the alpha-value.

This component is not validated.

Tradition

The principal component analyses was conducted on the 5 questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .80 ('good' according to Field (2009). Bartlett's test of sphericity χ^2 (6) = 199,052, p<0.001, indicated that correlations between items were sufficiently large for PCA. All the anti-immage correlations factors are >.763. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 7 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,499 which explains 62,463% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (,798), which means that the scale is also validated.

Table 7 Component Matrix OCM - Tradition

Component Matrix[a,b]	
	Component 1
Traditie | Het managementteam houdt vast aan de gevestigde, traditionele manier van werken	,792
Traditie | De manier waarop deze organisatie dingen doet is nooit sterk veranderd	,829
Traditie | Het management is niet geinteresseerd in het uitproberen van nieuwe ideeen	,777
Traditie | Veranderingen in de manier waarop dingen gedaan worden gaan erg langzaam hier	,763
Eigenvalue	2,499
% of variance	62,463
Crohnbach's Alpha	,798

Innovation & Flexibility

The principal component analyses was conducted on the 6 questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .83 ('great' according to Field (2009). Bartlett's test of sphericity χ^2 (15) = 250,688, p<0.001, indicated that correlations between items were sufficiently large for PCA. All the anti-immage correlations factors are >.796. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 8 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,944 which explains 49,065% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (,791), which means that the scale is also validated.

Table 8 Component Matrix OCM - Innovation and Flexibility

Component Matrix[a,b]	
	Component 1
Innovatie en Flexibiliteit | Nieuwe ideeën worden hier gemakkelijk geaccepteerd	,697
Innovatie en Flexibiliteit | Dit bedrijf reageert snel als er veranderingen nodig zijn	,745
Innovatie en Flexibiliteit | Het management hier ziet snel de noodzaak om dingen anders te doen	,674

Innovatie en Flexibiliteit | Deze organisatie is erg flexibel; er kunnen snel veranderingen in procedures worden doorgevoerd om aan nieuwe voorwaarden te kunnen voldoen of wanneer er problemen zijn ontstaan	,661
Innovatie en Flexibiliteit | Hulp bij het ontwikkelen van nieuwe ideeen is makkelijk beschikbaar	,712
Innovatie en Flexibiliteit | Mensen in deze organisatie zijn altijd op zoek naar nieuwe invalshoeken om naar problemen te kijken	,711
Eigenvalue	2,944
% of variance	49,065
Crohnbach's Alpha	,791

Clarity of Organizational Goals

The principal component analyses was conducted on the five questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .85 ('good' according to Field (2009). Bartlett's test of sphericity χ^2 (10) = 453,346, p<0.001, indicated that correlations between items were sufficiently large for PCA. All the anti-immage correlations factors are >.799. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 9 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 3,406 which explains 68,122% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (,881), which means that the scale is also validated.

Table 9 Component Matrix OCM - Clarity of Organizational Goals

Component Matrix[a,b]	
	Component 1
Duidelijkheid van organisatorische doelen | Mensen begrijpen goed wat de organisatie probeert te doen	,831
Duidelijkheid van organisatorische doelen | De toekomstige richting van het bedrijf wordt duidelijk naar iedereen gecommuniceerd	,846
Duidelijkheid van organisatorische doelen | Iedereen die hier werkt is zich bewust van de langetermijnplannen en de koers van het bedrijf	,818
Duidelijkheid van organisatorische doelen | Er is een sterk gevoel over waar dit bedrijf heen wil	,877
Duidelijkheid van organisatorische doelen van mijn vestiging | Mensen zijn niet duidelijk over de doelen van dit bedrijf	,750
Eigenvalue	3,406
% of variance	68,122
Crohnbach's Alpha	,881

Pressure to Produce

The principal component analyses was conducted on the five questions concerning the agreements, using the orthogonal rotations (varimax). The Kaiser-Meyer-Olkin measure was verified the sampling adequacy for the analysis, KMO = .75 ('good' according to Field (2009). Bartlett's test of sphericity χ^2 (10) = 171,785, p<0.001, indicated that correlations between items were sufficiently large for PCA. All the anti-immage correlations factors are >.720. An initial analysis was run to obtain the eigenvalues or the component in the data. Table 10 shows the factor loadings. Since there was only one factor, no rotations were executed. The eigenvalue of the component is 2,461 which explains 49,227% of the total correlation. The Crohnbach's Alpha is above the restricted ,7 (.742), which means that the scale is also validated.

Table 10 Component Matrix OCM - Pressure to Produce

Component Matrix[a,b]

	Component 1
Werkdruk | Er wordt meer van mensen verwacht dan dat ze op een dag aankunnen	,720
Werkdruk | Het management verwacht van mensen dat ze extreem hard werken	,649
Werkdruk | Mensen staan hier onder druk om hun doelen te halen	,722
Werkdruk | Over het algemeen is de werklast niet bijzonder veeleisend	,708
Werkdruk | Mensen staan hier onder druk om hun doelen te halen	,707
Eigenvalue	2,461
% of variance	49,227
Crohnbach's Alpha	,742

L

Appendix L - Results

Table 1 Means table, Utiliteitsbouw and Techniek

	Mean						
	Utiliteitsbouw			Techniek			Mean
	Management levels						
Variables	Low	Middle	High	Low	Middle	High	Total
1. Trust	2.95	3.02	3.01	2.46	2.69	2.60	2.90
2. Agreements	2.94	2.86	3.05	2.60	2.87	2.57	2.88
3. Autonomy	2.99	3.04	2.94	2.88	2.74	2.93	2.93
4. Involvment	2.85	2.83	3.03	2.57	2.83	2.88	2.85
5. Tradition	2.01	2.10	2.00	2.30	1.90	2.41	2.06
6. Innovation and Flexibility	2.72	2.70	2.70	2.67	2.83	2.67	2.71
7. Clarity of Organizational Goals	2.71	2.76	2.85	2.92	2.78	2.78	2.76
8. Pressure to Produce	2.68	2.74	2.62	2.64	2.74	2.43	2.68
9. Collaboration Soft	2.99	2.86	2.95	2.56	2.90	2.63	2.89
10. Collaboration Hard	2.76	2.68	2.65	2.50	2.92	2.61	2.72

Table 2 Correlation Matrix (all cases)

Means, Standard Deviations, Correlation Matrix (all Cases) N=171

	Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1	Trust	2.90	.46	-									
2	Agreements	2.88	.53	,379**	-								
3	Autonomy	2.93	.45	,135	-,015	-							
4	Involvement	2.85	.42	,216**	,193*	,357**	-						
5	Tradition	2.06	.56	-,045	-,174*	-,161*	-,445**	-					
6	Innovation and Flexibility	2.71	.54	,099	,357**	,066	,494**	-,576**	-				
7	Clarity of Organizational Goals	2.76	.54	,171*	,197*	,081	,559**	-,316**	,537**	-			
8	Pressure to Produce	2.68	.43	,013	-,006	-,110	-,028	-,130	,006	-,036	-		
9	Collaboration_Soft	2.89	.51	,562**	,390**	,066	,325**	-,105	,294**	,351**	-,126	-	
10	Collaboration_Hard	2.72	.50	,444**	,395**	-,063	,327**	-,244**	,450**	,396**	,021	,649**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3 Intraclass Correlation Coefficients and Rwg (j) calculations

Intraclasse Correlation Coefficient and Rwg(j) calcultation

Operating Company	Office location	Autonomy	Involvement	Tradition	Innovatie	Clarity	Pressure	Rwg_un	Rwg_ss
Ubouw	**Totaal**	**0,676**	**0,772**	**0,749**	**0,752**	**0,875**	**0,738**		
	Noord	0,665	0,866	0,83	0,791	0,753	0,575	**.94**	**.91**
	Oost	-0,682	0,841	0,941	0,665	0,905	0,705	**.99**	**.98**
	Arnhem	0,715	0,707	0,527	0,412	0,709	0,806	**.90**	**.85**
	Amsterdam	0,317	0,85	0,557	0,545	0,938	0,632	**.95**	**.93**
	Den Haag	0,749	0,689	0,246	0,828	0,761	0,607	**.90**	**.85**
	Rotterdam	0,666	0,84	0,906	0,538	0,923	0,877	**.92**	**.87**
	Utrecht	0,756	0,647	0,447	0,669	0,767	0,799	**.88**	**.82**
	Maastricht	0,725	0,686	0,839	-0,988	0,863	0,457	**.84**	**.77**
	Grote Projecten	0,68	0,802	0,845	0,843	0,952	0,659	**.90**	**.85**
	Eindhoven	0,875	0,32	0,706	0,835	0,671	0,572	**.88**	**.81**
	Noordwest	0,753	0,691	0,512	0,842	0,934	0,67	**.89**	**.84**
Techniek	**Totaal**	**0,667**	**0,808**	**0,875**	**0,857**	**0,899**	**0,759**		
	Noordoost	0,881	0,667	0,889	0,544	0,952	0	**.59**	**.39**
	Oost	0,161	0,593	-0,07	0,756	0,833	0,657	**.94**	**.91**
	Zuidoost	0,422	0,511	0,705	0,464	0,492	0,329	**.93**	**.89**
	Noordwest	0,465	0,853	0,855	0,758	0,948	0,192	**.91**	**.87**
	West	0,741	0,692	0,749	0,859	0,929	0,851	**.94**	**.91**
	Midden	0,374	0,87	0,846	0,886	0,563	0,811	**.97**	**.95**
	Industrie	0,745	0,911	0,889	0,171	0,933	0,923	**.90**	**.84**
Totaal		0,69	0,782	0,798	0,791	0,881	0,742	-	-

Table 4 Result of Regression Analysis with Dependent Variable: Soft Collaboration and Hard Collaboration (n= Full BAM)

Dependent Variable	Soft Collaboration	Hard Collaboration
	β	β
Step 1: Controls		
Autonomy	-0,032	-0,13
Involvement	0,109	0,08
Tradition	0,088	0,01
Pressure to Produce	-0,087	0,04
Step 2: Main Effects		
Trust	0,46***	0,34***
Agreements	0,14†	0,13†
Clarity of Organizational Goals	0,16*	0,16†
Innovations and Flexibility	0,13	0,28*
Step 3: Linear Interaction		
Agreements X Innovations and Flexibility	0,30*	-0,13
Step 4: Non-Linear Effects		
Agreements X Innovations and Flexibility X Clarity of Organizational Goals	0,40**	0,26†

† p<.10
* p<.05
** P<.01
*** P<.001

Table 5 Linear Two-way Interaction of Office level Innovation and Flexibility on Agreements made - Soft Collaboration (n=Full BAM)

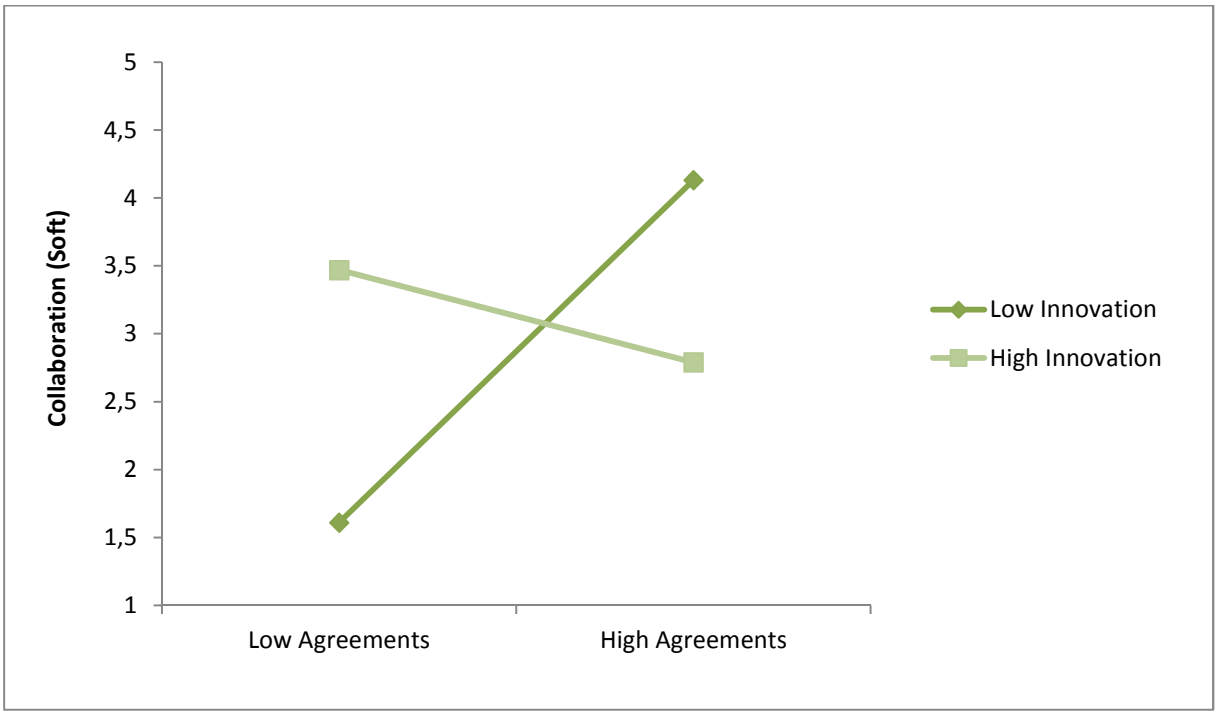


Table 6 Linear Three-way Interaction of Office level Innovation and Flexibility X Clarity of Organizational Goals X Agreements - Soft Collaboration (n=Full BAM)

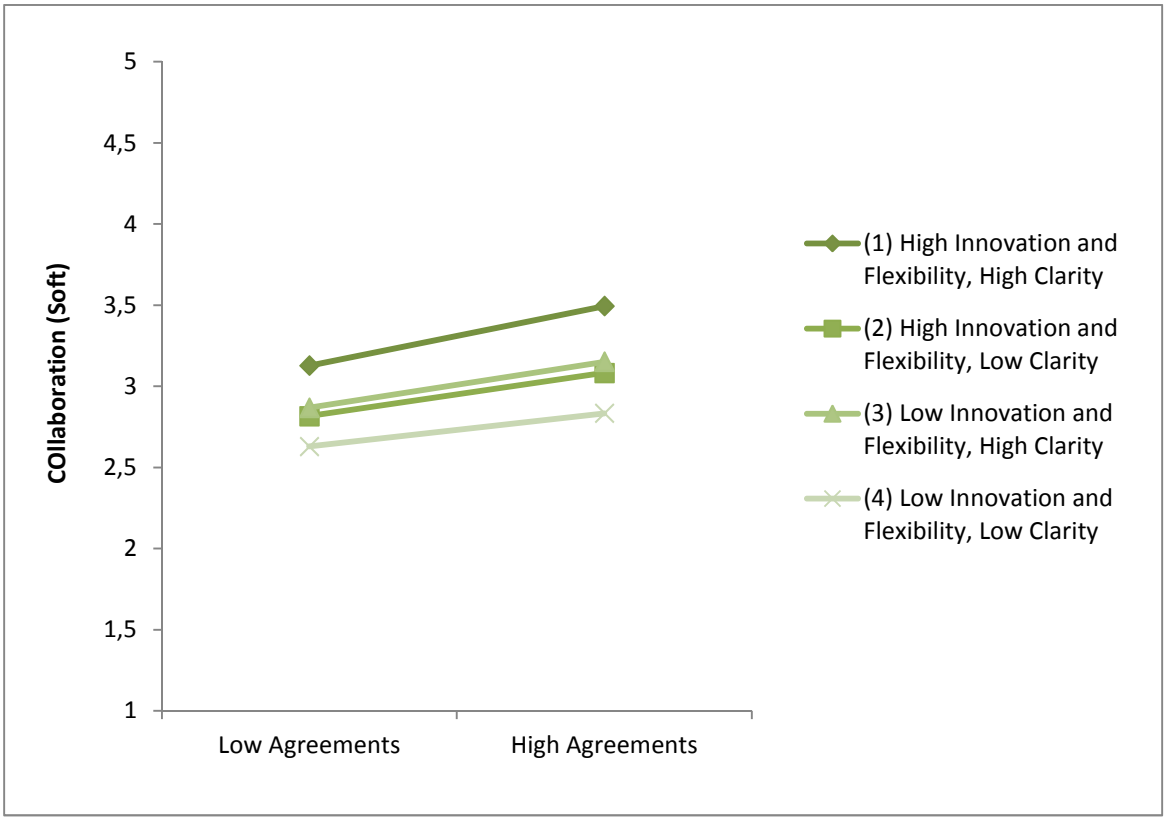
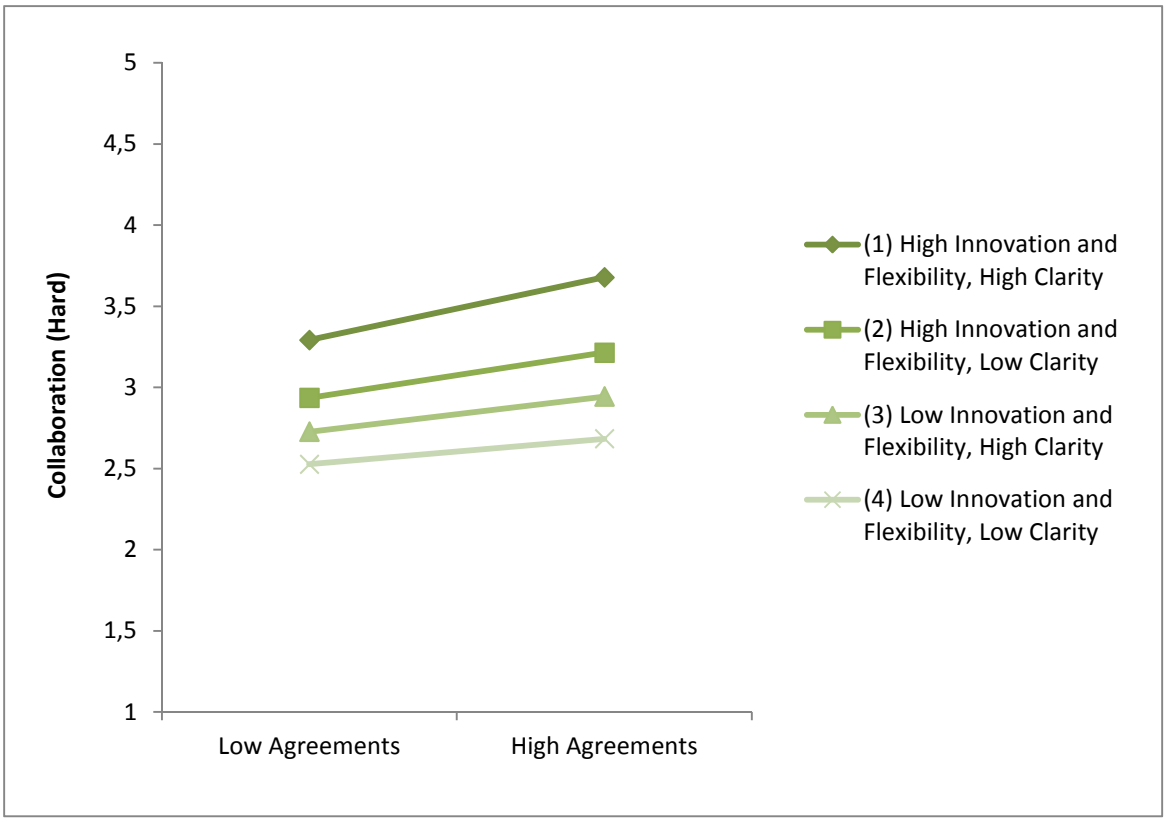


Table 7 Linear Three-way interaction of Office level of Innovation and Flexibility X Clarity of Organizational Goals X Agreements made - Hard Collaboration (n=Full BAM)



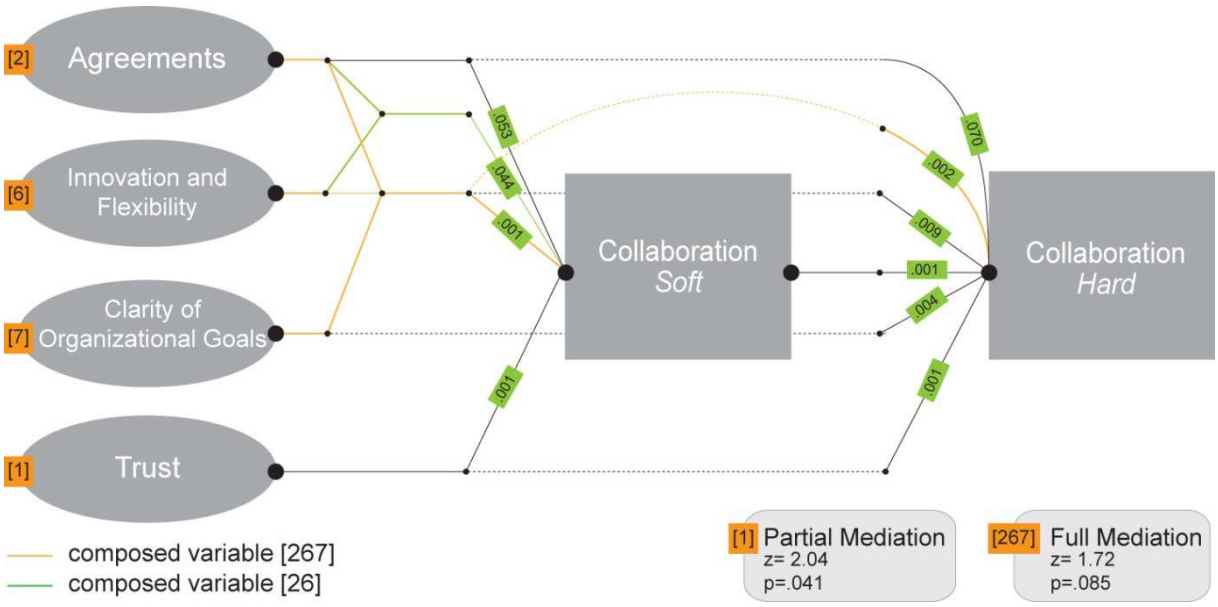


Figure 1 Research Model including Direct and Moderating Effects on Soft and Hard Collaboration (n=Full BAM)

Table 8 Correlation Matrix (N=BAM Utiliteitsbouw)

Table 1 **Means, Standard Deviations, Correlation Matrix (Only BAM Utiliteitsbouw cases) N=125/N=116**

	Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1	Trust	3.00	.43	-									
2	Agreements	2.93	.51	,339**	-								
3	Autonomy	3.01	.42	,109	,008	-							
4	Involvement	2.88	.39	,196*	,222*	,252**	-						
5	Tradition	2.06	.50	,033	-,152	-,108	-,294**	-					
6	Innovation and Flexibility	2.70	.39	,082	,280**	-,038	,466**	-,468**	-				
7	Clarity of Organizational Goals	2.76	.53	,200*	,188*	-,022	,533**	-,151	,443**	-			
8	Pressure to Produce	2.69	.43	,005	-,155	-,112	-,024	-,161	-,022	-,065	-		
9	Collaboration_Soft	2.91	.49	,605**	,441**	-,013	,355**	,054	,263**	,341**	-,150	-	
10	Collaboration_Hard	2.69	.47	,527**	,358**	-,121	,309**	-,079	,380**	,362**	-,089	,645**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 9 Correlation Matrix (N=BAM Techniek)

	Table 1	**Means, Standard Deviations, Correlation Matrix (Only BAM Techniek cases) N=47/N=42**										
	Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1	Trust	2.64	.46	-									
2	Agreements	2.77	.57	,405**	-								
3	Autonomy	2.74	.46	-,094	-,179	-							
4	Involvement	2.78	.49	,190	,114	,526**	-						
5	Tradition	2.07	.71	-,180	-,240	-,262	-,684**	-					
6	Innovation and Flexibility	2.75	.53	,201	,560**	,302*	,563**	-,735**	-				
7	Clarity of Organizational Goals	2.76	.55	,147	,243	,339*	,630**	-,629**	,729**	-			
8	Pressure to Produce	2.64	.43	-,033	,360*	-,173	-,054	-,075	,070	,042	-		
9	Collaboration_Soft	2.82	.55	,496**	,255	,188	,254	-,431**	,388*	,393*	-,067	-	
10	Collaboration_Hard	2.80	.57	,486**	,527**	,130	,383*	-,537**	,561**	,467**	,272	,698**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 10 Results of Regression Analyses with Dependent Variable: Soft Collaboration and Hard Collaboration (n=BAM Techniek)

Table Regression variables, Techniek

Dependent Variable	**Soft Collaboration**	**Hard Collaboration**
	β	**β**
Step 1: Controls		
Autonomy	-,008	-,082
Pressure to Produce	-,084	,048
Involvement	,108	,018
Step 2: Main Effects		
Trust	,516***	,485***
Agreements	,237**	,107
Innovation and Flexibility	,136	,257*
Clarity of Organizational Goals	,305*	,093
Soft Collaboration	-	,409***
Step 3: Linear Interaction		
Involvement	-,204**	-,034
Tradition	-,219**	-,191†

†	p<.10
*	p<.05
**	P<.01
***	P<.001

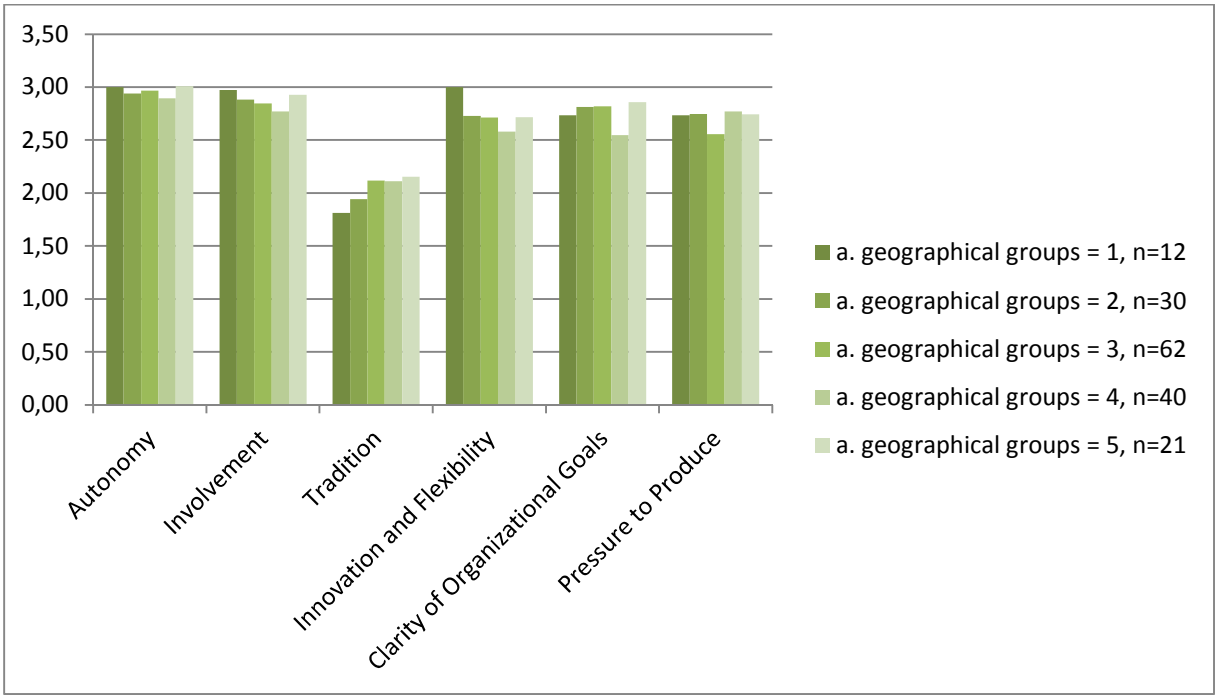
Table 11 Results of Regression Analyses with dependent Variables: Soft Collaboration and Hard Collaboration (n= BAM Utiliteitsbouw)

Table Regression variables, Utiliteitsbouw

Dependent Variable	Soft Collaboration β	Hard Collaboration β
Step 1: Controls		
Autonomy	-,032	-,082
Pressure to Produce	-,087	,048
Innovation and Flexibility	,115	,001
Step 2: Main Effects		
Trust	,413***	,312*
Agreements	,014	,276†
Clarity of Organizational Goals	,312*	,233
Soft Collaboration	-	,537***
Step 3: Linear Interaction		
Involvement	,154*	,052
Tradition	,175*	,084

† p<.10
* p<.05
** P<.01
*** P<.001

Table 12 Historgram of Organizational Climate profiles of groups based on geographical factors



M

Appendix M - Case Studies

Profiles

In this chapter the profiles of the offices of BAM Utiliteitsbouw and BAM Techniek will be showed. These are composed by taken the mean of all of the most important variables for this company, and making them understandable by plotting them in a spin diagram. Within these diagrams, no big differences can be spotted right away. When these diagrams are combined in one overview, the differences show more prominently.

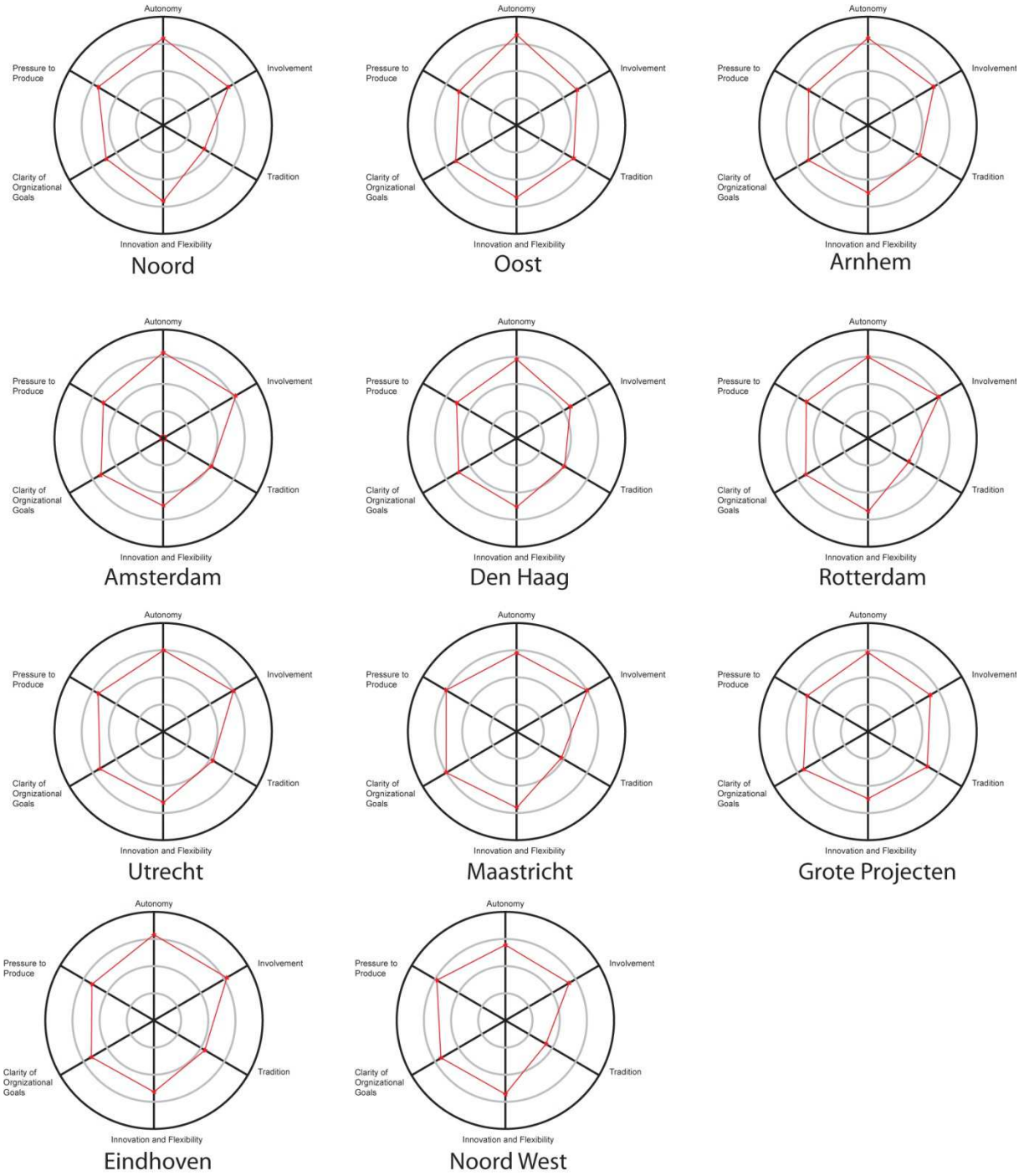


Figure 1 All different Organizational Climate profiles of the BAM Utiliteitsbouw offices (own ill., 2013)

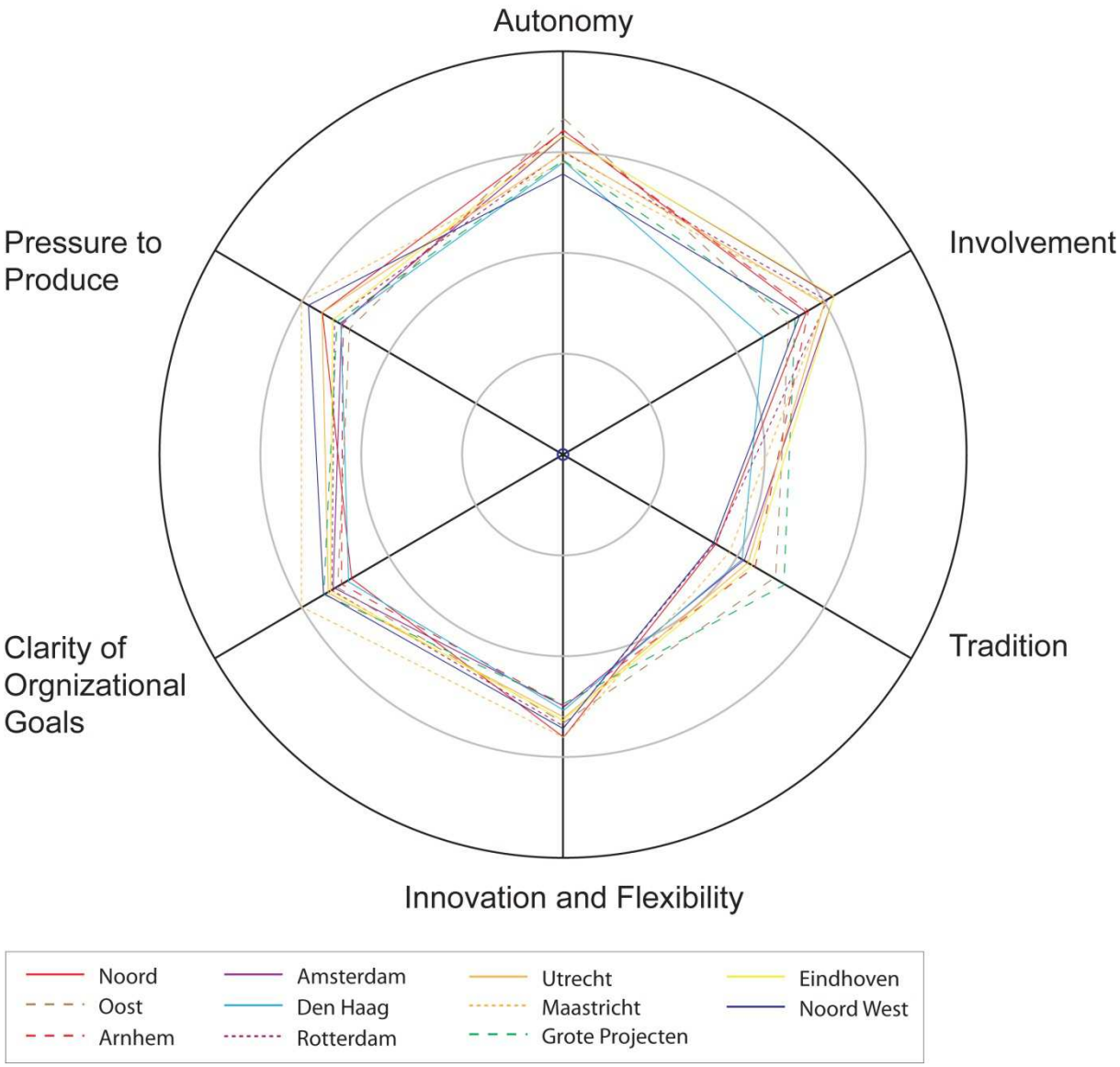


Figure 2 All different Organizational Climate profiles of BAM Utiliteitsbouw combined (own ill., 2013)

Figure 2 shows all the different offices of BAM Utiliteitsbouw in one figure. The lines show that on all the variables, the distribution of the data is almost the same. Except for the variables Tradition and Involvment, they show the largest distribution. Also interesting is that the variable of Innovation and Flexibility is very centered, but not very high. Also the variable of Clarity of Organizational Goals (except for one outlier) seems to be very centered around 2.5. However, when conducting a ICC, like was done for the regression analysis in chapter 5, it could be seen that the intraclass correlations (ICC) were consistent enough to view the group Utiliteitsbouw as one group. This is why it is no surprise that no real significant differences can be spotted within this group of offices.

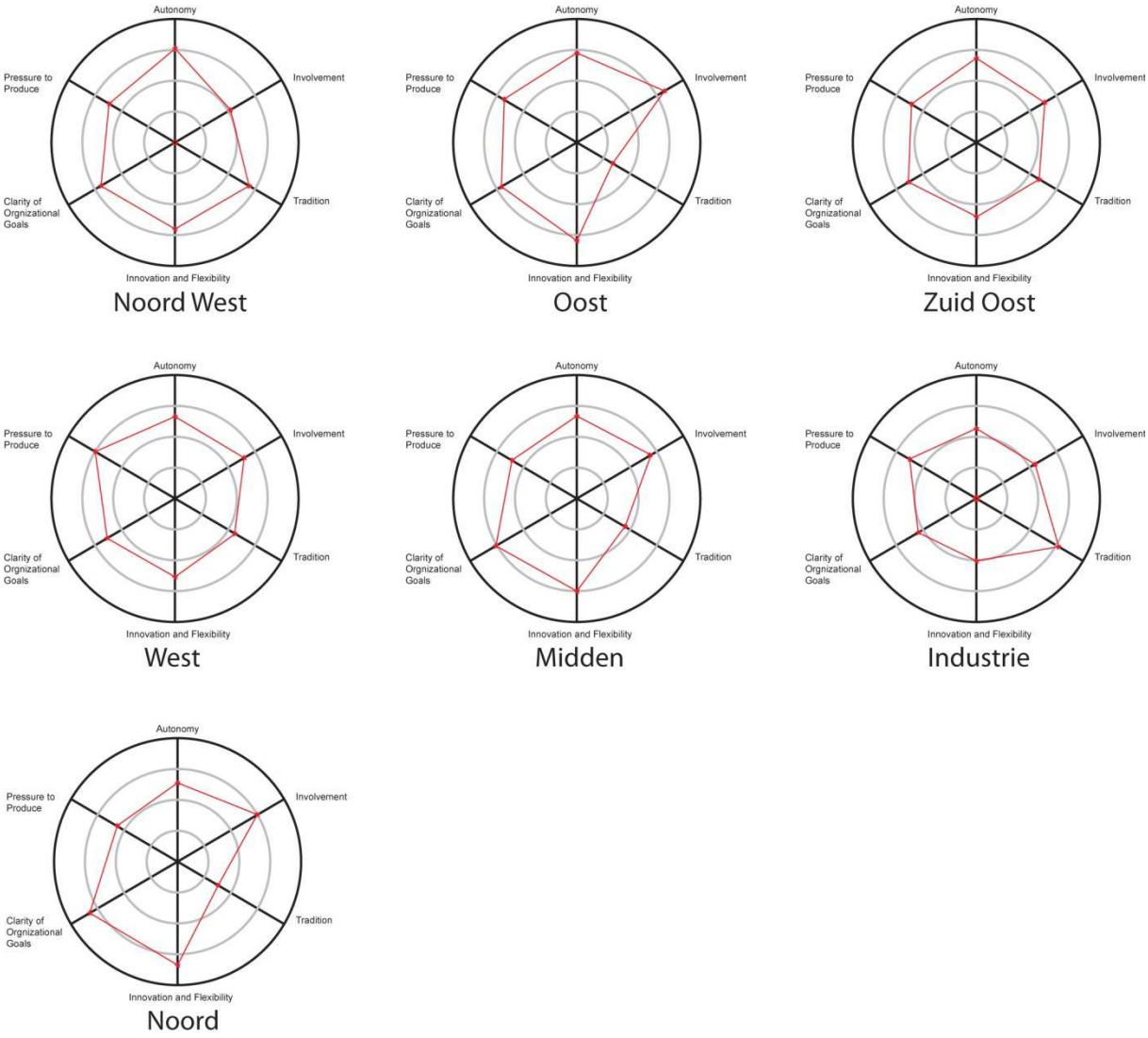


Figure 3 All different Organizational Climate profiles of the BAM Techniek offices (own ill., 2013)

Here all the different offices of BAM Techniek are shown. Just like for BAM Utiliteitsbouw, the intraclass correlation showed that the interrater consistency within the group BAM Techniek was consistent enough to view them as one group. Thus, large deviations were not expected when we view these profiles in one figure.

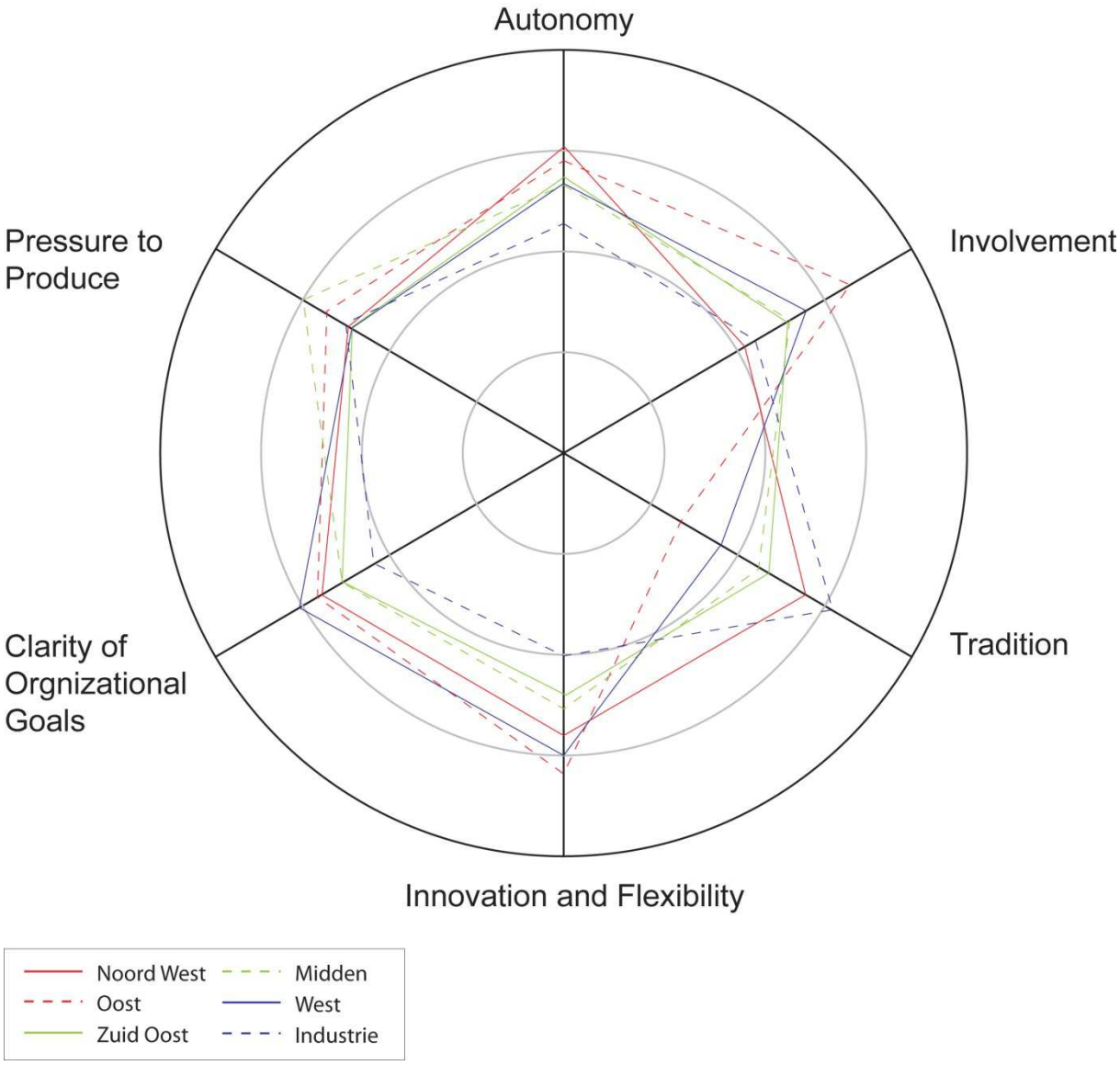


Figure 4 All different Organizational Climate profiles of BAM Techniek combined (own ill., 2013)

Analysis between BAM Utiliteitsbouw and BAM Techniek on Organizational Climate differences
Conducting a Mann-Whitney test between the groups BAM Utiliteitsbouw and BAM Techniek, shows that actually, not many siginificant differences between these groups exists. The only prominent and significant difference is the factor Autonomy.

Distribution of data for Utiliteitsbouw
The level of Autonomy for Utiliteitsbouw D(123)=.16, p<.001, which means it is significantly not normally distributed. The level of Involvement, for Utiliteitsbouw D(123)=.14, p<.002, which means it is significantly non-normally distributed. The level of Tradition, for Utiliteitsbouw D(123)=.67 , p<.001, which means it is significantly not normally distributed. The level of Innovation and Flexibility, for Utiliteitsbouw D(123)=.14, p<.001, which means it is significantly not normally distributed. The level of Clarity of Organizational Goals, for Utiliteitsbouw D(123)=.15, , p<.001, which means it is significantly not normally distributed. The level of Pressure to Produce, for Utiliteitsbouw D(123)=.11 , p<.001, which means it is significantly not normally distributed. This means all factors are non-normally distributed and a non-parametric test is in order.
Non-normally distributed: Autonomy, Involvement, Tradition, Clarity of Organizational Goals, Innovation and Flexibility and Pressure to Produce.

Distribution of data for Techniek

The level of Autonomy, for Techniek D(48)=.13, *ns,* which means it is normally distributed. The level of Involvement, for Techniek D(48)=.08, *ns*, which means it is normally distributed. The level of Tradition for Techniek D(48)=.11, *ns,* which means it is normally distributed. The level of Innovation and Flexibility for Techniek D(48)=.11, *ns,* which means it is normally distributed. The level of Clarity of Organizational Goals for Techniek D(48)=.20, , *p*<.013*,* which means it is not normally distributed. The level of Pressure to Produce for Techniek D(48)=.28, *p*<.05*,* which means it is not normally distributed.

Normally distributed: Autonomy, Involvement, Tradition, Innovation and Flexibility Tradition,. Non-normally distributed: Clarity of Organizational Goals and Pressure to Produce.

Mann-Whitney test

Autonomy in Utiliteitsbouw (Mdn=3.00) did differ significantly from Techniek (Mdn=2.80), U=2000, z= -3.266, *p*<.001*,* r= -.25. But this is a small size effect. Involvement in Utiliteitsbouw (Mdn=3.00) did not differ significantly from Techniek (Mdn=2.83), U=2578, z= -.1.25, *ns,* r= -.10. Tradition in Utiliteitsbouw (Mdn=2.00) did not differ significantly from Techniek (Mdn=2.00), U=2921.5, z= -.056, *ns,* r= -.00. Just like Innovation and Flexibility in Utiliteitsbouw (Mdn=2.67) did not differ significantly from Techniek (Mdn=2.67), U=2785, z= -.53, *ns,* r= -.04. Clarity of Organizational Goals in Utiliteitsbouw (Mdn=2.80) did not differ significantly from Techniek (Mdn=3.00), U=2814, z= -.43, *ns,* r= -.03. And Pressure to Produce in Utiliteitsbouw (Mdn=2.80) however did differ significantly from Techniek (Mdn=2.60), U=2641, z= -1.03, *ns,* r= -.08. This means that there is one significant difference in Organizational Climate, namely a small size effect different in Autonomy.

This means that for one of the sub-questions (*What are the differences in organizational climate between collaborating subsidiaries within one holding, in the Netherlands?)* the answer is that there is only a small size effect on one of the factors which are most important for the construction industry in the Netherlands. This means that the difference in Organizational Climate is very small.

Collaborations

To take a look closer, we will elaborate on the collaborations between the different offices of BAM Techniek and BAM Utiliteitsbouw. This case study will be executed in order to formulate an answer to Hypothesis 1: *When collaboration partners are more compatible (more alike) on the area of organizational climate, the degree of collaboration will be higher.* In order to come to an answer, it is important something can be said about the differences in organizational climate, and to say something about the degree of collaboration. To do this, a Mann-Whitney test will be conducted in order to conclude whether there are significant differences in Organizational Climate factors. Also, this test will be executed in order to be able to conclude whether the mean of the total group of the collaboration can be used as an indication of the degree of Collaboration. Before the Mann-Whitney test is executed, the data will be assessed, whether it is normally distributed or not. For non-normally distributed, a non-paramatric test like the Mann-Whitney test should be used. Besides this Mann-Whitney analysis, the mean standard deviation of all Organizational Climate factors will be used for profiling.

Collaboration Utiliteitsbouw Noordwest and Techniek Noordwest

The office of Utiliteitsbouw Noordwest is in Amsterdam, and the office of Techniek Noordwest is in Benningbroek. Figure 5 is based on the mean of the organizational climate factors of the entire office.

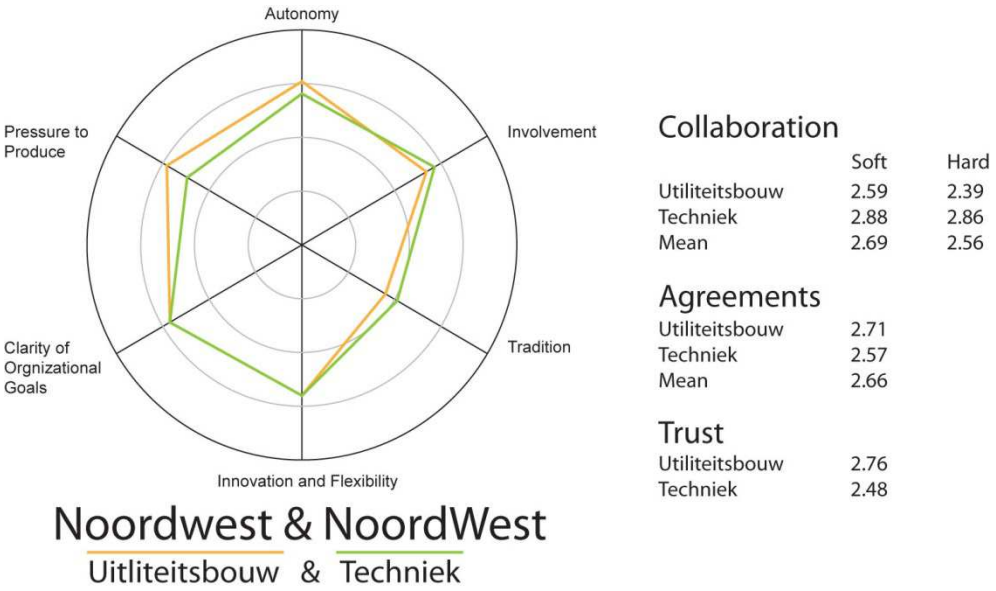


Figure 5 Organizational Climate profile (based on mean) of the collaboration between office Utiliteitsbouw Amsterdam and Techniek Noordwest (own ill., 2013)

When we take a look at this particular case, on organizational climate alone they look quite the match. Looking at the statistics of table 1, it can be noted that mean standard deviation between the individuals of both offices is .42.

Table 1 Descriptives of the collaboration 1

	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Autonomy	3,12	0,10	0,43
Involvement	3,03	0,08	0,35
Tradition	1,84	0,11	0,51

Innovation and Flexibility	2,78	0,10	0,46
Clarity of Organizational Goals	2,76	0,09	0,39
Pressure to Produce	2,64	0,09	0,38
Mean	2,69	0,09	0,42

Collaboration 1(Amsterdam and Noordwest), n=20

Distribution of data

In order to execute a Mann-Whitney test, first it needs to be determined whether the data is normally distributed or not.

Distribution of data for Utiliteitsbouw Noordwest

The level of Autonomy for Utiliteitsbouw Noordwest D(11)=.17, *ns,* which means it is normally distributed. The level of Involvement, for Utiliteitsbouw Noordwest D(11)=.21, *ns,* which means it is normally distributed. The level of Tradition, for Utiliteitsbouw Noordwest D(11)=.28, *ns*, which means it is normally distributed. The level of Innovation and Flexibility, for Utiliteitsbouw Noordwest D(11)=.21, *ns*, which means it is normally distributed. The level of Clarity of Organizational Goals, for Utiliteitsbouw Noordwest D(11)=.21, *ns,* which means it is normally distributed. The level of Pressure to Produce, for Utiliteitsbouw Noordwest D(11)=.28, *ns,* which means it is normally distributed.

Normally distributed: Autonomy, Involvement, Clarity of Organizational Goals, Tradition, Innovation and Flexibility Pressure to Produce.

Distribution of data for Techniek Noordwest

The level of Autonomy, for Techniek Noordwest D(6)=.20, *ns,* which means it is normally distributed. The level of Involvement, for Techniek Noordwest D(6)=.20, *ns*, which means it is normally distributed. The level of Tradition for Techniek Noordwest D(6)=.26, *ns,* which means it is normally distributed. The level of Innovation and Flexibility for Techniek Noordwest D(6)=.14, *ns,* which means it is normally distributed. The level of Clarity of Organizational Goals for Techniek Noordwest D(6)=.21, *ns ,* which means it is normally distributed. The level of Pressure to Produce for Techniek Noordwest D(6)=.28, $p<.03$, which means it is not normally distributed.

Normally distributed: Autonomy, Involvement, Tradition, Innovation and Flexibility Tradition, Clarity of Organizational Goals. Non-normally distributed: Pressure to Produce

Mann-Whitney tests for the collaboration

We carry out these tests in order to establish whether there is a difference in organizational climate between the two collaboration offices, and what the size of this difference is. This will be done for the Organizational Climate factors, but also for the factors Trust, Agreements and the two Collaboration factors, this to establish whether we can use the factors as one.

Autonomy in Utiliteitsbouw Noordwest (Mdn=2.80) did not differ significantly from Techniek Noordwest (Mdn=3.00), U=30, z= -1.02, *ns,* r= -.23. Also Involvement in Utiliteitsbouw Noordwest (Mdn=3.00) did not differ significantly from Techniek Noordwest (Mdn=2.67), U=33.5, z= -.73, *ns,* r= -.17. Tradition in Utiliteitsbouw Noordwest (Mdn=2.00) did not differ significantly from Techniek Noordwest (Mdn=2.25), U=27, z= -1.31, *ns,* r= -.30. Just like Innovation and Flexibility in Utiliteitsbouw Noordwest (Mdn=2.83)

did not differ significantly from Techniek Noordwest (Mdn=2.75), U=40.5, z= -.13, *ns,* r= -.03. Clarity of Organizational Goals in Utiliteitsbouw Noordwest (Mdn=2.60) did not differ significantly from Techniek Noordwest (Mdn=2.90), U=37, z= -43, *ns,* r= -10. And Pressure to Produce in Utiliteitsbouw Noordwest (Mdn=2.80) however did differ significantly from Techniek Noordwest (Mdn=2.50), U=14.5, z= -2.38, *p*<0.02*,* r= -.55. This means that there is one significant difference in Organizational Climate, namely a large size effect different in Pressure to Produce.

Trust is another factor which is should be assed. Just like Agreements, Collaboration Soft and Collaboration Hard. Trust in Utiliteitsbouw Noordwest (Mdn=2.71) did differ significantly from Techniek Noordwest (Mdn=2.36), U=28, z= -1.19, *ns,* r= -.27. But agreements in Utiliteitsbouw Noordwest (Mdn=2.60) did not differ significantly from Techniek Noordwest (Mdn=2.40), U=24, z= -.95, *ns,* r= -.22. Collaboration Soft in Utiliteitsbouw Noordwest (Mdn=2.75) did not differ significantly from Techniek Noordwest (Mdn=3.00), U= 20, z= -.1.33, *ns,* r= -.31. And Collaboration Hard in Utiliteitsbouw Noordwest (Mdn=2.5) did also not differ significantly from Techniek Noordwest (Mdn=2.83), U=15.5, z= -1.78, *ns,* r= -.71. This means that there is no difference in the way Utiliteitsbouw and Techniek asses the Collaboration, the Agreements that are made and the integrity of the other partner.

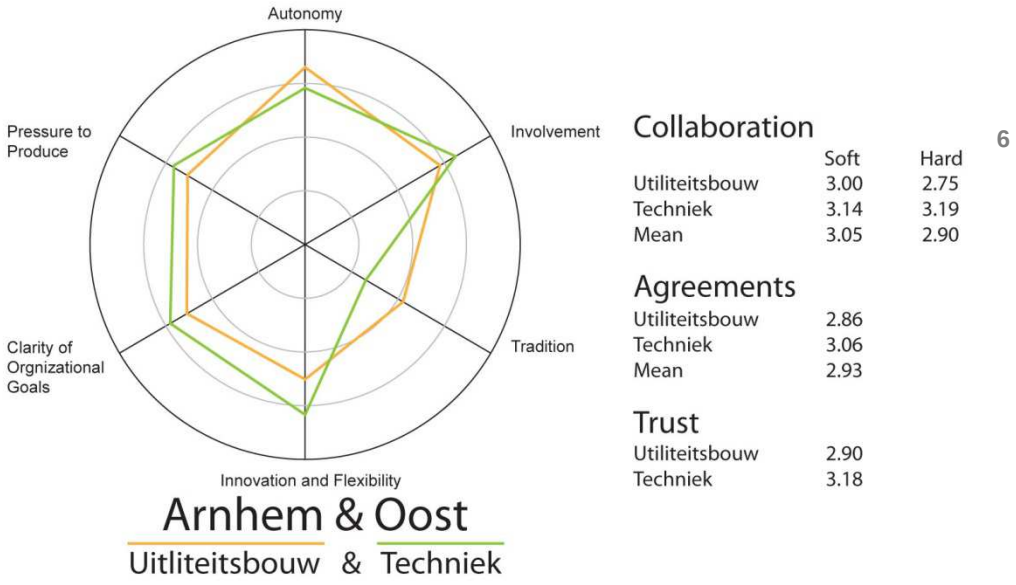
This means for the analysis of hypothesis one, that for this collaboration, no significant differences can be spotted in the Organizational Climate. The factors for Collaboration and Agreements are also not different and thus, the mean will be used to assess the situation. Since in the model, the end variable is Hard Collaboration, this is the variable that will be used as input for the hypothesis.

Significant differences: 1
Soft Collaboration mean: 2.69
Hard Collaboration mean: 2.56
Agreements mean: 2.66

Collaboration Arnhem and Oost

The office of Utiliteitsbouw Arnhem is in Arnhem, and the office of Techniek Oost is in Apeldoorn. Figure 6 is based on the mean of the organizational climate factors of the entire office.

Figure 6



Organizational Climate profile of the collaboration between office Utiliteitsbouw Arnhem and Techniek Oost (own ill., 2013)

The case of the offices of Utiliteitsbouw Arnhem and Techniek Oost looks a little different. Here the most striking differences in Organizational Climate are the variables Involvement, Tradition and Innovation & Flexibility. Both Soft and Hard collaboration are valued high according to both Utiliteitsbouw and Techniek. There is very little difference in the way these different offices value the collaboration. This can also be seen by Agreements and Trust. The level of Trust is quite high. Interesting here is that Techniek seems to value the integrity of their collegues of Utiliteitsbouw higher than the other way around. Something that is remarkable is the high value of Techniek Oost for the variable Innovation and Flexibility. No other office shows a this high result. This could also be an explanation for the high Collaboration rate. However, when we look at the mean standard deviation (see table 2) over all the different organizational climate factors it can be noted that this is .44, which is higher than other collaborations. However, for a more solid statement a Mann-Whitney test need to be executed.

Table 2 Descriptives of the collaboration 2

	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Autonomy	2,94	0,08	0,37
Involvement	2,74	0,08	0,41
Tradition	2,11	0,08	0,38
Innovation and Flexibility	2,60	0,10	0,51
Clarity of Organizational Goals	2,54	0,12	0,58
Pressure to Produce	2,83	0,09	0,43
Mean	2,63	0,09	0,44

Collaboration 2 (Arnhem and Oost), n=24

Distribution of data

In order to execute a Mann-Whitney test, first it needs to be determined whether the data is normally distributed or not.

Distribution of data for Utiliteitsbouw Arnhem

The percentage of Autonomy for Utiliteitsbouw Arnhem D(13)=.24, p<0.02, which means it is significantly non-normal. The percentage of Involvement, for Utiliteitsbouw Arnhem D(13)=.23, *ns,* which means it is normally distributed. The percentage of Tradition, for Utiliteitsbouw Arnhem D(13)=.26, p<0.03, which means it is significantly non-normal. The percentage of Innovation and Flexibility, for Utiliteitsbouw Arnhem D(13)=.28, p<0.01, which means it is significantly non-normal. The percentage of Clarity of Organizational Goals, for Utiliteitsbouw Arnhem D(13)=.14, *ns,* which means it is normally distributed. The percentage of Pressure to Produce, for Utiliteitsbouw Arnhem D(13)=.26, *p*,.001*,* which means it is not normally distributed.

Normally distributed: Involvement, Innovation and Flexibility, Clarity of Organizational Goals. Non-normally distributed: Autonomy, Tradition, Pressure to Produce

Distribution of data for Techniek Oost

The percentage of Autonomy, for Techniek Oost D(7)=.17, *ns,* which means it is normally distributed. The percentage of Involvement, for Techniek Oost D(7)=.19, ns, which means it is normally distributed. The percentage of Tradition for Techniek Oost D(7)=.35, *p*<.01*,* which means it is not normally distributed. The percentage of Innovation and Flexibility for Techniek Oost D(7)=.19, *ns,* which means it is normally distributed. The percentage of Clarity of Organizational Goals for Techniek Oost D(7)=.44, *p*<.01*,* which means it is significantly not normally distributed. The percentage of Pressure to Produce for Techniek Oost D(7)=.18, *ns,* which means it is normally distributed.

Normally distributed: Autonomy, Involvement, Tradition, Innovation and Flexibility, Pressure to Produce. Non-normally distributed: Tradition, Clarity of Organizational Goals

Mann-Whitney tests for collaboration

We carry out these tests in order to establish whether there is a difference in orgazational climate between the two collaboration offices, and what the size of this difference is. This wil be done for the Organizational Climate factors, but also for the factors Trust, Agreements and the two Collaboration factors, this to establish whether we can use the factors as one.

Autonomy in Utiliteitsbouw Arnhem (Mdn=3.00) did not differ significantly from Techniek Oost (Mdn=3.00), U=29, z= -1.33, *ns,* r= -.30. But ,Involvement in Utiliteitsbouw Arnhem (Mdn=3.00) did differ significantly from Techniek Oost (Mdn=3.33), U=20, z=-2.05, *p*<.05*,* r=--.46. Also, tradition in Utiliteitsbouw Arnhem (Mdn=2.25) differed significantly from Techniek Oost (Mdn=1.15), U=4, z=-3.36, *p*<.001*,* r= -.75. Just like Innovation and Flexibility in Utiliteitsbouw Arnhem (Mdn=2.50) did differ significantly from Techniek Oost (Mdn=3.16), U=11, z= -2.76, *p*<005*,* r= -.62. Clarity of Organizational Goals in Utiliteitsbouw Arnhem (Mdn=2.80) did not differ significantly from Techniek Oost (Mdn=3.00), U=23.5, z= -1.80, *ns,* r=-.40. Pressure to Produce in Utiliteitsbouw Arnhem (Mdn=2.60) did not differ significantly from Techniek Oost (Mdn=2.80), U=31.5, z=-1.4, *ns,* r= -.25. This means that three significant differences can be spotted in Organizational Climate between these collaborating offices. Involvement (medium effect size), Tradition (large effect size) Innovation and Flexibility (large effect size)

Trust is another factor which is should be assed. Just like Agreements, Collaboration Soft and Collaboration Hard. Trust in Utiliteitsbouw Arnhem (Mdn=3.00) did differ significantly from Techniek Oost (Mdn=3.15), U=22, z= -1.90, *ns,* r= -.42. But agreements in Utiliteitsbouw Arnhem (Mdn=2.80)

did not differ significantly from Techniek Oost (Mdn=3.00), U=34, z= -.94, *ns,* r= -.21. Collaboration Soft in Utiliteitsbouw Arnhem (Mdn=3.00) did not differ significantly from Techniek Oost (Mdn=3.00), U= 34.5, z= -.92, *ns,* r= -.20. And Collaboration Hard in Utiliteitsbouw Arnhem (Mdn=2.83) did also differs significantly from Techniek Oost (Mdn=3.16), U=12, z= -2.71, *p*<0.06*,* r= -.61. This means that there is a difference in the way Techniek Oost and Utiliteitsbouw West assessed the Hard Collaboration (large size effect). We will still take the mean of collaboration hard as an input variable for this analysis, but it need to be kept in mind that there is a difference in the way Utiliteitsbouw and Techniek assess the hard factors of the current collaboration.

This means for the analysis of hypothesis one, that for this collaboration, no significant differences can be spotted in the Organizational Climate. The factors for Collaboration and Agreements are also not different and thus, the mean will be used to assess the situation.

Significant differences: 3
Soft Collaboration mean: 3.05
Hard Collaboration mean: 2.90
Agreements mean: 2.93

Collaboration Den Haag en West

The office of Utiliteitsbouw Den Haag is in Den Haag, and the office of Techniek West is also in Den Haag, even in the same building. Figure 7 is based on the mean of the organizational climate factors of the entire office.

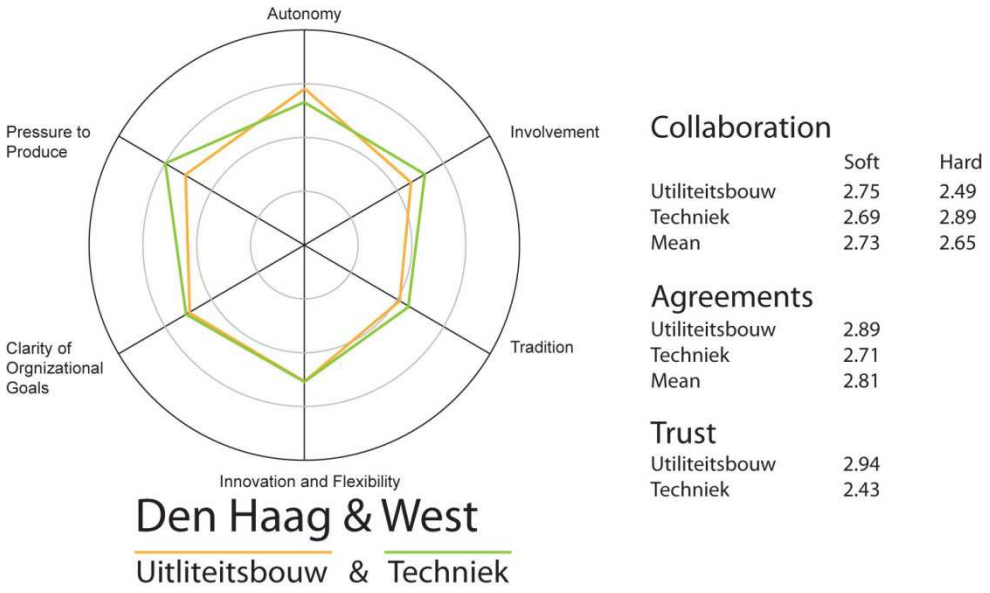


Figure 7 Organizational Climate profile of the collaboration between office Utiliteitsbouw Den Haag and Techniek West (own ill., 2013)

This collaboration has also been observed from close inside the organization. This data shows a relative similar profile for Organizational Climate. As an observer, I would expect a large difference in the variables of tradition and Innovation and Flexibility. This does not at all show in the data. The office of Techniek West has values the statements about the integrity of Utiliteitsbouw Den Haag as particularly low. Since this is <2.5, is means that most employees of BAM Techniek even distrust employees of Utilieitsbouw. When a look is taken at some of the variables of the Organizational Climate, it can be seen that two of the most important variables (Innovation & Flexibility and Clarity of Organizational Goals) are rather low. The regression analysis also showed a positive regression on both of these variables in combination with the variable Agreements. Table 3 shows the mean of the standard deviations of all the Organizational Climate factors. The standard mean of the deviation is

.40, which is the lowest of all the collaborations. However, to make a conclusive statement on Hypothesis 1, a Mann-Whitney test should be executed.

Table 3 Descriptive of collaboration 3

	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Autonomy	2,93	0,10	0,42
Involvement	2,91	0,08	0,35
Tradition	1,95	0,09	0,40
Innovation and Flexibility	2,85	0,09	0,38
Clarity of Organizational Goals	2,91	0,08	0,34
Pressure to Produce	2,40	0,12	0,51
Mean	2,66	0,09	0,40

Collaboration 3, n=19

Distribution of data

Before a Mann-Whitney test can be executed, the data must be assessed.

Distribution of data for Utiliteitsbouw Den Haag

The percentage of Autonomy for Utiliteitsbouw Den Haag D(14)=.20, p<0.03, which means it is significantly non-normal. The percentage of Involvement, for Utiliteitsbouw Den Haag D(14)=.20, *ns,* which means it is normally distributed. Tradition: The percentage of Tradition, for Utiliteitsbouw Den Haag D(14)=.23, p<0.01, which means it is significantly non-normal. The percentage of Innovation and Flexibility, for Utiliteitsbouw Den Haag D(14)=.28, p<0.01, which means it is significantly non-normal. The percentage of Clarity of Organizational Goals, for Utiliteitsbouw Den Haag D(14)=.14, *ns,* which means it is normally distributed. Pressure to Produce: The percentage of Pressure to Produce, for Utiliteitsbouw Anrhem D(14)=11, *ns,* which means it is normally distributed.

Normally distributed: Involvement, Innovation and Flexibility, Clarity of Organizational Goals, Pressure to Produce. Non-normally distributed: Autonomy, Tradition

Distribution of data for Techniek West

The percentage of Autonomy, for Techniek West D(9)=.20, *ns,* which means it is normally distributed. The percentage of Involvement, for Techniek West D(9)=.35, p<0.02, which means it is significantly non-normal. The percentage of Tradition for Techniek West D(9)=.12, *ns,* which means it is normally distributed. The percentage of Innovation and Flexibility for Techniek West D(9)=.20, *ns,* which means it is normally distributed. The percentage of Clarity of Organizational Goals for Techniek West D(9)=.18, *ns,* which means it is normally distributed. The percentage of Pressure to Produce for Techniek West D(9)=.20, *ns,* which means it is normally distributed.

Normally distributed: Autonomy, Tradition, Innovation and Flexibility, Clarity of Organizational Goals, Pressure to Produce. Non-normally distributed: Involvement

Mann-Whitney tests for the collaboration

We carry out these tests in order to establish whether there is a difference in orgazational climate between the two collaboration offices, and what the size of this difference is. This wil be done for the Organizational Climate factors, but also for the factors Trust, Agreements and the two Collaboration factors, this to establish whether we can use the factors as one.

Autonomy in Utiliteitsbouw Den Haag (Mdn=3.00) did not differ significantly from Techniek West (Mdn=2.80), U=42, z=-1.74, *ns,* r=-.344. Also ,Involvement in Utiliteitsbouw Den Haag (Mdn=2.92) did not differ significantly from Techniek West (Mdn=2.66), U=50, z=-1.27, *ns,* r=-.254. Tradition in Utiliteitsbouw Den Haag (Mdn=2.00) did not differ significantly from Techniek West (Mdn=2.25), U=66, z=-.35, *ns,* r=-.07. Just like Innovation and Flexibility in Utiliteitsbouw Den Haag (Mdn=2.66) did not differ significantly from Techniek West (Mdn=2.40), U=69.5, z=-.143, *ns,* r=-.027. Clarity of Organizational Goals in Utiliteitsbouw Den Haag (Mdn=2.60) did not differ significantly from Techniek West (Mdn=2.40), U=71, z=-.057, *ns,* r=-.01. Pressure to Produce in Utiliteitsbouw Den Haag (Mdn=2.70) did not differ significantly from Techniek West (Mdn=3.00), U=43, z=-1.66, *ns,* r=-.332. This means that no significant difference can be spotted in the organizational climate between Utiliteitsbouw Den Haag en Techniek West.

Trust is another factor which is should be assed. Just like Agreements, Collaboration Soft and Collaboration Hard. Trust in Utiliteitsbouw Den Haag (Mdn=2.92) did differ significantly from Techniek West (Mdn=2.28), U=34, z=-2.16, *p*<.03, r=.433. But agreements in Utiliteitsbouw Den Haag (Mdn=3.00) did not differ significantly from Techniek West (Mdn=2.60), U=40.5, z=-1.44, *ns,* r=-.288. Collaboration Soft in Utiliteitsbouw Den Haag (Mdn=2.75) did not differ significantly from Techniek West (Mdn=2.75), U=54.5, z=-.543, *ns,* r=-.11. And Collaboration Hard in Utiliteitsbouw Den Haag (Mdn=2.58) did also not differ significantly from Techniek West (Mdn=3.00), U=43, z=-.1.27, *ns,* r=.254. This means that there is a difference in the way Techniek West assessed the integrity of Utiliteitsbouw Den Haag, than Utiliteitsbouw assessed Techniek.

This means for the analysis of hypothesis one, that for this collaboration, no significant differences can be spotted in the Organizational Climate. The factors for Collaboration and Agreements are also not different and thus, the mean will be used to assess the situation.

Significant differences: 0
Soft Collaboration mean: 2.72
Hard Collaboration mean: 2.65
Agreements mean: 2.8

Collaboration Utrecht en Midden

The office of Utiliteitsbouw Utrecht is in Utrecht, and the office of Techniek Midden is in Veenendaal. Figure 8 is based on the mean of the organizational climate factors of the entire office.

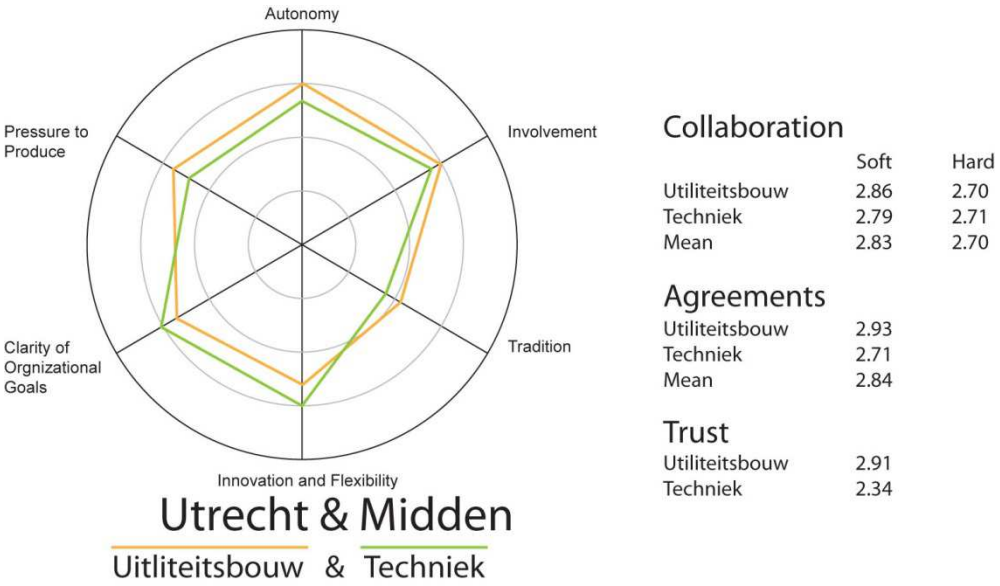


Figure 8 Organizational Climate profile of the collaboration between office Utiliteitsbouw Utrecht and Techniek Midden (own ill., 2013)

The last case that is going to be discussed is the collaboration between Utiliteitsbouw Utrecht and Techniek Midden. Again, not a very dissimilar graphic is showing regarding the Organizational Climate. Again, the office of Techniek shows quite high numbers. The value of the integrity of the other party is very low from the side of Techniek. A 2.34 average means they do not see their colleagues from Utiliteitsbouw as people with integrity. Normally this would influence the collaboration quite much. It could be an explanation that due to the high Innovation and Flexibility variable and due to the relatively high Agreements variable, this Trust issue is thereby resolved. The mean of the standard deviation of is the highest of all collaborations (.47). To make a valid statement about hypothesis 1, a Mann-Whitney test will also be executed.

Table 4 Descriptives of the collaboration 4

	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Autonomy	2,88	0,09	0,40
Involvement	2,81	0,10	0,43
Tradition	1,89	0,11	0,47
Innovation and Flexibility	2,78	0,11	0,46
Clarity of Organizational Goals	2,83	0,15	0,64
Pressure to Produce	2,78	0,09	0,38
Mean	2,66	0,11	0,47

Collaboration 4, n=19

Distribution of data

Distribution of data for Utiliteitsbouw Utrecht

The level of Autonomy for Utiliteitsbouw Utrecht D(11)=.24, p<0.02, which means it is significantly non-normal. The level of Involvement, for Utiliteitsbouw Utrecht D(11)=.23, *ns,* which means it is normally distributed. The level of Tradition, for Utiliteitsbouw Utrecht D(11)=.26, p<0.03, which means it is significantly non-normal. The level of Innovation and Flexibility, for Utiliteitsbouw Utrecht D(11)=.28, p<0.01, which means it is significantly non-normal. The level of Clarity of Organizational Goals, for Utiliteitsbouw Utrecht D(11)=.14, *ns,* which means it is normally distributed. The level of Pressure to Produce, for Utiliteitsbouw Utrecht D(11)=.26, *p*,.001*,* which means it is not normally distributed.

Normally distributed: Involvement, Clarity of Organizational Goals. Non-normally distributed: Autonomy, Tradition, Innovation and Flexibility Pressure to Produce

Distribution of data for Techniek Midden

The level of Autonomy, for Techniek Midden D(7)=.17, *ns,* which means it is normally distributed. The level of Involvement, for Techniek Midden D(7)=.19, *ns*, which means it is normally distributed. The level of Tradition for Techniek Midden D(7)=.35, *p*<.01*,* which means it is not normally distributed. The level of Innovation and Flexibility for Techniek Midden D(7)=.19, *ns,* which means it is normally distributed. The level of Clarity of Organizational Goals for Techniek Midden D(7)=.44, *p*<.01*,* which means it is significantly not normally distributed. The level of Pressure to Produce for Techniek Midden D(7)=.18, *ns,* which means it is normally distributed.

Normally distributed: Autonomy, Involvement, Tradition, Innovation and Flexibility, Pressure to Produce. Non-normally distributed: Tradition, Clarity of Organizational Goals

Mann-Whitney tests for the collaboration

We carry out these tests in order to establish whether there is a difference in organizational climate between the two collaboration offices, and what the size of this difference is. This will be done for the Organizational Climate factors, but also for the factors Trust, Agreements and the two Collaboration factors, this to establish whether we can use the factors as one.

Autonomy in Utiliteitsbouw Utrecht (Mdn=3.00) did not differ significantly from Techniek Midden (Mdn=2.80), U=31.5, z= -1.05, *ns,* r= -.24. Also Involvement in Utiliteitsbouw Utrecht (Mdn=3.00) did not differ significantly from Techniek Midden (Mdn=2.83), U=36, z= -.67, *ns,* r= -.15. Tradition in Utiliteitsbouw Utrecht (Mdn=2.25) did not differ significantly from Techniek Midden (Mdn=1.75), U=25.5, z= -1.59, *ns,* r= -.36. Just like Innovation and Flexibility in Utiliteitsbouw Utrecht (Mdn=2.67) did not differ significantly from Techniek Midden (Mdn=3.00), U=31.5, z= -1.05, *ns,* r= -.24. Clarity of Organizational Goals in Utiliteitsbouw Utrecht (Mdn=2.80) did not differ significantly from Techniek Midden (Mdn=3.00), U=26, z= -1.58, *ns,* r= -.36. And Pressure to Produce in Utiliteitsbouw Utrecht (Mdn=2.40) also did not differ significantly from Techniek Midden (Mdn=2.40), U=34.5, z= -.79, *ns,* r= -.18. This means that no significant differences in Organizational Climate between the offices Utiliteitsbouw Utrecht and Techniek Midden.

Trust is another factor which is should be assed. Just like Agreements, Collaboration Soft and Collaboration Hard. Trust in Utiliteitsbouw Utrecht (Mdn=2.86) did differ significantly from Techniek Midden (Mdn=2.29), U=9, z= -2.92, *p*<.003*,* r= -.67. But agreements in Utiliteitsbouw Utrecht (Mdn=3.00) did not differ significantly from Techniek Midden (Mdn=2.80), U=31.5, z= -.64, *ns,* r= -.14. Collaboration Soft in Utiliteitsbouw Utrecht (Mdn=3.00) did not differ significantly from Techniek Midden (Mdn=3.00), U= 36.5, z= -.19, *ns,* r= -.04. And Collaboration Hard in Utiliteitsbouw Utrecht (Mdn=2.66) did also not differ significantly from Techniek Midden (Mdn=2.66), U=38, z= -.046, *ns,* r= -.01. This means that there is no difference in the way Utiliteitsbouw and Techniek asses the collaboration and the integrity of the other partner.

This means for the analysis of hypothesis one, that for this collaboration, no significant differences can be spotted in the Organizational Climate. The factors for Collaboration and Agreements are also not different and thus, the mean will be used to assess the situation.

Significant differences: 0
Soft Collaboration mean: 2.83
Hard Collaboration mean: 2.70
Agreements mean: 2.84

Conclusion

The Mann-Whitney tests gave the following results:

Collaboration	Number of Differences	Rate of Collaboration
1. Noordwest & Noordwest	1	2.56
2. Arnhem & Oost	3	2.90
3. Den Haag & West	0	2.65
4. Utrecht and Midden	0	2.70

When the rate of Collaboration is divided into three groups, (2.5, 2.75 and 3.0) and the number of differences into three groups (0 differences, 1 differences, >2 differences), a scatterplot can be made of the collaborations and a this analyses can be made insightful.

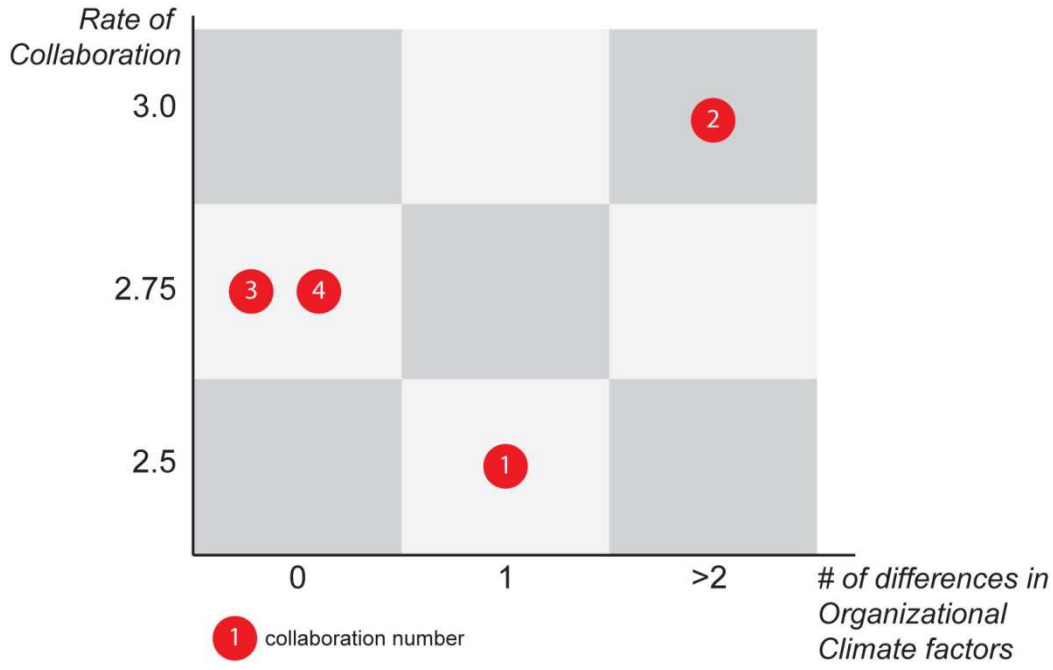
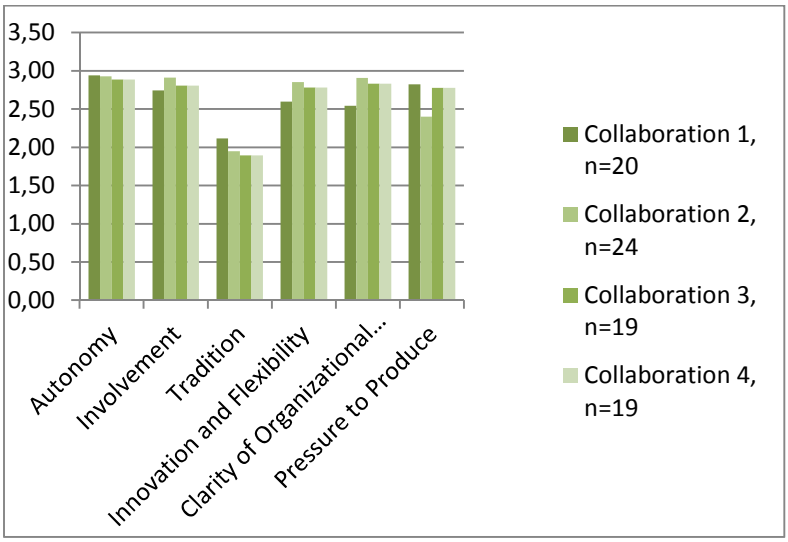


Figure 9 Differences in Organizational Climate versus Rate of Collaboration

This actually still tells nothings; no conclusion can be drawn from this. No regression line will follow from this analysis. Looking at Table 5, we can see that there is a clear trend concerning all of the offices about one particular variable of Organizational Climate. Table 5 shows that Collaboration 2 (Arnhem and Oost) have the highest score on Inovation and Flexibility and Clarity of Organizatonal Goals. This could be the explanation why they score the highest on the factor Hard Collaboration. Also, a combination of offices 1 scores the lowest on Innovation and Flexibility and Clarity of Organizational Goals and also scores the lowest on Hard Collaboration.

Table 5 Histogram of all Collaboration Profiles



An one-way ANOVA test was executed in order to see whether the difference in Organizational Climate had a significant effect on the rate of Collaboration. For this measurement we took the individual rating for Collaboration as the dependent variable, and the number of differences as the independent variable. However, the ANOVA test showed no significant results. There was no significant effect of differences in Organizational Climate on Collaboration, $F(2,74)=1.22$, *ns,* $\omega=.19$. This is why we can conclude to that no conclusion can be drawn based on this data set and we must reject the hypothesis.

Organizational Climate differences versus Trust

The last hypothesis that was made in the conceptual model was about the link between Organizational Climate and Trust. It was stated that when differences in Organizational Climate were small, the level of Trust should be higher. Again, we will also use the Mann-Whitney test that was used for assessing the first hypothesis, for assessing the fifth hypothesis. The base of the analysis stays the same: the differences in organizational climate inside the collaboration. The reason for splitting up the offices of Utiliteitsbouw and Techniek within one collaboration this time is because they did not assess the situation, they assessed the collaboration partner this time. This means that we cannot just take the means, since they were assessing something different.

Collaboration	Number of Differences	Trust of Ubouw in Techniek	Trust of Techniek in Ubouw
1. Noordwest & Noordwest	1	2.76	2.48
2. Arnhem & Oost	3	2.90	3.18
3. Den Haag & West	0	2.94	2.43
4. Utrecht and Midden	0	2.91	2.34

When the same categorization is made as for the assessment of hypothesis 1, the following figure shows;

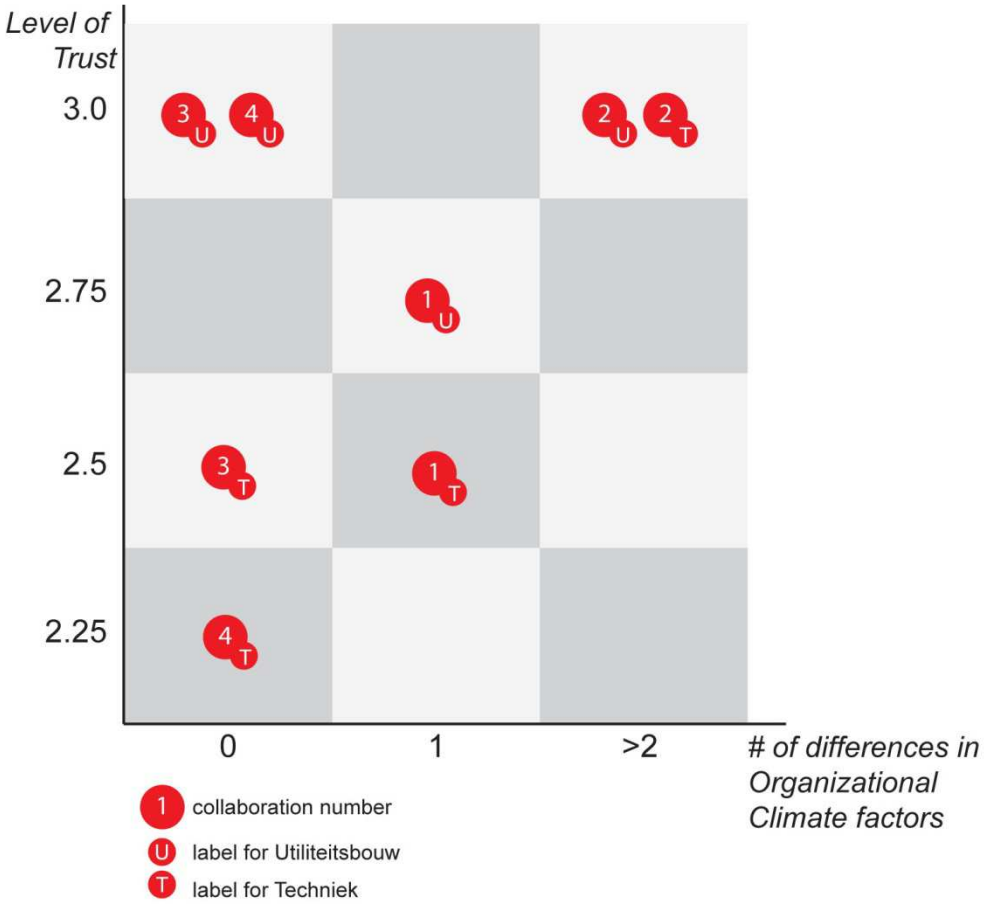


Figure 10 Differences in Organizational Climate versus Trust

At first look, some things stand out. For instance almost every office of Utiliteitsbouw thinks higher of his colleagues of Techniek, than the other way around. And in reference to the hypothesis, is seems

as though the higher the number of factor that significantly differ from each other, the higher the level of Trust. Though, this is not true for the Utiliteitsbouw offices of Collaboration 3 and 4.

An one-way ANOVA test was executed in order to see whether the difference in Organizational Climate had a significant effect on the rate of Collaboration. For this measurement we took the individual rating for Trust as the dependent variable, and the number of differences as the independent variable. There was a significant effect of differences in Organizational Climate on Trust, $F(2,79)=3.42$, $p<.05$, $\omega=.24$. There was also a significant linear trend $F(1,79)=4.96$, $p<.05$, $\omega=.18$, indicating that when the number of Organizational Climate differences is higher, the Trust level increased proportionally. This is the opposite of what was proposed in the hypothesis. This is why, the hypothesis is rejected.

Geographical Profiles

Looking at the numbers during the analyses, the hypothesis arose that besides the fact that the collaboration parties do not look that much different; there might be something like a geographical profile. Figure 11 shows the different geographical profiles. When a look is taken at the individual means, it can be seen that they do not differ that much from the means of the collaborating parties. But an Rwg(j) analyses can be conducted to see whether these geographical groups really perform as a group, and on the base of that outcome, a profile of the region could be conducted.

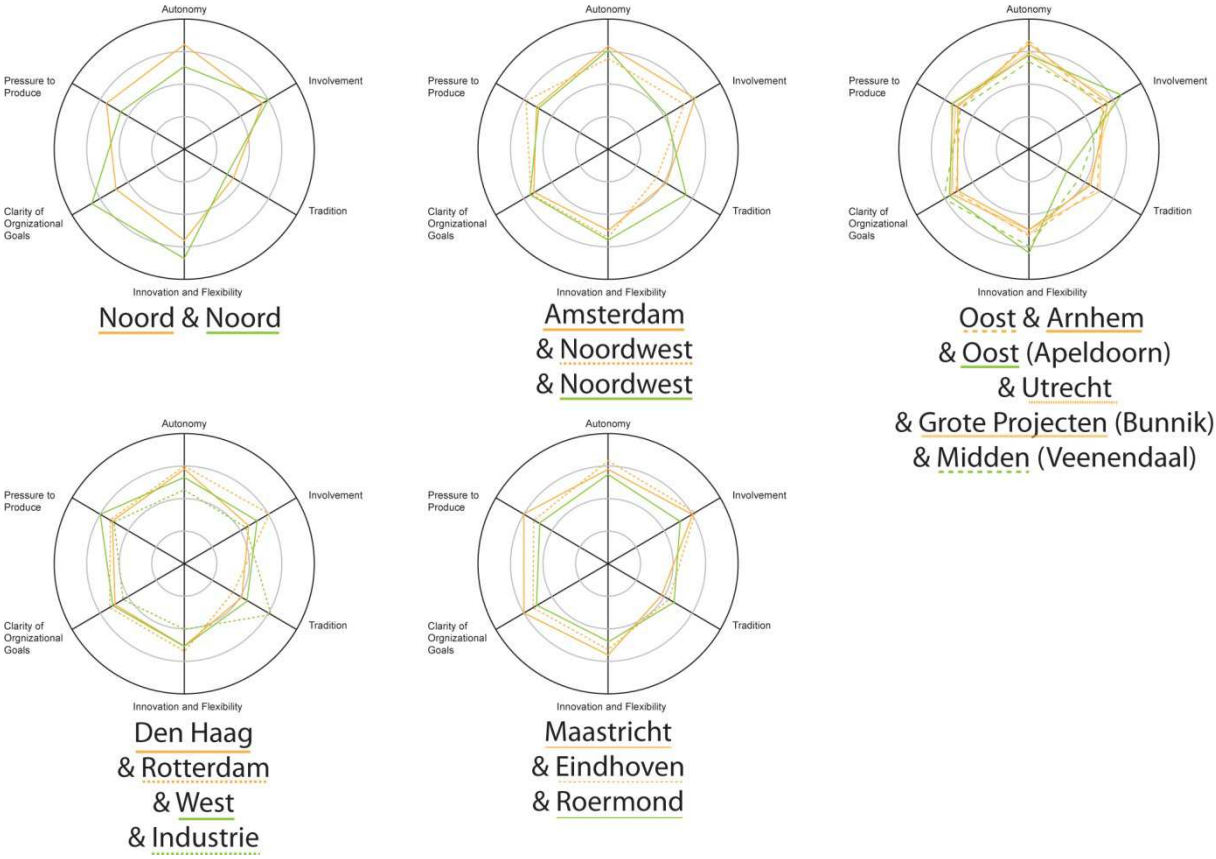
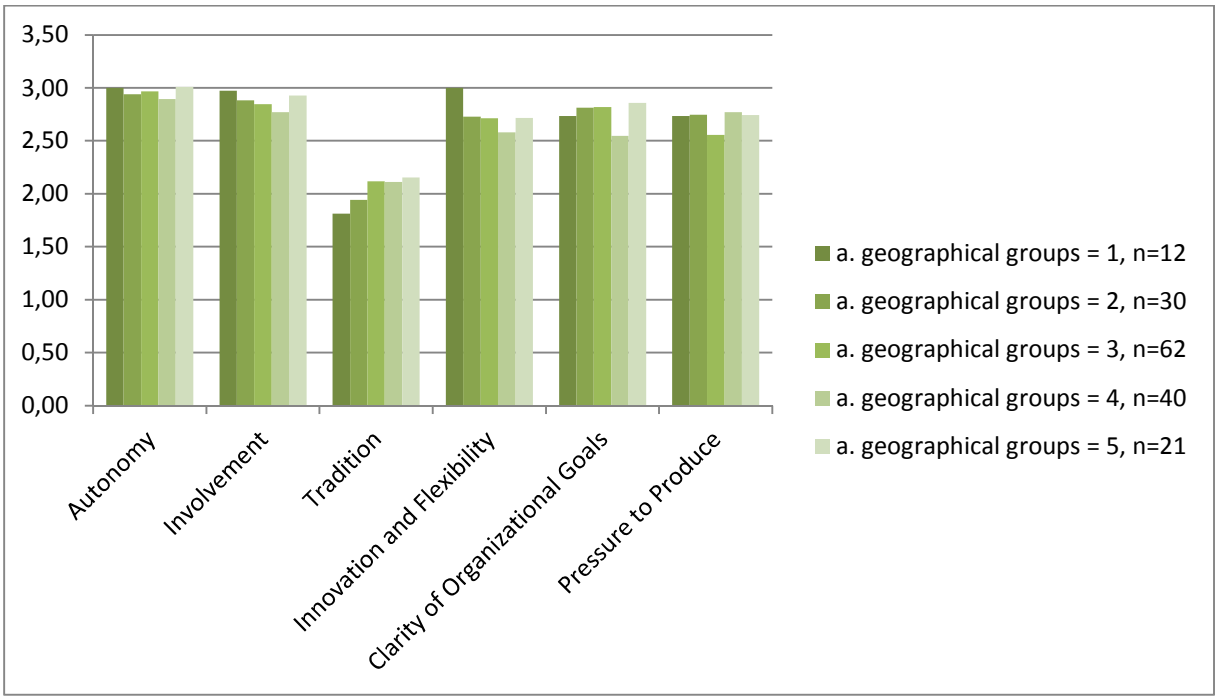


Figure 11 Organizational Climate profile based on geographical factors

Looking at the statisitcal data, besides these beautifull graphics, it can be seen that there is a large dynamic in the variabels. In general, the variable of *Tradition* is low, for all of the BAM offices. But no important conclusion could be drawn from these statistics.

Table 6 Historgram of Organizational Climate profiles of groups based on geographical factors

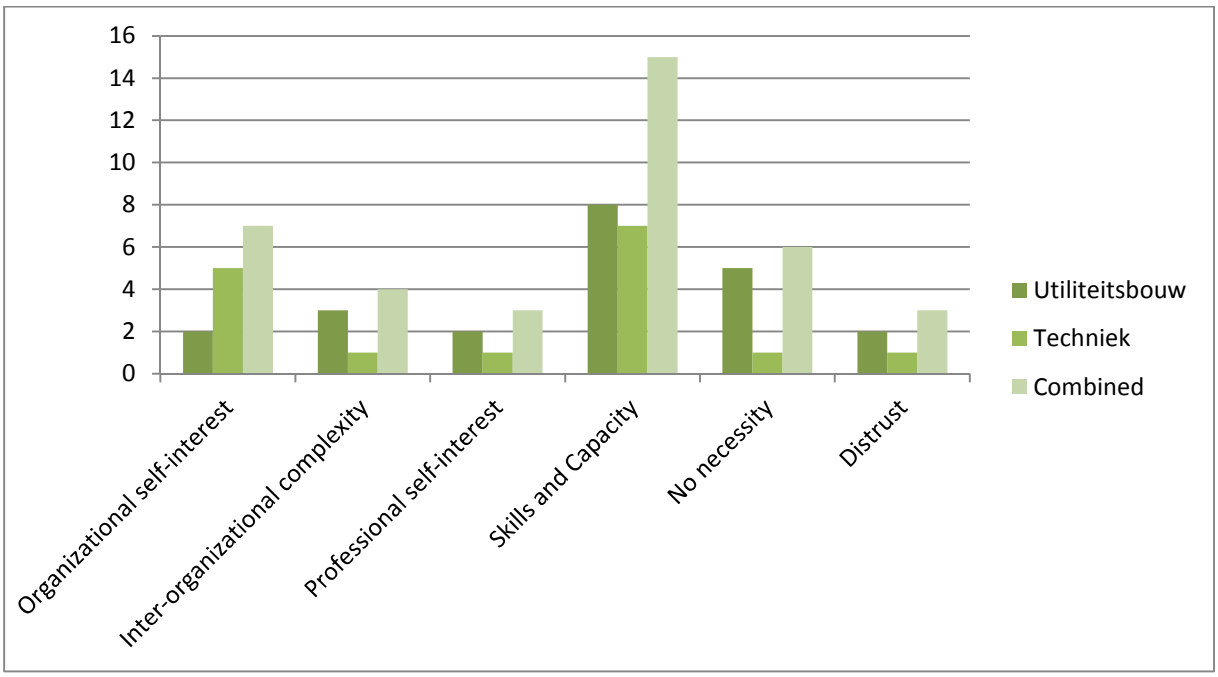


Why would no Agreements be made?

In an open question to the employees who filed inn they thought no agreements were made in the collaboration between Utiliteitsbouw and Techniek, the question was asked: *Why do you think no agreements are made in this collaboration?* The answers to this question were categorized using the same categorization that was used during the problem analysis phase, supplemented by to factors influencing collaboration

Category	Utiliteitsbouw	Techniek
Organizational self-interest	2	5
Inter-organizational complexity	3	1
Professional self-interest	2	1
Skills and Capacity	8	7
No necessity	5	1
Distrust	2	1
Total entries	22	16

Table 7 Count of Answers to the open question: Why would no agreements be made?



The third hypothesis that was made was that Trust would have a negative influence on the decision to make agreements on collaboration. These statements will be the second justification that this hypothesis is false. Even when you would state that the employees who mention “that there is no necessity to make agreements” would be based on Trust, this would still not be the largest amount of employees agreeing on that. The largest amount of employees thinks it is due to the lack of skills or capacity. The other answer that stand out is organizational self-interest. The fact that both organizations still need to make their own profit, and employees make choices based on that fact. This is line with the inter-organizational complexity of the Holding company. The fact that making one fund for the tenderteam between Utiliteitsbouw and Techniek is difficult is due to the inter-organizational complexity and is an obstacle in truly making agreements on this subject.

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