The relation between multiple team membership and team adaptability

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Award date:
2014

Eindhoven, January 2014

The Relation between Multiple Team Membership and Team Adaptability.

by

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in partial fulfilment of the requirements for the degree of

Master of Science
in Innovation Management

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TUE. School of Industrial Engineering.
Series Master Theses Innovation Management

Subject headings: Team, Multiple Team Membership, Team Adaptability, Team Adaption, Coordination, Expertise, Team Identification, Psychological Safety and Project Success

Abstract

The use of Multiple Team Membership has become more common for organizations operating in a new product development context. Although there is an increase in use, the effects of a Multiple Team Membership setting are not obvious for organizations nor can a definitive statement about it be found in the literature. Besides the increasing use of Multiple Team Membership, the need for adaptation in the new product development industry is also important, which requires a certain level of Team Adaptability in their project teams. In this study, the relation between these two phenomena is researched by doing a cross-sectional field study by use of questionnaires within the organization of TE Connectivity. This study finds there is an overall negative relation between Multiple Team Membership and Team Adaptability. Additionally, it seems this negative relation proceeds via mediators, namely Task Expertise, Team Identification and Psychological Safety. Besides these constructs, found is that Coordination enhances Team Adaptability, whereas Age has a negative influence. Finally, evidence is found for the positive relation between Team Adaptability and Project Success. Next to the scientifically outputs, practical implementations are mentioned. The most important one is using comprehensive kick-off meetings at the start of a project.

Acknowledgements

After finishing my Bachelor of Engineering education, I was convinced that I did not use my full potential. During my Bachelor education, I worked hard for my EC's, but I never reached my limits. Due to this recognition, I forced myself to make the step towards the Technical University. After four years of studying Innovation Management, I can say that the step to the university was one of the best choices of my life.

It were years with many new and unexpected experiences, which formed me to a person who is international oriented, instead of Dutch minded; transfer from a more practical to a more theoretical person; and develops a broad-minded view. The development was a jointly journey with lot of precious memories and sometimes stressful moments.

At the moment of writing these acknowledgements, I have just a small month to finish my master thesis. Before entering this stressful last phase of my study career, I like to thank several people who supported me during this journey.

At the first place, I want to thank my supervisors of the TU/e, especially dr. Josette Gevers. She gave me the opportunity to do my master thesis research by the department of Human Performance Management. From the first thoughts about Multiple Team Membership and Team Adaptability, she supported me in the right way.

A word of thanks also goes to Willy Rietveld. During the application of my research, I was surprised of his enthusiasm about the subject of this research. This positive reaction gave me extra motivation. Further, the supervision of Willy was great and he was always available for me at the moments I needed some support, despite of his full agenda.

Related to TE Connectivity, I want to thank Alex de Gast. During an informal conversation, he promised me to send my research proposal to Willy. At that moment, Alex was working for just a few months at that company and thought that this research

would fit to the environment and business of TE. I am very pleased that he has kept his word; otherwise I could have never done my research at such a nice company.

In addition, a “thank you” is for the support of my friends. Although their support contains often sarcastic remarks related to my study performances, it was one of the best motivators!

Next, I want to thank my family a lot for their support. With all the choices I have made, my parents, brother and sister supported me. I know they will be proud that I will graduate from university. But without their support, my study journey should be a very short holiday without sunshine.

Finally, the one who is the closest to me at this moment should be acknowledged. Sietske, I hope you will support me during this last month as you did before. At the right moments, you are the one who convinced me of my capacities and motivates me to further develop myself. From this side, sorry for the often “grumpy” mood during writing of my literature review or master thesis. I love you.

Rens van de Loo
Sint-Oedenrode, 10th December

Management Summary

This study focused on the relation between Multiple Team Membership (MTM) and Team Adaptability. MTM in this relation refers to the phenomenon that people are involved in several teams at the same time. This is more common nowadays in the Western industries (Europe, USA) and this phenomenon is accompanied with benefits and challenges for an organization. Beneficial aspects of MTM are cross-project learning and the availability for organizations to afford the use of expertise. Challenges of MTM are Coordination and Team Identification.

Team Adaptability is the adaptability of a team, which is a change in team performance in response to a signal (cue) from the environment. Teams operating in new product development industry, have to adapt continuously, therefore Team Adaptability is essential. Team Adaptability is described as an iterative process in this study, based on the adaptive cycle of Burke et al. (2006) (Appendix I). This process will be enhanced by aspects like: Task Expertise, Team Identification, Psychological Safety and Coordination. Finding matching aspects between the effects of MTM and antecedents of Team Adaptability, was the foundation of the proposed relation. After further support of theory (Chapter 2) resulting in a theoretical model (Figure 1). This model was the starting point of this research.

This study is conducted within the company TE Connectivity. This global organization operates within the electronics industry and has special attention for developing new fiber technology solutions. TE Connectivity is aware that innovation of their fiber products is needed to continue their market leader's position. Therefore this company fits in the new product development context. For gathering quantitative data from this organization to test the proposed model, a cross-sectional field study was conducted. A sample of 31 teams was available, containing 159 respondents. Team members from this sample received an online questionnaire with questions referring to just one of the teams they were involved in. To link the participants to a team for which

they receive the questionnaire, a linear model is developed. By using this model, it was possible to maximize the average number of selected individuals per team.

The different scales used in the questionnaire for measuring the constructs, were based on scales from previous studies. The gross of the used items were summed in Table 1. To measure the level of MTM in a team, a self-developed scale was used. This self-developed scale was needed, because in literature of MTM no applicable scale was available. With data from the used scales, it was possible to test the proposed theoretical model (Figure 1). This test is based correlations and hierarchical regression analyses.

In this study, we found a direct negative relation between MTM and Team Adaptability. This relation is under suppressed by three mediated constructs, namely Task Expertise, Team Identification and Psychological Safety. By adding these constructs into the new developed model, the direct relation impaired. From these intermediate constructs, Task Expertise and Team Identification have the biggest influence. The relation between MTM and Psychological Safety was not yet significant, but through the limited sample size and the highly correlations, we suppose this relation is valid. Further, this Final Theoretical Model (Figure 2) shows that Coordination has a positive relation with Team Adaptability, but has no significant relation with MTM.

Additional, we found a positive relation between Team Adaptability and Project Success. For organizations, this is important because generally the term Team Adaptability is hard to make tangible for organizations where Project Success is rather clear and emphasizes a beneficial aspect. In this study we found a strong positive relation between Team Adaptability and Project Success. Both correlations and the regression analyses are strongly significant, which means that the level of Team Adaptability contributes to the Project Success of the teams in the organization. Finally, from the control variables we used in this research, we found that Age influences Team Adaptability negatively. For organizations this finding could be interesting if the mean age in each team of the organization is rather high.

To use the found relations in a beneficial way for organizations, we recommended a few points. First, for organizations it is recommended to contribute individuals with special expertise to project teams. This is for organizations possible when they use a MTM setting. Using specialist in a project team this will broaden the scope of the project team which enhances Team Adaptability. Second, maximize the amount of teams an individual is active in. If individuals are active in too many teams at the same time, this will decrease the level of Team Identification, which is an important factor for Team Adaptability. Based on this study, it is hard to set a certain level on the maximum of teams for individuals but be aware of this aspect in your organization. Third,

to tackle the coordination challenge due to MTM, maximize the team sizes. The coordination level increases when the team size increases (Payne, 1995). In this study, the team size varies from 3 to 28 members. One can imagine that the coordination within a team of 28 members is more difficult than in a team consisting of 3 individuals. Recommended here is, to use key team members in your project team. These are team members which spend sufficient time in the project and are the most responsible. By using key team members, it is not necessary that by each team meeting all the team members will be involved which makes coordination easier. Finally, in this study we recommend to use kick-off meetings at the start of a project. This kick-off meeting should not only include the targets and planning of the project, but must mainly focus on the team members. It is important to explain why the team is composed in such way and what the roles are of the team members. Further, it is important for the project leader to stress the importance of each member. Intern in the team, this creates a better understanding of each other's roles and tasks and it gives you as individual the feeling that you are needed for the team. In addition with mentioning norms and values in the kick-off meeting, it will create an environment in which employees know what is expected during this project and what the way of working is. If a kick-off meeting is used in this way, it will be beneficial for different aspects mentioned in this study, like Team Identification, Psychological Safety and Coordination.

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Chapter 1

Introduction

This chapter introduces the master thesis study where research is done about the relation between Multiple Team Membership (MTM) and Team Adaptability. This cross-sectional field study focuses on the industry of new product development and highlights the potential challenges and benefits of the relation between MTM and Team Adaptability.

Adaptability has always been an important aspect in the development of people and animals. Charles Darwin quoted: "*It is not the strongest of the species that survives, not the most intelligent, but rather the one most responsive to change*" (Burke, Stagl, & Salas, 2006). This statement claims that adaptability is important to survive. In biology, animals which are able to adapt their habits to the changing environment in which they live, will survive and propagate in the future. Animals that rely on their traditional habits and do not adjust will gradually reduce in numbers and finally become extinct. With this wisdom in mind, it is fair to say that such adaptability is equally important for organizations in today's innovative environment.

Companies that operate in an innovative environment have to adapt continuously. In this environment, companies try to improve or create products that match new technologies and fit customer needs. One of the pillars of the innovative environment is the industry of new product development. New product development industry has become more complex and uncertain through fast changing technologies. Moreover, this complexity often requires that individuals with different knowledge, skills and expertise work together to accomplish tasks (Gevers, 2004). The implementation of teams is one mechanism used by organizations to respond to this environment, in the hope to enhance their capacity of adaptability (Burke, Stagl, & Salas, 2006). Structuring work in teams (in the innovative context often cross-functional teams) instead of working individually primes organizations to be more adaptive because collectives have a broader repertoire of capacities, experiences, and networks to draw on when engaging

in performance change (Zaccaro & Badar, 2003). Further, using a team structure in organizations decentralizes decision making, which makes response to the environment more flexible (Labianca, 2004). Within the new product development industry a large amount of teams are active, including marketing teams, development teams, research teams, design teams and sales teams. Since the environment is uncertain, unexpected events may thwart projects successes. Think for example of competitors entering the market much earlier than expected, prototypes showing defects, marketing campaigns that do not succeed, unexpected demands of a product, high amount of absenteeism of team members and distribution problems. In such situations teams have to adapt to finish projects successfully. However, often these events will be preceded by cues which offer the possibility of early intervention. The change in team performance in response to a salient cure or cue stream that leads to a functional outcome for the entire team is denoted as team adaptation (Resick, et al., 2010). The adaptability of teams will significantly influence the project success of development projects. For companies in the product development industry, it is beneficial to have an overview in place of what affects Team Adaptability, so they can navigate projects to a better end result.

In general, research that supports the use of teams in an organization based on the advantages, assumes that people are members of one team at a time and have the possibility to focus all of their energies on their team tasks without competing commitments (Mortensen, Woolley, & O'leary, 2007). In practice, people are often members of more than one team at the time which offers both benefits and challenges (Mortensen, Woolley, & O'leary, 2007). Among the benefits are learning aspects, more specifically cross-project learning. Team members who are involved in different projects over time create a broader perspective and strengthen their mental models with respect to the organization (Newell & Edelman, 2008). Therefore these team members enhances the Team Adaptability level because they recognize cues - which requires adaptation - in an earlier stage and therefore are able to handle these cues more proficiently based on their knowledge of previous projects.

On the other hand, one of the challenges of Multiple Team Membership is the scheduling of members and getting members' time, attention, and involvement (Mortensen, Woolley, & O'leary, 2007). When time becomes critical or the priority of the project changes, team coordination will be more complex in case of Multiple Team Membership (Payne, 1995). Additional, due to a Multiple Team Membership setting, there is an inherent tension with respect to team member relationships (Mortensen, Woolley, & O'leary, 2007). This could lead to a lower level of Team Identification and Psychological Safety within teams, which is important for team work.

While organizations' reliance on Multiple Team Membership is likely to grow (Mortensen, Woolley, & O'leary, 2007) and the need for continuous adaptation is

required in the new product development industry, the relationship between these phenomena becomes an important one. On the one hand, the Team Adaptability process is based on perceiving, anticipating, reacting and learning aspects which can be enhanced by a broader team perspective or cross-project learning activities caused by Multiple Team Membership. On the other hand, Team Adaptability also relies on flexibility which could be an issue due to the coordination challenges caused by Multiple Team Membership. Although it is easy to see that there might be a relation between Multiple Team Membership and Team Adaptability, it is difficult to determine which direction this relation has and which relational constructs are involved. Therefore the research question of this thesis is:

"What is the relationship between Multiple Team Membership (MTM) and Team Adaptability and which mechanisms are involved?"

Besides theoretical insights for organizations which operate in a new product development industry and use a Multiple Team Membership setting, the answer on the research question is supportive for organizations in the new product development industry. This research aims to give organizations more insight into the assumed relation which guides organizations to emphasize the positive and prevent the negative aspects of the relationship between Multiple Team Membership and Team Adaptability. In sum, this research will contribute to science and organizations by clarifying the relational tensions between Multiple Team Membership and Team Adaptability.

This research is conducted within the company TE Connectivity (TE). This global organization operates within the electronics industry and has special attention for developing new fiber technology solutions. TE is aware that innovation of their fiber products is needed to continue their market leader's position. Therefore this company fits in the new product development context sketched earlier. Additional, this organization utilizes a Multiple Team Membership setting for executing their projects. Together, TE is appropriate for this research. Finally, TE requested for an additional research question which is involved in this research namely:

"Is there a positive relation between Team Adaptability and Project Success?"

This additional question will enhance the importance of Team Adaptability for organizations.

Chapter 2

Theoretical Development

Chapter 2 presents the underlying theoretical development which is the backbone of this research and the explanation towards the hypotheses used.

As mentioned in the introduction, this study focuses on the relation between Multiple Team Membership and Team Adaptability. To understand the relation between these constructs, this chapter starts with the theoretical explanation of Team Adaptability and Multiple Team Membership. Thereafter, the relationship of these constructs is emphasized based on the antecedents and effects accompanied with the constructs and results in eight hypotheses which will act as the backbone of this report.

2.1. Team Adaptability

In the literature Team Adaptability is applied in different ways. Priest et al. explain adaptability as: “the utilization of knowledge, skills and attitudes that enable members to recognize deviations from expected action and then readjust actions accordingly” (Priest, Burke, Munim, & Salas, 2002, p. 562). Within this definition knowledge, skills and attitudes (KSA’s) of the team members are used for recognizing unusual situations and reacting on this with a suitable action. Porter et al. define Team Adaptability as the extent to which a team is able to modify its configuration of roles into a new configuration of roles by using knowledge acquired through interaction in the course of task execution as well as through more explicit exploration of alternatives (Porter, Webb, & Gogus, 2010). Thus, whereas Priest et al. (2002) highlight individual KSA’s as the basis for Team Adaptability, Porter et al. (2010) point towards the role of the interaction in the

team and experiences with the task as a basis for Team Adaptability. Moreover, the exploration of alternatives is considered to be important.

Further, Burke et al. (2006) define Team Adaptability as a change in team performance, in response to a salient cue or cue stream, which leads to a functional outcome for the entire team, where Team Adaptability is manifested in the innovation of new or modification of existing structures, capacities, and/or behavioral cognitive goal-directed actions. An additional look towards Team Adaptability is described in this article of Burke et al. (2006). They cast Team Adaptability into a dynamic model, which is an iterative process that a team uses while they execute their tasks. Burke et al. (2006) set up an input-throughput-output model to explain Team Adaptability. Within this model (Appendix l) they describe the iterative process as the adaptive cycle (Burke, Stagl, & Salas, 2006). This adaptive cycle consist of four phases: (1) situation assessment, (2) plan formulation, (3) plan execution and (4) team learning. These phases are explained shortly.

The first phase of the adaptive cycle is situation assessment. Although Team Adaptability is a team related process, it could start individually. The situation assessment phase starts when at least one of the team members scans the environment in search of signals that could affect the team's success. Individuals will identify cues which could be relevant to team success on basis of prior experience, knowledge and cognitive frameworks (Burke, Stagl, & Salas, 2006). Possible cues are very diverse with different levels of difficulty. When there is a failure on the part of the team where alterations may be necessary, one could speak of an obvious cue (Gersick & Hackman, 1990) which might be easy to identify. A subtle cue could be the halfway point in the team's project. In this case there is evidence that teams engage their process to increase their production in preparation for a deadline (Gersick, 1989). The recognition of cues in the situation assessment phase promotes adaptive team performance in at least two ways. First, the recognition of a cue from the environment is indicating a need for change. The speed with which environmental changes are recognized and appropriate responses enacted is related to subsequent Team Adaptability (Burke, Stagl, & Salas, 2006). Second, the emergent states that are the outcome of situation assessment phase, serve as the cognitive frameworks that allow team members to predict future system states with regard to team member action. They set a joint idea for changing their strategy.

The second phase of the adaptive cycle is plan formulation. In this phase a plan will be developed to react on the cue or cues which triggers the team to adapt. This planning involves deciding on a course of action, setting goals, clarifying member roles

and responsibilities, discussing relevant environmental characteristics and constrains, prioritizing tasks, clarifying performance expectations, and sharing information related to task requirements (Burke, Stagl, & Salas, 2006). In this phase a sufficient level of Psychological Safety, Team Identification and Team Expertise in the team is needed to succeed. Psychological Safety in this case refers to the shared belief that the team is safe for interpersonal risk taking (Edmondson A. , 1999), which supports discussions within the team and information sharing. Team Identification in this context relates to the need for affiliation to the team (Solansky, 2011), simply stated as the feeling to belonging to this team. This enhances this adaptive cycle phase because a person is better able to set team priorities and goals when someone really belongs to the project team. Finally, Team Expertise in the plan formulation phase refers to the knowledge one has about their fellow team members. Proper knowledge about the tasks, abilities and responsibilities of team members supports this phase, because Team Expertise creates the ability within a team to clarify member roles and responsibilities.

The third phase in the adaptive cycle is the plan execution phase. The plan execution phase involves a combination of individual and team-level behaviors such as monitoring, back-up behavior, communication, leadership and coordination in order to engage in adaptive team performance and achieve team adaptation (Burke, Stagl, & Salas, 2006). Generally, executing a new plan requires communication and coordination actions in a team. Monitoring and back-up behavior assist team members in executing the plan when cognitive or physical resources become depleted. Team leadership is essential because the leader enacts processes that serve to structure member's actions, developing members, and assist members in maintaining and recreating the shared coherence needed to be adaptive (Burke, Stagl, & Salas, 2006).

The fourth phase of the adaptive cycle is team learning. The process of team learning is a team level phenomenon. Edmondson (1999, p. 354) defines team learning as "an ongoing process of reflection and action, characterized by asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions." In the context of the adaptive cycle one could also mention that team learning is closely related to reflexivity. Reflexivity can be defined as the extent to which team members overtly reflect upon, and communicate about the team's objective, strategies and processes, and adapt them to current or anticipated circumstances (Schippers, Den Hartog, Koopman, & Wienk, 2003). The development of knowledge and the ability of members to improve their understanding of a given situation, due to team learning or reflexivity, enhance this phase from the adaptive cycle. The consequences learned from previous actions can be used or prevented in the

future. This kind of knowledge will be used by team members to scan the environment in future projects, which will lead to sustainable performance improvements of the team. After finishing this phase, the adaptive cycle will be passed through again.

In this study, the term Team Adaptability refers to the iterative process developed by Burke et al. (2006). As it is difficult to measure in which phase of the adaptive cycle a team is active, we choose not to use the specific details per phase but rather the general idea. Therefore this interpretation of Team Adaptability is used in this study.

2.2. Multiple Team Membership

Multiple Team Membership (MTM) refers to the phenomenon that people are involved in several teams at the same time. At first glance, this definition is straightforward and easy interpretable. Although the definition is clear, MTM is accompanied with several aspects.

MTM is a common phenomenon nowadays in the industries of the United States and Europe. Surveys have estimated that 65 to 95 percent of knowledge workers are members of more than one project team at the same time (O'Leary, Mortensen, & Woolley, 2011). Organizations use Multiple Team Membership to enhance individual and team productivity and learning, especially in highly competitive settings characterized by pressure for productivity and learning, like information technology, software development and new product development (O'Leary, Mortensen, & Woolley, 2011). Characteristics accompanied with Multiple Team Membership are: (a) team members are working on different projects in different teams at the same time, (b) the collaboration is often cross-functional, (c) availability to use experts in the team, (d) teams are formed for a specific period which is temporary and (e) team members are part-time available for the team (Mortensen, Woolley, & O'leary, 2007). For a deeper understanding of MTM, some beneficial and challenging aspects are highlighted below.

One of the beneficial aspects of MTM is cross-project learning (Mortensen, Woolley, & O'leary, 2007). Cross-project learning refers to the phenomenon that people use knowledge and experience from other projects in the execution of current projects and to solve problems. Research shows that cross-project learning is indeed beneficial to project success (Newell & Edelman, 2008). Team members which are involved in different projects over time create a broader perspective and strengthen their mental models with respect to the organization. This learning advantage will probably influence Team Adaptability positively.

Another aspect of MTM which might be beneficial is the use of expertise in your organization. Mortensen et al. (2007) verbalize it as follows: “projects operating in an MTM environment benefit from being able to “afford” special expertise that would be too

costly if acquired outside the organization or through a dedicated full-time employee" (p. 219). The expertise mentioned here in this study is interpreted as Task Expertise. Task Expertise is commonly defined as a combination of individual talent, competence and proficiency in a specific discipline (Germain & Ruiz, 2009). Although this kind of expertise is individually based, it is necessary to integrate Task Expertise into a collective project to benefit from it (Tiwana & McLean, 2005). With this in mind, it is plausible that the possibility to use different kind of expertise in your project team due to a MTM setting will also positively influence Team Adaptability, because there is more specific knowledge in the team that could be supportive for the situation assessment, plan formulation and plan execution phase of team adaptation.

Besides benefits for learning and expertise, MTM is also likely to present organizations and their teams with several challenges. One of the challenges of MTM is the coordination of projects that are executed simultaneously. When different projects are carried out simultaneously, managers have to allocate resources in accordance with required skills and project urgency (Mortensen, Woolley, & O'leary, 2007). One can imagine that some employees are needed in several projects at the same time. These common resources should be scheduled well, because these people can only work for one project at a time. However, there is only so much an employee can take in terms of distributed attention. If an individual is distributed among many teams, contributions and commitment to the teams may suffer and negatively influence internal team processes such as performance monitoring, communication and back-up behavior. Commitment in this context refers to the willing of an individual to work for the project and belonging to the team. In the article of Payne (1995) it is mentioned MTM is negatively related with commitment.

In this study, commitment is interpreted as a kind of team spirit someone should have to perform and is transformed to the term Team Identification. As mentioned in paragraph 2.1., Team Identification is viewed as a team-related variable that represents the need for affiliation (Solansky, 2011). Identification with a team is the key to teamwork because "people's level of cooperation with groups is primarily shaped by the extent to which they identify with those groups" (Tyler & Bladder, 2003, p. 355). In short, Team Identification is positively related to team performance (Solansky, 2011). When people are active in different teams at the same time, the level of Team Identification will most likely not be equal over all the teams. Further, by switching between teams and staff members it is plausible that the overall level of Team Identification in a MTM setting will be lower than in a conservative setting where an employee works in a fixed team for a while.

A lower level of identification with and commitment to the team could affect the internal coordination of a team which in the model of Burke et al. (2006) reflects to performance monitoring, communication and back-up behavior. If an individual has a low level of commitment to a team, this person less likely will back-up his team colleague(s) in this project when this is desired. Also monitoring the performance of the team will be less interesting for this person, because he feels no responsibility for this team due to a low level of commitment. Together, lower commitment will negatively influence internal team processes.

2.3. Effects and Antecedents of both: MTM and Team Adaptability

During the research of both constructs, it became clear that there is overlap between the effects of MTM and the antecedents of Team Adaptability. For instance, the possibility to use special expertise due to a MTM is a positive antecedent of Team Adaptability in the model (Appendix I) of Burke et al. (2006). On the other hand, coordination seems to have a negative relation with MTM but has a positive relation with Team Adaptability. Overall, this structure creates a negative relationship between MTM and Team Adaptability. The discovery of some overlapping constructs is the foundation of the research question mentioned in the introduction. The overlapping constructs in the relation between MTM and Team Adaptability suggest this relationship is mediated by them. Next to this suggestion, it is possible there is also a direct relationship between these constructs. One could not exclude this based on the assumption made above. Therefore the first hypothesis will act as the motivator to approve the suggestion that the relationship between MTM and Team Adaptability is mediated, by assuming a direct relation between them. Thus,

Hypothesis 1: There is a direct relation between MTM and Team Adaptability.

2.3.1. Task Expertise

The first construct that could represent the relationship between MTM and Team Adaptability is Task Expertise. Task Expertise refers to the knowledge of a team member of a specific task. “Simply stated, members should know what to do, how to do it, and why it should be done” (Burke, Stagl, & Salas, 2006, p. 1199). Mentioned in paragraph 2.2, Task Expertise is one of the beneficial aspects of MTM. Due to a MTM setting, companies can afford (more) special expertise because they can divide the

costs of the expert across more projects (Mortensen, Woolley, & O'leary, 2007). On team level, it will lead to teams with members which have more special expertise, which is likely to improve Team Adaptability. Therefore assumed in this study is when the level of MTM increases, also the level of Task Expertise increases.

Further, Burke at al. (2006) state Task Expertise is an antecedent of Team Adaptability because they set the proposition: “Task Expertise is positively related to situation assessment” (Burke, Stagl, & Salas, 2006, p. 1199). For Team Adaptability, Task Expertise is useful for team members when they can couple their expertise to the team and create awareness of the role they play in the context of the team. Deep understanding of task principles and role of members ensure the team will have a wide repertoire of responses at its disposal, which results in a situation where the team will not have to rely on one or two methods for solving a particular problem but can build on the combined expertise among many courses of action (Burke, Stagl, & Salas, 2006). Another look towards expertise is found in the research of Tiwana and McLean (2005). In this research, individually held expertise was positively related to creativity. The individually held expertise described in Tiwana and McLean (2005) is comparable with the Task Expertise of Burke et al. (2006). In accordance with the adaptive cycle model (Appendix l) and the description of the situation assessment phase, one can imagine that the integration of Task Expertise, which is positively related to creativity, is beneficial for the first phase of the adaptive cycle and therefore enhances Team Adaptability.

As explained above, MTM might be positive related to Task Expertise, where Task Expertise is positively related to Team Adaptability. This situation suggests that Task Expertise mediates the relation between MTM and Team Adaptability. Based on the substantiation of the influences of Task Expertise, the next three hypotheses are stated:

Hypothesis 2: There is a positive relation between MTM and Task Expertise.

Hypothesis 3: There is a positive relation between Task Expertise and Team Adaptability.

Hypothesis 4: The influence of MTM on Team Adaptability is mediated by Task Expertise.

2.3.2. Team States & Processes

The second set of constructs which are related to MTM as well as Team Adaptability is named in this study as Team States & Processes. This set contains the following constructs: Team Identification, Team Expertise, Psychological Safety and Coordination. Team Identification refers to the commitment of an individual to a team. As stated earlier, identification with a team is the key to teamwork because “people’s level of cooperation with groups is primarily shaped by the extent to which they identify with those groups” (Tyler & Bladder, 2003, p. 355). But for a person to identify with a team, one should have the feeling of Psychological Safety in this group. If an individual has the belief that it is safe to take interpersonal risk within the team, this will enhance team commitment. Further, if one is committed to a team, it is likely this person’s knowledge about the knowledge and abilities of the team members will be stronger. This means the level of Team Expertise also depends on Team Identification and Psychological Safety. Together, these constructs contribute to the internal coordination of the team, because they are closely related to each other. Therefore in this study, these constructs are packed together under the header “Team States & Processes”.

In this paragraph, first the relations between the constructs of Team States & Processes and MTM are explained, recapitulated in a hypothesis. Second, the relations between the Team States & Processes and Team Adaptability are explained resulting in hypothesis 6. Finally, the overall mediated relation is attended also cooperated with a hypothesis.

Team Identification is mentioned as a challenge of MTM. When people are active in different teams at the same time, the level of Team Identification will most likely not be equal across teams. In this case it is plausible Team Identification is higher for teams on which members spend more time. Further, by switching between teams and staff members it is plausible the overall level of Team Identification in a MTM setting will be lower than in a conservative setting where an employee works in a fixed team. Proposed here is that MTM has a negative relation with Team Identification.

Next, Team Expertise refers to the knowledge one has about the knowledge and abilities of the team members. Related to Team Identification, if one is concerned of a team, the knowledge about their fellow team members will be higher. Further, if members are active in different projects at the same, it will be difficult to develop knowledge about fellow team members, because the time you spend together on the project will be presumably lower in a MTM setting than in a conservative setting. Therefore in this study we assume MTM has a negative relation with Team Expertise.

The following construct is Psychological Safety. Psychological Safety has been defined as the shared belief that the team is safe for interpersonal risk taking (Edmondson A. , 1999). It is difficult to determine which mechanisms influence the level of Psychological Safety, but one of the aspects related to this is Team Identification. If someone does not have the feeling to belong to the team, it is likely this person does not have the safe feeling in this team for interpersonal risk taking. Further if someone is active in more teams at the same time, the safety feeling in a team will differ across the teams this person is active in. If you spent a low amount of time in one team it creates a situation in which you have less knowledge about the fellow team members and their norms and way of working. In such a case, it is difficult for an individual to predict if an intervention in this team regarding the project will be appreciated. This kind of occurrences creates a lower level of Psychological Safety. Therefore proposed in this study is that MTM has a negative relation with Psychological Safety.

The final construct containing to the set of Team States & Processes is Coordination. As mentioned in paragraph 2.2., Coordination is one of the challenges of MTM. As different projects, operating with team members who are active in different projects, are executed simultaneously, it is difficult to allocate resources in accordance with the required skills, especially when something changes in the project and speed becomes important, because in this case not all the team members will be directly available. Besides these “logistical” challenges, the internal coordination in a team, which is also mentioned in the model of Burke et al. (2006), plays a role. When team members identify themselves less with the team, these team members will be less inclined to take account for each other and to help other team members when it is needed. Further, if the level of Team Expertise is low, it will be more difficult to coordinate the team internal, because the knowledge about their fellow team members is lower which makes it more difficult to connect each other’s tasks and to take over activities when needed. So, the internal coordination will also be an issue due to MTM through the effects of Team Identification, Team Expertise and Psychological Safety which are part of the Team States & Processes.

In sum, all the relations between MTM and the constructs of Team States & Processes are assumed negative. Therefore the fifth hypothesis is:

<u>Hypothesis 5:</u> There is a negative relation between MTM and Team States & Processes.

Next to the relationship of Team States & Processes and MTM, the relation between this set of constructs and Team Adaptability is interesting. In the model of Appendix I these constructs were already mentioned.

First, Team Identification is attended as an antecedent of Team Adaptability. The feeling of belonging to a team simply explains Team Identification. This shall increase the individual knowledge of the team. When this is the case for more team members it creates shared understanding of the current situation at a given point in time (Salas, Prince, Baker, & Shrestha, 1995). This situation is named team situation awareness and is proposed to have a positive relation on the second phase of the adaptive cycle (Burke, Stagl, & Salas, 2006). Therefore, based on this route of mechanisms, this study proposes that Team Identification has a positive relation with Team Adaptability.

Second, Team Expertise is mentioned as an antecedent of the adaptive cycle in the model of Burke et al (2006) (Appendix I). Team Expertise refers to the knowledge an individual has about the team members. Individuals who are highly knowledgeable about their fellow teammates will pick up internal cues better than those who are not familiar with their team members (Burke, Stagl, & Salas, 2006). Therefore it is proposed that Team Expertise is positively related to situation assessment which is the first phase of the adaptive cycle (Burke, Stagl, & Salas, 2006). Thus, Team Expertise has a positive relation to Team Adaptability.

Next, as proposed in the adaptive cycle model of Appendix I, Psychological Safety has a positive relation with Team Adaptability. Further, Edmondson (1999) argued that Psychological Safety does not play a direct role in team performance but is a facilitator for team members for taking appropriate actions to accomplish work. Burke et al. (2006) uses this argument to state that Psychological Safety contributes to quality plan development by promoting a climate where members feel free to question suggestions and decisions. Through this mechanism Burke et al. (2006) propose that the level of Psychological Safety in a team is positively related to the plan formulation phase of the adaptive cycle model (Appendix I). This implies Psychological Safety has a positive relation with Team Adaptability.

Finally, in the model (Appendix I) of Burke et al. (2006) Coordination has a prominent role in the plan execution phase of the adaptive cycle. In this model, Coordination is a construct which relates to mutual monitoring, communication and back-up behavior. Proposed in this article (Burke, Stagl, & Salas, 2006) is that these constructs enhance the level of Coordination which in turn has a positive influence on the plan execution phase. Therefore stated in this study is that Coordination has a positive relation to Team Adaptability.

In contrast to the negative relations mentioned in the fifth hypothesis, for Team Adaptability it is proposed all related constructs of Team States & Processes have a

positive relation. Most of these positive relations are already proposed by Burke et al. (2006), but no statistical evidence is in place. This leads to the following hypothesis:

> *Hypothesis 6: There is a positive relation between Team States & Processes and Team Adaptability.*

At this point, for every construct containing to the set of Team States & Processes a theoretical analysis is completed of the mechanism which relates to the relationship of MTM and Team Adaptability. Hypothesized is the negative relation between MTM and Team States & Processes and a positive relation between this set of constructs and Team Adaptability. These findings suggest that the Team States & Processes mediate the relationship between MTM and Team Adaptability. Based on this perception, hypothesis 7 is developed.

> *Hypothesis 7: The influence of MTM on Team Adaptability is mediated by Team States & Processes.*

2.3.3. Project Success

Additional to the relationship of MTM and Team Adaptability, the relation between Team Adaptability and Project Success is also taken into account in this study. For organizations it is desirable to know if Team Adaptability enhances the Project Success, because organizations want to know in which way Team Adaptability could be beneficial. In the literature evidence is available on the positive relation between Team Adaptability and effectiveness or performance. Kozlowski et al. (2001) states that adaptability as an individual, team, and organizational capability is increasingly critical to effectiveness. Additional, Resick et al. (2010) state adaption is critical for team decision effectiveness. Burke et al. (2006) state adaptation lies at the heart of team effectiveness. Together, the complex interdependence requirements of teams mandate that in order to be effective, team members serve as compensatory systems for their fellow teammates, which necessitating adaptation based on internal team cues (Burke, Stagl, & Salas, 2006). Therefore adaptability is supportive to effectiveness in general.

In this study effectiveness is transferred to Project Success, because effectiveness is difficult to measure with a questionnaire, because not all the teams from

the sample are active in the same phase of a project. For teams which are finishing the project, it is easier to rate their effectiveness compared to a team that just starts. The items used to measure Project Success takes this fact into account. Additionally, in the article of Shenhar, Dvir, Levy and Maltz (2001) Project Success relates strongly to effectiveness. Therefore the final hypothesis is,

<u>Hypothesis 8:</u> There is a positive relation between Team Adaptability and Project Success.

The hypotheses underlying this study were developed and explained in this chapter. The overall picture of the hypotheses is proposed in the model shown in Figure 1.

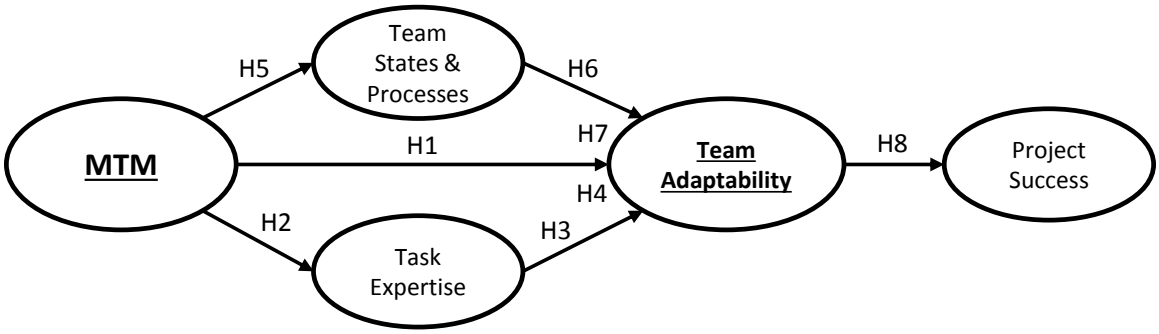

Figure 1 - Theoretical Model

Chapter 3

Method

This chapter presents the method of this study. The design and procedure will be shortly explained. Thereafter, a detailed development and use of the measurements is presented, ending with the adjustment of control variables which will be involved in the proposed theoretical model.

3.1. Design

To test the hypotheses, a cross-sectional field study is conducted by using a questionnaire spread by an online tool. The conducted data is gathered from individuals of the selected teams, but is analyzed on team level. The main constructs used are evaluated by the team members, excluding team project success. This construct is evaluated by the core team leaders of the projects.

3.2. Procedure

The data was obtained from the organization TE Connectivity. The structure of this company is based on four main departments: Industrial Solutions, Transportation Solutions, Network Solutions and Consumer Solutions. Each of these departments is further divided in business units. This research is focused on three business units of the department Network Solutions, namely: Enterprise Solutions, Data Communication and Telecom Networks. An overview of the company structure is available in Appendix II. One of the core activities of these business units is developing new fiber technologies for connections between devices. This research is executed by the business units settled in the Netherlands, Belgium, United Kingdom, Spain, Czech Republic, Sweden and United

States. The focus in this research is on project teams which are involved with the development of new fiber technologies.

To inform the selected employees of TE Connectivity, the CTO's of this group of people were informed by mail about the research with the request to inform their employees of their business unit. After five days, the selected participants were informed individually by mail with a short explanation of the research. In this mail also an indication of the sending date of the questionnaire was given. Three days later, the participants received the questionnaire by mail. After one week, time was reserved in the Outlook agendas of the individuals who did not respond yet to the questionnaire. In the agenda blockings, the link to the questionnaire was added. Finally, the last missing individuals were approached individually by calling and personal mailing.

In order to meet the assumption of independence, an individual could only fill out one survey associated with one particular team. Therefore, a random and appropriate method is needed to link an individual to one project for receiving the questionnaire. For this task, a linear model is created in Excel which links the individuals to a team using the Open Solver function in this software tool. The aim of the solver was to select as many participants as possible to represent a specific team without including individual participants twice; that is to maximize the average number of selected individuals per team. A part of the final solution is depicted in Appendix III. The minimum value of selected individuals of a team is 44% (maximized value) and the maximum value is 100% (M = .60, SD = .17). Simply stated, with this method individuals who are active in two or more projects were coupled to just one project. By this selection procedure, the goal is to maximize the lowest number of selected individuals of one team without including individuals twice.

3.3. Sample

The selected projects from the three business units were selected from the database of the ERP system used by TE Connectivity. The projects are selected using two requirements: (1) the project is started in 2011 (or later) and (2) the project is still running. In total 35 projects were selected (279 individuals) for participation. Within this group of individuals, 119 (43%) individuals were assigned to two or more projects in the sample (M = 1.77, SD = 1.23). From the sent questionnaires, 52% of responses from team members returned and 83% of the team leaders' evaluations were completed. On average, the response rate is 57%. The final sample consists of 31 teams, of which 29 teams have the core team leader evaluation available. These teams ranged in size from

3 to 28 members (M = 14.14, SD = 7.46); 89 percent of the team members were male; the average age was 44.70 years (SD = 8.74); the average time these members worked by this company was 13.51 years (SD = 9.72), and the average time these individuals were involved in product innovation was 15.25 years (SD = 9.36). In addition, 38 percent of team members held master's degrees or higher, and an additional 45 percent held bachelor's degrees. Geographically, most of the team members were settled in Shakopee (26%), Den Bosch (18%), Harrisburg (9%) and Kessel-Lo (7%).

3.4. Measures

The questionnaire used in this research contains mainly informant items (Van de Ven & Ferry, 1980). Informant items ask individuals to evaluate their team rather than their own personal behaviors or attitudes (Van der Vegt & Bunderson, 2005). Due to these kinds of questions it is possible to measure team level constructs based on individual responses.

3.4.1. Multiple Team Membership

MTM is measured on a 3-item self-developed scale based on criteria from different sources. This measurement is developed during this study due to a lack of an applicable measurement already available in the literature. Previous studies about MTM use an interview method for gathering qualitative data or did an experiment. Because this study is a field study and quantitative data is required, both methods are not applicable in this study. Therefore a self-developed scale of 3 items is used to gather quantitative data. The first item is based on the article of O'Leary, Mortensen and Woolley (2011); (1) "How many different project teams are you currently involved in?". This item is supplemented by two items based on the article of Mortensen, Woolley and O'Leary (2007); (2) "On average, how much time do you typically spend on this project on a weekly basis?", (3) "Do you consider this team to be your core project team?". A team has a high level of Multiple Team Membership when team members spend on average lower amount of time, have a low percentage of team members who consider the project as a core project and have team members who are on average more involved in different projects. Based on these presumptions, a correlation table is computed to research the relations between items 1, 2 and 3 (Appendix IV). From this table, it can be concluded that the three selected items correlate significantly ($p < .05$). To take these items together to one 'Multiple Team Membership' construct, this construct is computed as follows:

$$MTM = -\left(Time\ Spend\ on\ Project\ (1) \cdot Core\ Team\ (2) \cdot \left(\frac{1}{Different\ Projects\ Involved\ (3)}\right)\right) + 20$$

The average amount of Multiple Team Membership per team was calculated as follows. For item 1 (Time Send on project) the mean is taken from the teams. Item 2 (Core Team) is a dichotomous variable, where 1 means that an individual mentioned this team as a core team. Per team the percentage of the individuals, which mention their team as their core team, is computed and used in this formula. For item 3 (Different Projects Involved) also the mean is taken. In the computed construct, the items 1 and 2 were reversed scored. When the average time spend on project of a team is high, it will indicate a low level of MTM. Next, when the percentage of Core Team increases, the level of MTM decreases. To get item 3 into the same direction of the other items, 1 is divided by item 3. At this point, the construct's value is reversed coded with a diverse range. Therefore this construct is multiplied by -1. Further, to make the construct easier to interpret, 20 is added to give all the items in the data a positive value. Due to the dichotomous item 2, a standard reliability test over the three items is not applicable. The construct correlates significantly with all the three items (Appendix IV). The computed construct has a range between 0 and 20. In this range, 0 means an extreme low level of Multiple Team Membership. 20 is a high level of Multiple Team Membership. To give an overall understanding of the variable MTM, a graph is displayed in Appendix IV.

3.4.2. Task Expertise, Team States & Processes and Team Adaptability

The items from the constructs Task Expertise, Team Identification, Team Expertise, Psychological Safety, Coordination and Team Adaptability were based on existing scales, already tested in the literature. These items are stepwise analyzed in factor analyses. Due to the sample size of 159 individuals, it was not possible to put all the items into one factor analysis, because of the rule of thumb that for each item included, five responses are needed (Hair, Black, Babin, & Anderson, 2009, p. 101). In this case it was possible to have a maximum of 31 items in an analysis. Due to this restriction, a stepwise factor analysis was executed where first the items of Team Identification, Team Expertise, Psychological Safety and Coordination are analyzed. In this analysis, Items are eliminated due to low or cross loadings. Thereafter, Task Expertise is added to the reduced set of items from the first batch. Finally, the items of Team Adaptability were taken into account. Result of the final factor analysis on the remaining items is shown in Table 1.

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Team Identification is computed by the scale of Van der Vegt and Bunderson (2005). They use the four highest-loading items from Allen and Meyer's (1990) affective commitment scale. In previous research the Cronbach's alpha of these four items is .92 (Van der Vegt & Bunderson, 2005). Participants were asked; "to what extent do you (1) feel emotionally attached to this team", (2) "… feel a strong sense of belonging to this team?", (3) "… feel as if the team's problems are their own?", (4) "… feel like part of the family in this team?". Items were rated on a 7-points scale; 1 = to little extent, 7 = to great extent. The Cronbach's alpha of these items in this research is .92.

Task Expertise is measured using 3 items from the scale of Tiwana and McLean (2005). In previous research, the original scale has a Cronbach's Alpha of .93. The items used in this research are: (1) "Members of this team vary widely in their areas of expertise", (2) "Members of this team have a variety of different backgrounds and experiences" and (3) "Members of this team have skills and abilities that complement each other's". The 3 items are rated on a 5-points scale; 1 = strongly disagree, 5 = strongly agree. The Cronbach's alpha in this study is .81.

Team Expertise is measured using 4 items adapted from Lewis measure of Transactive Memory Systems (Lewis, 2003) (α = .75). These four items are: (1) "Each team member has specialized knowledge of some aspect of our project", (2) "I have knowledge about an aspect of the project that no other team member has", (3) "I will relay confidently on the information that other team members bring to a discussion" and (4) "When other members give information, I will double-check it for myself". The items were rated on a 5-point scale; 1 = strongly disagree, 5 = strongly agree. The adapted scale has a Cronbach's alpha of .67.

Psychological Safety is computed using 3 items from Edmondson (1999) (α = .82). The used items were: (1) "If you make a mistake on this team, it is often held against you", (2) "People on this team sometimes reject others for being different" and (3) "it is difficult to ask other members of this team for help". These items were rated on a 5-point scale; 1 = strongly disagree, 5 = strongly agree. The Cronbach's alpha of the adapted 5-item scale is .70.

Coordination is measured using 4 items of the coordination subscale (α = .80) of Lewis' Transactive Memory System scale (Lewis, 2003). Participants were asked to rate the following items on a 5-points scale (1 = strongly disagree, 5 = strongly agree): (1) "Team members work together in a well-coordinated fashion", (2) "Team members have very few misunderstandings about what to do", (3) "We accomplish our tasks smoothly and efficiently", and (4) "There is much confusion about how we would accomplish our tasks". Cronbach's alpha of this scale was .82.

Table 1 - Results of Factor Analyses

Scale Items and Results of Factor Analyses

Item	Scale Item	Factor A	P	T	I	C	X
Team Identification[b]							
I_1	To what extent do you feel emotionally attached to this team?				**,878**		
I_2	To what extent do you feel a strong sense of belonging to this team?				**,861**		
I_3	To what extent do you feel as if the team's problems are their own?				**,789**		
I_4	To what extent do you feel like parte of the family in this team?				**,821**		
Team Expertise[a]							
X_1	Each team member has specialized knowledge of some aspect of our project.					-,369	
X_2	I have knowledge about an aspect of the project that no other team member has.						**,746**
X_3	Different team members are responsible for expertise in different areas.						.
X_4	The specialized knowledge of serveral different team members is needed to complete the project deliverables.						.
X_5	I know which team members have expertise in specific areas.						.
X_6	I will accept comfortably procedural suggestions from other team members.						.
X_7	I will rely confidently on the information that other team members bring to a discussion.						**,547**
X_8	When other members give information, I will double-check it for myself. *(Reverse)*						**,518**
Psychological Safety[a]							
P_1	If you make a mistake on this team, it is ofthen held against you. *(Reverse)*		**,869**				
P_2	Members of this team are able to bring up problems and tough issues.		.				
P_3	People on this team sometimes reject others for being different. *(Reverse)*		**,826**				
P_4	It is safe to take a risk on this team.		.				
P_5	It is difficult to ask other members of this team for help. *(Reverse)*		**,494**				
Coordination[a]							
C_1	Team members work together in a well-coordinated fashion.					**-,645**	
C_2	Team members have very few misunderstandings about what to do.					**-,715**	
C_3	This team needs to backtrack and start over a lot. *(Reverse)*					.	
C_4	We accomplish the task smoothly and efficiently.					**-,624**	
C_5	There is much confusion about how we would accomplish the task. *(Reverse)*					**-,758**	
Task Expertise[a]							
T_1	Members of this team vary widely in their areas of expertise.			**,917**			
T_2	Members of this team have a variety of different backgrounds and experiences.			**,931**			
T_3	Members of this team have skills and abilities that complement each other's.			**,659**			
T_4	Members of this team synthesize and intergrate their individual expertise at the project level.			.			
T_5	Members of this team can clearly see how different pieces of this project fit together.			.			
T_6	Members of this team competently blend new project-related knowledge with what they already know.			.			
T_7	Overall, members of this team can interrelate to each other's unique skills and abilities.			.			
T_8	Members of this team recognize the potential value of their peers' expertise.			.			
Team Adaptability[c]							
A_1	This team takes creative actions to solve problems for which there are no easy or straight forward answers.	.					
A_2	My team uses innovative ways to deal with unexpected events.	**,380**					
A_3	This team adapts to and deals with unpredictable situations, shifts focus, and takes reasonable actions.	.					
A_4	This team devises alternative plans in a very short time as a way to cope with new task demands.	.					
A_5	My team periodically updates technical and interpersonal competencies, as a way to better perform the tasks in which my team is involved.	**,776**					
A_6	My team searches and develops new competencies to deal with difficult situations.	**,683**					
A_7	My team adjusts behavior to accommodate towards team members' characteristics.	**,880**					
A_8	My team improves interpersonal relationships by matching each team member's needs and aspirations.	**,768**					
A_9	This team remains calm and behaves positively under highly stressful events.	.					
A_{10}	This team maintains focus when dealing with multiple situations and responsibilities.	.					

Note: Exploratory factor analysis; extraction method: principal component analysis; rotation method: oblimin with Kaiser normalization. Loadings in boldface indicate factor structures. Blank fields indicates low loadings (-,35 < x < ,35). Dot indicates item that is eliminated in final factor analysis. [a] Scale range: 1= Strongly disagree; 5 = Strongly agree. [b] Scale range: 1= To little extent; 7 = To large extent. [c] Scale range: 1= Strongly disagree; 7 = Strongly Agree.

Team Adaptability is measured using 5 items adapted from a new scale (α = .95) of Quiteiro (Under Review). This new scale is based on Team Adaptability scales from Pulakos et al. (2000) and (2002) and an individual adaptive performance scale from Charbonnier-Voirin & Roussel (2012). The adapted items used are (1) “My team uses innovative ways to deal with unexpected events”, (2) “My team periodically updates technical and interpersonal competencies, as a way to better perform the tasks in which my team is involved”, (3) “My team searches and develops new competencies to deal with difficult situations”, (4) “My team adjusts behavior to accommodate towards team members’ characteristics” and (5) “My team improves interpersonal relationships by matching each team member’s needs and aspirations”. Participants rated these items on a 7-point scale (1 = strongly disagree, 7 = strongly agree). Cronbach’s alpha of this scale is .87.

Project Success is measured by the scale (α = .86) of Tiwana and McLean (2005). This scale consists of three items all started with “In light of marketplace-mandated changes and new business requirements that arose during project execution, at this present time, …”, followed by (1) “… this project delivers all desirable features and functionality”, (2) “… this project meets key project objectives and business needs”, and (3) “… this project overall is very successful”. Items were rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree). The Cronbach’s alpha is .81.

3.4.3. Control variables

To control the model, four control variables are added: (1) team size, (2) age, (3) virtuality and (4) task interdependence. In general, these variables have or could have influence on Team States & Processes. For example, virtuality influences the level of coordination (Ahuja, 2010) and team size could influence the level of Team Identification or Psychological Safety. Further, these control variables are selected because from managerial insights of the company where this study is conducted, these items could play a role. Within this company, the level of virtuality is high and the used teams vary widely in team size. Additional, the average age of the employees is rather high and there are differences in task interdependence between the teams. Therefore the mentioned control variables are used.

Virtuality is measured by 4 items adapted (α = .85) from Chudoba et al. (2005). The items used are: “To what extent do the members of this team (1) collaborate across different time zones.”, (2) “… collaborate with team members they have never met face-to-face.”, (3) “… collaborate with team members who speak different native languages.”, (4) “… work at different company sites.”. These items are rated on a 5-point scale (1 = (almost) never, 5 = often). The Cronbach’s alpha of these items is .71.

Task Interdependence is measured by 3 items. These items are adapted from a scale of Van der Vegt and Janssen (2003). The used items were: (1) “I need information and advice from my colleagues to perform my job well”, (2) “I need to collaborate with my colleagues to perform my job well”, (3) “I regularly have to communicate with colleagues about work related issues”. These items are rated on a 7-point scale (1 = strongly disagree, 7 = strongly agree). The Cronbach’s alpha is .73.

3.4.4. Data aggregation reliability

In this research the evaluations of the team members are used to asses team level constructs. These constructs are: virtuality, task interdependence, Team Identification, Task Expertise, Team Expertise, Psychological Safety, coordination and Team Adaptability. Under this method to gather team level information, lies the assumption that team member’s ratings would reflect a shared reality within each team. When this assumption is valid, it suggests that ratings from different team members on the same team are similar to one and another, and that they are more similar to one another than they are to team member ratings from other teams (Bliese, 2000). For testing this assumption which refers to the reliability of data aggregation, the intraclass correlation (ICC) of the different constructs is calculated. When the ICC values are positive and significant, then this implies our assumption is valid. The ICC values are summed in Table 2.

Table 2 - ICC values

Intraclass Correlation (ICC)

	Variable	N of Items	ICC
1	Virtuality	4	.703***
2	Team Identification	4	.893**
3	Task Expertise	3	.786***
4	Team Expertise	4	.633**
5	Psychological Safety	3	.482*
6	Coordination	4	.833***
7	Team Adaptability	5	.903***
8	Team Interdependence	3	.613**

Notes: *p < .05; **p < .01; ***P < .001

The ICC is used when one is interested in understanding the inter-rater reliability among multiple targets (e.g., organizations) rated by a different set of judges (e.g., team members) on an interval measurement scale (e.g., Likert-type scale) (LeBreton & Senter, 2008). The ICC is computed for each construct and control variable in this research which is evaluated on a Likert-type scale. This analysis is supported by the instruction in appendix A of the article of LeBreton and Senter (2008). All values were positive and significant ($p < .01$) except for the ICC of Psychological Safety, with a significance level of $p < .05$. Recapitulated, the analysis, using ICC, supports the aggregation of team member responses from the team to create team-level constructs.

Chapter 4

Results

Chapter 4 presents the results of analyses made to give the answers to the hypotheses. After the statistical explanation of the supporting or non-supporting evidence of the hypotheses, a final model is developed which is shown in the following chapter.

The means, standard deviations and zero-order Pearson correlations among the constructs are presented in Table 3. The zero-order correlations show a negative relation between MTM and Team Adaptability. Further, Team Adaptability correlates positively with Project Success. Finally, the proposed mediated constructs correlate positively with Team Adaptability and negatively with MTM.

Table 4 presents the results of the different hierarchical regression analyses. The models in Table 4 include only age as control variable, instead of the four control variables mentioned earlier. In the first sets of regression analyses, these variables were taken into account, but they had no significant influence on the different models (see Appendix V). Considering the relatively small sample size and the need for economical use of the degrees of freedom, it was decided to only use age as a control variable in the final models.

Hypothesis 1 predicts there is a direct relation between Multiple Team Membership and Team Adaptability. Table 3 presents a significant negative zero-order correlation between these constructs ($r = -.546$; $p < .01$), which suggests a confirmation of hypothesis 1. Further, model 1 of Table 4 presents the hierarchical regression analysis where Team Adaptability is the dependent, Age the control and MTM is the independent variable. This model shows that, also when controlling for age, there is a

significant negative relation between MTM and Team Adaptability ($F = 9.23$, $p < .01$; $\beta = -.64$, $p < .01$). Therefore, hypothesis 1 is confirmed.

Hypothesis 2 assumes a positive relation between Multiple Team Membership and Task Expertise. The correlation between these constructs (Table 3) is strongly negative ($r = -.503$; $p < .01$). Also, controlling for age, Model 5 in Table 4 presents a negative relation between MTM and Task Expertise ($F = 4.85$, $p < .05$; $\beta = -.49$, $p < .01$). Thus, there is a strong relation between MTM and Task Expertise, but this is a negative relation which is opposite to hypothesis 2. Therefore, hypothesis 2 is not confirmed.

Hypothesis 3 suggests a positive relation between Task Expertise and Team Adaptability. The zero-order correlation between these constructs is highly positive ($r = .577$; $p < .01$) as is shown in Table 3. Further, Model 9 of Table 4 confirms the positive relation in a regression analysis where the relation between Task Expertise and Team Adaptability is controlled for Age ($F = 9.50$, $p < .01$; $\beta = .63$, $p < .01$). Hypothesis 3 is thereby confirmed.

Next, Hypothesis 4 predicts the influence of Multiple Team Membership on Team Adaptability is mediated by Task Expertise. Both MTM and Task Expertise have shown a significant zero-order correlation with Team Adaptability (Table 3: MTM; $r = -.546$; $p < .01$, Task Expertise; $r = .577$; $p < .01$). Also, in the regression analyses that are controlled for age, both constructs show a significant relationship with Team Adaptability (Table 4, Model 1; and Table 5, Model 9). In Table 4; Model 2, MTM and Task Expertise were both entered into a hierarchical regression simultaneously and both show a significant relation with Team Adaptability ($F = 10.43$, $p < .01$; MTM: $\beta = -.43$, $p < .05$; Task Expertise: $\beta = .43$, $p < .01$). Moreover, the beta of MTM weakened considerably in comparison to Model 1 in Table 4 (Model 1: $F = 9.23$, $p < .01$; $\beta = -.64$, $p < .01$; Model 2: $F = 10.43$, $p < .01$; $\beta = -.43$, $p < .01$), indicating that Task Expertise indeed mediates the relation between MTM and Team Adaptability and confirming Hypothesis 4.

According to Hypothesis 5, Multiple Team Membership is expected to have a negative relation with different Team States & Processes, namely Team Identification, Team Expertise, Psychological Safety and Coordination. Table 3 show a negative correlation between MTM and all of these variables, where Team Identification show the strongest correlation ($r = -.469$; $p < .01$). In Table 4, Model 6 – 9 present the results of the regression analyses of MTM with each of the team processes or states separately, controlled for age. The results indicate that when controlling for all other Team States

Table 3 - Zero-order Pearson Correlations

Means, Standard Deviations, Range, Cronbach's Alpha, and Correlations (n = 31)

Variable	Mean	S.D.	Range	1	2	3	4	5	6	7	8	9	10	11	12
1. Team Size	15,13	7,40	3-28	-											
2. Age	44,17	6,09	28-64	-,079	-										
3, Virtuality	3,52	,60	1-6	,006	-,298	**,71**									
4, Task Interdepend	3,91	,55	1-5	-,140	,292	,085	**,73**								
5, MTM	18,28	3,66	0-20	,084	-,292	,369*	-,354"	-							
6, Team Adaptability	4,82	,76	1-7	,152	-,143	-,194	,226	-,546**	**,87**						
7, Project Success[a]	4,06	,79	1-5	,304	-,045	-,269	-,042	-,234	,537**	**,91**					
8, Team Identification	4,44	1,12	1-5	,176	,066	-,270	,142	-,469**	,621**	,302	**,92**				
9, Team Expertise	3,92	,36	1-5	-,151	-,120	,240	,183	-,135	,357*	,103	,388*	**,67**			
10, Psychological Safety	4,16	,46	1-5	-,084	-,003	-,097	,143	-,360*	,398*	,481**	,257	,558**	**,70**		
11, Coordination	3,67	,54	1-5	,018	-,011	,162	,141	-,200	,626**	,365"	,471**	,575**	,418*	**,82**	
12, Task Expertise	4,08	,38	1-5	-,021	,206	-,005	,498**	-,503**	,577**	,360"	,548**	,600**	,470**	,508**	**,81**

Notes: Bold diagonal elements are the Cronbach's Alpha's of the constructs. Off-diagonal elements are the correlations between different constructs (aggregated team-level data). " p < .10; *p < .05; **p < .01 [a] n = 29. [+] Core team leader's evaluation.

Results of Regression Analyses (n = 31)

	Dependent Variable									
	Team Adaptability				Task Expert	Team Ident	Team Expert	Psy Safety	Coordination	Proj Success
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10[a]**
Independent Variables	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**
Step 1: Control Variable										
Age	-,33*	-,36*	-,29*	-0,33*	,07	-,08	-,17	-,12	-,08	,00
F	,61	,61	,61	,61	1,28	,13	,42	,00	,00	,06
R^2	,02	,02	,02	,02	,04	,00	,01	,00	,00	,00
Step 2: MTM / Team Adaptability										
MTM	-,64**	-,43*	-,41**	-,34*	-,49**	-,49**	-,17	-,39*	-,22	
Team Adaptability										,54**
ΔR^2	,38	,38	,38	,38	,22	,23	,04	,14	,05	,29
F	**9,23****	**9,23****	**9,23****	**9,23****	**4,85***	**4,08***	,68	2,32	,67	**5,27***
R^2	,40	,40	,40	,40	,26	,23	,05	,14	,05	,29
Step 3: Task Expertise										
Task Expertise		,43**		,26						
ΔR^2		,14		,14						
F		**10,43****		**10,43****						
R^2		,54		,54						
Step 4: Team States & Processes										
Team Identification			,27"	,22						
Team Expertise			-,15	-,26						
Psychological Safety			,07	,06						
Coordination			,47**	,45**						
ΔR^2			,30	,10						
F			**9,31****	**8,69****						
R^2			,70	,64						

Notes: "p < .1; *p < ,05; **p < ,01. [a] n = 29. Bold elements indicate significant models.

& Processes, MTM only has a negative relation with Team Identification (Model 6: $F = 4.08$, $p < .05$; $\beta = -.49$, $p < .01$)). All other models were not significant, where the regression model with Psychological Safety involved is just not significant due to the sample size probably. Therefore, hypothesis 5 is partially confirmed but only for the part that there is a negative relation between MTM and Team Identification.

Hypothesis 6 suggests that Team States & Processes (Team Identification, Team Expertise, Psychological Safety and Coordination) will have a positive relation with Team Adaptability. The zero-order correlations show significant positive relation with Team Adaptability for all these constructs. In addition, regression analyses (Model 5 – 8, Table 5) demonstrated for each construct a significant positive relation when controlling for age, except for Team Expertise, which did not show a significant relation with Team Adaptability ($F = 2.23$, $p > .10$; $\beta = .35$, $p < .10$). The values of the regression analyses where Team Adaptability is the dependent variable are respectively Team Identification ($F = 10.14$, $p < .01$; $\beta = .63$, $p < .01$), Psychological Safety ($F = 3.04$, $p < .10$; $\beta = .40$, $p < .05$) and Coordination ($F = 9.76$, $p < .01$; $\beta = .63$, $p < .01$). Therefore, Hypothesis 6 is confirmed: Teams States & Processes are positively related to Team Adaptability is confirmed for Team Identification, Psychological Safety and Coordination but not for Team Expertise.

Hypothesis 7 assumes the influence of MTM on Team Adaptability is mediated by team (Team Identification, Team Expertise, Psychological Safety and Coordination). All constructs (MTM, Team Identification, Team Expertise, Psychological Safety and Coordination) have shown a significant zero-order correlation with Team Adaptability (Table 3: MTM; $r = -.546$, $p < .01$, Team Identification; $r = .621$, $p < .01$, Team Expertise; $r = .357$, $p < .05$, Psychological Safety; $r = .398$, $p < .05$ and Coordination; $r = .626$, $p < .01$). After confirming Hypothesis 6, one can conclude that Team Expertise could not have a mediated effect, because Team Expertise does not have a significant effect on Team Adaptability (Table 5, Model 6: $F = 2.23$, $p > .10$; $\beta = .35$, $p < .10$). Moreover, Model 8 and 9, where Psychological Safety and Coordination are dependent variables, from Table 4 initiates there is no significant relation between MTM and Psychological Safety and Coordination (Model 8; $F = 2.32$, $p > .10$; $\beta = -.39$, $p < .05$, Model 9; $F = .67$, $p > .10$; $\beta = -.22$, $p > .10$). Thus, these constructs (Psychological Safety and Coordination) have no mediated effect. This means, that the last remaining construct which could have a mediated effect of Team States & Processes is Team Identification. Both constructs, MTM and Team Identification, show a significant relationship with Team Adaptability (Table 4, Model 1; and Table 5, Model 5). Also, when MTM and Team

Table 5 - Regression Analyses with Team Adaptability as Dependent Variable

Results of Regression Analyses (n = 31)

	Dependent Variable: Team Adaptability								
Independent Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
	β	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**
Step 1: Control Variable									
Age	-,30*	-,29''	-,31''	-,29*	-,19	-,10	-,14	-,14	-,27''
F	,61	,61	,61	,61	,61	,61	,61	,61	,61
R^2	,02	,02	,02	,02	,02	,02	,02	,02	,02
Step 2: MTM									
MTM	-,43*	-,60**	-,57**	-,53**					
ΔR^2	,38	,38	,38	,38					
F	**9,23****	**9,23****	**9,23****	**9,23****					
R^2	,40	,40	,40	,40					
Step 3: Team States & Proc / Task Expertise									
Team Identification	,44**				,63**				
Team Expertise		,24				,35''			
Psychological Safety			,19				,40*		
Coordination				,52**				,63**	
Task Expertise									,63**
ΔR^2	,15	,050	,03	,25	,40	,12	,16	,39	,38
F	**10,93****	**7,46****	**6,78****	**16,96****	**10,14****	2,23	**3,04''**	**9,76****	**9,50****
R^2	,55	,45	,43	,65	,42	,14	,18	,41	,40

Notes: ''p < ,1; *p < ,05; **p < ,01. [a] n = 29. Bold elements indicate significant models.

Identification are both entered into a hierarchical regression simultaneously (Table 5, Model 1), both show a significant relation with Team Adaptability ($F = 10.93$, $p < .01$; MTM: $\beta = -.43$, $p < .01$; Team Identification: $\beta = .44$, $p < .01$). Moreover, the beta of MTM weakened considerably in comparison to Model 1 in Table 4 (Table 4, Model 1: $F = 9.23$, $p < .01$; $\beta = -.64$, $p < .01$; Table 5, Model 1: $F = 10.93$, $p < .01$; $\beta = -.43$, $p < .01$), indicating that Team Identification indeed mediates the relation between MTM and Team Adaptability and hence confirming Hypothesis 7.

Finally, Hypothesis 8 predicts a positive relation between Team Adaptability and Project Success. At first glance, the correlation table (Table 3) demonstrates a positive significant correlation ($r = .537$; $p < .01$). Further, Model 10 of Table 4 presents the regression analysis where Project Success is the dependent and Team Adaptability the independent variable, controlled for Age. This analysis shows a highly positive relationship between Team Adaptability and project success ($F = 5.27$; $\beta = .54$; $p < .01$). Thus, the final hypothesis is also supported.

Additional to the results of the proposed hypotheses, the influence of the control variable Age is remarkable. In the regression analysis where all constructs were included (Table 4; Model 4) Age has a significant negative beta in relation to Team Adaptability ($F = 8.69$, $p < .01$; $\beta = -.33$, $p < .01$). The suspicion that Age could have influence on the proposed theoretical model (Figure 1) is confirmed. This means Age has a negative relation to Team Adaptability.

Chapter 5

Discussion

This chapter explains the contribution of this study to the scientific world and organizations in the innovative industry. First, the results will be analyzed followed by the limitations of this research. Finally, future research aspects are noted.

The aim of this study is to examine the relationship of Multiple Team Membership and Team Adaptability, in the context of the new product development industry. We expected that there should be a relationship between MTM and Team Adaptability. That this could be either positive or negative was mainly based on the benefits and challenges accompanied with a MTM setting. Our research findings show that this relation exists and has a negative direction, based on the data gathered by the organization TE Connectivity.

To get a more complete picture of the mechanisms linked to the main relation MTM and Team Adaptability, some additional constructs are involved in this research. These constructs are selected based on literature and the presumption that they could have influence on the relationship of MTM and Team Adaptability. These constructs are: Task Expertise, Team Identification, Team Expertise, Psychological Safety and Coordination. In Figure 2 the Final Theoretical Model, taking the empirical results into account, is presented. What we found is a direct negative relation between MTM and Team Adaptability. This relation is suppressed by three mediated constructs, namely Task Expertise, Team Identification and Psychological Safety. By adding these constructs into the model, the direct relation impaired. From these intermediate constructs, Task Expertise and Team Identification have the biggest influence. The relation between MTM and Psychological Safety was not yet significant, but through the

limited sample size and the highly correlations, we suppose this relation is valid. Further, this Final Theoretical Model (Figure 2) shows that Coordination has a positive relation with Team Adaptability, but has no significant relation with MTM.

Besides the mechanisms described in this study about the relation between MTM and Team Adaptability, the relation between Team Adaptability and Project Success is important. Generally, the term Team Adaptability is hard to make tangible for organizations where Project Success is rather clear and emphasizes a beneficial aspect. In this study we found a strong positive relation between Team Adaptability and Project Success. Both correlations and the regression analyses are strongly significant, which means that the level of Team Adaptability contributes to the Project Success of the teams in the organization.

Finally, from the control variables we used in this research, we found that Age influences Team Adaptability negatively. For organizations this finding could be interesting if the mean age in each team of the organization is rather high.

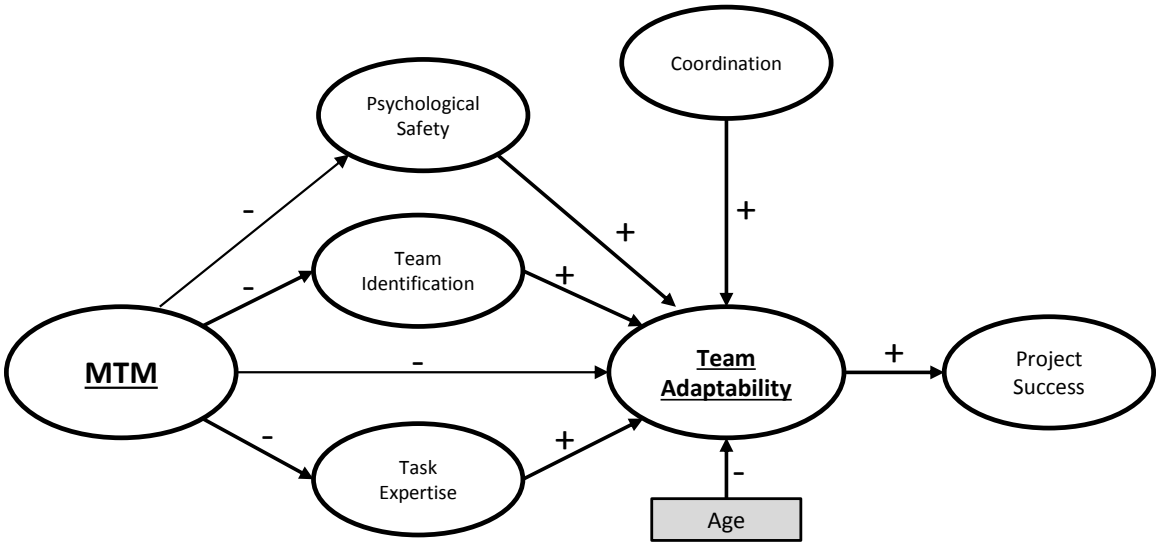

Figure 2 - Final Theoretical Model

In the Final Theoretical Model (Figure 2) from MTM there are only negative relations towards another construct. This means when the level of MTM increases, the level of Task Expertise, Team Identification and Psychological Safety decreases. This also implies that the level of Team Adaptability decreases, as this is positively related to the constructs. When the level of MTM is high of a team, implying the majority of the team members is active in 2 or more teams, the time spend per person to this team is rather low. Most of the team members consider this team not as their core team. Both factors combined show this has a negative influence on Team Adaptability. This

happens because through the MTM setting, the availability or time spends of a team needed for adaption to a certain situation is not sufficient. One can imagine when adaption is needed and the team members are at that moment busy with the other teams they are active in, this adaption fails. Therefore a negative direct relation is found between MTM and Team Adaptability.

Next, if team members were active in a lot of different teams the feeling to belong to a particular team will be lower. Therefore a negative relation is found between MTM and Team Identification. Also “the feeling that it is safe to take personal risks within the team” decreases due to MTM, which is mentioned in the model as the negative relation between MTM and Psychological Safety. This interplay between MTM, Team Identification and Psychological Safety will lead to a lower level of Team Adaptability. This is because Team Identification and Psychological Safety, in their turn, have a positive relation with Team Adaptability. Additional to these constructs which have a positive relation with Team Adaptability, Task Expertise and Coordination are beneficial. If an organization could create a situation where expertise is available for the project teams, it ensures that teams are better able to react on cues from the environment (Burke, Stagl, & Salas, 2006), because these specialists have more knowledge and abilities in accordance to their tasks. Further, if also the coordination is well regulated and team members’ roles are clear within the team, teams are better able to adapt to cues. Therefore Task Expertise and Coordination have a positive relation with Team Adaptability. Finally, all these constructs which enhances Team Adaptability ensure that the level of Project Success increases, because Team Adaptability is strong positive related to Project Success. At the end, this Final Theoretical Model (Figure 2) shows organizations that when they focus on Team Adaptability, Psychological Safety, Task Expertise, Coordination and Team Adaptability it will enhance their overall project successes.

To get a deeper insight into this model, the discrepancies between the final (Figure 2) and presumed (Figure 1) theoretical model will be explained. The first remarkable difference is the relation between MTM and Task Expertise. We hypothesized this relation should be positive. However, during analyses we found a strong negative relation between these constructs. This surprised us because this beneficial relation was clearly mentioned by Mortensen et al. (2007). An explanation for this negative relation could be that within the sample used, the diversity in expertise was not high. Afterwards it seemed that most of the participants were engineers (although in various fields), which means they mainly have the same expertise and thoughts towards a situation. Additional, within the teams of the sample no special expertise was used, it were all “general” engineers. However, we still have the feeling this relation direction

should be different and will have another outcome when the sample of future research has a higher degree of special expertise and expertise diversity.

The second discrepancy is in accordance with the construct Team Expertise. This construct is one of the Team States & Processes but is not more involved in the final (Figure 2) theoretical model. This construct which is explicitly mentioned in the model of Burke et al. (2006) (Appendix I), seems to have no significant relation with Team Adaptability or MTM. An explanation for this is the measurement used for this construct in this study is inadequate. Referring to (Table 1) the factor loadings according to the Team Expertise items in this factor analysis are doubtful. Further, the Cronbach's alpha of this construct is just sufficient (Table 3; $\alpha = .67$). Additional to these statistical declarations, the items used are difficult to evaluate by participants which operate in a MTM setting. If you must evaluate the team member's knowledge of the knowledge of your team members in a team you not consider as your core team, this seems to be nonsensical. Further, the items used for Team Expertise are rather similar to the items of Task Expertise. There is a chance that this construct will measure a large part of Team Expertise. Afterwards, we can conclude this construct was not measurable in our sample and research set up. If one likes to find evidence for the positive relation between Team Expertise and Team Adaptability mentioned in Burke et al. (2006) this must be done in a context where MTM not occurs.

Thirdly, no significant relation is found between MTM and Coordination. In the presumed theoretical model (Figure 1) this construct was part of the Team States & Processes. Also, coordination was mentioned in the article of Mortensen et al. (2007) as one of the challenges of MTM. Therefore it is remarkable that no evidence for this proposed direct relation is found. On the other hand, as mentioned in Chapter 2, internal coordination is influenced by Team Identification and Psychological Safety which showed to have a negative relation with MTM. So, improving the level of Team Identification and Psychological Safety in a team enhances the internal coordination.

Fourth, in accordance to Psychological Safety in this study we found no hard evidence of the relation between this construct and MTM. Although the correlation between these phenomena is strongly negative, in the regression analyses no significant model ($p < .05$) was found, probably by the limited power of the sample. Although the missed significance level in the regression analyses, everything found in this study points out that MTM has a negative relation with the level of Psychological Safety in a team.

Besides the discrepancies between the two theoretical models, the final model has some underlying issues which have to be stressed. First, this new model gives insights in the relations of the constructs used in this research. There are several

constructs that positively influence Team Adaptability. But, the strengths of the relations differ. If an organization has the vision to improve their Team Adaptability level, they could best focus on Task Expertise, Team Identification and Coordination. These constructs have the strongest positive relation and will have a bigger impact on the Team Adaptability improvement instead of Psychological Safety or Age for instance. Additionally, focusing in an organization on the Team Adaptability is beneficial, because clear evidence is found in our research that Team Adaptability positive significantly relates to Project Success. This may contribute to the reasoning in a company to shift the focus from team performance towards Team Adaptability.

Second, with the offered model (Figure 2) it seems that MTM is not beneficial at all for organizations. Although the use of MTM in organizations grows (O'Leary, Mortensen, & Woolley, 2011), awareness of the negative relationship with Team Adaptability is important to keep in mind for organizations with a MTM structure. Besides the fact of this negative relation, organizations should be able to prevent or decrease the negative influence to an acceptable level. For instance, a reduction in the amount of projects an individual is working on could lead to a situation where this person creates a higher level of Team Identification of the remaining project teams. In this case, the scope of the individual is narrowed and more focus can be brought to the projects. Also setting norms and values in your organization which supports a safety environment for employees could help to increase the level of Psychological Safety of teams in your organization.

In sum, this study confirms some propositions set in the article of Burke et al. (2006) which supports Team Adaptability depends on Task Expertise, Team Identification, Psychological Safety and Coordination. Further, this study gives new insights towards the exploratory relation between MTM and Team Adaptability. Encouragement is given to science that there are mechanisms between these constructs which are accountable for the performances of project teams. These insights broaden the scope of the aspect Team Adaptability and provide food for thought of the usability of Multiple Team Membership. Additionally, it gives organizations handles to better understand the underlying mechanisms in project teams which have to adapt continuously.

5.1. Limitations

It is important to note certain limitations of this study. First, the sample size of this research is just sufficient. It was desirable to have 35 teams in the final sample, but due to some overdue of registration, the ERP systems of the company was not up to date for

all projects. Therefore, some participants who received a questionnaire were not working for the selected project. This led to the situation that 4 projects had to be excluded from the sample. The final sample consists of 31 teams based on the evaluations of 159 individuals.

Second, due to the Multiple Team Membership setting, it was in advance not possible to get a 100% response from the team members. To confirm the assumption of independence, one individual could only fill out one questionnaire. To get the best random sample of team members selected for a project, a linear model was built with use of the open solver in Excel. Through the use of this instrument, it was possible to get a minimum of 44% of selected team members to one project. Taking into account the response rate afterwards, the lowest value of team evaluations is 27,5%, which is acceptable.

Third, like much of the existing research on team level data (Van der Vegt & Bunderson, 2005), Project Success was measured by supervisor ratings. Since there is no data in research to show that this perceptual measure of Project Success is a predictor of more “objective” Project Success (Van der Vegt & Bunderson, 2005), it is possible that supervisor (core team leaders) ratings of performance were biased. Research using more objective Project Success measures would provide greater confidence in the robustness of these observed relations. One of the points in this research which could bias the results, are cultural differences. One of these is that USA leaders have systematically higher performance ratings. From the perspective of the prejudices, one could state that a person from the USA is generally more enthusiastic than a Dutchman. But in this study it is hard to find out that kind of bias. A vignette study in advance could have sorted this bias out (Kapteyn, Smith, & van Soest, 2007).

Fourth, the measurement of MTM is developed in this study by the researcher. In literature about MTM no method is described which was useful in this research to measure actual influence of MTM to the data. Mortensen et al. (2007) used a survey method in their research where the preference of 401 professionals was asked. They did not split up their sample into teams. Also the study of O’Leary et al. (2011) uses no measurement for MTM, because they set propositions based on literature and gave no quantitative information. Due to absence of a quantitative method for MTM, a measurement for MTM was developed. The underlying items used in this measurement were based on criteria found in the literature about MTM. This first shot towards a measurement of MTM was useful in this set of data, but showed little variance in the final distribution. Therefore it is hard to determine to what extent these found results are reliable and valid. This needs to prove itself in future studies where this instrument is being used.

5.2. Future research

This exploratory research of the relationship between MTM and Team Adaptability contains different aspects which could be relevant for future research. First, given the rather small sample size (31 teams), statistical power might play a role in testing our hypotheses, which implies that we are careful to deal with the non-significant found results. On the other hand, it also suggests that the found results in this sample are strong. Further, this research is conducted in a sample of project teams from just one company. To be better able to generalize these results and to get stronger significant results of some hypotheses, future studies could make use of a bigger sample which contains teams from different companies.

Second, further development of a MTM measurement is something which is needed in future research, because otherwise it is difficult to find quantitative evidence for mechanisms in accordance with MTM. In this study, the items time spent on the project team, number of different project and the average rate of having the feeling that the proposed project team is your core team, were combined to one measurement. These items were selected based on criteria from MTM literature. Although little literature is dedicated to MTM it was from my point of view the only way to develop a measurement. For future research, it would be nice if researchers will test this measure, but also come with alternatives. Comparing between different measurements will proof if this developed scale is useful in field studies related to MTM.

Third point for future research is related to the measurement of Task Expertise. In this study, we proposed that MTM should have a positive relation with Task Expertise. However, the analyses show us a strong negative relation between these constructs. This outcome is still very surprising and difficult to support by literature. Extra attention to this relation in the future could extra support the findings in here or prove the opposite. Further, the items used for the construct Task Expertise are difficult to use in a MTM setting, because they ask the opinion about their fellow members. But if the level of MTM is high and the main part of the team is active in a lot of different projects at the same time, it is difficult to initiate a reliable answer to the items. Therefore in future research it is advisable to use another set of items related to Task Expertise. For example if you are not committed to a team it is difficult to answer the following item question: “Members of this team have a variety of different backgrounds and experiences”. Related to this item, it will be more accurate to ask what the background is of the respondent and determine afterwards, when all the team members answered the question, what the level of task expertise is in the team.

Finally another promising avenue for future research is preventing the situation, in which you have to select the team members for the projects and you know in advance

that 100% response is not possible. If the pool of teams from your sample consists of teams from different departments or companies, the overlap between the employees of the teams in your sample is not present. If this is the case, one will get better team average values of the measured constructs. Otherwise, a mathematical method is needed, as was in this study, to optimize the team member selection.

Chapter 6

Recommendations

This final chapter explains why the findings from this research will support the business of new product development. Practical recommendations are mentioned which should be implementable for an organization in this industry.

As mentioned in the previous chapter, there are some variables that have a substantial influence on the adaptability of a project team. These aspects are: Task Expertise, Team Identification and Coordination. As mentioned in Chapter 5, Team Adaptability has a positive relation with Project Success. As the named aspects (Task Expertise, Team Identification and Coordination) are positively related to Team Adaptability, they are indirectly positively related to Project Success. Therefore it is important for an organization to stress these aspects and use them beneficially.

Task Expertise in this context refers to highly specialized employees in your organization. To make use of a Multiple Team Membership setting, it is beneficial for an organization to attract specialized employees. When you have employees with a certain specialism, it supports Team Adaptability due to the knowledge and abilities such an employee has to react on unexpected events. Therefore it is advisable to organizations to set up teams with members where some of them have a specialist on a certain domain. Additional to this recommendation related to Task Expertise, is the diversity of expertise in a team. If an organization is able to create teams where team members with a different domain of knowledge sit together, it broader the overall scope of the team. This broader scope of a project team enhances Team Adaptability in the sense that these kinds of teams are better able to recognize cues from the environment. So, for

organizations it is advisable to use employees with special expertise in project teams and try to mix different expertise among the teams, for enhancing Team Adaptability and therefore create a higher level of Project Success.

Another aspect that is strongly positive related to Team Adaptability is Team Identification. The feeling to belong to a team is important for an individual to perform in a team and is therefore important for the success of a project team. In a Multiple Team Membership setting, the level of Team Identification is lower. This is understandable because one can imagine that when you are working in a lot of teams, you cannot consider each team as an important team where you are part of. This research confirms that the use of a Multiple Team Membership setting contributes to a lower level of Team Identification. From this point of view, it is recommendable to organizations to maximize the amount of teams an individual could be part of. Based on this research, it is hard to set a certain level on the maximum teams for an individual, but a limit on the amount of teams will prevent a low level of Team Identification. Logically thinking, if an individual is related to more than 10 teams with a 40 hourly work week, one could only spend 4 hours per week per project. This is a low amount where it is hard for that employee to contribute sufficiently to the teams. Based on this logical way of thinking, we recommend that the maximum amount of teams linked to one individual lies between five to eight teams. To create evidence for this statement, future research is needed.

Next aspect which strongly influences Team Adaptability is Coordination. This positive relation was already mentioned in the article of Burke et al. (2006). Coordination in this research is not influenced by Multiple Team Membership, but it is still an important aspect for team work in organizations. In project teams Coordination can be influenced by different aspects. The coordination level increases when the team size increases (Payne, 1995). In this study, the team size varies from 3 to 28 members. One can imagine that the coordination within a team of 28 members is more difficult than in a team consisting of 3 individuals. Although team size was a control variable which did not influence the regression analyses, it is a point of attention for organizations. Also in this case, there should be an optimum of the team size related to Coordination. To reduce the proliferation of team size, I suggest the use of key team members which are fully involved in the project. Besides these members, additional individuals could support the team with expertise or knowledge, but it is not necessary that these additional team members were always in touch with the team (e.g. were involved in every meeting). By creating teams where the key team members were tactically selected it is also possible to create more structure in the different project teams. A clear structure within a team enhances coordination which, in turn, enhances Team Adaptability. So, for organizations it is useful to optimize the amount of key team members to improve the level of coordination.

To cover the different aspects in an organization, a possible instrument which could increase the probability of high Project Success, is a comprehensive kick-off meeting at the beginning of each project. This kick-off meeting should not only include the targets and planning of the project, but must mainly focus on the team members. It is important to explain why the team is composed in such way and what the roles are of the team members. Further, it is important for the project leader to stress the importance of each member. Intern in the team, this creates a better understanding of each other's roles and tasks and it gives you as individual the feeling that you are needed for the team. In addition with mentioning norms and values in the kick-off meeting, it will create an environment in which employees know what is expected during this project and what the way of working is. If a kick-off meeting is used in this way, it will be beneficial for different aspects mentioned in this study.

When in the kick-off meeting the composition of the team is explained and it is stressed that you are important, it will increase the level of Team Identification. It gives individuals the feeling to belong to that specific team because these individuals know why they are needed, but also know that other team members are aware of their importance in the group. Further, in combination with a psychological safe environment created through mentioning the norms and values used in the project, it will also enhance the level of Psychological Safety. Individuals, at this moment, are aware of their roles and importance and know which behavioral rules will be used, therefore can predict how many personal risks they can take. When the norms and values are well respected, this increases the overall team level of Psychological Safety. Setting norms and values is a difficult task, because the personal feeling of safety within a team may disappear by simple remarks of other team members, for instance: "is that you again, with that question?" Therefore it is important for a project leader to set norms and values used in the project teams, to protect the safety of team members.

In relation to Task Expertise, when in the kick-off meeting the roles and qualities of the team members are explained, it gives the team members a better view of the expertise in their team. To discuss this, it could be possible that an additional expertise is recommended by the team due to experience from other projects. Further, by knowing the expertise of fellow team members, individuals know which fellow team mate can support them in certain situations. Therefore, the use of Task Expertise will improve.

Finally, the use of a kick-off meeting in this setting will enhance coordination in a team. As it is clear for everyone what the different roles are in the team and who is responsible for what, it makes it easier for both the project leader as well as for fellow team members to get to the right source of information and to divide responsibilities. When this information is available, team members are better able to monitor each other

and to back-up when needed. Since these aspects supports Coordination, mentioned in paragraph 2.3.2., the use of a comprehensive kick-off meeting enhances Coordination.

In sum, this instrument is beneficial for all the aspects which correlate positively with Team Adaptability. Since Team Adaptability is positive related with Project Success, using such kick-offs will at the end contribute a higher level of project successes in the organization.

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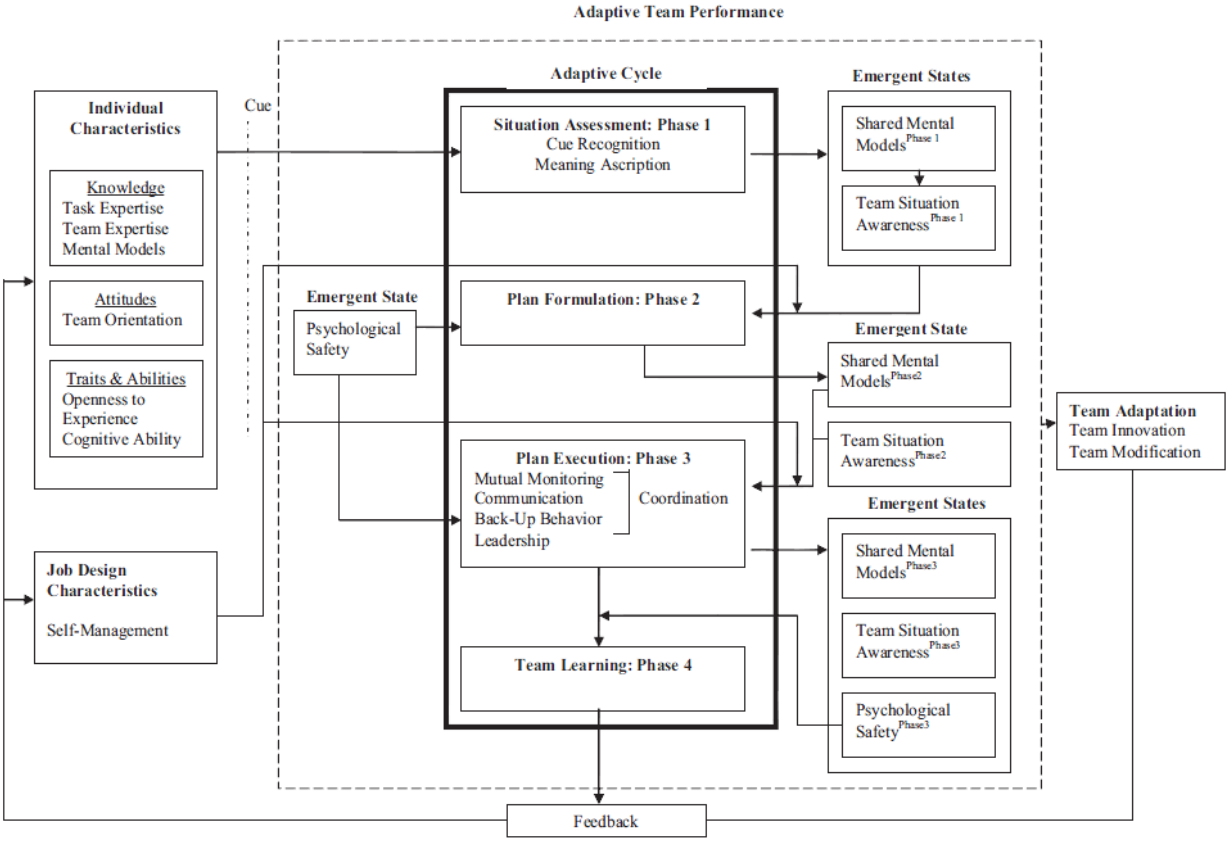
Appendix I

Adaptive Model

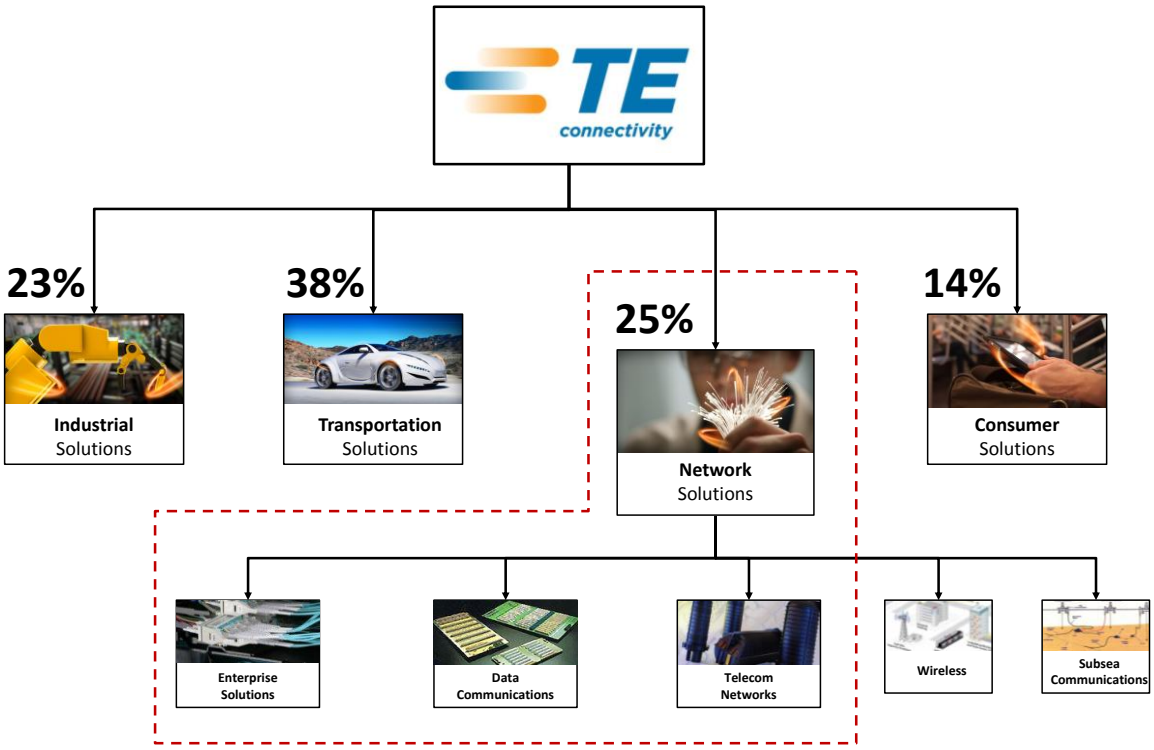
This adaptive model is developed by Burke et al. (2006).



Appendix II

Organizational Structure TE

Below the structure of the company TE Connectivity is displayed. The study is executed in the departments which are involved in the dotted line market area. The percentages in this figure refer to the percentage of the total turnover of TE Connectivity.



Appendix III

Individual Selection with Linear Model

The figure below shows a screenshot of the final solution of the individual selection of the teams. It is accurate to show the whole file of this linear model used in Excel, because the list of individuals is too long. If you like to have more explanation about this used method, you are free to contact the author.

	#	#	Projects 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Title	umber of projects	f selected projects	PRJ-11-000000035	PRJ-11-000001899	PRJ-11-000002143	PRJ-11-000002840	PRJ-11-000005096	PRJ-11-000005634	PRJ-12-000000491	PRJ-12-000001697	PRJ-12-000001815	PRJ-12-000001989	PRJ-12-000002858	PRJ-12-000002859	PRJ-12-000002891	PRJ-12-000002999	PRJ-12-000003079	PRJ-12-000003343	PRJ-12-000003695	PRJ-12-000005585
# project members			15	18	14	13	13	21	28	19	2	26	27	26	6	18	16	11	11	24
# selected project members			13	12	7	8	6	10	13	15	2	12	13	13	6	12	8	5	6	11
% of team member in sample			1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,50	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
% selected team members			0,87	0,67	0,50	0,62	0,46	0,48	0,46	0,79	0,50	0,46	0,48	0,50	1,00	0,67	0,50	0,45	0,55	0,46
Mean	1,77	278	0,87	0,67	0,50	0,62	0,46	0,48	0,46	0,79	1,00	0,46	0,48	0,50	1,00	0,67	0,50	0,45	0,55	0,46
Sr Mgr Product Development Engineer	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Sr Principal Engineer	3	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Product Development Engineer	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fibre Design Engineer	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Test Engineer	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Secretaria Ingenieria	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Jefe Laboratorio	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Tecnico De Laboratorio	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Tecnico De Laboratorio	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Tecnico De Laboratorio	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Mgr R&D	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scientist	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Designer	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Designer	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanical Engineer	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanical Engineer	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Snr Mgr Product Development Engineer	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Engineering Manager	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Development Engineer Cad	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
Title	PRJ-13-000002194	PRJ-12-000000541	PRJ-11-000005280	PRJ-12-000001969	PRJ-10-000002047	PRJ-10-000003992	PRJ-12-000003270	PRJ-12-000003326	PRJ-12-000003333	PRJ-11-000004814	PRJ-12-000001557	PRJ-12-000002101	PRJ-13-000001140	PRJ-13-000000933	PRJ-12-000003029	PRJ-12-000005730	PRJ-12-000002605	Mean	stde
# project members	3	16	24	10	8	10	12	22	20	12	9	4	7	11	9	3	4	14,057	7,52
# selected project members	3	8	11	5	6	5	7	11	11	9	7	4	5	6	4	2	2	7,943	3,69
% of team member in sample	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,986	0,08
% selected team members	1,00	0,50	0,46	0,50	0,75	0,50	0,58	0,50	0,55	0,75	0,78	1,00	0,71	0,55	0,44	0,67	0,50	0,604	0,17
Mean	1,00	0,50	0,46	0,50	0,75	0,50	0,58	0,50	0,55	0,75	0,78	1,00	0,71	0,55	0,44	0,67	0,50	Cut-off value	0,44
Sr Mgr Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,62	
Sr Principal Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Fibre Design Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Test Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Secretaria Ingenieria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Product Development Engineer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jefe Laboratorio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Tecnico De Laboratorio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Tecnico De Laboratorio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Tecnico De Laboratorio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Mgr R&D	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0		
Scientist	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		
Designer	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
Designer	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
Mechanical Engineer	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
Mechanical Engineer	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
Snr Mgr Product Development Engineer	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
Engineering Manager	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
Product Development Engineer Cad	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		

Appendix IV

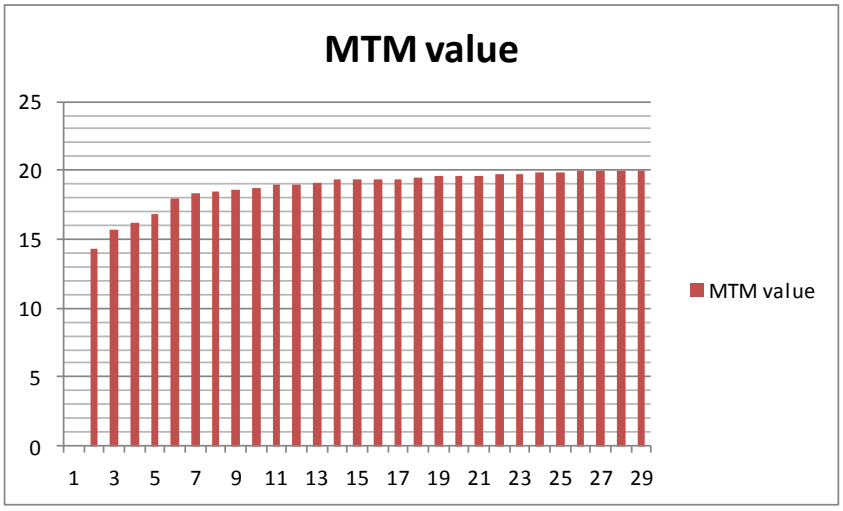
Additional Information MTM

In this appendix additional information about the self-developed construct MTM is shown. The first table refers to the correlation table of three used variables to compute MTM. This table showed that all variables were touched by the new overall construct MTM. The second figure shows the values of MTM per teams. This gives you an indication of the distribution of MTM.

Correlation MTM-Items[a]

Item	Mean	S.D.	1	2	3
1. Time Spend on Project	8,96	8,45			
2. Core Team	,49	,29	,433*		
3. Other Projects Involved	5,16	2,31	-,448*	-,480**	
4. Multiple Team Membership	18,28	3,66	-,856**	-,509**	,417*

Notes: *p < .05; **p < ,01 [a] n = 31



Appendix V

Additional Regression Analyses

The additional regression analyses not mentioned in the main text are available in this appendix. See the next page.

Results of Regression Analyses (n = 31)

	Dependent Variable									
	Team Adaptability				Task Expert	Team Ident	Team Expert	Psy Safety	Coordination	Proj Success
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10[a]**
Independent Variables	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**	**β**
Step 1: Control Variables										
Team Size	,18	,17	,13	,12	,06	,21	-,13	-,06	,04	,25
Age	-,34''	-0,39*	-,36*	-0,38**	,03	-,11	-,15	-,13	-,02	,01
Virtuality	-,33''	-,17	-,21	-,22	,13	-,14	,27	,00	,26	-,09
Team Interdependence	,38''	,02	,15	,09	,34''	,06	,10	,04	,03	-,06
F	1,88	1,88	1,88	1,88	2,23''	1,11	,84	,20	,30	1,23
R^2	,22	,22	,22	,22	,25	,15	,12	,05	,04	,17
Step 2: MTM / Team Adaptability										
MTM	-,57**	-,37*	-,36*	-,31''	-,43*	-,45	-,23	-,38	-,30	
Team Adaptability										,50*
ΔR^2	,24	,24	,24	,24	,14	,14	,03	,10	,06	,20
F	**4,17****	**4,17****	**4,17****	**4,17****	**3,17***	2,01	,90	,86	,60	**2,70***
R^2	,46	,46	,46	,46	,39	,29	,15	,15	,11	,37
Step 3: Task Expertise										
Task Expertise		,47**		,24						
ΔR^2		,13		,13						
F		**5,72****		**5,72****						
R^2		,59		,59						
Step 4: Team States & Processes										
Team Identification			,15	,10						
Team Expertise			-,05	-,14						
Psychological Safety			,01	,00						
Coordination			,52**	,50**						
ΔR^2			,28	,17						
F			**6,78****	**6,41****						
R^2			,74	,76						

Notes: "p < .1; *p < ,05; **p < ,01. [a] n = 29. Bold elements indicate significant models.