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Identifying the impact of team composition on SWOT analysis – an fsQCA study at a Dutch purchasing firm

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ABSTRACT

Background: Through a literature review it was concluded that team-level factors and their effects on SWOT are poorly understood in literature. Team-level factors are defined in this study as team size, hierarchy, structure, composition and leadership. These factors are expected to influence SWOT team performance and effectiveness and should therefore be studied to gain more insight into the optimal SWOT approach.

Method: The author measured the impact of team factors on SWOT through a total of 6 workshops. Each workshop is performed by 2 to 6 members of a Dutch purchasing consultancy firm. A fuzzy-set qualitative comparative analysis (fsQCA) is applied to survey data. Nine team-level input variables are studied as independent variables on three dependent variables. Of which two measures for SWOT team effectiveness and one measure for performance.

Results: Generally, SWOT teams should be small in size for effectiveness measures, while performance measures improve with larger teams. Diversity in teams benefits both effectiveness and performance, with some exceptions. SWOT workshop experience is beneficial, but only with a minor effect. Team cohesion and emergent leadership play minor roles.

Conclusions: The literature on teams influencing strategic management is limited and this study has presented statistical proof of team-level factors influencing SWOT team effectiveness and performance. Although further research can be performed to include more variables and increase the size and diversity of the dataset, new insights into team formulation have already been generated. The practicing manager should be aware of team-level factor influence and form their strategic planning teams accordingly. Especially since this study's findings sometimes contract common knowledge found in literature. To illustrate, diversity in teams is not necessarily beneficial and teams can benefit from being relatively small.

***Keywords**:* SWOT analysis, team performance, team effectiveness, fsQCA

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LIST OF ABBREVIATOINS

Initialism	Contents of Initialism	Meaning of Initialism
SWOT	Strengths Weaknesses Opportunities Strengths	The four quadrants of SWOT for which factors influencing the organization are listed
fsQCA	Fuzzy-set Qualitative Comparative Analysis	An analysis method using fuzzy sets
SAR	Self-Assessment Report	A survey that participants take to evaluate their themselves or their team or their results
BOR	Behavioural Observation Scale	A method of assessing the performance or effectiveness of individuals or teams by observing their behaviour
EAR	External Assessment Report	A survey that non-participants take to evaluate participants or their results
MEP	Mean External Panel	A construct that measures the effectiveness of a SWOT team through an external panel of consultants
MTP	Mean Team Performance	A construct that measures the performance of a SWOT team through a self-assessment report
MSE	Mean SWOT Effectiveness	A construct that measures the effectiveness of a SWOT team through an external panel of consultants

1. INTRODUCTION

Firms are often confronted with the need to evaluate and improve their competitive position through strategic management. The concept of strategic management describes a collection of decisions and actions to determine the long-term direction of an organization (Yüksel & Dağdeviren, 2007). Several tools and frameworks have been developed over the past decades for strategic management among which is the SWOT-analysis framework. SWOT is an initialism for Strengths, Weaknesses, Opportunities and Threats that exist or can appear within the environment of an organization. Subsequently, the SWOT analysis summarizes the most important internal and external factors that have the power to influence the future of the organization (Yüksel & Dağdeviren, 2007). These are called strategic factors. The information that is obtained through a thorough analysis of the internal and external environment of the firm is then presented in a matrix (Yüksel & Dağdeviren, 2007). By forming combinations of the determining factors within this matrix, suggestions can be laid out that form the basis of strategic plan formulation.

Strategic management is an important topic for nearly every organization. Proper strategic management can help firms gain a competitive advantage and can generally enable an organization to meet its goals and objectives. The SWOT analysis has been used for this purpose since the mid-20th century. Much of today's business literature related to SWOT is focused on improving either the method of analysis or the formation of results. This has led to the applicability of SWOT in an ever-expanding field of academia and business. Very little attention, however, has been given to the source of information for the SWOT analysis. Generally, researchers and managers form teams of individuals with knowledge about the organization from within the organization without much methodological thought about factors like team diversity and composition. However, this group that performs SWOT and the ideas and concepts formulated by them are crucial to the formation of quality results. Therefore, this research aims to identify the impact of group-level factors on SWOT analysis based on a variation of the model by Rasker et al. (2001) presented in chapter 2.4. For this purpose, the impact of team factors on SWOT is measured through a total of 20 workshops. Each workshop is performed by 2 to 6 members of a Dutch purchasing firm. The fsQCA method is used to analyse the impact of 9 independent variables on two dependent variables: team performance and effectiveness.

1.1 Gap In The Literature

Numerous articles are still being published on the further development of the SWOT framework (Yüksel & Dağdeviren, 2007; Houben et al., 1999; Lee & Sai on ko, 2000; Lu, 2010). One thing all this academic effort has in common is the focus on the method of analysis or the formulation of results for the SWOT analysis. After an extensive review of the literature, however, little research effort has focused on the impact of the entity performing the analysis. As was discussed by Hill & Westbrook (1997), SWOT can be performed by an individual, a collation of individuals or by groups. Through the years several scholars have addressed the importance of selecting expert individuals with comprise knowledge of the organization and its environment to perform SWOT analysis in teams (Pickton & Wright, 1998; Argenti 2018; D. Pickton, 2017; Namugenyi et al., 2017). D. Pickton (2017) goes as far as having a separate chapter in their paper that contains the singular statement: SWOT analysis should be a group activity".

Researchers and managers generally form an expert team from individuals they consider to be knowledgeable and comprised members of the organization. This approach to expert team composition however lacks much methodological thought. Contrastingly, it has been shown that for project teams, group composition has a significant impact on team performance (Mathieu et al., 2014); Cohen & Bailey, 1997; Amason & Sapienza, 1997; Higgs et al., 2005; Mathieu et al., 2014). Furthermore, different teams can end up with completely different factors and scoring (Hill & Westbrook, 1997). Therefore, because the factors form the results of the SWOT analysis, different teams beget different results.

Concluding this preliminary review of SWOT literature, while great attention is given to the exact methodology of refining the input and results, team formation is left undertheorized. In this research, this gap in the literature is addressed. Subsequently, the goal of this research is to identify and analyse the impact of the composition of the expert team for SWOT analysis. To study this impact, the fuzzy-set Qualitative Comparative Analysis approach is used, which is elaborated upon further in Chapter 3. This method analyses the relation between a dependent variable (effectiveness and performance) and configurations of independent variables (team composition, team size, etc.). Therefore, to achieve the goal of this study, the following research question has been formulated:

What combination of team level factors leads to high SWOT team effectiveness and performance?

1.2 Theoretical And Practical Contributions

The theoretical contribution of this study is to further develop the literature on the effect of team-level factors on strategic management teams. Through this study it has been shown that team size, structure, composition and SWOT workshop experience consistently influence SWOT team performance and effectiveness. These results show the significance of the gap in SWOT and strategic management literature that is discussed in the previous section. While there is practically no academic attention given to this subject of team-level factors, it does appear to have an impact on the results that are generated from SWOT analysis. Furthermore, two measures of SWOT team effectiveness and one measure of SWOT performance are presented. While these measures show internal consistency, they lack correlation between them. Subsequently, relevant measures have been discovered, however the resulting constructs appear to reflect different aspects of the SWOT workshops and also differ in their objectivity, potentially as a result of varying measurement approaches. Therefore, another theoretical contribution is the relevance of developing quality measures of strategic management tool performance and effectiveness. These measures have the potential to further develop the literature on strategic management teams and team performance.

The practical contributions of this research are to provide insights into the internal team composition factors that influence strategic management tools and the performance of the teams deploying these tools. With this information, practicing managers can better compile their teams that will perform SWOT analysis and perhaps even similar strategic management tools. Additionally, the importance of gaining experience in performing SWOT analysis is shown to be consistently beneficial to both SWOT team performance and effectiveness.

This chapter has introduced the goals and motivations for the research in this paper. Following this, in chapter 2, a theoretical framework is presented based on which the design decisions in this research are made. Next, in Chapter 3, the research design of this paper and the use of the fsQCA method is explained. Chapter 4 presents the results of the research. Furthermore, Chapter 5 presents the analysis of the collected results/ information. Chapter 6 presents the discussion, followed by practical implications in Chapter 7 and limitations and conclusion in Chapter 8.

2. THEORETICAL FRAMEWORK

To investigate the impact of team-level factors on SWOT team performance and effectiveness, the existing literature is reviewed. Chapter 2.1 starts with a description of the characteristics of SWOT and a description of published work on SWOT teams. Chapter 2.2 describes the dependent variables team performance and effectiveness and how they can be measured. Chapter 2.3 presents a summary of published work on team performance and effectiveness models. Lastly, chapter 2.4 presents a synthesis of reviewed literature, a new combined model for SWOT team performance and effectiveness and describes an approximation of the optimal SWOT team according to literature.

2.1 SWOT Analysis, Characteristics, And SWOT Teams

Several strategic management tools like PEST-analysis, MOST-analysis, MoSCow, SCRS analysis and VPEC-T analysis are used for planning and development. Each of these tools brings its unique value and most of them have seen development during their lifetime. This paper, however, focuses on the SWOT analysis. SWOT is one of the most widely used strategic management tools and is employed by teams and individuals ranging from high school students to high-level executives (Leigh, 2010). An example of a SWOT analysis performed in this study is presented in Figure 1. While the SWOT framework might not pose a complete solution to a management problem, it can serve as a grounded start (D. Pickton, 2017). Academics have been developing the framework since its initial publication. This is because SWOT analysis in its most basic form is a naïve method that can easily lead to strategic errors (Leigh, 2010; D. Pickton, 2017). Therefore, within this research, a quantitative method developed by Leigh (2010) is used. This method is valuable because takes into account the level of control the organization has on SWOT factors and thereby takes the potential impact of factors into account. To illustrate, a small and relatively insignificant strength mustn't be used to tackle a large and imposing threat.

Sterktes	**Zwaktes**
• Transparant verdienmodel • Veel volume qua aanbestedingen, veel personeel in dienst. Back-ups etc. • Specialistische kennis in huis	• Gelimiteerd inzicht in de expertise en kennis van klant • Veel junioren met weinige ervaring. Vereist tijdsinvestering • Overal te weinig marktkennis aanwezig
Kansen	**Bedreigingen**
• Code verantwoordelijk marktgedrag • Aanvullende diensten aanbieden aan klanten • Re-shoring van productie	• Digitalisering. Vermindering in marktvraag (pennen en papier, koffie, en minder locaties huren) • Veel marktkennis vereist, en veel vlieguren nodig om de juiste vragen te kunnen stellen • Verhitte arbeidsmarkt

***Figure 1** SWOT analysis example*

2.1.1 Characteristics Of SWOT Analysis

SWOT is generally valued because of its simplicity and its capacity to generate focus and insight into key issues (D. Pickton, 2017). The framework is presented as a 2x2 matrix forming four quadrants or components. The first axis of the matrix differentiates between factors that are either internal or external to the organization. The second axis differentiates between beneficial and detrimental factors to the organization. Furthermore, the four quadrants are subsequently, the Strengths, Weaknesses, Opportunities and Threats that are experienced by or inherent to a specific organisation. However, the tool can be considered naïve if used in its most simple manner, thereby possibly leading to strategy mistakes (D. Pickton, 2017). Therefore, academics have developed additions and changes to the SWOT framework to deal with problems like high subjectivity (Nikjoo & Saeedpoor, 2014; Yüksel & Dağdeviren, 2007). Some disagreement exists on the nature of SWOT, as presented in Figure 2. However, most recently academics believe the strategy formulation approach using SWOT is irregular and non-rational (D. Pickton, 2017). This argument is made due to the reliance on subjective opinion and idea formation. The benefits of SWOT come in the form of generating strategic business plans, however, the process of SWOT itself can also be beneficial. This process of performing SWOT facilitates management development and an understanding of the scrutinized business activities (D. Pickton, 2017). In SWOT analysis, the business environment is analysed, both internally and externally. This analysis requires the participant(s) to possess profound knowledge of the organization and its environment (Argenti, 2018). SWOT is bound by a certain level of subjectivity because of this observation. One individual might observe more than another. Additionally, formulating factors from these observations and subsequently scoring these factors introduces more subjectivity. To mitigate this subjectivity, SWOT observation is often performed through the use of models like Porter's Five Forces and PESTEL analysis. These models make the process of SWOT more systematic and homogenize the process steps amongst different participants. Additionally, while much of SWOT analysis is dependent on the opinion and views of participants, the gathering of concrete data can be used to support or deny these opinions (D. Pickton, 2017).

According to Argenti (2018), SWOT analysis should be performed by groups of individuals, including managers and other knowledgeable staff within an organization. These individuals generally possess broad knowledge of the organization and have the power to address large problems (elephants) that can be too politically sensitive to tackle for subordinates. Therefore, the importance of the analysed subject must always be balanced by the hierarchical importance of the individuals performing the analysis. Additionally, including a variety of stakeholders can help in representing distinct perspectives (Argenti, 2018).

Perspective	Back-end planning	Front-end marketing
Outlook	Retrospective/past	Prospective/future
Goal	Description of organisational control	Prescriptin/evaluation of net value
Process	Naming factors	Interpreting meaning
Bias	Objective	Subjective
Logic	Theoretical ("is")	Normative ("ought")
Results	Factors categorized	Interrelationships analyzed
Requirement	Honesty	creativity

Figure 2 *Two perspectives on SWOT (Leigh, 2010)*

To summarize, SWOT is a valuable and popular tool for strategic planning. Depending on the context in which SWOT is applied, the method can be seen as either subjective and based on creativity or objective and based on logic and honesty. SWOT is highly dependent on the quality of data collection which can be supported by tried and tested methods.

Additionally, SWOT benefits from team formation and team diversity in terms of knowledge and hierarchy.

2.1.2 Swot Teams According To Literature

There has been limited research published on expert team composition for the SWOT methodology as much is focused on the application of the framework (Leigh, 2010). In the early days of SWOT, analyses were performed by individuals. However, in the following decades, group formation when performing SWOT analyses became more prevalent (Hill & Westbrook, 1997). In their studies of the SWOT framework Hill & Westbrook (1997) found there are broadly three approaches to SWOT, namely performed by:

1. An individual manager or consultant.
2. Several managers or consultants and afterwards collated.
3. A group of (senior) managers.

There are several benefits to applying strategic management tools in groups. Groups allow individuals to supplement their knowledge, allowing for discussion and deliberation of ideas. Furthermore, teams that perform SWOTin workshops have the benefit of discursive interaction that improves team performance (Hodgkinson et al., 2006).

SWOT literature shows a mix of disagreement and agreement on expert team composition practices depending on the exact subject. When large-scale, high-impact decisions need to be made, top-level management needs to be involved (Hill & Westbrook, 1997; Argenti, 2018; D. W. Pickton & Wright, 1998; Namugenyi et al., 2017; Hodgkinson et al., 2006). However, when less impactful decisions are made, the expert team can consist of managers from lower hierarchical levels (Hill & Westbrook, 1997). It is also believed that the optimal composition of the expert team will differ per organization (Hill & Westbrook, 1997; Argenti, 2018). Argenti (2018) believes SWOT should be performed solely by the top-management team with the option of a singular supportive staff member. Contrastingly, Hill & Westbrook (1997) and D. Pickton (2017) believe combinations of top-level management and lower-level managers should comprise the expert team. Furthermore, Hodgkinson et al. (2006) believe the expert team should consist of managers supported by a singular respected high-level manager.

Individuals selected to comprise the expert team should be very knowledgeable about the organization (Pickton & Wright, 1998). Furthermore, the members should have profound knowledge of the subject that is being addressed (Argenti, 2018). This is because the SWOT framework, outside of the external analysis is wholly dependent on the knowledge of the expert team. Furthermore, companies might make use of external consultants for performing a SWOT analysis. However, the consultants should only be placed in a supporting role, not a leading one and they should definitely not perform the analysis on their own (Argenti, 2018). Lastly, teams should three to eight people while larger and smaller teams should be avoided (Argenti, 2018). The preference goes to six to avoid delay but still include several voices.

Based on the reviewed literature, a few statements about SWOT concerning teams and performance can be made. SWOT analysis is performed by participants and the information available is limited to the knowledge possessed by these participating individuals. Therefore, groups with more knowledge might perform better. Complete consensus on this idea is difficult however, therefore, some causal complexity should be considered. Additionally, Hierarchical diversity is important when SWOT is performed for high-stakes strategic planning processes. Therefore, in this case, the absence of hierarchical diversity would be detrimental. Larger teams allow access to more diverse knowledge and perspectives (voices), however too large teams cause delays, internal stress, and free loafing. The optimal team contains around 5-6 members. And stakeholder diversity in SWOT teams allows access to broader perspectives. Also, SWOT has an impact on the team that performs the analysis. SWOT facilitates the process of interaction between the participants, increases understanding of the internal and external environment, increases manager interaction, and improves and promotes strategic thought of managers performing the analysis.

2.2 SWOT Performance And Effectiveness

Research on SWOT requires an understanding of what is considered a ‘good’ or ‘bad’ analysis. This evaluation can be measured through both the performance and effectiveness of the teams performing the analysis. Subsequently, for a good assessment, clear definitions of these two concepts must be formulated. Team effectiveness and team performance are sometimes used interchangeably in team-based research. According to Essens et al. (2005), performance describes the capability of a team and the processes a team undertakes. However, the performance of a team is not necessarily a representation of that team's effectiveness in contributing to their respective goal. While a team might be effective under one set of circumstances, they might not be under another. Henderson & Walkinshaw (2002) present a similar definition (Table 1), however, they also include a temporal dimension to the two concepts, where effectiveness comes after performance. Lastly, Essens et al. (2005) conclude that effectiveness is more linked to accomplishments of goals and objectives that have been previously defined. Contrastingly, performance relates to how well team- and taskwork is performed. The definitions of Henderson & Walkinshaw (2002) shown in table 1 are used in this research. The exact approach for measuring performance and effectiveness is discussed in Chapter 3.

Table 1 *Definition of team performance and effectiveness (Henderson & Walkinshaw, 2002)*

Concept	Definition
performance	the execution of an action; something accomplished; what is going on inside the team.
measure of performance	the extent to which a team executes the actions required to be effective.
effectiveness	the accomplishment of a desired result, especially as viewed after the fact.

2.3 Team Effectiveness/ Performance Models

The literature on team effectiveness and performance is quite extensive. Subsequently, numerous models of team effectiveness and performance have been developed (Driskell et al., 2018; Essens et al., 2005; Klimoski & Jones, 1995; Kunz & Hogreve, 2011; Smith-Jentsch et al., 1998; Tannenbaum et al., 1992). The purpose of this section is to analyse these different models and find the most important factors and processes for team effectiveness and performance. Overly complex or simplistic models such as those presented by Shanahan (2001) are left out of this review as their practical applicability within this research is limited. A visual representation of all discussed models can be found in Appendix A. Only major differences between the models are discussed in this section.

Notably, the model by J. Driskell et al. (1987) is structured through an input, process, and outcome approach (Appendix A.5). Additionally, the authors state that group performance is not synonymous with the effectiveness of achieving a task. Instead, group performance is linked to potential effectiveness. True effectiveness is achieved through the function of team processes. Klimoski & Jones (1995) build upon this linear approach presenting a clear input, process, and outcome separation (Appendix A.4). Here, the input directly influences team processes, which in turn generates team effectiveness. Interestingly, this model is the only one to include leadership as a major contributing (input) factor for team effectiveness. The authors define leadership as influencing team outcomes by interpersonal means where both formal and emerging leadership roles influence team performance. The model by Cannon-Bowers et al. (1995) primarily focuses on task characteristics and task competencies influencing team performance. Interestingly, they include task knowledge skills and abilities as a factor influencing team performance. This logically implies a person more experienced in performing a specific task will likely perform better. The model by Tannenbaum et al. (1992) instead, focuses more on the inclusion of feedback steps. These steps consist of team building variables, feedback, and team changes. It is, therefore, more focused on the continuous or iterative improvement of the team. Therefore, it is likely not very suited to this research as the teams formed for SWOT are project teams which generally exist only for the duration of the project. The inclusion of individual changes, however, is interesting for this research as participants might perform a SWOT analysis multiple times which influences their performance.

The model by Rasker (2001), shown in Figure 3, continues with the linear design seen previously. There are five factor sets which constitute the operational context of this model. The authors describe teamwork as the most critical factor in contributing to team effectiveness. Furthermore, teamwork is split up into two types of activities, namely task and team related. Interestingly, this model is the first to introduce a situational factor set, including characteristics like time stress and uncertainty. As was mentioned earlier in this chapter, SWOT is a method involved with high uncertainty, therefore this model can provide valuable insight. In chapter 2.4 a synthesis of the model by Rasker (2001) and other models is presented which will be the guiding conceptual model for this research.

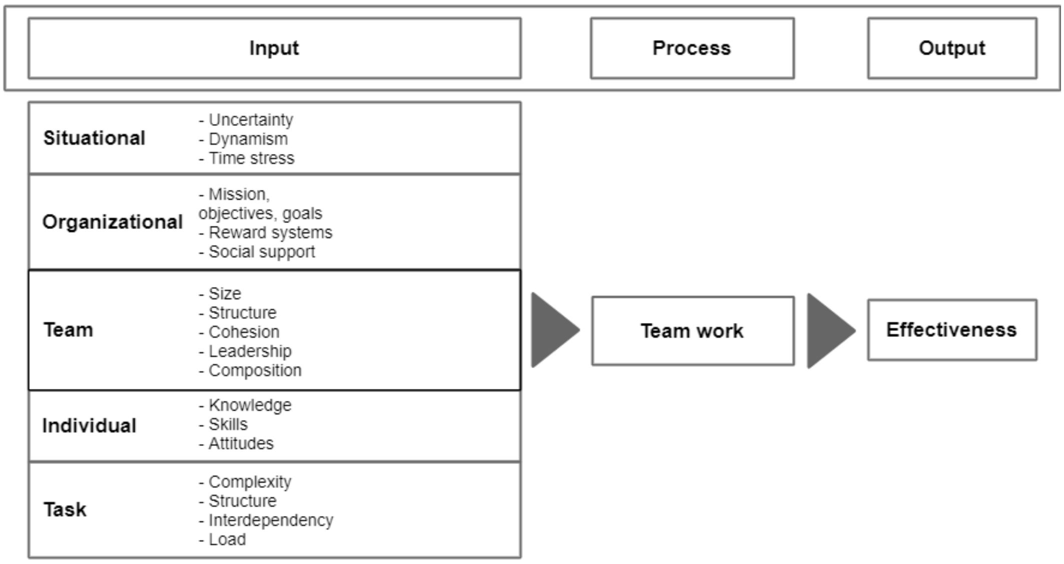

Figure 3 *Team process model by Rasker (2001)*

The above model by Rasker (2001) is selected for the theoretical basis of this research. This model is most suitable because of its simplicity which was seen as a recurring trend in the previous three discussed models. Additionally, this team process model summarizes the most recurring input factors from all previous models. The processes and variables of a complex model might be closer to those existing in practice, however, the complex interrelations within these models can be very difficult to model, especially with smaller datasets. Furthermore, this research is exploratory. Therefore, a simpler, but more inclusive model is deemed most suitable. Although the model originates from military literature, it is widely used in common academic literature and is therefore deemed suitable. The teams within this research perform several SWOT analyses, which means they experience a learning effect which is not included in the model by Rasker (2001). Individuals will likely increase in task-related performance. Teams might also increase in cohesion, leadership might emerge and team structure might develop. Therefore, individual and team changes should be included. For this purpose, the individual and team changes presented in the model by Tannenbaum et al. (1992) will be added to the final model. Within a team, two different types of activities are performed, taskwork and teamwork activities. Taskwork activities are operational tasks performed by the members of a team (Rasker, 2001). While teamwork activities are the activities and behaviours that a performed by the members of a team that increase functional team operation. This distinction is not presented in the model by Rasker (2001) but is shown in Figure 4. Teamwork tasks are present when individuals must work together in a team and rely on the shared knowledge, skills and experience of team members. Instead, taskwork activities rely on the individual's knowledge, skills and experience. In the context of SWOT, teamwork tasks include communication in the form of discursive interaction and achieving consensus on factors and scoring. Whereas taskwork activities include individual tasks like idea generation and formulating factors and factor descriptions.

2.3.1 Team Level Factors

In the previous section, six models of team effectiveness have been analysed. From these models, the one by Rasker (2001) is mainly used for this research. Within this model, the focus is put on team-level factors as independent variables as these can be easily influenced when forming SWOT teams. Contrastingly, individual-level factors such as knowledge and attitudes require much more insight into and knowledge the participating individuals. Additionally, the organisational-level factors do not change when SWOT is performed in an organisation and can therefore not be manipulated. Lastly, task and situational-level factors are inherent to the organisation and the SWOT approach itself. There is therefore not change in these factors sets between SWOT analyses within an organisation. Study of these factors would therefore be less relevant to the practicing manager. To conclude, team-level factors are high in observability and can easily be manipulated by the practicing manager and are thus the focus of this study. Therefore, in this section the variables team size, structure, cohesion, leadership, and composition are discussed.

TEAM SIZE

Team size has a moderating effect on the relationship between teamwork processes and team effectiveness (Jeffery et al., 2012). There exist more linkages between the members of a team in larger groups compared to smaller ones. Additionally, the tendency toward the loss of motivation and coordination is also higher in larger teams (Fleishman, 1980; Steiner, 1972). However, team size also correlates strongly with cognitive capability

(Haleblian & Finkelstein, 1993). Similar to the effect of team size on heterogeneity, larger teams have greater cognitive resources through their collective (Bantel & Jackson, 1989). However, there also exists a greater potential for dissimilarity in larger teams precisely due to these increases in cognitive resources and heterogeneity (Bantel & Jackson, 1989; Smith et al., 1994; Wiersema & Bantel, 1992). Subsequently, this dissimilarity has the potential to lead to conflict (Amason & Sapienza, 1997). Greater cognitive resources and heterogeneity, however, are believed to increase the team's ability to process large amounts of diverse information (Eisenhardt et al., 2012).

TEAM STRUCTURE

Team structure also affects team processes and team performance (Driskell et al., 2018). The group structure is believed to have the potential to encourage consensus and is operationalized as the degree of hierarchical differentiation and amount of communication paths (Priem, 1990) individual-level level factors, there are team member personality profiles that influence team performance (Colbert et al., 2014). Traits like openness and emotional stability are positively related to team effectiveness (Colbert et al., 2014). Furthermore, both functional and tenure diversity are positively related to team performance (Cohen & Bailey, 1997). These relations between factors, however, come from general team literature and therefore the applicability to SWOT is unknown.

TEAM COMPOSITION

Team composition describes the combination of team member characteristics (Rasker, 2001). According to West et al. (2001) team, composition research focuses on figuring out what levels of heterogeneity of characteristics are beneficial to a team and whether certain combinations of factors are more beneficial than others. There are many characteristics of team composition such as gender, tenure, and experience. There are, however, many more characteristics and as a consequence researchers often have significantly different operationalizations of the factor team composition. Therefore, for this section, several authors have been reviewed and their approaches to operationalizing team composition are summarized in Table 2. Based on these findings, a characteristic set is formulated for this research in chapter 2.4.

***Table 2** Team composition operationalization according to literature*

Author	Subject	Category	Operationalization
(Essens et al., 2005)	General teams	Skills	intelligence, experience, training, teamwork skills
		Demographics	age, gender, ethnicity, culture
		Personality traits	extraversion/ introversion, Big Five
(Naranjo-Gil, 2009)	TMT	Diversity	age, tenure, education, experience
(Priem, 1990)	TMT	Homogeneity	age, education, socioeconomic background, length of time with firm, length of time in current position
		Team structure	hierarchical differentiation, role formalization
(Colbert et al., 2014)	TMT	Personality composition	personality traits: Big Five
		Leadership composition	leadership style
(Bantel & Jackson, 1989)	TMT	Cognitive resources	
		Demography	age diversity, tenure diversity, educational background, functional experience

COHESION

Cohesion refers to the forces that act on individuals within a group to remain in that group Festinger et al. (1950). Cohesion is believed to be strongly related to team performance (Essens et al., 2005). Additionally, communication within the team correlates with cohesion level (Shaw, 1981). Furthermore, team cohesion is positively related to perceived performance, team viability and satisfaction (Tekleab et al., 2009). However, it is believed team cohesion primarily influences a team over time (Tekleab et al., 2009). It is suggested that early after the formation of a team, members experience conflict amongst each other and must go through this phase of conflict to increase their cohesion (Tuckman & Jensen, 1977). In the context of this research, it is unlikely participants will complete this conflict phase, therefore the assumption is that the teams will not achieve a high level of cohesion.

LEADERSHIP

Leadership composition generally refers to the leadership style that the leader of the team encompasses. Team leadership can be both formal, so a preselected leader, or information or an emerging leadership role (Klimoski & Jones, 1995). Some authors, like Klimoski & Jones (1995) and Colbert et al. (2014) believe leadership can be either a major contributing factor to team effectiveness or indirectly play a role in hierarchical diversity as a contributing factor to team structure (Priem, 1990). The main contributing factor of leaders is to motivate their followers by creating compelling visions, serving as a role model or encouraging others to challenge themselves and the status quo (Colbert et al., 2014). This research focuses on project teams, without preselected team leaders. There will therefore be no formal leadership. The hierarchical diversity within the teams might, however, lead certain individuals to take up the role of emergent leadership quicker than others.

2.3.2 Individual Factors

The individual factor set is summarized by the factors of knowledge skills and attitudes. These factors represent what the individual adds to the team. Most important for strategic analysis are the knowledge and attitudes of participants. This is important because SWOT analyses require profound knowledge of the case to get meaningful results (Argenti, 2018). However, without the right attitude, this knowledge is not applied effectively. Participants not willing to contribute likely hinder positive teamwork processes. Participation in this research is voluntary, therefore the assumption is participant attitudes are positive and productive.

The skills of individuals can be divided into hard and soft skills. Soft skills are important as the strategic analyses performed in this research are done so by teams. As was discussed in chapter 2.3.1 ‘Team size’, teamwork involves interaction between members and coordination (Fleishman, 1980). Teams require management of motivation and coordination, as well as management of dissimilarity and conflict. Soft skills allow a person to perform these tasks effectively and productively. Lastly, hard skills are not relevant in this context as they are not needed for SWOT.

2.3.3 Situational, Organizational, And Task Factors

Situational, organizational and task-related factor sets influence teamwork processes directly and team effectiveness indirectly. These factor sets along with team and individual related factor sets define the operational context of the team. Situational factors arise from the outside world and impose influence on the team. Organizational factors are factors outside of the team, which give direction but also limitations. Lastly, task factors describe the activities the team must perform while achieving their goal. These three factor sets comprise the non-human elements of the model. Table 3 provides insight into how these three factor sets relate to this research and the SWOT workshops performed within.

***Table 3** situational, organizational, and task factor sets*

Factor set	**Factor**	**Factor in the context of this research**
Situational	Uncertainty	The situational uncertainty experienced by the teams is low as the situational in the context of this research is quite simple: one-off strategic workshops.
	Dynamism	The situation is the SWOT workshops do not or barely change during the existence of the project team. Therefore little to no situational dynamism is experienced.
	Time stress	A Limited amount of time is given to the SWOT teams to perform their analyses that should be enough for the average team. Some individuals, however, work slower or engage in more interactive processes resulting in more time spent. This might increase time stress. Therefore, the goal is to minimize time stress by giving ample (still limited) time for the analyses to minimize the impact on teamwork processes.
Organizational	Mission, objectives, goals	The organizational mission, objectives and goals within this context are strategic development planning to improve and expand current business activities. The seriousness with which participants adhere to these missions, objectives and goals may differ per individual.
	Reward systems	There is no reward system in place for the workshops, besides intellectual gratification and gratification from team building and working towards an organizational goal.
	Social support	Little social support is likely required as the context of this research involved limited lifespan project teams.
Task	Complexity	The complexity of the task is relatively low, as a clear structure is provided for the teams to follow. Each step follows the previous one consecutively, thereby avoiding complicated process interactions.
	Structure	The structure of the task is made clear through instructions given to each team. Each step follows the previous one consecutively. After all, the steps have been completed, the project is finished.
	Interdependency	There is high task interdependency when defining tasks as different SWOT process steps. Each consecutive step builds on the previous step (except for internal and external analysis). The SWOT process, however, is very linear, thereby limiting complexity.

Load	The intellectual load is relatively high, as individuals are required to engage in intellectual debate through discursive interaction, idea formation and conceptualization.

2.4 Synthesis Of Literature And Expected Performance Of The Team

A suitable base model has been found and all important factors and interrelations between factors leading to team performance and effectiveness have been discussed. Now that an understanding of team performance and effectiveness has been achieved, an interpretation of the optimal team can be discussed. The theoretically optimal composition of teams performing SWOT according to literature is diverse teams with high heterogeneity of hierarchy, tenure and demographic composition with around 5 to 6 members. Logically, if teams are more homogenous they perform worse. Also if they are too large or too small they might underperform. Emergent leadership, cohesiveness as well as high levels of knowledge, skills, and positive attitudes are expected to correlate to high team effectiveness. Based on these conclusions Table 2 presents the independent variables that are included in this research. Although there are likely a large number of plausible independent variables, the number that is used in this study should be limited to fit the sample size. Therefore a selection of 9 independent variables is made. An additional facet called changes is included in the list which is operationalized as the number of workshops individuals have participated in during this research. This variable is aimed at tracking the learning effect of participants. While not a team-level factor, changes is included because of its high expected impact and ease of measurement.

Table 4 *Independent variable list*

Factor	Component	Source
Size	Team size	(Jeffery et al., 2012; Fleishman, 1980; Steiner, 1972; Priem, 1990)
Structure	Hierarchical diversity	
Composition	Age diversity	(Naranjo-Gil, 2009; Mello & Ruckes, 2006; Uhl-bien & Maslyn, 2003)
	Tenure diversity	(Naranjo-Gil, 2009; Mello & Ruckes, 2006; Uhl-bien & Maslyn, 2003)
	Experience diversity	(Naranjo-Gil, 2009; Cohen & Bailey, 1997; Bantel & Jackson, 1989; Hoffman and Maier, 1961)
	Education diversity	(Naranjo-Gil, 2009; Cohen & Bailey, 1997; Bantel & Jackson, 1989; Hoffman and Maier, 1961)
Cohesion	Level of cohesion	(Essens et al., 2005; Shaw, 1981; Tekleab et al., 2009; Cohen & Bailey, 1997)

Leadership	Emergent leadership	(Klimoski & Jones, 1995; Colbert et al., 2014; Priem, 1990; Tannenbaum et al., 1992)
Changes	Amount of participation in workshops	

Based on the reviewed literature, some assumptions can be made about the likely optimal values for the independent variables listed as components in Table 4. These are assumptions and not factual statements because these factors have not been tested as such in the context of SWOT. The assumptions based on reviewed literature and those expected by the researcher are presented in Table 5 using a scale of [low-medium-high].

Table 5 *Expected optimal values for independent variables*

Component/ independent variables	**Optimal values according to literature**
Team size	Around 5-6
Hierarchical diversity	High
Age diversity	High
Tenure diversity	High
Experience diversity	High
Education diversity	High
Level of cohesion	High
Emergent leadership	High
Amount of participation in workshops	High

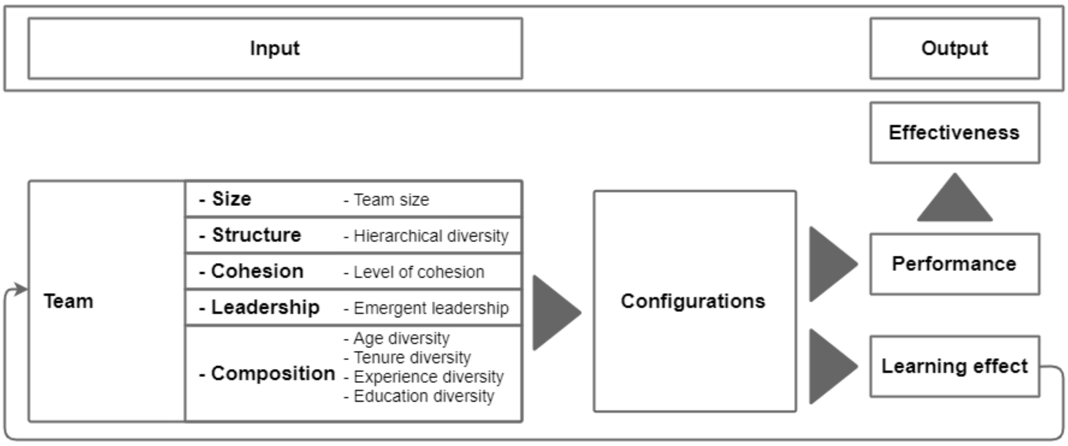

Figure 4 *Team process model for SWOT workshops*

The model by Rasker (2001) is selected for the theoretical basis of this research because of its simplicity and inclusion of the most important factors from reviewed models. The input variables consist out of the team-level factors team size, structure, cohesion, leadership and composition. Team composition is further divided into age, tenure, experience and education diversity.

The workshops are performed by ad-hoc teams which only last for the duration of the workshops. This likely means little cohesion will be achieved, as well as limited emergent leadership. Furthermore, because SWOT requires high diversity in hierarchy, tenure and demographic composition, the teams will be relatively heterogeneous. This might improve discursive interaction and access to knowledge, but might also cause conflict. The teams within this research perform several SWOT analyses, which means they experience a learning effect which is not included in the model by Rasker (2001). Additionally, teams might increase in cohesion, leadership might emerge and team structure might develop. There for changes are presented in the model as a ‘learning effect’ which originated from the model Tannenbaum et al. (1992).

The learning effect is on the same output level as performance and not a result of performance itself. That is because, within this model, team performance and effectiveness are not representations of performance and effectiveness perse, but measures or operationalizations of these constructs. Therefore the learning effect does not result from performance. Instead, it results from teamwork activities during the SWOT workshop. The independent variables presented in Figure 4 under input together form configurations in the fsQCA analysis. These configuration are then analysed on their relation to the dependent variables performance and effectiveness.

Rasker (2001) makes no clear distinction between team performance and effectiveness, however, this distinction is made in this research. Therefore, performance and effectiveness are included in the model presented in Figure 4. Team effectiveness is an output of team performance and this relation is based on the definitions provided by Henderson & Walkinshaw (2002). To corroborate, the measure of team performance is the extent to which a team executes the actions required to be effective. Additionally, effectiveness temporally comes after the performance and is a result of performance.

3. METHOD

3.1 The Approach

The literature on SWOT, team performance and team effectiveness has been reviewed and discussed in Chapter 2. From this review, several key factors and variables have been discovered that are presented in a new, synthesized model of SWOT performance and effectiveness in Chapter 2.4.2. The purpose of this study is to test the causal relationship between these variables and gain insights into optimal SWOT team formation. For this purpose, a case study is designed within which several SWOT workshops are performed at a Dutch procurement firm. The Dutch firm wants to more clearly define the strategic potential of its market segments. For each market segment, a team of firm employees performs a strategic analysis workshop using SWOT analysis, an IE2-matrix (Leigh, 2010), and a confrontation matrix according to the firms wishes. Based on the confrontation matrix, participants formulate key issues and a central problem statement (Schoemaker, 2019). Workshop participants consist mainly of procurement consultants, with a few managing consultants. Workshop participants are picked by a panel of consultants within the firm. The primary selection criteria for selection is profound knowledge of the market segment for which the participant join a workshop. Data has been collected from participants after each workshop using questionnaires. There are three questionnaires for the dependent variables and one for the independent variables. A total of 6 workshops have been organised, one for each market segment, with two to five participants. Each participant of a workshop is seen as a unique data entry, resulting in a dataset of n = 20. After the workshops have taken place and the questionnaires have been collected, the dependent variable constructs are created using the approach described in Chapter 3.4 and 3.5.

Next, three fsQCA analyses are performed, one for each dependent variable. Based on the fsQCA analyses, insights are formulated. FsQCA is a method that can combine variable and case-oriented quantitative analysis thereby being able to facilitate much smaller datasets than other quantitative methods. Furthermore, fsQCA is capable of analysing configurations of conditions (independent variables) and their effect on the dependent variable. This is rather unique to the method. Additionally, there are three versions of QCA that can be used. This study uses the fuzzy-set approach, but there exist also the crisp and multi-value approaches. The fuzzy-set approach retains more information from the original dataset compared to the others (Rohlfing, 2020). For the reasons listed above, this analysis method has been selected.

3.2 Sampling and data collection

The sample for this study consists of 15 unique individuals of whom most have participated only once in a workshop, one individual participated four times and two individuals twice. The sample of participations contains more men (60%) and slightly fewer women (40%). The age ranges between 24 and 52 and, including multiple participations by some participants, has a mean of 39,35 and a standard deviation of 10,07. Fifteen of the participations have been performed by individuals with Dutch HBO level education and 5 by Dutch university master's level education. First, literature is reviewed on how to measure team performance and effectiveness in Chapter 3.2.1. Next, The selected measurement approach is discussed in Chapter 3.2.2.

3.2.1 How to measure team performance and effectiveness

Team performance is a construct formed from mental ideas, and to measure it, its attributes need to be defined. Additionally, different methods can be used to measure these attributes. There exist about five main methods that can be used to measure team performance according to Kendall & Salas (2004). These include self-assessment reports (SAR), behavioural observation scales (BOS), behaviourally anchored rating scales, automated performance monitoring, and lastly event-based measurement. Additionally, this study introduces the External assessment report (EAR). The EAR is an assessment performed by an external team, thereby limiting some self-assessed subjectivity. Team performance is viewed as a combination of individual and team processes and individual and team outcomes (Smith-Jentsch et al., 1998). Furthermore, Rosen et al. (2008) believe the measurement of team performance should include the following three aspects:

- Focus on processes and outcomes
- Meet a specific goal
- Linked to a specific scenario or context

Most used for this type of research is self-evaluation by the team performing the project (Andersson et al., 2017; Karakowsky et al., 2004). For this purpose, a team performance evaluation form is selecte that participants complete immediately after performing their task, which in this case is the SWOT workshop. The major problem with this type of self-evaluation is subjectivity (Andersson et al., 2017). Two persons might perform similarly but evaluate their performance differently, thereby influencing the results of the study. To mediate this problem, two approaches might be taken. The first is to select or create a good questionnaire that aims to minimize subjectivity through precise questioning, relying on Self-Assessment Reports (SAR). The second is to introduce a second evaluation by an outside team, relying on External Assessment Reports (EAR). This team can consist of consultants or researchers (Andersson et al., 2017). This evaluation naturally also includes subjectivity but is more constant amongst teams. However, if the EAR-team is biased in some way, this bias translates to all cases.

To formulate the questionnaire items, Andersson et al. (2017) suggest to figure out what question(s) the team performance assessment should answer and what constraints apply to the assessment. Despite SAR and EAR being subjective, they are both accurate enough to be used for practical assessment of team performance (Andersson et al., 2017). Crucial to accurate assessment, is to link metrics to a specific purpose Wildman et al. (2013 as cited by (Andersson et al., 2017). Furthermore, there are no findings that show either method is more accurate than the other in assessing team performance (Andersson et al., 2017), therefore issues like accessibility and infringement are good deciding factors for the choice of method. Therefore, SAR is used to measure performance within this research. While performance can be measured through SARs, effectiveness is instead measured through observer-based assessment, similarly as was done by Andersson et al. (2017). Observers must perform the assessment objectively and may not participate in the workshops (Andersson et al., 2017). Effectiveness is measured through the extent to which a team meets the demands which are placed upon it (Henderson & Walkinshaw, 2002).

Triangulation can be used when measuring team performance to decrease measurement error. Triangulation involves the combination of different forms of performance measurement (i.e. Quantitative and qualitative). Furthermore, the measurements used should be broadly applicable to improve the comparability (Valentine et al., 2015). Too specific and niche measurement approaches (i.e. very specific questionnaire items) cannot be used by other researchers and therefore have no method of comparison. To summarize, SAR is used for measuring team performance while observer assessment is used to measure effectiveness. Because performance and effectiveness are two different concepts, no triangulation of these measures is performed.

3.2.2 Selected sampling and measurement approach

Participants take part in one or more of six SWOT workshops that have been organised within a period of two weeks during the month of June 2022. Initially, a purposive sampling approach is taken by selecting employees with expansive knowledge on one or more of the workshop topics. This is important because SWOT analyses require profound knowledge of the case to get meaningful results (Argenti, 2018). For this purpose, several official expertise groups within the firm are addressed. After exhaustion, a snowball approach is used where those participants selected in the first round are asked whether they know any more knowledgeable individuals willing to participate. Participation is completely voluntary and individuals are motivated to participate by their interest in strategic development of the firm and helping a master thesis project. The selection of workshop participants is performed by a panel of consultants, called the selection panel. This selection panel consists of employees with profound knowledge of the organization and the members within who additionally carry the responsibility for this strategic management project within the firm. The selection panel uses a judgement or purposive sampling approach to select the members constituting the six teams. The six market segments are very diverse and those knowledgeable about one segment might have no experience with another. Therefore, consultants and managers are selected for each work category according to their expertise on said subject. Because the groups are formed not by the researcher, but by the organization itself, this is considered the natural formation of these groups within this research. The use of natural teams is a requirements for fsQCA analysis.

Participants perform a number of SWOT-related activities during the workshops as is described in Chapter 3.1, which each take 3 hours. After completion of the workshop, participants are asked to fill in three questionnaires. The first questionnaire measures the indicators of the dependent variable and self-assessed team performance (18 items survey). The second measures the indicators of self-assessed team effectiveness (5 items survey). Both the first and second questionnaire are comprised only of 7-point Likert scales. A third questionnaire measures the team-level independent variables. Seven of these nine independent variables are measured through open-ended questions, while two are 7-point Likert scale items (cohesion and emergent leadership). A fourth questionnaire is given to an external panel of consultants, different from the selection panel, whom judge the workshop results. The questionnaire given to the external panel is the same as the questionnaire given to the participants for measuring self-assessed SWOT effectiveness. This fourth questionnaire is therefore the second measure of team effectiveness. If a participant is active in 2 or more workshops, they fill in an equal amount of questionnaires. An overview of the four questionnaires and their characteristics is presented in Table 6. More detail on each questionnaire is given in the following sections.

***Table 6** questionnaire overview*

Survey	Survey sections	Data collection method	Item type	Expected duration	Answered by
Team performance Scale (SAR)	NA	Survey	7-point Likert scale	5 mins	Workshop participants
SWOT effectiveness (SAR)	NA	Survey	7-point Likert scale	2 mins	Workshop participants
SWOT effectiveness (EAR)	NA	Survey	7-point Likert scale	60 mins	External panel
Team-level factors	Independent variable 1-7	Survey	Open questions	1 min	Workshop participants
	Independent variable 8-9	Survey	7-point Likert scale	1 min	Workshop participants

3.3 Questionnaire design

A total of three different constructs are used as dependent variables and a total of 9 independent variables. The independent variables can be measured directly, however, the dependent variables are constructs that can only be measured through their indicators, making them latent variables. A systematic view of these constructs and indicators is presented in Appendix D. The nine independent variables influence both team performance and effectiveness and this causal relationship is analysed in this study.

3.3.1 Dependent variable: SWOT Team Performance

Team performance is a construct that represents the extent to which a team executes the actions required to be effective (Henderson & Walkinshaw, 2002). As was discussed in Chapter 2, there is no singular agreed-upon measurement of team performance. Luckily, literature on team performance has been in development for many decades and subsequently there exist numerous scales to measure team performance. Every scale results in a slightly different construct, however, so the importance of choosing the right scale is great. The approach taken in this study to find a suitable scale for team performance is to select based on a few key factors. The factors are the extent to which a scale is empirically founded, tested for consistency and validity can measure differences between teams. In chapter 2.2 it was concluded that SWOT team performance can best be measured through SARs or Self-Assessment Reports. These reports are filled out by participants directly after the workshop and aim to measure performance through a list of questions. Each question results in a unique indicator that constitutes the construct. It was also discussed by Andersson et al. (2017) that it is important to choose an assessment method that suits the study and can be performed with sufficient ease. There, the measurement of team performance uses a Self-Assessment Report, specifically a Team Performance Scale (TPS), developed by Thompson et al. (2009). This method contains an 18-item, 7-point Likert scale questionnaire which has been empirically tested in the context of medical education on 309 students while testing for internal consistency, validity and differences between teams. While other TPS' exist, the one by Thompson et al. (2009) is well-rounded, includes a finished questionnaire, and includes metrics for interpretation of the resulting score. The TPS by Thompson et al. (2009) was tested on student project teams which generally operate in a high theory and knowledge-intensive context. This bears similarities to the knowledge- and theory-intensive nature of team-based SWOT analyses. Because of these similarities and the sufficient empirical evaluation it is deemed suitable for this study. The questionnaire items for SWOT team performance can be found in Appendix B.1. These items of Appendix B.1 are in

English, but are translated to Dutch using DeepL, one of the current most accurate translating software based on AI technology (Appendix B1.1). Afterwards face validity is checked by presenting the new questionnaire to the selection panel. After translation, only minor changes are made to improve the readability of the items. This approach is taken to minimize the bias of the researcher in translations. To conclude, SWOT team performance is measured through 18 7-point Likert scale indicators. This generates 18 integer values ranging from [0-6]. The team performance scale is calculated by calculating the mean of these values per participant in a workshop.

3.3.2 Dependent variables: SWOT Team Effectiveness

Unlike team performance, there is virtually no operationalization of SWOT team effectiveness in Literature. This is mainly because such a construct is much too specific. As was discussed in Chapter 2, team effectiveness is measured as the extent to which a team meets the demands which are placed upon it. In the context of SWOT, this would involve actions such as formulating factors according to guidelines and scoring these factors according to scoring rules. However, fulfilment of these steps is a requirement for a workshop. Therefore each workshop in this dataset would have the same results, making it impossible to distinguish between teams. Subsequently, the measure would be useless. For this reason, the decision was made to split the SWOT analysis into its major steps and subjectively evaluate the quality of these individual parts. The evaluation of each part becomes an indicator constituting the effectiveness construct. This choice for a newly designed effectiveness scale is further supported by Andersson et al. (2017) who state that the questionnaire items should measure exactly what is asked of participants. This means that a general effectiveness questionnaire would not be sufficient. The SWOT methodology that is used includes the following steps: external analysis, internal analysis, formulating factors, scoring factors, and formulating narrative actions. Based on these steps Table 8 shows how the five indicators for a SWOT-specific effectiveness construct have been created. The full questionnaire can be found in Appendix B.2 and B.2.1 for the Dutch version. Again, DeepL is used for translations.

Table 7 SWOT effectiveness construct indicators

Construct	Item	Indicators
SWOT team effectiveness	X_1	Quality of external analysis
	X_2	Quality of internal analysis
	X_3	Quality of factor scoring
	X_4	Quality of narrative actions
	X_5	Overall evaluation

The indicators have been given a user test, where they are shown to three consultants from the firm and the academic supervisor of the researcher. Both parties have confirmed the appropriateness of the indicator set for measuring the effectiveness construct. The constructs are tested on validity and reliability using Pearson's R and Cronbach's alpha tests. The result of these tests are presented in Chapter 3.3.4. According to Salas et al. (2017), it is best to triangulate different measures to gain insight into a construct like team performance and similarly team effectiveness. This is why two measures of SWOT team effectiveness are created. Both approaches use the indicators in Table 6. The first approach consists of a survey given to each workshop participant after completion of each workshop in the form of a Self-Assessment Report (SAR). The second approach consists of a survey given to an independent and outside review board, similar to Andersson et al. (2017). This is called an External Assessment Report (EAR) Two factors are important for ensuring the value of this EAR:

1. The members of this board do not participate in the workshops and are therefore impartial.
2. This board consist of inside consultants and high-level management. Having individuals with the power to enact change evaluate the strategic analysis increases the likelihood of adoption of results within the organization.

A review board consisting of four individuals performs this assessment. Two of these members are firm consultants while another two are high-level management. In line with other assessment approaches, these components are measured through 5 questionnaire items with a 7-point Likert scale. The full questionnaire list can be found in Appendix B.3 and B.3.1 for Dutch. To conclude, SWOT team effectiveness is measured through five 7-point Likert scale indicators. This generates five integer values ranging from [0-6]. The effectiveness scales are calculated by calculating the mean of these values per participant in a workshop.

3.3.3 Independent variables

As was discussed in chapter 2, this study focuses mainly on team factors influencing team effectiveness and performance. Each of the factors such as size and structure is measured through one or more components as shown in Table 9. These components have been selected in chapter 2.4.1 based on the literature review of chapter 2.3.1. The factor components are the independent variables for this research. The sources for these independent variables are listed in Table 4 of chapter 2.4.1.

Table 8 *Independent variables*

Higher level facet	**Component/ indep-var**	**Item**	**Outcome**
Size	Team size	X_1	[2-5] int
Structure	Hierarchical diversity	X_2	In-group standard deviation
Composition	Age diversity	X_3	In-group standard deviation
	Tenure diversity	X_4	In-group standard deviation
	Experience diversity	X_5	In-group standard deviation
	Education diversity	X_6	In-group standard deviation
Cohesion	Level of cohesion	X_7	[0-6] int
Leadership	Emergent leadership	X_8	[0-6] int
Changes	Amount of participation in workshops	X_9	[1-3] int

*****[0-5] int means the measurement of the variable generates an integer ranging from 2 to 5.

Each of the components presented in Table 9 is measured through a single questionnaire item. These questionnaire items can be found in B.4 and B.4.1 for Dutch. fsQCA distinguishes three types of sets to which the entry of a variable can belong. The placement within these sets is decided upon through a calibration step which is explained in Chapter 3.5. The exact values for calibration for each variable can only be presented after the data has been collected and can therefore be found in Chapter 4. To conclude, the items 1 to 7 generate integer values. Team size and amount of workshop participation are left unmanipulated and are used in the analysis as is. For each diversity variable, the standard deviation is calculated within the workshop group. Lastly, cohesion and leadership are 7-point Likert scale items. This generates integer values ranging from [0-6]. This integer value is used in the analysis.

3.3.4 Construct validity and reliability

After creating the latent variables, the construct validity needs to confirmed. Below, the three constructs are presented.

1. Team performance (MTP)
2. Swot effectiveness (MSE)
3. External review panel (MEP)

Measuring construct validity is done through a bivariate correlation analysis in SPSS using a Pearson's significance test. Both the general performance and external review survey show a high correlation between items with significance at the 0.01 level (2-tailed). The general performance measure, however, shows no significance on half of the items and significance at the 0.05 level for the other half. The results are shown in Table 11.

***Table 9** Descriptive statistics and correlations of constructs (latent variables)*

Construct	N	Mean	Std. Deviation	Cronbach's alpha	construct 1	2	3
1. External panel (MEP	20	3,71	0,98	0,87	1		
2. Team performance (MTP)	20	4,25	0,77	0,79	-0,44	1	
3. SWOT performance (MSE)	20	4,75	0,98	0,96	0,03	-0,00	1

Construct reliability is tested using Cornbrash's Alpha in SPSS for each of the dependent variable constructs. The reliability values are presented in Table 11. The general performance measure has the lowest value as was to be expected. This is because this measure is not made exactly for SWOT and therefore includes items that are perhaps less relevant. However, each of the three constructs has a sufficient reliability value (>0.7), so no alterations need to be made.

3.4 Data analysis method: fsQCA

The data analysis method used in this research is the fuzzy-set Qualitative Comparative Analysis (fsQCA). Qualitative Comparative Analysis (QCA) is a technique that is a combination of qualitative and quantitative approaches (Pappas & Woodside, 2021). QCA uses several independent variables and a singular dependent variable as input. QCA then generates configurations of conditions, which are states of the independent variables, that lead to a specific outcome in the dependent variable (Pappas & Woodside, 2021). A condition can be either present or absent, as well as core and peripheral. QCA can output several configurations, also called solutions, which are all plausible explanations of the outcome. By combining several of these solutions, insights can be generated into the causal relationship between the independent and dependent variable. Amongst the QCA method, there are three variations, which are the crisp set QCA, the multi-value QCA and lastly the fuzzy-set QCA. CsQCA is rather limited in its usability as it only take in dichotomous variables (binary data, 0-1) (Pappas & Woodside, 2021). This limits the amount of information that an be extracted from a dataset. MvQCA expands on this by allowing multiple values as opposed to dichotomous ones. FsQCA, however, goes beyond the limitation of binary variables. FsQCA takes variables with an input ranging between 0 and 1, allowing for greater information extraction.

For fsQCA, variables need to be calibrated to form fuzzy sets ranging from 0 to 1. These values are the membership scores of the fuzzy sets (Pappas & Woodside, 2021). According to the membership score, a variable is either a full member (1), a full non-member (0) or a member of the intermediate set (0.5). Data calibration can be performed direct or indirect. The direct approach requires the researcher to have set calibration values, whereas the indirect approach relies on a percentile split. FsQCA can be performed in both fsQCA software and R-studio. This study uses the R-studio package 'QCA' to perform fsQCA analysis because of the software's ability to automate steps and easily redo analyses . First construct reliability and validity are analysed using the Cronbach alpha indicator. These must exceed the value of 0.70. No contrarian case analysis is performed for this study as there is no practical use for this analysis within this study. Table 9 gives an overview of parameters that are necessary for performing fsQCA analyses as well as their meaning and recommended threshold values. Furthermore, Table 11 shows the thresholds values used for calibrating both the variables in this study.

***Table 10** fsQCA threshold explanation (Pappas & Woodside, 2021)*

threshold	Meaning	Threshold value
Overall solution consistency	The measure of which a combination of conditions leads to a specific outcome	>0.75
Raw consistency	Proof that the configuration is sufficient for the resulting occurrence	
PRI consistency	Proportional reduction in consistency. This value should be high.	>0.7 is good. <0.5 means significant inconsistency
Coverage	The relative amount of cases that fit a solution	More is better
Sample Size	The measure in which the result is explained by the solution	N<50 = small, N>50 = large
Frequency	The amount of time a combination of conditions occurs	>1
Membership	Belonging to either the full set membership, intermediate membership or full set non-membership according to percentile values. Percentile measure deals with skewness of results.	75% full set membership 50% intermediate membership 25% full set non-membership

* source: (Pappas & Woodside, 2021)

3.5 Data preparation

Two actions must be performed for data preparation. As has been previously said, the dependent variable constructs have been created by calculating the mean of all items. Additionally, the diversity scales for the independent variables must be created. Currently, only the characteristics of individual participants are shown in the dataset. However, to calculate diversity (heterogeneity) the in-group standard deviation is calculated. The groups in this case are the six different workshops. This results in each participant within a specific workshop having the same diversity score. Data for all but one participant have been collected during and after the workshops resulting in a dataset of N=20. The missing participant left the workshop after an hour and is therefore not included. For each construct, the mean of its item values has been calculated using SPSS. Table 10 shows the descriptive statistics of all variables. As can be seen in the column ‘Skewness’, differing, but significant amounts of skewness can be seen in the variables. This supports the decision for using indirect calibration methods using percentiles over a direct approach as such insights were not gained from the literature.

Table 11 Descriptive statistics dataset

Variable	Range	Minimum	Maximum	Mean	Std, Deviation	Variance	Skewness	Kurtosis
Team size	3,00	2,00	5,00	3,90	0,91	0,83	-0,71	0,15
Hierarchical diversity	3,00	1,00	4,00	2,90	0,85	0,73	-0,36	-0,30
Age diversity	28,00	24,00	52,00	39,35	10,07	101,40	-0,06	-1,64
Tenure diversity	7,00	0,00	7,00	3,85	1,98	3,92	-0,40	-0,91
Experience diversity	23,00	2,00	25,00	11,40	6,99	48,88	0,05	-1,14
Education diversity	2,00	3,00	5,00	3,50	0,89	0,79	1,25	-0,50
Amount of participation in workshops	3,00	0,00	3,00	0,50	0,83	0,68	1,86	3,44
Level of cohesion	6,00	0,00	6,00	4,85	1,57	2,45	-0,18	3,74
Emergent leadership	6,00	0,00	6,00	4,10	1,62	2,62	-0,68	0,44
External review panel	2,45	2,10	4,55	3,71	0,98	0,97	-1,05	-0,70
Team performance	2,56	2,67	5,22	4,25	0,77	0,60	-0,73	-0,63
Team effectiveness	3,00	3,00	6,00	4,75	0,98	0,97	-0,15	-1,16

* Skewness has a Std.Error of 0,512 and kurtosis 0,992.

3.6 Data Treatment

If several items are used to measure a construct, only one value must be selected as input for fsQCA (Pappas & Woodside, 2021). Each construct is therefore formed by calculating the mean of its indicators (survey items). This gives values between 0 and 6. Important for this step is that the construct reliability measure should be sufficient for each construct. Cronbach's alpha is calculated for each construct in SPSS. The value must be greater than 0.70 (Pappas & Woodside, 2021). If not, the construct is not reliable. To solve this unreliability problem, specific items that do not contribute to the construct reliability might be removed. However, special care must be taken that construct validity is maintained, therefore this approach should be avoided if not necessary.

For this study, the indirect approach for calibration is used because there is very little theoretical insight into the expected and wanted values for each variable. Furthermore, thresholds must be selected for the transformation of variables into fuzzy sets. For all variables, including the Likert-scale items, a 75%-50%-25% percentile split is used for deciding variable membership. This split is chosen because it most evenly distinguishes membership. Furthermore, no reasons have been found to support tighter percentile splits.

The goal of this research is to measure differences between participants and groups. This split most effectively serves that purpose.

3.7 Calibrating The Data

The variables are calibrated in R studio using the programming language R and the package ‘QCA’. Calibration is performed using the thresholds of 75/50/25 proposed in the previous section. Subsequently, 0.0001 is added or subtracted from all causal conditions to prevent cases from landing on 0.5 and being removed from the analysis. Subtraction of the 0.00001 value only occurs when a variable has a value of 1 in one of its rows. This is because a value greater than 1 results in errors. Next, fsQCA is run to generate a Truth Table. This truth table contains all possible combinations of conditions, along with their frequencies of occurrence. For this study, a consistency threshold of 0.9 is set, however no coverage thresholds. A value of 0.8 is generally recommended (Pappas & Woodside, 2021), however, this generates way too many solutions for this dataset. Therefore, a tighter threshold of 0.9 is selected. Tis first analysis is exploratory and all values are relevant to gain insights. Later in the analysis, this might change. Furthermore, each combination of conditions must occur at least once, so n>=0. The percentiles are set at 25%, 50% and 75%. The quantile function in R is used for this purpose with the variable type set to six. Type six means the percentile equation used by SPSS is applied instead of the standard R equation which slightly differs in their result. Type 6 is defined as follows:

$$m = p.p_k = \frac{k}{n+1}.Thus\ p_k = E[F(x_k)]$$

All calibration values based on this 25/50/75 split are presented in Table 13.

***Table 12** calibration values*

variable	Afkorting	Dep/indep	Low	Mid	High
SWOTperformance	MSE	dependent	4.00	5.00	5.88
Performance	MTP	dependent	3.51	4.47	4.86
External panel	MEP	dependent	2.54	4.05	4.45
Team size	TS	Independent	3.25	4.00	4.75
Hierarchical diversity	HD	Independent	0.58	0.79	1.14
Age diversity	AD	Independent	6.11	9.19	11.47
Tenure diversity	TD	Independent	1.29	2.10	2.35
Experience diversity	EXD	Independent	4.04	5.13	6.18

Education diversity	ED	Independent	0.00	1.05	1.14
Level of cohesion	CH	Independent	4.25	5.00	6.00
Emergent leadership	EL	Independent	3.00	4.00	5.75
Amount of participation in workshops	AP	Independent	0.00	0.00	1.00

Note: These calibration values are based on a 25%/50%/75% percentile split

3.8 Obtaining the configurations/solutions FsQCA

Three solutions are generated through fsQCA, which are the complex solution, parsimonious solution, and intermediate solution. These solutions are generated using the R package ‘QCA’. R-studio outputs the standard truth table as well as tables for each of the complex, parsimonious and intermediate solutions. These truth tables include configurations of conditions forming solutions in relation to one of the three dependent variables. Subsequently, this output is generated for each of the dependent variables, resulting in 9+3=12 tables. Overall solution consistency should have a minimum value of 0.75 and raw consistency should be greater than 0.80 (Pappas & Woodside, 2021). For smaller samples the expected coverage is high.

The complex and parsimonious solutions can be generated using the R-QCA package without further setting of parameters. To generate the intermediate solutions, however, the software requires an additional setting. Namely, the expected direction of each independent variable. The expected direction refers to whether the condition is beneficial or detrimental to the dependent variable. This is input as a ‘1’ if the condition is beneficial or ‘0’ if it is detrimental. To illustrate, if four out of four conditions should be present for high effectiveness, the parameter would look as follows: ‘[1,1,1,1]. The expected direction for all independent variables has been listed in Table 5 of Chapter 2.4. According to the literature each independent variable used in this study should be beneficial to their respective dependent variables. Therefore, the expected direction parameter looks as follows: [1,1,1,1,1,1,1,1,1]. During the analysis it is confirmed whether this is correct for each dependent variable and if necessary, changes are made accordingly.

3.9 Interpreting and presenting the solutions

The complex solutions are not useful for further analysis (Pappas & Woodside, 2021). Parsimonious and intermediate solutions are both used. In fsQCA, the intermediate solution is generally presented as the basis for the output of an analysis (Pappas & Woodside, 2021). However, the intermediate solution only makes a distinction between whether conditions should be present or absent. No distinction is made in the intermediate solution between core and peripheral conditions. A core condition is a condition for which strong statistical proof is found, while this is not true for the peripheral condition. There is another possible option for a condition, which is that its presence or absence does not matter for the solution as there is no statistical proof found even for a peripheral status. Because the parsimonious solution only shows core conditions, by comparing both the intermediate and parsimonious solutions, a distinction can be made (Pappas & Woodside, 2021). To conclude, a condition can be either beneficial or detrimental and core or peripheral, lastly it is also possible for a condition to be statistically irrelevant to the solution. These five options are presented in a table using the symbols shown in Table 13.

Table 13 *Symbols and their meaning: solution table*

Symbol	Meaning
◯	Represents the absence of a core condition
○	Represent the absence of a peripheral condition
⬤	Represents the presence of a core condition
•	Represent the presence of a peripheral condition
	Does not matter

The table presenting all solutions take the same format as Table 3 of the article by Pappas et al. (2016). The consistency and coverage of the individual and overall solution are also presented in this table (Pappas & Woodside, 2021). Next, from the table, the findings can be interpreted in a qualitative and story-like manner. The solution table that is generated uses visual representations of the presence and absence of conditions. In this study, the solution tables of different independent variables are combined in one large table. This makes it easier to compare the solutions of each analysis (Pappas & Woodside, 2021). To illustrate, the effect of a condition becomes more interesting when it shows up in several solutions. Also, specific combinations of conditions can be compared between solutions. Furthermore, higher consistency and coverage values also mean the solution is more relevant to draw conclusions on.

3.10 Theory building

Theory building is used to finally make sense of the generated fsQCA results. This process of theory building involves creating and developing one or more statements of conditions and the interrelations they show to explain when a certain outcome occurs. This essentially involves analysing the generated solutions per dependent variable and describing which combinations of core and peripheral conditions lead to high dependent variable values. Finally, the code for generating the solutions is presented in Appendix E.

4. RESULTS

4.1 fsQCA output

FsQCA produces four types of outputs. The truth table and the complex, parsimonious and intermediate solutions. Because this study includes three separate dependent variables, three sets of these four outputs are generated. From the intermediate and parsimonious outputs a solution table is generated that visually presents the individual solutions. The solution tables for each fsQCA analysis are then combined into one overlapping table presented in Table 14. Each fsQCA analysis, referring to the different dependent variables, are individually discussed in sections 4.1.2, 4.1.3, and 4.1.4. These three sections include a description of the fsQCA analysis, the expected direction table, a discussion of findings, and a conclusion. The truth table is only included for the first fsQCA analysis in Chapter 4.1.2, while the others can be found in Appendix C. For generating the fsQCA output the variable incl.cut is set to 0.9. This value represents the cut-off point for the R package to decide whether the outcome of a condition set should be 0 or 1. The literature recommends using 0.8, however, this produces an extremely large amount of useless solution tables, therefore a tighter value of 0.9 is chosen. Lastly, the PRI threshold is set at 0.5 as a bottom-level.

Because of the relatively small dataset (N=20), some doubt existed towards the relatively high amount of independent variables (9). However, team performance and effectiveness are complex subjects and are expected to have causal relations with a large number of variables. Additionally, through this first fsQCA analysis, relatively low coverage levels were found. Through trial and error, it was found that the removal of any one independent variable would reduce the existing coverage levels by about 20%. Therefore, the decision was made to include all nine independent variables as conditions that are deemed important by the literature.

Table 14 solution tables for MEP, MTP and MSE

	MEP		MTP			MSE		
configuration	1	2	1	2	3	1	2	3
(TS) Team size	◯	◯	⬤	⬤			◯	⬤
(HD) Hierarchical diversity		•		⬤	⬤	◯		⬤
(AD) Age diversity				⬤	⬤		⬤	⬤
(TD) Tenure diversity		⬤	⬤	⬤	◯		⬤	⬤
(EXD) Experience diversity		⬤	⬤	⬤	◯		⬤	⬤
(ED) Education diversity		⬤					⬤	
(AP) Amount of participation in workshops	•	•	•	•	•	•	•	•
(CH) Level of cohesion			•		•	⬤	⬤	⬤
(EL) Emergent leadership				•	•	⬤	⬤	◯
consistency	0,952	1	0,983	0,983	0,993	0,989	1	1
PRI	0,922	1	0,963	0,972	0,99	0,971	0,994	0,999
Raw Coverage	0,56	0,123	0,217	0,216	0,23	0,312	0,085	0,098
Unique Coverage	0,531	0,094	0,094	0,094	0,175	0,266	0,056	0,057
Overall solution consistency		0,959			0,992			0,992
Overall solution PRI		0,937			0,988			0,978
Overall solution coverage		0,654			0,485			0,425

Symbol	Meaning
◯	Represents the absence of a core condition
○	Represent the absence of a peripheral condition
⬤	Represents the presence of a core condition
•	Represent the presence of a peripheral condition
	Does not matter

4.1.1 Mean external panel (MEP)

This section shows the complete output of the MEP fsQCA analysis. MEP is the measure for SWOT team effectiveness measured through an external panel. This construct was created from 5 indicators with a Cronbach's alpha value of 0.87. The expected directions of conditions for the intermediate solution is presented in Table 15 and the truth table in Table 16. For MEP, the expected direction of all independent variables for the intermediate solution is 1 except for team size (TS) as is shown in Table 15. This is supported by the researcher's experience during the workshops and this parameter leads to higher consistency and coverage values. The two solutions generated from MEP also show team size should be low to achieve high effectiveness, despite contrasting existing SWOT literature.

Table 15 Expected direction of conditions

Variable	TS	HD	AD	TD	ED	EXD	AP	CH	EL
Expected direction	0	1	1	1	1	1	1	1	1

Table 16 *Truth table MEP with incl.cut = 0.9*

	TS	HD	AD	TD	ED	EXD	AP	CH	EL	OUT	n	incl	PRI
272	1	0	0	0	0	1	1	1	1	1	3	0,954	0,944
55	0	0	0	1	1	0	1	1	0	1	2	1.000	1.000
261	1	0	0	0	0	0	1	0	0	1	2	0,93	0,386
464	1	1	1	0	0	1	1	1	1	0	2	0,794	0,216
504	1	1	1	1	1	0	1	1	1	0	2	0,259	0,071
502	1	1	1	1	1	0	1	0	1	0	2	0,202	0,048
253	0	1	1	1	1	1	1	0	0	1	1	1.000	1.000
256	0	1	1	1	1	1	1	1	1	1	1	1.000	1.000
271	1	0	0	0	0	1	1	1	0	1	1	0,949	0,925
311	1	0	0	1	1	0	1	1	0	1	1	0,944	0,894
264	1	0	0	0	0	0	1	1	1	1	1	0,918	0,684
208	0	1	1	0	0	1	1	1	1	0	1	0,692	0,106
503	1	1	1	1	1	0	1	1	0	0	1	0,417	0,119

The fsQCA analysis outcome for MEP is presented in Table 14, under MEP and is comprised of two solutions. In the lower section of Table 14, a legend is shown that explains the solutions table. To illustrate, team size is a core condition, therefore this condition is important and statistically significant. Team size must be absent for high effectiveness. This means according to these configurations, team size should be small. However, because coverage is incomplete, this type of statement cannot be generalized for all cases.

- To summarize, the combination of small teams with the presence of workshop experience leads to high effectiveness, regardless of other diversity types, cohesion or emergent leadership (solution 1).
- Tenure, education and experience diversity are also all core conditions. The absence of Team size combined with the presence of Tenure, education and experience diversity, as well as peripheral presence of hierarchical diversity and workshop experience leads to high effectiveness (solution 2).

The highest coverage values are given by solution 1. This means most of the explanation of the outcome comes from this configuration. Hierarchical diversity and workshop experience play a minor role in explaining the effectiveness of this fsQCA analysis. Additionally, cohesion and emergent leadership are completely irrelevant. This might mean it can be difficult for an external panel to perceive the effects of cohesion and emergent leadership. On the other hand tenure, education and experience diversity are important (core) factors that lead to high effectiveness. However, their role only accounts for a small part in explaining effectiveness. Contrastingly, team size is a major (core) factor that should have low values for high effectiveness in most solutions. Smaller teams might see improved communication and effectiveness in completing the SWOT workshop steps compared to their larger counterparts. Additionally, workshop experience shows some statistical proof for its importance in achieving high effectiveness. Diversity factors, with the exception of age are beneficial in the second solution, likely adding in available knowledge and experience. A combination of small teams, with experience, knowledge and experience might be able to very effectively apply relevant knowledge to complete the goals of the workshop, thereby achieving high effectiveness.

4.1.2 Mean Team Performance (MTP)

Mean Team performance or MTP is the self-assessment report in which workshop participants judge the teamwork of their team. This construct was created from 18 indicators with a Cronbach's alpha value of 0.786. This dependent variable showed the lowest construct reliability of the three. The outcome of the fuzzy set analysis for high team performance is shown in Table 14, under MTP and consists of 3 solutions. The expected directions of conditions for the intermediate solution is presented in Table 17. For MTP, the expected direction of all independent variables for the intermediate solution is 1 including team size (TS). The expected direction for team size for the team performance analysis differs from the team effectiveness analysis. MTP appears to benefit from larger teams as opposed to MEP and MSE. This could be explained by the nature of the measure for team performance used in this study. This measure, includes are number of items that likely correlate with high team size. To illustrate, we can look at item 3 of the questionnaire: 'Team members encouraged one another to express their opinions and thoughts'. Encouraging each other to express opinions and thoughts likely occurs more often in larger teams, as individuals get to have their say more easily in teams of two or three. Therefore, because such situations occur less often, the score for this item would be lower for smaller teams despite this not necessarily reflecting differences in performance. This would be an invalidity in the measurement. Based on this logic, the expected direction for team size for MTP is set as 1.

Table 17 Expected direction of conditions

Variable	TS	HD	AD	TD	ED	EXD	AP	CH	EL
Expected direction	1	1	1	1	1	1	1	1	1

- Again team size is a core condition, however, for self-assessed team performance (MTP), the condition should be present. Therefore, larger teams lead to higher team performance within this configuration. Additionally, the (core) presence of tenure and education diversity leads to high team performance with a (peripheral) presence of workshop experience and cohesion regardless of hierarchical, age, and experience diversity as well as emergent leadership (solution 1). Similarly to MEP, workshop experience has a peripheral positive effect on the dependent variable.
- Team size should be high, as well as high values for (core) conditions of hierarchical, age, tenure and education diversity. Combined with the (peripheral) presence of workshop experience and emergent leadership (solution 2) regardless of experience diversity and cohesion.
- The presence of (core) conditions hierarchical and age diversity, combined with the absence of (core) conditions tenure and experience diversity lead to high effectiveness when combined with (peripheral) conditions workshop experience, cohesion and emergent leadership (solution 3). This effect is regardless of team size and experience diversity.

Very similar coverage and inclusion values are given by all three solutions. Team size, as well as all diversity factors except for experience diversity, leads to high performance. However, in solution three, with the irrelevancy of team size, tenure and education diversity should be absent. Workshop experience, cohesion and emergent leadership all have a positive effect on team performance, except with lower statistical significance. Furthermore, experience diversity is statistically completely irrelevant to team performance. Contrasting to the first two solutions, solution three shows tenure and experience diversity should be low for high team effectiveness. A Major difference here is that team size is absent as a relevant factor. This might mean that diversity of these two factors should be low in with the absence of team size, because high diversity per definition also includes low values for tenure and experience. The inclusion of low values might be detrimental when team size is not accounted for.

4.1.3 Mean SWOT effectiveness (MSE)

Mean SWOT effectiveness or MSE is the self-assessment report in which workshop participants judge their satisfaction with the generated results as a measurement of SWOT team effectiveness. This construct was created from five indicators with a Cronbach's alpha value of 0.956. This dependent variable showed the highest construct reliability of the three. The outcome of the fuzzy set analysis for high team performance is shown in Table 14, under MSE and consists of 3 solutions. Finally, the expected direction for the intermediate solution of MSE is presented in Table 17. Similarly to MEP, the expected direction of team size for MSE is '0'. This is because for the effectiveness measure used in this study, team size negatively correlates with SWOT effectiveness as opposed to the other independent variables. This is further confirmed by improved coverage values with this configuration.

***Table** 18 Expected direction of conditions*

Variable	TS	HD	AD	TD	ED	EXD	AP	CH	EL
Expected direction	0	1	1	1	1	1	1	1	1

For MSE, cohesion is a core variable that should be present in each of the three solutions and has a major positive effect on SWOT performance. Additionally, workshop experience has a minor positive effect on SWOT performance.

- The absence of (core) condition Hierarchical diversity, as well as the (core) presence of cohesion and emergent leadership combined with the (peripheral) presence of workshop experience leads to high SWOT performance. This occurs regardless of the presence of team size, age, tenure, education and experience diversity (solution 1).
- The absence of (core) condition team size, as well as the presence of (core) conditions age, tenure, education, and experience diversity as well as cohesion and emergent leadership combined with the presence of (peripheral) condition workshop experience leads to high SWOT performance. This occurs regardless of the presence of hierarchical diversity (solution 2).

- The presence of (core) conditions team size, hierarchy, age, tenure, and education diversity and cohesion as well as the absence of (core) condition emergent leadership and the presence of (peripheral) condition workshop presence leads to high SWOT performance (solution 3).

The highest coverage is seen in solution one with a value of 0,312 compared to values lower than 0,1 for solutions 2 and 3. This means solution one is the most relevant and has the highest impact. Furthermore, very high consistency values are seen, far exceeding their thresholds. Interestingly, compared to MEP and MTP, for MSE it there is strong statistical proof the presence of emergent leadership and cohesion leads to high effectiveness. The difference between MSE and MEP is of course that MSE is self-assessed. When assessing their own effectiveness, apparently these two factors become statistically significant and beneficial to effectiveness. contrastingly, in solution three, where team size should be high, emergent leadership should be low or absent to achieve high effectiveness. Apparently for this configuration, emergent leadership and large teams do not combine. Similarly, in solution two, team size should be low, but now emergent leadership should be present for high effectiveness. This is opposite to what would be expected. Logically, larger teams have greater need for emergent leadership to take place.

4.2 An alternate calibration approach

According to literature, the team-level factors composition and structure are generally defined by diversity. The same conclusions are drawn within SWOT literature, where the importance of team diversity is stated. However, logically, diversity is not the only way of looking at team composition and structure. Instead of calculating the standard deviation for variable heterogeneity, another possibility would be to calculate the mean values for the diversity variables. This would result in the average level of hierarchy, age, experience, education, and tenure. Higher average levels of these variables might be strongly correlated with the amount of relevant knowledge about the internal and external environment of the firm. Therefore, a new fsQCA analysis is performed for which the mean of these five variables is calculated. Subsequently, the differences between the two analyses are presented and discussed.

***Table** 19 solution tables mean instead of diversity*

	MEP			MTP			MSE	
configuration	1	2	3	1	2	3	1	2
(TS) Team size	○	●	●	●	●			
(HD) Hierarchy	●	○	●			●	○	○
(AD) Age	●		●			●		
(TD) Tenure		●	○			●	●	○
(EXD) Experience			●			●		
(ED) Education	●			●	●	○		●
(AP) Amount of participation in workshops	•	•	•	•	•	•	•	•
(CH) Level of cohesion		•		•		•	●	●
(EL) Emergent leadership					•	•	●	○
consistency	1	0,933	1	0,719	0,784	0,992	0,930	0,972
PRI	1	0,896	0,998	0,548	0,681	0,988	0,844	0,921
Raw Coverage	0,290	0,272	0,194	0,260	0,268	0,188	0,392	0,125
Unique Coverage	0,067	0,226	0,120	0,090	0,098	0,149	0,327	0,059
Overall solution consistency			0,970			0,825		0,939
Overall solution PRI			0,949			0,747		0,871
Overall solution coverage			0,644			0,507		0,452

Symbol	Meaning
○	Represents the absence of a core condition
◦	Represent the absence of a peripheral condition
●	Represents the presence of a core condition
•	Represent the presence of a peripheral condition
	Does not matter

Some differences can be observed when comparing Table 19 with the previous solutions of Table 14. Team size is no longer a core condition for MSE, MEP now also includes configurations where teams should be relatively large for high effectiveness, and hierarchy and age have are now core conditions for MEP. Additionally, emergent leadership is statistically irrelevant for all MEP solutions. For solution three, team size, hierarchy, age and experience must be high with low tenure to achieve high effectiveness. In solution two, employees should have high tenure, however mean hierarchy should be low. In solution one, small teams are combined with high mean hierarchy and age, as well as education to achieve high effectiveness. It appears mean education should only be high in small teams within these solutions. Again workshop participation and cohesion are beneficial to team effectiveness, however with limited statistical proof.

The solutions for the mean and standard deviation approaches for MTP as very similar. Similarly to Table 14, team size, hierarchy, age, tenure and experience are core conditions. Contrastingly, for mean MTP, education is also a core condition. The team's mean level of education should be high in large teams, but when team size is irrelevant in solution three, it should be low. This is somewhat similar to the solutions of mean MEP. For MTP, workshop participation, cohesion and emergent leadership are beneficial to team performance, however with limited statistical proof. This is in contrast to MEP, where emergent leadership is not statistically relevant.

The MSE mean fsQCA analysis presented in Table 19 shows again different results. Team size is no longer a relevant condition. Furthermore, cohesion and emergent leadership are core conditions in solutions. Workshop participation is still beneficial for team effectiveness, however with limited statistical proof. Hierarchy levels should be low for high team effectiveness in both solutions. Teams with high mean tenure should have emergent leadership for high effectiveness (solution 1). Contrastingly, teams with low mean tenure, should have high mean levels of education combined with the absence of emergent leadership to achieve high effectiveness (solution 2). It appears teams with high tenure benefit from emergent leadership, while teams with low tenure benefit from high mean education while emergent leadership becomes detrimental. This could be interpreted as teams with individuals younger in the company liking to be more flexible and base more of their work on their education. Conversely, teams with individuals who have worked in the company longer have need for a leader to perhaps work more systematically, while previous education becomes irrelevant.

4.3 A Summary Of Findings

Two approaches to analysing SWOT team performance and effectiveness have been tried in this study: a standard deviation and a mean approach. While a number of configurations showed similarities between the two approaches, there were also significant differences. When comparing the consistency and coverage values for the two approaches some slight differences can also be observed. Diversity-based MEP shows lower consistency compared to its mean counterpart, but slightly higher coverage. Diversity-based MTP shows significantly higher consistency, but slightly lower coverage. And lastly, diversity-based MSE shows significantly higher consistency, but slightly lower coverage. Overall, the consistency of the diversity approach configurations is higher, but shows slightly lower coverage values are seen. This in turn means the diversity-based approach has a higher extent to which the configurations lead to the specified outcomes, but the outcomes explain slightly less of the total dataset.

Interesting findings in the configurations, are the differences between the two effectiveness and single performance measure when looking at team size. For the diversity-based approach, teams should be small for high effectiveness, but large for performance. Contrastingly, this relationship is not found as strongly in the mean-based approach. Both approaches show the benefit of having participated in SWOT workshops previously. This factor is therefore the singular variable that consistently benefits all configurations. However, the statistical proof for its effect is statistically weaker. Contrasting existing literature, almost no solutions show the presence of all conditions to be beneficial to either performance or effectiveness. Generally, only halve the conditions have a statistically significant effect. Additionally, some conditions tend to become detrimental to the outcome variable, but which condition changes with each configuration. It is therefore difficult to pinpoint specific effects at work.

5. DISCUSSION

The goal of this study is to answer the question: 'What combination of team-level factors leads to high SWOT team effectiveness and performance?'. Specifically, this study focusses on the team-level factors of team size, structure, cohesion, leadership and composition as defined by Rasker (2001) and their relation to three measures of SWOT team effectiveness and performance. The intended contributions of this study are divided into two parts. The first part involves a proclamation of how SWOT and general strategic management literature is lacking in empirical research on a crucial component, which is the team performing the analysis. Along with this proclamation, an exploratory start of this research is executed in this study. The second part involves a contribution to the practical field of SWOT application. Through this study, insights have been generated into the combinations of variables that positively and negatively influence SWOT performance and effectiveness.

Six fsQCA analyses have been performed on three different dependent variables. These dependent variables are mean external panel (MEP), mean team performance (MTP), and mean SWOT effectiveness (MSE). Through testing the construct validity of the three dependent variables it was concluded that there is no significant correlation between any of the three constructs. Therefore, there appear to be differences in the nature of these constructs. MEP is created from the subjective opinion of an external panel that judges the quality of SWOT results based only on the outputs of SWOT analysis. There is no clear definition of when SWOT results are useful or when quality is high, therefore this measure is still subjective. However, participants of the external panel are not biased towards any specific workshop as they did not participate in the workshop themselves. MTP and MSE are measures created from the subjective reflection of workshop participants on their own teamwork and generated results. MTP measures performance using a general team performance scale created by Thompson et al. (2009), while MSE measures effectiveness using the same indicators as MEP.

According to the MEP fsQCA analysis, teams should be small (<3,25) for high effectiveness. Interestingly, these findings oppose all reviewed team and SWOT performance and effectiveness literature (Pickton & Wright, 1998; Argenti 2018; D. Pickton, 2017; Namugenyi et al., 2017). Solution 1 shows a configuration where teams should be small and participants should have experience in SWOT workshops verifying findings by Tannenbaum et al., (1992). All other factors show no statistically significant effect on team effectiveness. This might mean that for MEP, these diversity-based factors are not very relevant. Although solution 2 presents an alternative configuration with the inclusion of tenure, experience, and education diversity as beneficial conditions, its raw and unique coverage is limited. This means solution 1 occurs in many more cases than solution 2. Diversity-based factors are therefore, for MEP, relatively irrelevant. Solution 2 shows the benefit of having high tenure, education and experience diversity with a minor proven benefit of high hierarchical diversity. This corroborates the stance of team effectiveness literature on the importance of team composition diversity (Bantel & Jackson, 1989). When changing diversity scores to mean scores, the MEP fsQCA analysis shows team size is no longer a major contributing factor to effectiveness. Instead, mean hierarchy, age, education tenure and experience are all core conditions. However, the absence and presence of these conditions vary per solution. Interestingly, almost no authors discuss the value of high mean team composition values. Instead, they mostly focus on diversity (Naranjo-Gil, 2009; Priem, 1990; Wiersema & Bantel, 1992). Logically, however, it would make sense that high mean values for these variables are beneficial to team effectiveness. Older, more experienced and more highly educated individuals are likely to possess more relevant knowledge useful for strategic management tools. It would be interesting to study this difference between mean and diversity approaches to team composition and their impact on team effectiveness.

According to the MTP fsQCA analysis, high team size generally leads to high performance when combined with tenure and experience diversity (solution 1). Large teams in this case, refer teams larger than an average of 3,25. To illustrate, Argenti (2018) believes SWOT teams should have between 3 and 8 members, fitting with this study's large team description. Also when combined with hierarchical and age diversity (solution 2) high team performance is achieved. These findings are in line with contemporary team performance literature, but oppose this study's findings for team effectiveness, possibly explaining some of the low dependent correlation values. Especially the papers by Naranjo-Gil (2009) and Priem (1990) fit well with the fsQCA results of MTP. These papers generally also discuss team performance as opposed to team performance, not effectiveness, thereby fitting well with the findings. Furthermore, diversity in hierarchy, age, tenure, and education are core conditions that positively influence performance. The exception to this rule is solution 3. With the absence of team size as a relevant condition, tenure and education diversity should be low for high performance. It is, however, difficult to formulate a clear explanation for this interaction. Based solely on the standard deviation-based MTP analysis, it could be induced that for solution 3 tenure and experience diversity should be low in combination with small teams because heterogeneity would necessarily also include low values. This would possibly be to the detriment of team functioning. Continuing on this line of reasoning, the mean-based MTP analysis solution 3 shows mean tenure and experience should indeed be high when teams are small. This might explain the effect shown in solution 3. Diversity for these factors should be low, because mean values need to be high and the dataset might not allow for high mean values with high standard deviation. Furthermore, minor benefits are seen by having SWOT-experienced participants as well as cohesion and emergent leadership in the team.

According to the MSE fsQCA analysis, cohesion and emergent leadership are core conditions that should be present for high effectiveness. However, emergent leadership should be absent in solution 3 where team size is high. This could be interpreted as large teams suffering from emergent leadership, which is the opposite of what one might expect. Generally, larger groups benefit more from leadership. One reason for this is that the responsibility experienced by individuals decreases with increasing team size (Colbert et al., 2014). Furthermore, workshop experience still has a minor positive effect on swot effectiveness. The absence of hierarchical diversity combined with the presence of cohesion and emergent leadership has a major benefit to SWOT effectiveness (solution 1). Solution 2 and 3 show the importance of the presence of age, tenure and education diversity. In small teams, hierarchical diversity is irrelevant, while experience diversity is important (solution 2). Contrastingly, in larger teams, hierarchical diversity should be high and experience diversity is irrelevant (solution 3). When changing diversity scores to mean scores, low mean hierarchy and high cohesion have a large positive impact on SWOT effectiveness. Additionally, a minor benefit is seen from the presence of SWOT workshop experience. Furthermore, either a combination of high mean tenure and high emergent leadership has a major positive impact on SWOT effectiveness (solution 1). Or a combination of low mean tenure and the absence of emergent leadership leads to high SWOT effectiveness (solution 2). Combination 1 has much greater coverage and is therefore significantly more relevant (0,392 vs 0,125). While both solutions are correct, the presence of tenure and emergent leadership explains more of the results. These two combinations of conditions might be interpreted as follows. If a group consist of individuals who have worked at the firm for a long time, emergent leadership is detrimental. However, when individuals are new to a firm, emergent leadership is beneficial.

The expected direction of conditions for the three fsQCA analyses sets have one difference. For MTP all values are equal to '1', while for MEP and MSE, only team size is equal to 0. This is done because this action results in significantly higher inclusion and coverage values. This value can be interpreted as the importance of small teams over larger teams for MEP and MSE. This difference in expected direction for performance and effectiveness measures is attributed to the operationalisation of the performance construct in this study, which is biased towards larger teams. Whether this approach is correct is uncertain, as literature on this topic turned out to be limited. This study is therefore continued with the idea that this decision was correct.

Emergent leadership and cohesion played relatively minor roles in most of the fsQCA analyses as the statistical proof for their effects is limited. This might be due to these variables being more vague or unclear compared to the other independent variables. Emergent leadership for example might be present in a team, but does not necessarily have to benefit the team's effectiveness. A leader might perform bad, resulting in the entire team performing badly. However, a leader can also perform well, resulting in the team performing well. Subsequently, only measuring the presence of an emergent leader might not be enough to gain meaningful insights. To illustrate, while observing one of the teams in this study, a participant took up a strong emergent leadership role. However, this leader continued to discuss SWOT factors that were not relevant to the market segment that was being analysed. Subsequently, the team followed the leader and few meaningful results were generated during the workshop. A solution to this problem might be to include additional measures of leader competence. However, as the above story illustrates, the team joined the direction of the leader and appeared quite satisfied. Therefore, it would be interesting to perform further research on how this variable can be better included in this type of study.

Based on the results of the fsQCA analyses, to achieve high team effectiveness, teams generally need to be small (<3,25), while for team performance it should be high. Here, one attempt to explain this is presented. To start, smaller teams are easier to work with, have shorter communication lines between individuals and generally see improved communication. This in turn is beneficial to the ability of the team to achieve their required goals, thereby achieving higher effectiveness scores. The construct of performance, however, is measured through several indicators that naturally correlate with large teams. An example of this is item 3, where participants are asked whether individuals encouraged each other to share their opinions and thoughts. This act of asking and verifying likely occurs much less often in smaller teams as it is simply not necessary. In a small team of fewer than 3,25 individuals on average, it can be expected each individual has ample opportunity to speak. The construct of performance used in this study is therefore biased towards larger teams. In turn, this bias leads to higher performance scores for larger teams. An interesting opportunity for further research is therefore to develop a measure of team performance that is not biased towards larger teams and that is more suitable for this kind of study.

The researcher was present during the workshops and also subjectively evaluated each workshop. Interestingly, high MTP scores didn't correlate with workshops that subjectively went 'well'. This might explain the low construct correlation scores between MSE and MEP, as well as MTP and MEP. However, this does not explain the low, or even negative, correlation scores between MTP and MSE. These constructs are both created from surveys completed by workshop participants. Apparently, self-assessed team performance does not correlate with self-assessed SWOT effectiveness. This might mean that the team performance construct does indeed measure team performance, but that the measured indicators are not representative of SWOT results. Equally plausible, the external effectiveness construct might not be representative of SWOT performance. Although the standard deviation of the constructs is very similar, the mean values differ significantly. MEP has a mean of 3,71, MTP of 4,25, and MSE of 4,75. Differing means does not mean the constructs cannot correlate, but does show there is a difference in perception.

This is especially true for MEP and MSE, which are based on the same questionnaire but are answered by two different types of groups. Their mean values diverge a full point, showing the more positive and negative assessment of each group. It would be interesting to perform further research into developing a team performance construct that does correlate with the self-assessed SWOT effectiveness construct. If such measures could be created, SWOT workshop participants might be better instructed on what aspects of team work to focus on to achieve better SWOT results. If one of the constructs presented in this study had to be selected for its usefulness, it likely would be MEP. The external panel consist of individuals with high levels of hierarchy in the firm, who carry the responsibility of organizing organizational change within the firm. Additionally, they generally have much experience in and knowledge about the firm. Finally, the best measure of SWOT effectiveness is likely one gained from those individuals who will actually use and deploy its results. Self-assessment is per definition subjective. Subsequently, one individual might consistently assess themselves more positively, while another might do the opposite. An interesting variable to include for further research would be the propensity for individuals to evaluate themselves either positively or negatively. However, most individuals are likely unaware of how relatively negative or positive their self-assessment is. Therefore, this type of variable cannot be measured by directly asking the participant. Subsequently, a construct would have to be created with questions as indicators that derive a person's reflective positivity.

6. IMPLICATIONS TO THE PRACTICING MANAGER

The most significant takeaway of this study for the practicing manager should be the knowledge that team-level factors significantly influence the performance and effectiveness of SWOT teams. SWOT Team effectiveness and performance are influenced by team size, structure, composition (diversity), and to a lesser extent team cohesion and leadership. Additionally, prior experience with SWOT workshops is consistently beneficial to high SWOT performance and effectiveness, although with a relatively minor effect.

A statement has previously been made about the relative importance of the external panel measure for SWOT team effectiveness. This statement is believed to be especially true for the practicing manager, as this measure likely most closely reflects a quality assurance process that managers would go through after a SWOT workshop. Based on this statement and the findings of this study, several practical implications can be formulated. Firstly, teams should be relatively small for team-based SWOT workshops to achieve high effectiveness. Small in this case means on average less than 3,25 individuals. This contrast existing literature on teams in knowledge-intensive settings, but accentuates the importance of having just the key personnel for the job. Secondly, diversity in team composition factors such as age, tenure, experience and education, as well as high mean values for these factors is generally beneficial to SWOT team effectiveness. This means both diverse teams and older, experienced and knowledgeable teams are valuable for SWOT. Thirdly, as has been previously stated, experience in SWOT workshops is consistently beneficial to SWOT effectiveness. Every single solution showed a minor beneficial effect with the presence of this condition. Therefore, the practicing manager is recommended to have their SWOT team perform several trial runs, perhaps with increasing importance, before performing the analysis that will form the basis of their organization's strategic planning initiative. Fourthly, the importance of team cohesion and leadership, according to the findings of this study, should not be overestimated. Other factors show much greater influence on team effectiveness and should therefore be given more attention. Lastly, in accordance with team literature, different teams are likely to perform differently as well as generate significantly different results due to the inherent subjectivity of the SWOT framework. Therefore, it might be wise to not rely solely on one team to perform a crucial SWOT analysis. Instead, a collation of team-based SWOT workshops is recommended.

7. LIMITATIONS AND CONCLUSION

Several limitations were inherent to this study, which will be discussed in this chapter. Firstly, a clear limitation of this research is the low sample size, especially when compared with the relatively high amount of independent variables or constructs. It was decided, however, that all nine independent variables should be included because excluding any of them resulted in significantly decreased coverage values. If the coverage values become too low, the results would decrease in relevance. Therefore, more complex solutions are generated, while their relevancy is upheld. Additionally, the reviewed literature on team-level factors include a broad number of factors, therefore the variables used in this study are already a limited selection (Colbert et al., 2014; Essens et al., 2005; Naranjo-Gil, 2009; Priem, 1990; Wiersema & Bantel, 1992). Similarly to the limitations experienced by Gonçalves et al. (2016), the lower sample size also means that individual results are more likely to make a large impact as outliers are averaged out less. Secondly, the sample profile of this study includes mainly procurement consultants and is therefore not representative of all firms. This limitation is rather common and is for example also discussed by Pappas et al. (2016). By including more procurement firms, the sample profile could become representative for of procurement firms. Furthermore, by including different types of firms in different industries, this representativeness could increase further. Thirdly, this study used questionnaires as the source for data collection. These questionnaires consist of items that can be interpreted differently amongst participants. To illustrate, during the workshops, participants shared their difficulty in understanding certain questionnaire items. This meant that the questions presented to the participants were not defined clearly enough. An improvement on these questionnaires would be the inclusion of definition packages for each question, clearly defining the meaning and intention of each question so that each participant interprets the question in the same manner. Additionally, Pappas et al. (2016) suggest that including interviews and observations complementary to the self-reported data could help with subjectivity. Fourthly, each workshop took a full three hours to complete, with the questionnaires being filled in at the end of these three hours. During most workshops, participants shared their tiredness after having been mentally focused for this duration of time. This tiredness might have influenced the accuracy with which participants answered their questionnaires. However, delaying the answering of the questionnaires would likely not have improved questionnaire answers as details would start to slip from the mind of participants. Furthermore, it was impossible to bring the answering of the questionnaires forward since the questionnaires could only be answered after completion of the workshops.

Lastly, a select number of participants joined the workshops through an online medium. This fact was unavoidable in the constraints of this study. The digital presence of participants involves new variables that were not included in the analysis. Digital presence might decrease communication quality within a team or increase irritation due to delays. However, the researcher observing the workshops found no clear effects of digital presence. Therefore, this factor is not scrutinized further. For further research the digital presence of participants would be an interesting additional variable that can be studied as the subjective observations of the researcher could have limitations.

It has been the objective of this study to exploratively discover which team-level factors influence SWOT team performance and effectiveness. Fulfilling this research objective involved the consideration of several different academic subjects without the luxury of always having previous literary work to fall back on. This required the synthesis of relevant existing work with newly created methodology, as is the nature of exploratory research. This study's goal was achieved through five major steps: first, defining the nature and context of SWOT analysis as a strategic management tool. Second, comparing and synthesizing team performance and effectiveness research and the interrelated input variables that influence them. Thirdly, Combining findings about SWOT analysis and team performance and effectiveness into a comprehensive model. Fourthly, formulating measurement approaches for all included variables, designing, organizing, and coordinating SWOT workshops at a Dutch consultancy firm in Amsterdam. Fifthly, collecting and analysing data using the fsQCA methodology in R and formulating conclusions based on this analysis. Each of these five steps was completed successfully, however, through their completion, many areas of improvement have been discovered that are elaborated upon in the discussion. The relative complexity of this study, arising from the combination of academic topics, means there are major opportunities for expansion and deliberation of this study. By increasing the sample size, including more companies, discovering more relevant independent variables, creating correlating dependent variables and more clearly defining their interrelatedness as well as performing this study in other industries and by other researchers will allow this single exploratory study to be the beginning of a new stream of highly method-specific team performance and effectiveness studies. Larger sample sizes will also allow the use of different analytical methods allowing for triangulation of methodologies and their results.

To conclude, this study has discovered the relevancy of team-related input factors on SWOT team performance and effectiveness measures. These findings might aid consultancy firms in knowledge-intensive industries to better organize teams to improve their teamwork and results. Secondly, this study has discovered the incompleteness of team performance and effectiveness models. This is understandable when looking at the three dependent variables used in this study, each producing significantly different models. Major differences are discovered between models, with the in- and exclusion of crucial variables. Thirdly, this study has discovered which team-level input factors are beneficial and detrimental to the three team performance and effectiveness measures. Due to the uncorrelatedness of the three dependent variables a choice would need to be made about the relative importance of each approach. The argument can be made that the measure MEP, collected from an outside panel of managers and directors, would have the greatest managerial value as an output measure. SWOT in this study was used to explore new strategic opportunities and risks for strategic development planning. These types of major developments must go through managerial review to be implemented. Additionally, it can be argued that for strategic development, most important are the results, not the process. Because it will be the results that influence the organization's future more than the process.

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Wiersema, M. F., & Bantel, K. A. (1992). Top Management Team Demography and Corporate Strategic Change. *Academy of Management Journal*, *35*(1), 91–121. https://doi.org/10.5465/256474

Yüksel, I., & Dağdeviren, M. (2007). Using the analytic network process (ANP) in a SWOT analysis—A case study for a textile firm. *Information Sciences*, *177*(16), 3364–3382. https://doi.org/10.1016/j.ins.2007.01.001

APPENDICES

Appendix A: Team performance and effectiveness models

Appendix A.1

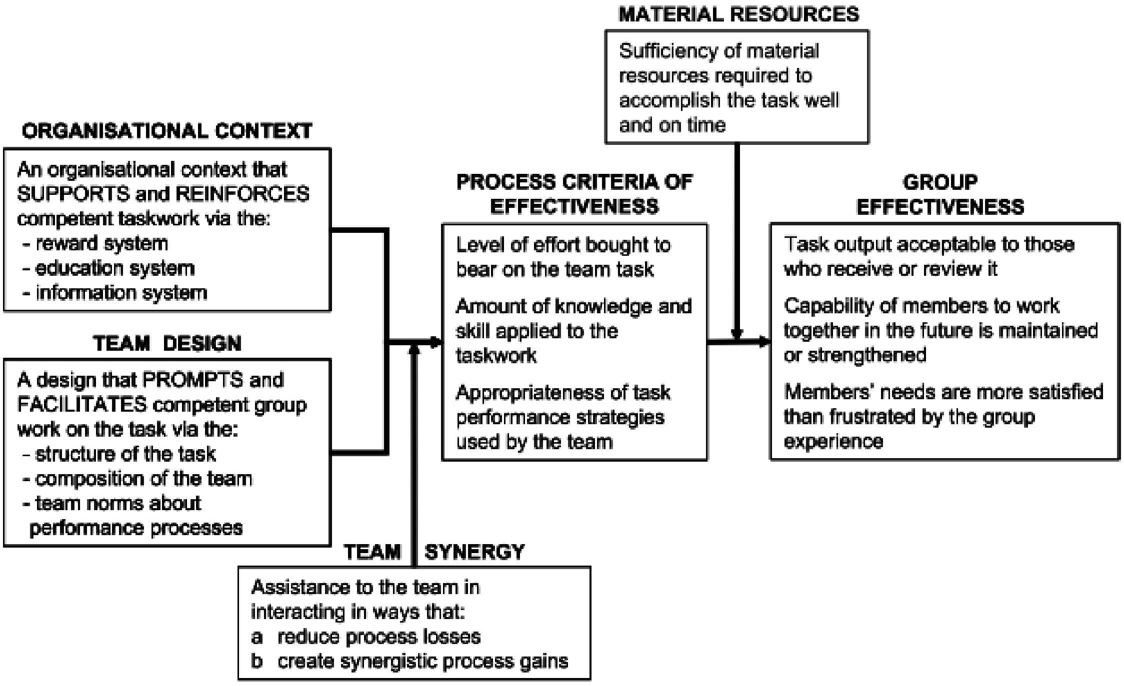


Figure 3 *Team effectiveness model by Salas et al. (1992*

Appendix A.2

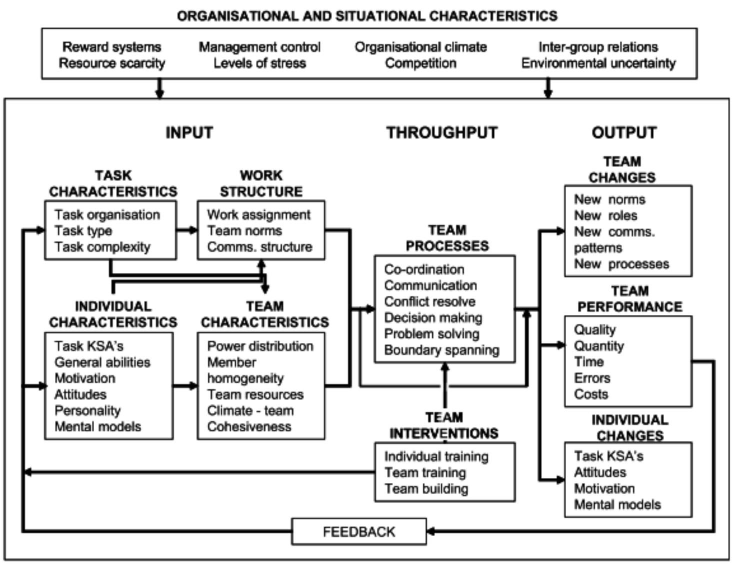


Figure 4 *Team effectiveness model by Tannenbaum et al. (1992)*

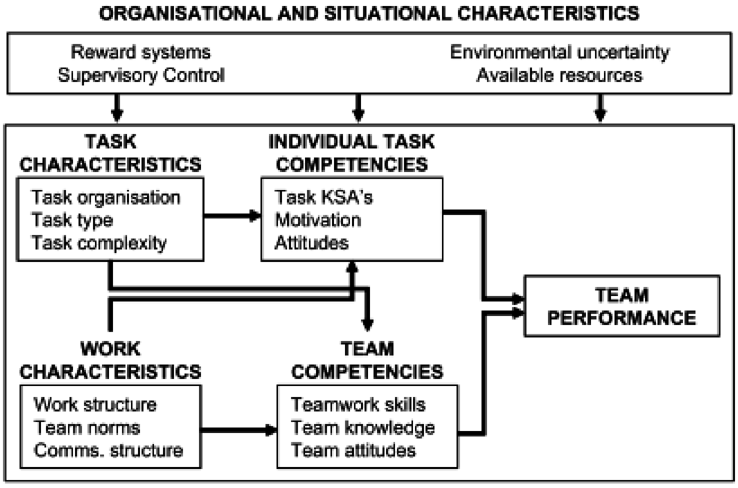


Figure 5 Team effectiveness model by Cannon-Bowers et al. (1arg95)

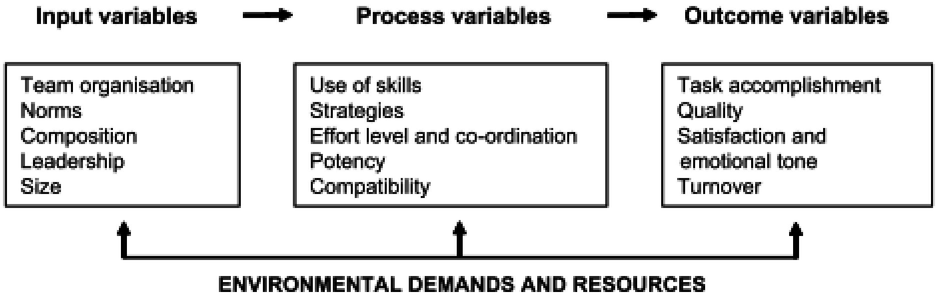


Figure 6 Team effectivenss model by Klimoski & Jones (1995)

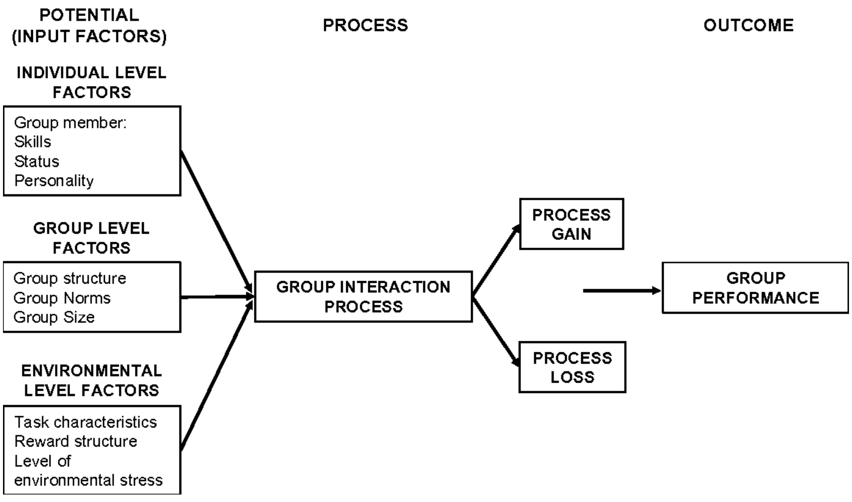


Figure 7 Model of Team Effectiveness from Driskell, Salas, and Hogan (2018)

Appendix B: Questionnaires

B.1

How to interpret the results:

Remember that the answer scale ranged from 0 (*none of the time*) to 6 (*all of the time*).

Team Performance Scale

Based on your **OVERALL** experience with your team, please estimate **HOW OFTEN** the following events occurred using the scale: 0=None of the time; 3=Some of the time; 6=All of the time.

		None of the time			Some of the time			All of the time
1.	All team members made an effort to participate in discussions.	0	1	2	3	4	5	6
2.	When team members had different opinions, each member explained his/her point of view.	0	1	2	3	4	5	6
3.	Team members encouraged one another to express their opinions and thoughts.	0	1	2	3	4	5	6
4.	Team members shared and received criticism without making it personal.	0	1	2	3	4	5	6
5.	Different points of view were respected by team members.	0	1	2	3	4	5	6
6.	Often members helped a fellow team member to be understood by paraphrasing what he/she was saying.	0	1	2	3	4	5	6

7.	My team used several techniques for problem solving (such as brainstorming) with each team member presenting his/her best ideas.	0	1	2	3	4	5	6
8.	Team members worked to come up with solutions that satisfied all members.	0	1	2	3	4	5	6
9.	All team members consistently paid attention during group discussions.	0	1	2	3	4	5	6
10.	My team actively elicited multiple points of view before deciding on a final answer.	0	1	2	3	4	5	6
11.	Team members listened to each other when someone expressed a concern about individual or team performance.	0	1	2	3	4	5	6
12.	Team members willingly participated in all relevant aspects of the team.	0	1	2	3	4	5	6
13.	Team members resolved differences of opinion by openly speaking their mind.	0	1	2	3	4	5	6
14.	Team members used feedback about individual or team performance to help the team be more effective.	0	1	2	3	4	5	6
15.	Team members seemed attentive to what other team members were saying when they spoke.	0	1	2	3	4	5	6
16.	My team resolved many conflicts by compromising between team members, with each one giving in a little.	0	1	2	3	4	5	6

17.	Members who had different opinions explained their point of view to the team.	0	1	2	3	4	5	6
18.	Team members were recognized when something they said helped the team reach a good decision.	0	1	2	3	4	5	6

Reference: Thompson BM, Levine RE, Kennedy F, et al. Evaluating the Quality of Learning-Team Processes in Medical Education: Development and Validation of a New Measure. *Acad Med.* 2009;84(10):S124-S127.

B.2 Questionnaire for SWOT effectiveness

Item	SWOT component	Scale
X1	Are you satisfied with the formulated factors	0-6 Likert scale
X2	Are you satisfied with the scoring of factors	0-6 Likert scale
X3	Are you satisfied with the formulated key issues	0-6 Likert scale
X4	Are you satisfied with the formulated central problem statement	0-6 Likert scale
X5	Are you satisfied with the SWOT analysis?	0-6 Likert scale

B.3 Questionnaire for external panel (effectiveness)

Questionnaire for external panel to assess team effectiveness

Item	SWOT component	Scale
X1	Are you satisfied with the formulated factors	0-6 Likert scale
X2	Are you satisfied with the scoring of factors	0-6 Likert scale
X3	Are you satisfied with the formulated key issues	0-6 Likert scale
X4	Are you satisfied with the formulated central problem statement	0-6 Likert scale
X5	Are you satisfied with the SWOT analysis?	0-6 Likert scale

B.4 Questionnaire for independent variables (input variables)

Higher level facet	Independent variable	Item	Questionnaire item	Scale
Size	Team size	X_1	How many members were in the team?	Open question
Structure	Hierarchical diversity	X_2	What is your position within the company?	Open question
Composition	Age diversity	X_3	What is your age?	Open question
	Tenure diversity	X_4	How long have you worked within the company?	Open question
	Experience diversity	X_5	How long have you worked in this industry?	Open question
	Education diversity	X_6	What is the highest level of education you have achieved?	Open question
Changes	Amount of participation in workshops	X_7	How many workshops have you participated before this one?	Open question
Cohesion	Level of cohesion	X_8	How well did the members form and participate as a team?	0-6 Likert scale
Leadership	Emergent leadership	X_9	Did someone take up a leadership role?	0-6 Likert scale

B.1.1 Team performance scale Dutch

Team performance questionnaire translated to Dutch

		None of the time			Some of the time			All of the time
1.	Alle teamleden spanden zich in om aan de discussies deel te nemen.	0	1	2	3	4	5	6
2.	Wanneer teamleden verschillende meningen hadden, legde elk lid zijn/haar standpunt uit.	0	1	2	3	4	5	6
3.	De teamleden moedigden elkaar aan om hun meningen en gedachten te uiten.	0	1	2	3	4	5	6
4.	De teamleden deelden en ontvingen kritiek zonder deze persoonlijk te maken.	0	1	2	3	4	5	6
5.	Verschillende standpunten werden gerespecteerd door de teamleden.	0	1	2	3	4	5	6
6.	Vaak hielpen teamleden een medeteamlid om begrepen te worden door te parafraseren wat hij/zij zei.	0	1	2	3	4	5	6
7.	Mijn team gebruikte verschillende technieken om problemen op te lossen (zoals brainstormen) waarbij elk teamlid zijn/haar beste ideeën presenteerde.	0	1	2	3	4	5	6
8.	De teamleden werkten samen om oplossingen te bedenken die alle leden tevreden stelden.	0	1	2	3	4	5	6
9.	Alle teamleden waren consequent aandachtig tijdens groepsdiscussies.	0	1	2	3	4	5	6
10.	Mijn team heeft actief meerdere standpunten uitgelokt alvorens te beslissen over een definitief antwoord.	0	1	2	3	4	5	6
11.	Teamleden luisterden naar elkaar wanneer iemand een bezorgdheid uitte over individuele of teamprestaties.	0	1	2	3	4	5	6

12.	Teamleden namen vrijwillig deel aan alle relevante aspecten van het team.	0	1	2	3	4	5	6
13.	Teamleden losten meningsverschillen op door openlijk hun mening te geven.	0	1	2	3	4	5	6
14.	De teamleden gebruikten feedback over individuele of teamprestaties om het team te helpen doeltreffender te zijn.	0	1	2	3	4	5	6
15.	De teamleden leken aandachtig voor wat de andere teamleden zeiden wanneer ze spraken.	0	1	2	3	4	5	6
16.	Mijn team loste veel conflicten op door compromissen te sluiten tussen teamleden, waarbij ieder een beetje toegaf.	0	1	2	3	4	5	6
17.	Leden die een andere mening hadden, legden hun standpunt aan het team uit.	0	1	2	3	4	5	6
18.	Teamleden werden erkend wanneer iets wat ze zeiden het team hielp tot een goede beslissing te komen.	0	1	2	3	4	5	6

B.2.1 Questionnaire for SWOT effectiveness Dutch

SWOT effectiveness questionnaire translated to Dutch

Item number	Wording as surveyed	Scale
X19	Ik ben tevreden met de externe analyse	0-6 Likert scale
X20	Ik ben tevreden met de interne analyse	0-6 Likert scale
X21	De door het team geformuleerde factoren zijn een goede samenvatting van de situatie	0-6 Likert scale
X22	Ik ben tevreden over de score van het team op de factoren	0-6 Likert scale
X23	Ik ben tevreden over de geformuleerde verhalende acties	0-6 Likert scale
X24	Ik ben tevreden over de SWOT-analyse	0-6 Likert scale

B3.1 Questionnaire items for external panel Dutch

External panel questionnaire translated to Dutch

Item	SWOT component	Scale
X1	Are you satisfied with the formulated factors	0-6 Likert scale
X2	Are you satisfied with the scoring of factors	0-6 Likert scale
X3	Are you satisfied with the formulated key issues	0-6 Likert scale
X4	Are you satisfied with the formulated central problem statement	0-6 Likert scale
X5	Are you satisfied with the SWOT analysis?	0-6 Likert scale

B.4 Questionnaire for independent variables (input variables)

Higher level facet	Independent variable	Item	Questionnaire item	Scale
Size	Team size	X_1	Hoeveel leden (inclusief uzelf) zaten in het team?	Open question
Structure	Hierarchical diversity	X_2	Wat is uw functietitel binnen het bedrijf?	Open question
Composition	Age diversity	X_3	Wat is uw leeftijd in jaren?	Open question
	Tenure diversity	X_4	Hoeveel jaar werkt u al binnen het bedrijf?	Open question
	Experience diversity	X_5	Hoeveel jaar werkt u al in deze bedrijfstak/industrie?	Open question
	Education diversity	X_6	Wat is het hoogste opleidingsniveau dat u hebt bereikt?	Open question
Changes	Amount of participation in workshops	X_7	Aan hoeveel workshops heeft u voor deze deelgenomen?	Open question
Cohesion	Level of cohesion	X_8	De leden hebben zich gedragen als een hecht team	0-6 Likert scale
Leadership	Emergent leadership	X_9	binnen het team namen één of meerdere individuën een leiderschap rol op zich	0-6 Likert scale

Appendix C: Truth tables

Truth table for MEP

OUT: output value
n: number of cases in configuration
incl: sufficiency inclusion score
PRI: proportional reduction in inconsistency

	TS	HD	AD	TD	ED	EXD	AP	CH	EL	OUT	n	incl	PRI
272	1	0	0	0	0	1	1	1	1	1	3	1.071	0.944
464	1	1	1	0	0	1	1	1	1	1	2	1.168	0.216
55	0	0	0	1	1	0	1	1	0	1	2	1.000	1.000
261	1	0	0	0	0	0	1	0	0	0	2	0.930	0.386
504	1	1	1	1	1	0	1	1	1	0	2	0.259	0.071
502	1	1	1	1	1	0	1	0	1	0	2	0.202	0.048
208	0	1	1	0	0	1	1	1	1	1	1	1.707	0.106
271	1	0	0	0	0	1	1	1	0	1	1	1.026	0.925
253	0	1	1	1	1	1	1	0	0	1	1	1.000	1.000
256	0	1	1	1	1	1	1	1	1	1	1	1.000	1.000
311	1	0	0	1	1	0	1	1	0	0	1	0.944	0.894
264	1	0	0	0	0	0	1	1	1	0	1	0.918	0.685
503	1	1	1	1	1	0	1	1	0	0	1	0.417	0.119

Truth table for MTP

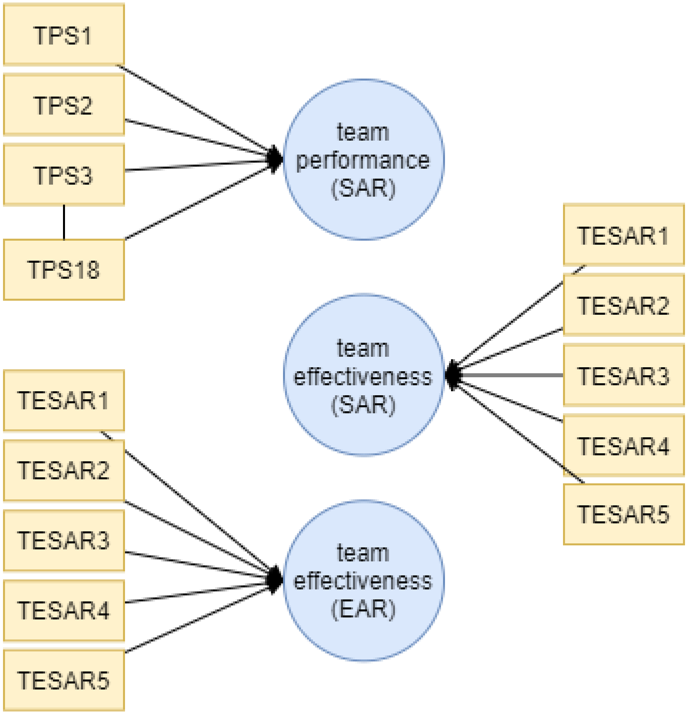
	TS	HD	AD	TD	ED	EXD	AP	CH	EL	OUT	n	incl	PRI
272	1	0	0	0	0	1	1	1	1	1	3	1.778	0.303
464	1	1	1	0	0	1	1	1	1	1	2	1.011	0.978
502	1	1	1	1	1	0	1	0	1	0	2	0.990	0.987
504	1	1	1	1	1	0	1	1	1	0	2	0.971	0.928
55	0	0	0	1	1	0	1	1	0	0	2	0.730	0.502
261	1	0	0	0	0	0	1	0	0	0	2	0.532	0.085
256	0	1	1	1	1	1	1	1	1	1	1	1.227	0.000
271	1	0	0	0	0	1	1	1	0	1	1	1.223	0.094
253	0	1	1	1	1	1	1	0	0	1	1	1.074	0.767
208	0	1	1	0	0	1	1	1	1	1	1	1.020	0.989
311	1	0	0	1	1	0	1	1	0	1	1	1.000	1.000
503	1	1	1	1	1	0	1	1	0	1	1	1.000	1.000
264	1	0	0	0	0	0	1	1	1	0	1	0.611	0.068

Truth table for MSE

	TS	HD	AD	TD	ED	EXD	AP	CH	EL	OUT	n	incl	PRI
272	1	0	0	0	0	1	1	1	1	1	3	1.000	1.000
464	1	1	1	0	0	1	1	1	1	1	2	1.138	0.179
504	1	1	1	1	1	0	1	1	1	0	2	0.661	0.526
261	1	0	0	0	0	0	1	0	0	0	2	0.653	0.476
55	0	0	0	1	1	0	1	1	0	0	2	0.485	0.017
502	1	1	1	1	1	0	1	0	1	0	2	0.296	0.036
208	0	1	1	0	0	1	1	1	1	1	1	1.250	0.790
253	0	1	1	1	1	1	1	0	0	1	1	1.246	0.031
271	1	0	0	0	0	1	1	1	0	1	1	1.226	0.215
256	0	1	1	1	1	1	1	1	1	1	1	1.000	0.994
264	1	0	0	0	0	0	1	1	1	0	1	1.000	0.998
503	1	1	1	1	1	0	1	1	0	0	1	1.000	0.999
311	1	0	0	1	1	0	1	1	0	0	1	0.502	0.035

Appendix D: Systematic view of the three dependent variable constructs

Below, a systematic view is presented of the three dependent variables (constructs) used in this study as well as their respective indicators.



Appendix E: R code

Below, the R code used for this study is presented. The code shown in this appendix is used for generating the primary set of solutions using the mean calibration method of the dependent variables. To generate the sum variations of the dependent variables, the functions of mutate(HD = mean(HD)) must be changed to mutate(HD = sum(HD)).

```
library(dplyr)
library(QCA)
library(tidyverse)
library(readr)

file <- read.csv("dataset.csv", sep = ";")

plow <- 0.25
pmid <- 0.50
phigh <- 0.75

## turn comma to dot + numeric
file$MEP<-as.numeric(gsub(",", ".",file$MEP))
file$MTP<-as.numeric(gsub(",", ".",file$MTP))
file$MSE<-as.numeric(gsub(",", ".",file$MSE))

file<-file%>%
  group_by(workshop)%>%
  mutate(HD = mean(HD))%>%
  mutate(AD = mean(AD))%>%
  mutate(TD = mean(TD))%>%
  mutate(EXD = mean(EXD))%>%
  mutate(ED = mean(ED))%>%
  ungroup()

## write dataset and set percentiles globally
#write_csv(file,"sd_dataset.csv")

## calibrate variables based on 25/50/75 percentile split
file$TS<-calibrate(file$TS,type="fuzzy",thresholds = c(quantile(file$TS, c(plow, pmid, phigh), type=6)))
file$HD<-calibrate(file$HD,type="fuzzy",thresholds = c(quantile(file$HD, c(plow, pmid, phigh), type=6)))
file$AD<-calibrate(file$AD,type="fuzzy",thresholds = c(quantile(file$AD, c(plow, pmid, phigh), type=6)))
file$TD<-calibrate(file$TD,type="fuzzy",thresholds = c(quantile(file$TD, c(plow, pmid, phigh), type=6)))
```

```
file$ED<-calibrate(file$ED,type="fuzzy",thresholds = c(quantile(file$ED, c(plow, pmid, phigh), type=6)))
file$EXD<-calibrate(file$EXD,type="fuzzy",thresholds = c(quantile(file$EXD, c(plow, pmid, phigh), type=6)))
file$AP<-calibrate(file$AP,type="fuzzy",thresholds = c(quantile(file$AP, c(plow, pmid, phigh), type=6)))
file$CH<-calibrate(file$CH,type="fuzzy",thresholds = c(quantile(file$CH, c(plow, pmid, phigh), type=6)))
file$EL<-calibrate(file$EL,type="fuzzy",thresholds = c(quantile(file$EL, c(plow, pmid, phigh), type=6)))
file$MEP<-calibrate(file$MEP,type="fuzzy",thresholds = c(quantile(file$MEP, c(plow, pmid, phigh), type=6)))
file$MTP<-calibrate(file$MTP,type="fuzzy",thresholds = c(quantile(file$MTP, c(plow, pmid, phigh), type=6)))
file$MSE<-calibrate(file$MSE,type="fuzzy",thresholds = c(quantile(file$MSE, c(plow, pmid, phigh), type=6)))

## add 0.0001 to avoid 0.5 barrier
file$TS<-file$TS +0.0001
file$HD<-file$HD+0.0001
file$AD<-file$AD+0.0001
file$TD<-file$TD-0.0001
file$ED<-file$ED-0.0001
file$EXD<-file$EXD-0.0001
file$AP<-file$AP+0.0001
file$CH<-file$CH+0.0001
file$EL<-file$EL+0.0001
file$MEP<-file$MEP-0.0001
file$MTP<-file$MTP-0.0001
file$MSE<-file$MSE-0.0001
```

##solutions for MEP

```
##truth table
truth<-truthTable(file,outcome="MEP",
        conditions=c("TS","HD","AD","TD","ED",
              "EXD","AP","CH","EL"),
        sort.by="n, incl", incl.cut = 0.90, first.min=TRUE)
## view truth table
truth
##complex solution
minimize(truth,details=TRUE)
## intermediate solution
minimize(truth,details=TRUE, include="?",dir.exp=c(0,1,1,1,1,1,1,1,1),first.min = TRUE)
#parsimonious solution
minimize(truth,details=TRUE, include="?", first.min=TRUE)
```

##solutions for MTP

```
##truth table
```

```
truth<-truthTable(file,outcome="MTP",
        conditions=c("TS","HD","AD","TD","ED",
              "EXD","AP","CH","EL"),
        sort.by="n", incl.cut = 0.9)
##complex solution
minimize(truth,details=TRUE)
## intermediate solution
minimize(truth,details=TRUE, include="?",dir.exp=c(1,1,1,1,1,1,1,1,1) , first.min=TRUE)
#parsimonious solution
minimize(truth,details=TRUE, include="?", first.min=TRUE)
```

##solutions for MSE

```
##truth table
truth<-truthTable(file,outcome="MSE",
        conditions=c("TS","HD","AD","TD","ED",
              "EXD","AP","CH","EL"),
        sort.by="n", incl.cut = 0.9)
##complex solution
minimize(truth,details=TRUE)
## intermediate solution
minimize(truth,details=TRUE, include="?",dir.exp=c(0,1,1,1,1,1,1,1,1) , first.min=TRUE)
#parsimonious solution
minimize(truth,details=TRUE, include="?")

minimize(truth,details=TRUE, include="?", first.min = TRUE)
```

Appendix F: Advisory report to the external firm

Advisory report to the external firm. Included with the non-public release of this thesis.

Attached as a separate document named:

Advisory_Report_External_Firm_Youri_Lammers.pdf