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Effective teamwork in new venture teams: Unpacking the coordination of team members' competence

Eleni Georgiadou

NORD UNIVERSITY BUSINESS SCHOOL

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Nord University
N-8049 Bodø
Tel: +47 75 51 72 00
www.nord.no

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ABSTRACT

This thesis examines how co-founders who form teams to found and lead new ventures—new venture teams (NVTs)—coordinate NVT members' competence to achieve effective teamwork that enables new venture development. Associated with high chances of new ventures' survival and growth, effective teamwork typically entails the coordination of NVT members' knowledge, skills, abilities, and other characteristics, and as such, contributes to successful development of new ventures. Despite NVTs' importance in the creation of successful new ventures, we lack a clear understanding of precisely how NVT members coordinate their competence and achieve effective teamwork during the fragile early phase of new venture development. Recent NVT literature advocates extending our focus beyond the mere aggregation of NVT members' demographic characteristics and competence—reflected in NVTs' composition—and more thoroughly examine the role of team processes and properties in the coordination of NVT members' competence and the development of effective teamwork in NVTs. To address this call, this thesis asks: *How do NVT members coordinate their competence to develop effective teamwork?*

This research question is examined through a longitudinal case study of five NVTs from a venture creation program organized by a leading Norwegian University. This setting allowed me to trace NVTs from the point of their formation, which is particularly important when studying how NVTs begin to coordinate NVT members' competence to develop effective teamwork. This thesis consists of three empirical papers that draw on general team and NVT literatures. Overall, the findings of this thesis uncover: (i) the specific processes and properties NVT members mobilize to coordinate their competence during the early phase of new venture development and (ii) how these team processes and properties—as well as their interplay—contribute to the development of effective teamwork in NVTs. Focusing on the processes and properties developed in NVTs, this thesis contributes to NVT literature by illuminating why a mere aggregation of NVT members' competence is insufficient for effective

teamwork in NVTs and suggesting to view the development of effective teamwork as a complex ongoing process.

Keywords: *new venture teams, teamwork, competence coordination*

SAMMENDRAG

Denne avhandlingen undersøker hvordan medgründere som danner team for å etablere og lede oppstartsselskaper – oppstartsteam – koordinerer oppstarts teammedlemmers kompetanse for å oppnå effektivt teamarbeid som muliggjør utviklingen av oppstartsselskap. Effektivt teamarbeid, som vanligvis er assosiert med høy sannsynlighet for overlevelse og vekst for oppstartsselskaper, innebærer koordinering av oppstarts teammedlemmenes kunnskap, ferdigheter, evner og andre egenskaper, og bidrar dermed til vellykket utvikling av oppstartsselskaper. Til tross for oppstartsteamers viktige rolle i opprettelsen av vellykkede oppstartsselskaper, mangler vi en klar forståelse av nøyaktig hvordan oppstarts teammedlemmene koordinerer deres kompetanse og oppnår effektivt teamarbeid i den skjøre tidlige fasen av oppstartsselskapets utvikling. Den nyeste forskningen om oppstartsteam oppfordrer til å utvide fokuset utover den enkle samlingen av teammedlemmenes demografiske egenskaper og kompetanse – som gjenspeiles i oppstartsteams sammensetning – og mer grundig undersøke rollen som teamprosesser og egenskaper spiller i koordineringen av medlemmenes kompetanse og utviklingen av effektivt teamarbeid i oppstartsteam. For å besvare dette kravet, stiller denne avhandlingen spørsmålet: *Hvordan koordinerer oppstarts teammedlemmene deres kompetanse for å utvikle effektivt teamarbeid?*

Dette forskningsspørsmålet undersøkes gjennom en longitudinell case-studie av fem oppstartsteam fra et venture-skapeprogram organisert av et ledende norsk universitet. Denne settingen tillot meg å følge oppstartsteam fra det tidspunktet de ble dannet, noe som er spesielt viktig når man studerer hvordan oppstartsteam begynner å koordinere teammedlemmenes kompetanse for å utvikle effektivt teamarbeid. Denne avhandlingen består av tre empiriske artikler som bygger på generell forskning om team og oppstartsteam.

Samlet sett avdekker funnene i denne avhandlingen: (i) de spesifikke prosessene og egenskapene oppstarts teammedlemmene mobiliserer for å koordinere deres kompetanse i den tidlige fasen av oppstartsselskapets utvikling, og (ii) hvordan disse teamprosessene og egenskapene – samt samspillet deres – bidrar til utviklingen av effektivt teamarbeid i oppstartsteamet. Ved å fokusere på prosessene og egenskapene som utvikles i oppstartsteam, bidrar denne avhandlingen til litteraturen om oppstartsteam ved å belyse hvorfor en enkel samling av teammedlemmenes kompetanse er utilstrekkelig for å oppnå effektivt teamarbeid i oppstartsteam, og den antyder at utviklingen av effektivt teamarbeid bør betraktes som en kompleks og kontinuerlig prosess.

CONTENTS

TABLES

1 INTRODUCTION

"Nearly everything we value in the modern economy is the result of decisions and actions that are interdependent and therefore benefit from effective teamwork."

Amy C. Edmondson, 2018

1.1 Research topic

This thesis examines how co-founders who form teams to found and lead new ventures—new venture teams (NVTs)—coordinate NVT members' competence to develop effective teamwork that enables the establishment of new ventures.

Associated with the creation of many new ventures (Bolzani, Fini, Napolitano and Toschi, 2019; Klotz, Hmieleski, Bradley and Busenitz, 2014; Knight, Greer and De Jong, 2020), NVTs have a strong presence in modern societies (Wasserman, 2012). The prevalence of NVTs is attributed to the superior performance that NVTs often exhibit (Shane, 2000), as they provide new ventures with a great range of competence that consists of knowledge, skills, abilities, and other characteristics (Ployhart and Moliterno, 2011) and improve the venture's chances for survival and future growth (Bolzani et al., 2019; Klotz et al., 2014; Knight et al., 2020). Though crucial to creativity and innovativeness, a great range of competence can introduce additional challenges to NVT members' coordination (de Mol, Khapova and Elfring, 2015) and increase the possibility for conflicts in NVTs (Dai, Roundy, Chok, Ding and Byun, 2016). This, in turn, can hamper teamwork and—as studies indicate—lead 60-65% of NVTs to fail at new venture development (Brattström, 2019; Kaplan and Strömberg, 2004). Therefore, effective teamwork in NVTs largely depends on NVT members' ability to coordinate their complementary competence (Colombo and Grilli, 2005).

Research highlights the critical role that the coordination of NVT members' competence play in the development of effective teamwork in NVTs (Dai, Du, Byun and Zhu, 2017; Zheng 2012). Although in mature organizations effective teamwork is also

linked to the creation of organizational routines and knowledge (Argote and Guo, 2016; Argote and Ingram, 2000; Felin, Foss, Heimeriks and Madsen, 2012), scholars identify coordination of team members' competence as the crucial initial step in the development of effective teamwork (Brush, Greene and Hart, 2001; Salas, Burke and Cannon- Bowers, 2000). In NVTs, successfully coordinated competence allow team members jointly and effectively make sense of their environment as well as the opportunities and threats it entails (DeChurch and Mesmer-Magnus, 2010), and as such, enable a fruitful combination of NVT members' knowledge, skills, abilities, and other characteristics during the initiation of entrepreneurial activities (Brush et al., 2001; de Mol et al., 2015; West, 2007).

1.2 Knowledge gaps and overall research question

Intrigued by the superior entrepreneurial outcomes that NVTs tend to exhibit (Harper, 2008; Lazar, Miron-Spektor, Agarwal, Erez, Goldfarb and Chen, 2020), NVT scholars have been particularly interested in how NVT members establish teamwork that enables the creation and development of new ventures (Bolzani et al., 2019; Klotz et al., 2014). In fact, NVT literature considers effective teamwork as a pillar of new ventures' performance (Brinckmann and Hoegl, 2011; Ensley, Pearson and Amason, 2002). Especially during the fragile early phase of new venture development, NVTs exert great impact on the survival and growth of their new ventures (Brush et al., 2001; Hmieleski and Ensley, 2007), rendering effective teamwork crucial to new ventures' success (Bolzani et al., 2019; Klotz et al., 2014). However, effective teamwork does not occur spontaneously, as its development requires significant effort from NVT members (Colombo and Grilli, 2005; Delice, Rousseau and Feitosa, 2019; Lechler, 2001). Given that NVT literature identifies coordination of NVT members' competence as a crucial initial step of effective teamwork in NVTs (Brush et al., 2001; Salas et al., 2000), I examine the development of effective teamwork in NVTs through the coordination of NVT members' competence.

Overall, team literature associates the coordination of team members' competence (i.e., knowledge, skills, abilities, and other characteristics) with a more effective team performance as well as less conflictual and more beneficial interactions among team members (DeChurch and Mesmer-Magnus, 2010; Mesmer-Magnus, Niler, Plummer, Larson and DeChurch, 2017). In the context of NVTs, NVT members coordinate their competence while they work together to accomplish entrepreneurial outcomes (Grégoire, Corbett and McMullen, 2011; Zheng, 2012). Without coordination, NVTs struggle to synchronize NVT members' efforts and utilize NVT members' knowledge, skills, abilities, and other characteristics (Ensley and Pearce 2001; West, 2007). Therefore, coordination of the competence NVT members jointly possess is an important step towards utilizing knowledge, skills, abilities, and other characteristics of NVT members and achieving effective teamwork in NVTs (de Mol et al., 2015; West, 2007). NVTs are called to coordinate NVT members' competence, integrate it, and—ultimately—use it during teamwork (de Mol et al., 2015; West, 2007). In particular, NVT members' competence are valuable during decision making and task performance, especially in teams that face increased uncertainty and complexity (Mohammed, Rico and Alipour, 2021), like NVTs. Moreover, coordination of NVT members' competence enables NVTs to generate creative and innovative solutions (Dai et al., 2017; Perry-Smith and Shalley, 2003; Zheng and Mai, 2013) and co-develop new knowledge (Argote and Ren, 2012; Lewis, Belliveau, Herndon and Keller, 2007).

To better understand how NVTs achieve effective teamwork, NVT scholars have focused on NVTs' composition (NVT members' characteristics and competence). Thus, NVTs' effective teamwork, and subsequently, NVTs' successful performance—related to new venture development—are typically ascribed to the presence of valuable competence (i.e., knowledge, skills, abilities, and other characteristics) among NVT members (Klotz et al., 2014; Knight et al., 2020). As a result, most studies on NVTs have contributed with insights on the direct relationship between NVTs' composition and performance (Amason, Shrader and Tompson, 2006; Lazar et al., 2020). However, we still lack a clear understanding of team processes (joint activities) and properties

(collectively developed features) that NVTs mobilize to develop teamwork and achieve successful performance (Bolzani et al., 2019; Klotz et al., 2014). Furthermore, while scholars consider coordination of team members' competence as a crucial initial step in the development of effective teamwork (Brush et al., 2001; Salas et al., 2000), we have a scarce understanding of the team processes and properties through which coordination unfolds in the early phase of new venture development (de Mol et al., 2015; West, 2007). Given the importance of competence coordination in the effective teamwork of NVTs and successful establishment of their new ventures (de Mol et al., 2015; West, 2007), unpacking team processes and properties involved in coordination can shed light into the development of effective teamwork in NVTs (Bolzani et al., 2019; Klotz et al., 2014). This, in turn, might explain why some NVTs begin to work more effectively than others (Harper, 2008; Knight et al., 2020; Patzelt, Preller and Breugst, 2021).

Moreover, since both NVTs and the new ventures they establish are constantly evolving (Fisher, Kotha and Lahiri, 2016; Patzelt et al., 2021), scholars have begun to emphasize the complexity and dynamism of NVTs, advocating that NVTs and their teamwork are likely to change over time (Brattström, 2019; Knight et al., 2020). All the above suggest that an in-depth understanding of NVTs' effective teamwork requires considering the processes and properties that emerge in NVTs, advocating the existence of indirect—and thus more complex—ongoing relationship between NVTs' composition and performance (Bolzani et al., 2019; Klotz et al., 2014). Last but not least, the "success bias"—tendency to include NVTs that have already reached the point of venture creation—is inherent in most of NVT studies (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). As such, much of our knowledge about NVTs and their teamwork stems from NVTs that have already developed teamwork that led to successful venture creation. However, we have little insight into the surprisingly many NVTs that do not manage to reach that point (Bolzani et al., 2019). Studying teamwork in newly formed NVTs, one can capture the great variation among NVTs and their teamwork (Knight et al., 2020) and trace the important changes that NVTs undergo

during the fragile early phase (Patzelt et al., 2021). Hence, this thesis aims to unpack how NVT members begin to coordinate their competence at an early phase of new venture development. This is particularly important, as it can reveal why some—but far from all—NVTs develop effective teamwork (Knight et al., 2020). By unpacking the ongoing processes and properties involved in such coordination, the thesis also extends its focus beyond the direct relationship between NVTs' composition and performance (Bolzani et al., 2019; Klotz et al., 2014) and illustrates the complexity and dynamism of NVTs and their teamwork (Brattström, 2019; Knight et al., 2020) at the early phase of new venture development (Patzelt et al., 2021). Thus, the overall research question of this thesis is: *How do NVT members coordinate their competence to develop effective teamwork in NVTs?*

1.3 Research papers and their contribution to NVT literature

Table 1. Overview of research papers in this thesis

Research paper	Title	Research question	Research method	Data source	Main findings
1	From groups to teams: A longitudinal study of mechanisms that enable the transition	How does a group (e.g., co-founders) evolve into a team (e.g., founding team)?	Qualitative longitudinal multiple case study mainly inspired by Langley (1999)	5 cases selected from a venture creation program of a Norwegian University and followed over 17 months	▪ The transition from group of co-founders to founding team occurs through stages of: expectations, collective action, coordinated action, and synchronized autonomy. ▪ A complex and dynamic interplay of team processes and collective properties guides this transition. ▪ The identified collective properties emerge from team processes, and subsequently, alter the content of team processes moving team formation forward.

2	Development of transactive memory systems in new venture teams	How are transactive memory systems developed in NVTs?	Qualitative longitudinal multiple case study inspired by Gioia et al. (2013) and Langley (1999)	5 cases selected from a venture creation program of a Norwegian University and followed over 12 months	▪ TMS pre-formation stage includes TMS enabling process and leads to initial specialization. ▪ Formation and collaboration stages enhance the specialization and lead to gradual development of credibility and coordination. ▪ TMS processes of encoding, storage, and retrieval are reflected in self-assessment, assessment of co-members, shared understanding, role formalization, decision making, and task performance. ▪ The identified TMS reinforcing process– driven by members' motivation, trust, and shared ownership– helps strengthening TMSs over time.
3	Every step you take: Role formalization in new ventures teams	How does role formalizatio n unfold in new venture teams and what team-level factors, if any, influence this formalizatio n?	Qualitative longitudinal multiple case study mainly inspired by Gioia et al. (2013)	5 cases selected from a venture creation program of a Norwegian University and based on 52 interviews	▪ Role formalization unfolds through the processes of self-selection, reassessment, and restructuring. ▪ Strategic consensus, cognitive trust, and team identification drive role formalization. ▪ Role formalization is identified as a dynamic concept encompassing both a structural (stability) and a processual (flexibility) components.

1.3.1 Contributions to NVT literature

To obtain an in-depth understanding of team processes and properties that guide the coordination of NVT members' competence and the development of effective teamwork in NVTs, Paper 1 sets to clarify the term "NVT"—at least in the context of this thesis—as NVTs vary in significant ways that can profoundly affect their teamwork (Knight et al., 2020). Furthermore, by examining how team processes and properties that emerge in newly formed NVTs influence the way NVT members work together, Paper 1 shows which team processes and properties NVT members jointly develop to work effectively as an NVT. Next, Paper 2 and Paper 3 unpack the team processes and properties that enable the coordination of NVT members' competence (de Mol et al., 2015; West, 2007) and demonstrate how these processes and properties contribute to the development of effective teamwork in NVTs (Bolzani et al., 2019; Klotz et al., 2014). In particular, Paper 2 identifies the processes and properties that NVT members mobilize to develop transactive memory systems. Transactive memory systems are mechanisms team members establish to identify each other's competence and assign tasks according to this competence (Huang and Chen, 2018), and as such, facilitate the coordination of NVT members' competence. Paper 3, on the other hand, reveals the team processes and properties that NVT members mobilize to formalize NVT's role structure. Together, Paper 2 and Paper 3 show which team processes and properties are involved in the coordination of NVT members' competence, and subsequently, in the development of teamwork in NVTs. This, in turn, can enhance our understanding of why some—but far from all—NVTs achieve effective teamwork in NVTs (Knight et al., 2020).

Combined, the three papers of this thesis provide a better explanation of the role specific team processes and properties play in the coordination of NVT members' competence and how they contribute to the development of effective teamwork in NVTs (Bolzani et al., 2019; Klotz et al., 2014), showing why NVTs' composition alone might not be able to explain NVTs' effective teamwork and successful performance (Colombo and Grilli, 2005; Delice et al., 2019; Lechler, 2001). Secondly, this thesis

demonstrates the dynamic nature of NVTs and their teamwork (Paper 1) and reveals the dynamism inherent in the coordination of NVT members' competence (Paper 2 through dynamic transactive memory systems and Paper 3 through dynamic role formalization). As such, this thesis recognizes the complexity and dynamism of NVTs and their teamwork (Brattström, 2019; Knight et al., 2020), suggesting to view teamwork as an ongoing process that can change over time. Finally, studying the coordination of competence in newly formed NVTs, the papers of this thesis address the need to overcome the "success bias" that is incorporated in most of NVT studies (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). Indeed, including primarily NVTs that have managed to establish new ventures –and as such have already developed a relatively effective teamwork– NVT scholars are likely to miss interesting nuances from the preformation and formation periods (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). Given that the findings of this thesis are based on NVTs followed from the very beginning of their formation and throughout 17 months, this thesis contributes to an in-depth understanding of how NVT members initiate the coordination of their competence and start developing effective teamwork in NVTs (Patzelt et al., 2021), shedding light into what happens in NVTs during a fragile—yet so important—early phase of new venture development (Brush et al., 2001; Hmieleski and Ensley, 2007; Patzelt et al., 2021).

1.4 Structure of the thesis

This thesis is structured as follows. Section 2 introduces the theoretical background related to NVT research and presents the identified in prior NVT literature research gaps. Section 3 presents the methodological stance of this thesis, including the research setting, research design, data collection, and data analysis. Furthermore, Section 3 discusses the ethical considerations of this thesis. Section 4 provides a summary of all three papers. Section 5 contains conclusions and discussions of the overall findings as well as a presentation of contributions to NVT literature and

practical implications. Finally, Section 6 includes the three papers on which this thesis is based.

2 THEORETICAL BACKGROUND

This section provides an overview of the existing NVT literature, focusing on teamwork and the coordination of competence, and presents the conceptual framework that helps to address the research questions of this thesis. This section ends with a discussion of the research gaps identified in NVT research and studied in this thesis.

2.1 New venture teams

Co-founders who team up to establish a new venture are described in the entrepreneurship literature by several terms, such as entrepreneurial teams (e.g., Kamm, Shuman, Seeger and Nurick, 1990), entrepreneurial top management teams (e.g., Maschke and zu Knyphausen-Aufseβ, 2012), founding teams (e.g., Beckman, 2006), start-up teams (e.g., Franke, Gruber, Harhoff and Henkel, 2008), and NVTs (e.g., Klotz et al., 2014). The existence and use of several terms (Table 2.1.1) illustrates ambiguity and potential differences that may exist among teams of co-founders, especially in regard to equity ownership, decision making autonomy, and entitativity (Knight et al., 2020). This partially explains why some teams of co-founders can be more effective than others in developing their business ideas and establishing new ventures (Knight et al., 2020).[1] Although this thesis is not directly informed by these three dimensions (equity ownership, decision making autonomy, and entitativity), it recognizes their value in viewing teams of co-founders as complex and dynamic entities that can develop in different ways.

Except Paper 1 that uses the term "founding teams", the rest of the papers included in this thesis as well as the thesis itself use the term "new venture teams" (NVTs). Klotz and colleagues (2014, p. 227) describe an NVT as "the group of individuals that is chiefly

[1] Entitativity being defined as "internal homogeneity, social interaction, clear internal structure, common goals, and common fate, which makes a group 'groupy'" (Hogg, Sherman, Dierselhuis, Maitner & Moffitt, 2007, p. 136).

responsible for the strategic decision making and ongoing operations of a new venture." The terms "founding teams" and "NVTs" serve better the topic of this thesis because they emphasize that co-founders/NVT members form these teams to found/develop new ventures. As such, co-founders/NVT members are the ones who hold key leadership positions, make all the strategic decisions, and implement all the entrepreneurial activities (Klotz et al., 2014; Knight et al., 2020). This, in turn, indicates that—at this early phase of new venture development—co-founders/NVT members are highly dependent on the coordination of the competence they jointly possess (Brush et al., 2001). Furthermore, the terms "founding teams" and "NVTs"indicate that the teams included in this study are newly formed, and thus, NVT members are just beginning to coordinate their competence and develop teamwork. According to Knight et al. (2020), such teams are typically characterized by a high degree of ownership, autonomy, and entitativity as well as the absence of formal role structures and organizational routines. As a result, "founding teams"/"NVTs" are likely to face increased uncertainty and undergo frequent changes. Throughout this thesis, I solely apply the term "NVTs" to avoid using two terms that have the same meaning.

Table 2. Overview and analysis of definitions of new venture teams

Term	Exemplary Definitions	Other Articles with This Combination	Feature Ownership	Feature Autonomy	Feature Entitativity
Entrepreneurial team Entrepreneurial founder team Entrepreneurial team	"Two or more individuals who jointly establish a business in which they have an equity (financial) interest. These individuals are present during the pre-start-up phase of the firm, before it actually begins making its goods or services available to the market." (Kamm et al., 1990: 7) "Those who hold ownership and control positions (Kamm & Shuman, 1990; Gartner et al., 1994; Watson et al., 1995; Cooney & Bygrave, 1997; Chandler & Hanks, 1998; Ensley et al., 2000). [...] EFT members were defined as individuals who owned at least 10% of the equity in the venture. They also hold a key role in the strategic decision making of the venture at the time of its founding." (Ucbasaran et al., 2003: 108) "Two or more persons who have an interest, both financial and otherwise, in and commitment to a venture's future and success; whose work is interdependent in the pursuit of common goals and venture success; who are accountable to the entrepreneurial team and for the venture; who are considered to be at the executive level with executive responsibility in the early phases of the venture, including founding and prestart up; and who are seen as a social entity by themselves and by others." (Schjoedt & Kraus, 2009: 515)	Brinckmann & Hoegl (2011); Cooney (2005); Forsstr ¨om-Tuominen et al. (2017); Lazar et al. (2020); Lechler (2001); Roure & Maidique (1986); Watson et al. (1995)	Yes	Yes	Yes

Entrepreneurial team Entrepreneurial team	"A group of people who share the ownership and management of a new venture (Cooney, 2005; Kamm & Nurick, 1993;Watson et al., 1995). Although there are more general definitions of teams in business activities, we think that ownership and management are essential aspects for defining entrepreneurial teams." (Iacobucci & Rosa, 2010: 354) "Entrepreneurial team members work interdependently, share an equal interest in the new venture, collectively create the initial policies and procedures for the company, recruit the first intake of employees and shape organizational culture. Entrepreneurial teams have arguably greater managerial discretion and a broader latitude of action than other work teams." (Chen et al., 2017: 935)	Ensley & Pearce (2001); Lockett et al. (2006)	Yes	Yes	No
Entrepreneurial team	"Two or more people formally establish and share their ownership of the new organization." (Kamm & Nurick, 1993: 17)	Hellerstedt, Aldrich, & Wiklund (2007)	Yes	No	Yes
Founding team	"Individuals who work to some degree in the firm, invest in the firm, and can expect to obtain the proceeds of any profits from the firm (by the implication from the discussion of Cooper and Bruno, 1977)." (Bruton & Rubanik, 2002: 565)	None	Yes	No	No
Founding team Founding team	"The relatively small group of most influential executives at the strategic apex of a firm." (Simsek et al., 2015: 466) "Those individuals who were founders of the firm and who worked full time for the firm in executive-level positions at the time of founding." (Eisenhardt & Schoonhoven, 1990: 515)	Beckman & Burton (2008); Cardon et al. (2017); Forbes, Borchert, Zellmer-Bruhn, & Sapienza, (2006)	No	Yes	Yes

Founding core team New venture team	"Individuals, regardless of job title, reporting directly to the top executive of a new venture, and these individuals have a significant impact on the strategies and practices of the firm (Leung, 2003; Leung, Zhang,Wong, & Foo, 2006)." (Leung, Foo, & Chaturvedi, 2013: 88) "The group of individuals that is chiefly responsible for the strategic decision-making and on-going operations of a new venture." (Klotz et al., 2014: 227)	Jin et al. (2017); Reid et al. (2018)	No	Yes	No
Founding top management team	"The group of entrepreneurs who founded the new venture." (de Jong et al., 2013: 1835)	Harper (2008); Sardana & Scott-Kemmis (2010)	No	No	Yes
Founding team	"The team in charge of exploiting the technological knowledge and of marketing it through a new company. The 'entrepreneurial team' emerges as those members of the research group who decide to become involved in the entrepreneurial initiative are joined by other non-university partners." (Grandi & Grimaldi, 2003: 333)	None	No	No	No

Adapted from Knight et al. (2020, p. 235-236)

2.2 Effective teamwork in new venture teams

Teamwork can be defined as "the set of interrelated behaviors and actions that occur among team members while performing on a task" (Salas et al., 2000, p. 344). Teamwork entails the coordination of team members' competence to utilize their knowledge, skills, abilities, and other characteristics and synchronize their efforts during the performance of team's tasks (Marks, Mathieu & Zaccaro, 2001). Whereas in mature organizations effective teamwork is also associated with the creation of organizational routines and knowledge (Argote and Guo, 2016; Argote and Ingram, 2000; Felin, Foss, Heimeriks and Madsen, 2012), in newly formed teams (like NVTs), the coordination of team members' competence serves as the crucial initial step in the

development of effective teamwork (Brush et al., 2001; Salas et al., 2000). In NVTs, teamwork represents the quality of collaboration among NVT members (Hoegl and Gemuenden, 2001). Therefore, effective teamwork is considered a pillar of successful performance of NVTs and their new ventures (Brinckmann and Hoegl, 2011; Chowdhury, 2005; Ensley, Pearson and Pearce, 2003). However, developing effective teamwork in NVTs is particularly challenging since NVT members typically work under uncertainty and face substantial interdependencies and high information-processing requirements (Hoegl, Parboteeah and Gemuenden, 2003). Lacking established routines or formalized role structures—features that could enhance teamwork—NVT members synchronize novel and complex tasks, make strategic decisions together, and share responsibility for these decisions (Brinckmann and Hoegl, 2011). Furthermore, unlike teams of mature organizations, NVTs cannot rely on organizational culture or conflict-resolution mechanisms to improve members' teamwork (Kim, Aldrich and Ruef, 2005).

Despite the challenges that NVT members face while developing effective teamwork, the advantages that NVTs enjoy from such teamwork are numerous. Effective teamwork enables clear and more open communication (Hauptman and Hirji, 1996), enhances task performance (Faraj and Sproull, 2000), and fosters mutual support (Cooke and Szumal, 1994) among NVT members. Furthermore, effective teamwork reinforces NVT members' commitment to achieve NVT's goals (Brattström, 2019). Another significant benefit of effective teamwork is its role in improving NVTs' reactions to unexpected changes in their environment (Iansiti, 1995; Zheng and Mai, 2013), as it may lead to better and faster decision making as well as more efficient implementation of corrective actions (Brinckmann and Hoegl, 2011). Last but not least, effective teamwork is linked to superior new venture outcomes in terms of survival, profits, and growth (DeSantola and Gulati, 2017; Ensley, Pearson and Amason, 2002; Watson, Ponthieu and Critelli, 1995). This thesis focuses on teamwork at an early phase of new venture development, therefore, it regards as effective the teamwork that enables the establishment of new venture.

After presenting the concept of teamwork and explaining the benefits associated with effective teamwork (in the setting of this thesis), it is important to mention the aspects that could constitute teamwork ineffective or even detrimental. Overall, teamwork advocates that close collaboration within NVTs and strong social ties among NVT members are essential for optimal performance of NVTs and their new ventures (Bolzani et al., 2019; Brattström, 2019; Klotz et al., 2014). However, some studies reveal the dark side of extremely tight collaboration within NVTs, suggesting that it can actually reduce the effectiveness of teamwork (Brinckmann and Hoegl, 2011). These studies imply that too much close collaboration and very strong social ties can sometimes harm, instead of benefit, teamwork in NVTs. Such close collaboration may result in "groupthink"[2] in NVTs, leading NVT members to a distorted image of NVT's current efficiency (Chandler, Honig and Wiklund, 2005) and refusal to acquire new competence (Brinckmann and Hoegl, 2011). All the above do not alter the importance of effective teamwork but merely call for a more extensive examination of the processes and properties that contribute to its development (Bolzani et al., 2019; Klotz et al., 2014). To study how NVT members develop effective teamwork that enables the establishment of new venture, I focus on the coordination of NVT members' competence in NVTs. Effective teamwork—especially in mature organizations—has been also linked to the creation of organizational routines and knowledge (Argote and Guo, 2016; Argote and Ingram, 2000; Felin, Foss, Heimeriks and Madsen, 2012). Moreover, in NVTs, effective teamwork has been also attributed to NVTs' composition (Jin et al., 2017) as well as emotions and moods developed in NVTs (Brattström, 2019; Klotz et al., 2014). However, coordination of NVT members' competence is considered a crucial initial step in the development of effective teamwork in NVTs (Brush et al., 2001; Salas et al., 2000).

[2] A detrimental inward orientation dominated by a strong and often unrealistic belief in the ability of the existing team to achieve great results without additional help or resources (Janis, 1983).

2.3 Coordination of competence in new venture teams

Compared to solo founders, NVTs can early mobilize a broader and deeper pool of competence—including NVT members' knowledge, skills, abilities, and other characteristics (Ployhart and Moliterno, 2011)—and thus provide their new ventures with higher chances of successful entry and survival (Bolzani et al., 2019; Klotz et al., 2014; Knight et al., 2020; Shane, 2000). Furthermore, NVTs' early access to broader and deeper pool of competence tends to affect significantly new ventures' long-run development and future performance (Leung, Foo and Chaturvedi, 2013; Bryant, 2014). Not surprisingly, investors prioritize NVTs' composition over the business idea (Bernstein, Korteweg and Laws, 2017). Especially during the fragile early phase of new venture development, a broader and deeper pool of competence that NVT members can use as they found, develop, and lead new ventures is particularly important for new ventures' success (West, 2007). Continuously interacting with each other, NVT members have the opportunity to engage in a fruitful exchange of ideas, perspectives, and values, which in turn help them jointly develop their new venture (Bolzani et al., 2019). Furthermore, combining knowledge and experience from different fields, NVT members can co-create new connections, solutions, and outcomes (Hargadon, 2003), and thus, provide NVTs with increased creativity, wisdom, and resilience (Carland and Carland, 2012).

However, successful new venture development largely relies on the coordination of NVT members' competence (knowledge, skills, abilities, and other characteristics) during their teamwork (Colombo and Grilli, 2005). Sadly, the synergy derived from the competence NVT members jointly possess does not arise neither spontaneously nor effortlessly (Colombo and Grilli, 2005). Studies show that many venture creation attempts fail within the first 12 months (Shim and Davidsson, 2018), with many of these failures being attributed to issues related to poor coordination of NVT members' competence rather than poor business ideas (Brattström, 2019; Kaplan and Strömberg, 2004). Indeed, coordination among individuals with different professional

backgrounds and diverse knowledge, skills, abilities, and other characteristics can be hampered by differences in perspectives, experiences, and understandings (Kellogg, 2009; Nembhard and Edmondson, 2006; O'Mahony and Bechky, 2008). The presence of multiple perspectives, values, and understandings in NVTs can generate significant tension, making agreement and collaboration among NVT members particularly challenging (West, 2007). In their attempt to coordinate NVT members' competence and achieve effective teamwork that enables the establishment of new venture, NVT members need to engage in collaborative team processes (de Mol et al., 2015) and cultivate collective properties (Blatt, 2009; Brattström, 2019). Therefore, effective teamwork does not rest solely upon the presence of broader and deeper pool of competence in NVTs but requires considerable effort from NVT members to coordinate their competence during teamwork.

2.4 Conceptual framework for research on teamwork in new venture teams

To study teamwork, likewise other NVT related aspects, scholars have primarily relied on the input-mediator-outcome (Bolzani et al., 2019; Klotz et al., 2014) framework derived from the studies of team effectiveness (Marks et al., 2001). The input-mediator-outcome framework states that inputs—typically associated with team members' characteristics and team composition—shape team processes and properties, which in turn influence team performance (Mathieu, Maynard, Rapp and Gilson, 2008). NVT members' characteristics include various demographic, cultural, personality, ability, and other characteristics that may be important to team composition (Chao and Moon, 2005). NVT scholars have extensively investigated the relationship between NVTs' composition and the performance of NVTs' (Lazar et al., 2020) and their new ventures (Jin, Madison, Kraiczy, Kellermanns, Crook and Xi, 2017). According to the input-mediator-outcome framework, two primary elements connect inputs to outcomes in teams: namely, team processes (i.e., team members' interactions) and cognitive or affective emergent states (i.e., collective properties)

(Marks et al., 2001). Team processes refer to activities that team members collectively perform—such as communication, decision making, task performance—to convert resources into meaningful outcomes (LePine, Piccolo, Jackson, Mathieu and Saul, 2008; Rosen, Dietz, Yang, Priebe & Pronovost, 2015).

Emergent states, on the other hand, refer to cognitive and affective properties that team members develop through team processes. Cognitive and affective emergent states—such as consensus, cohesion, trust—become the properties that teams possess at any given moment, which subsequently affect team processes and teams' outcomes (Marks et al., 2001; Rosen et al., 2015). Cognitive emergent states represent collective properties associated with team cognitions, while affective emergent states represent collective properties associated with team moods and emotions. Thus, cognitive emergent states focus on thoughts, while affective emergent states focus on feelings (Barsade and Gibson, 2007). Especially during the fragile early phase of new venture development, when NVT members work more intensively on novel and complex tasks, team processes as well as cognitive and affective emergent states exert profound and often long-lasting effects on NVTs and their new ventures (Patzelt et al., 2021).

This thesis aims at unpacking team processes and properties (i.e., emergent states) involved in teamwork's crucial initial step—coordination—to study how NVT members begin to coordinate their competence at the early phase of new venture development, which is a key in developing effective teamwork in NVTs. This thesis does not concentrate on specific team processes and properties (i.e., emergent states) since its goal is to open the "black box" of team processes and properties, as opposed to examining the relationship between specific team processes and/or properties.

2.5 Research gaps

Adopting the conceptual framework discussed in section 2.4, prior NVT studies mainly emphasize the importance of NVTs' composition—in terms of NVT members'

characteristics and competence—in NVTs' effective teamwork and successful performance (Knight et al., 2020). As such, a large amount of NVT research focuses on how to form effective NVTs (Lazar et al., 2020) and create an effective NVTs' composition (Chowdhury, 2005), closely associating the characteristics and competence of NVT members with NVTs' effective teamwork and new ventures' successful creation and growth (Jin et al., 2017). Though undoubtedly critical, NVTs' composition represents merely one part of the conceptual framework—that of the input—and as such, cannot completely explain the path toward effective teamwork in NVTs (Knight et al., 2020). Recognizing that effective teamwork is more that solely the presence of competence in NVTs, increasingly more scholars suggest that coordination of NVT members' competence is the crucial initial step in the development of effective teamwork (Brush et al., 2001; Salas et al., 2000). And though we know that coordination requires NVT members to engage in team processes (e.g., communication, decision making) and relies on the development of collective properties (e.g., shared understanding, trust, openness) (Colombo and Grilli, 2005; Delice et al., 2019; Lechler, 2001), we tend to treat coordination as a rather abstract process without truly unpacking it (Bolzani et al., 2019). As a result, we still lack insights on how NVT members coordinate competence in the early phase of new venture development (Bolzani et al., 2019; Gruber, MacMillan and Thompson, 2008; Klotz et al., 2014). Therefore, by considering solely the direct relationship between NVTs' composition and NVTs' performance, NVT research might miss interesting nuances generated by team processes and properties (i.e., emergent states) that emerge in NVTs and—more importantly—their interplay (Bolzani et al., 2019; Klotz et al., 2014).

Furthermore, unpacking the team processes and properties that are involved in the coordination of NVT members' competence, which in turn contributes to the development of effective teamwork in NVTs, this thesis responds to calls to extend insights on the direct relationship between NVTs' composition and performance and acknowledge the existence of intermediary elements that can influence this relationship (Bolzani et al., 2019; Klotz et al., 2014). The need to examine both the

direct and indirect relationships between NVTs' composition and performance is further supported by the call to acknowledge the complexity and dynamism of NVTs and their teamwork (Brattström, 2019; Knight et al., 2020), as effective teamwork is often a result of manifold and dynamic relationships (Ilgen, Hollenbeck, Johnson and Jundt, 2005). Moreover, NVTs have some particularities that augment the need to incorporate dynamism into NVT research. Specifically, NVTs operate under increased uncertainty and novelty. NVTs deal more with change than stability since they are required to continuously revisit and revise existing assumptions about their products and their customers (Brattström, 2019). In addition, NVTs constantly change in terms of ownership, autonomy, and entitativity (Knight et al., 2020). Embracing the complexity and dynamism inherent in NVTs and their teamwork can enhance our understanding of how NVT members coordinate their competence and develop effective teamwork in NVTs (Bolzani et al., 2019; de Mol et al., 2015; Klotz et al., 2014; West, 2007).

Last but not least, attempts to create and sustain a new venture often fail and many new ventures close their operations within the first five years of founding (Dahl and Sorenson, 2012; Åstebro, Herz, Nanda and Weber, 2014) mainly due to problematic teamwork in NVTs (Brattström, 2019). Therefore, studying as early as possible—preferably from the point co-founders form NVTs—how NVT members begin to coordinate their competence and develop effective teamwork becomes very important (Patzelt et al., 2021). Yet, the majority of NVT research suffers from the "success bias", examining primarily NVTs that have already reached the point of venture creation and thus have established a relatively effective teamwork (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). As such, NVT research might miss some interesting nuances regarding team processes and properties that emerge in NVTs during the fragile early phase of new venture development (Bolzani et al., 2019; Klotz et al., 2014). This, in turn, can hinder a complete understanding of team processes and properties that are involved in the coordination of NVT members' competence and limit our insights on how NVT members begin to develop effective teamwork in NVTs

(Patzelt et al., 2021), leaving an important gap in our knowledge on why some—but far from all—NVTs achieve effective teamwork(Knight et al., 2020).

Hence, through a longitudinal case study of five newly formed NVTs, this thesis shows how NVT members coordinate their competence at the early phase of new venture development (de Mol et al., 2015; West, 2007), and thus, opens the "black box" of team processes and properties that NVT members jointly mobilize to begin the coordination of their competence (Bolzani et al., 2019; Klotz et al., 2014). This, in turn, can more clearly explain how effective teamwork is initially developed in NVTs (Bolzani et al., 2019; Klotz et al., 2014)—simultaneously—demonstrating that the development of effective teamwork might be a result of manifold and dynamic relationships (Brattström, 2019; Knight et al., 2020) that take place at the important, yet often overlooked, early phase of new venture development (Patzelt et al., 2021).

3 METHODOLOGY

This section discusses the methodological approach I used to examine how NVT members coordinate the competence they jointly possess to achieve effective teamwork in NVTs. This section begins with a discussion of critical realism, which is the research philosophy that inspired this thesis. Next, this section describes the choice of research design, empirical setting, case selection, data collection, data analysis, and research quality. Finally, this section ends with reflections on the ethical considerations of this thesis.

3.1 Critical realism

The term "research philosophy" describes systems of beliefs and assumptions regarding the nature and development of knowledge (Saunders, Lewis and Thornhill, 2009). There are three main research philosophies: positivism, critical realism, and social constructivism (Guba and Lincoln, 1994; Healy and Perry, 2000). While each research philosophy offers benefits to the research process, it also contains limitations. To achieve its purpose, this study draws mainly on the research philosophy of critical realism, relying on a balance between the real and the observable world (Bhaskar, Collier, Lawson and Norrie, 1998). According to critical realism, there is a reality in which the phenomena exist—and thus—can be observed and studied (Bhaskar, 1975). Developed as a critique towards both positivism and social constructivism (Danermark, Ekström, Jakobsen and Karlsson, 2002), critical realism shares similarities and differences with positivism and social constructivism. Both positivists and critical realists accept reality as an actual condition that exists independently of those who observe it (Danermark, Ekström and Jakobsen, 2005; Sayer, 1992). In this thesis, I study how NVT members develop effective teamwork by coordinating the competence they jointly possess. Thus, I recognize that knowledge related to effective teamwork in NVTs is attainable, since NVTs exist and operate in the real world, characterized by established laws, cultural norms, and specific performance measures used to evaluate

the entrepreneurial outcomes. However, I also acknowledge that what constitutes effective teamwork in NVTs is largely influenced by perceptions and experiences of NVT members who comprise these NVTs.

However, similarly to social constructivism, critical realism accepts that the knowledge we have about the world that surrounds us is not entirely objective (Guba and Lincoln, 1994). This lack of objectivity does not stem from individuals' construction of the world (as social constructivism claims) but rather from individuals' continuous efforts to explain it (Easton, 2010). As such, critical realism encourages individuals to understand and explain the reality—while simultaneously—dismiss the existence of solely one interpretation (Bhaskar et al., 1998) because it is impossible to obtain "a single, 'correct' understanding of the world" (Maxwell, 2012, p. 5). Attempting to explain why some NVTs achieve more effective teamwork than others, this thesis recognizes that its findings reveal part of the reality by showing how the coordination of NVT members' competence can improve teamwork within NVTs. Inspired by critical realism, this thesis acknowledges that there might be alternative explanations and additional elements that illuminate the development of effective teamwork in NVTs (e.g., collective affect). Therefore, the findings of this thesis complement—rather than complete—our understanding of how NVT members achieve effective teamwork in NVTs, suggesting future research to apply alternative perspectives and examine additional elements to enrich this understanding. When it comes to research methods, critical realism advocates the choice of research approach that corresponds better to the nature of the examined phenomenon and the objectives of the specific study (Sayer, 2004). Furthermore, critical realism encourages the use of multiple theoretical lenses to achieve a more complete understanding of the examined phenomenon (Easton, 2010). Following this suggestion, this thesis integrates two different literatures—NVT and team literatures—and applies theoretical lenses from different research streams like IMO framework from team effectiveness and transactive memory system (TMS) theory from cognitive psychology. These particular literatures and theoretical lenses are selected due to their high relevance and potential

contribution to our knowledge on coordination of NVT members' competence and development of effective teamwork in NVTs (e.g., Bolzani et al., 2019; Klotz et al., 2014; Lazar, Miron-Spektor, Chen, Goldfarb, Erez and Agarwal, 2022).

3.2 Research design

The papers of this thesis apply a qualitative longitudinal study of multiple cases to examine how NVT members coordinate the competence they jointly possess to achieve effective teamwork in NVTs. Qualitative method was chosen for its ability to capture in-depth nuances of relatively understudied processes and properties that enable the coordination of NVT members' competence and development of effective teamwork in NVTs (Bolzani et al., 2019; de Mol et al., 2015; Klotz et al., 2014; West, 2007), enhancing our understanding of NVT members' experiences and interactions (Maxwell, 2012). Indeed, qualitative methods can further advance NVT research by enabling researchers to scrutinize the findings from quantitative studies on NVTs and thus construct entirely new theory regarding the effectiveness of NVTs (Hindle, 2004; Klotz et al., 2014). Furthermore, this thesis employs longitudinal research design, since real-time longitudinal data enable to study the development process as it unfolds, observing potential changes over time (Langley, 1999). Moreover, a longitudinal study can reveal interesting nuances when a significant number of comparable incidents are enriched with generous descriptions (Langley, Smallman, Tsoukas and Van de Ven, 2013). Thus, prospective and longitudinal research design offered me the opportunity to repeatedly collect data from the five NVTs throughout an extended period of time to closely monitor the development of effective teamwork through the coordination of NVT members' competence, identifying changes in the way effective teamwork unfolds in NVTs over time (Bolzani et al., 2019; de Mol et al., 2015; DeSantola and Gulati, 2017). In addition, real-time longitudinal data helped me develop theory in a more systematic way, revealing how team processes and properties guide the coordination of NVT members' competence, leading to effective teamwork in NVTs (Langley, 1999). Finally, a multiple case study research design is used to ensure that

the findings of this thesis are applicable to more than one case (Eisenhardt, 2021), thus, strengthening this thesis. Enabling comparison across the cases, multiple case study research design allowed me to examine the emerged similarities and differences between the five NVTs (Eisenhardt, 1989; Eisenhardt and Graebner, 2007)—especially between the NVTs that eventually split and the ones that continued operating—to form a better understanding of effective teamwork in NVTs (Hunziker and Blankenagel, 2021). As such, a multiple case study research design allowed me to compare the findings generated from the five NVTs to specify whether findings are idiosyncratic to a single case or steadily replicated in several cases (Eisenhardt, 1991).

3.3 Empirical setting

A venture creation program organized by a leading Norwegian University served as empirical setting for this thesis. Venture creation programs offer their participants the opportunity to engage in entrepreneurship and learn through their own experience of founding real ventures in an environment that facilitates this effort (Haneberg and Aadland, 2019; Ollila and Middleton, 2011). Researchers have used venture creation programs as setting to study various entrepreneurial phenomena in the past (e.g., Jung, Vissa and Pich, 2017; Knipfer, Schreiner, Schmid and Peus, 2018). In fact, NVT literature demonstrates a rather broad range of samples defined and researched as NVTs (Knight et al., 2020), including executives of relatively new ventures (e.g., Ensley and Pearson, 2005), leaders of relatively small ventures (e.g., Colombo and Grilli, 2005), and students forming NVTs to jointly perform entrepreneurial activities (e.g., Jung et al., 2017). All these studies have contributed to a better understanding of NVTs and their performance (Knight et al., 2020). Using the venture creation program as empirical setting offered me the unique opportunity to trace equally far progressed—in regard to NVT formation and business idea development—cases (NVTs) from the very beginning of their formation. This, in turn, can enhance our understanding of how NVT members begin to coordinate the competence they jointly possess, developing initial

teamwork in NVTs (Davidsson and Gordon, 2012; Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012).

To obtain more accurate insights on how the coordination of NVT members' competence contributes to the development of effective teamwork in NVTs, I purposefully chose as empirical setting a program focused on creating actual new ventures[3], as also validated during interview with the head of the program and in additional conversations with other program faculty members. The appropriateness of the specific venture creation program as empirical setting is further reinforced by its structure and content. First, the program faculty members do not interfere in the process of NVTs' formation (participants freely select their co-members from within and outside the program, having the opportunity to proceed as solo entrepreneurs). Furthermore, the program is designed to encourage NVTs to develop their business ideas on their own, supporting participants in a similar way as early-stage incubators. Both participants and faculty members of the program confirmed that apart from a general course on teamwork in NVTs, discussions with faculty members over issues that concern participants only emerge from time to time. These discussions are typically informal conversations initiated by participants and are merely of an advisory nature. Finally, to enter the program, participants are evaluated based on criteria like educational background, work experience, and motivation to engage in entrepreneurial activity, with the purpose to include individuals from different fields and encourage interdisciplinarity. Such diversity and interdisciplinarity are particularly important for the examination of effective teamwork in NVTs through the coordination of NVT members' competence, as they can reveal how NVT members with different knowledge, skills, abilities, and other characteristics synchronize their efforts. All the above render the specific venture creation program an appropriate empirical setting for this thesis.

[3] For instance, during the 2005–2017 period, program participants legally incorporated 143 new ventures and produced a total economic value of approximately 46 million USD (data obtained from participants' annual accounts submitted to the Business Register in Norway).

3.4 Case selection

This thesis employs data from five cases (newly formed NVTs) that aim at developing and commercializing technology-based business ideas in different sectors: health care, fitness, food production, entertainment, and information technology. Given that the similarities and differences across cases can provide interesting insights and facilitate theory building (Eisenhardt, 2021), I tried to incorporate homogeneity and heterogeneity during the selection of cases. In particular, the selected NVTs are from the same setting and at the same phase of formation. Furthermore, the selected NVTs are all involved in the development of knowledge-intensive technology-based business ideas but in different sectors. Such relative homogeneity allows to separate the idiosyncratic from the more general, and therefore, can generate a better understanding of how the coordination of NVT members' competence and the development of effective teamwork unfolds in NVTs (Davidsson and Gruenhagen, 2021). The five NVTs were selected as cases from a population of 10 NVTs that were formed in the program in a particular year between 2016 and 2020. Since I was not a faculty member of the venture creation program from which the cases were selected, NVT members could freely decide whether they wished to participate in this study, without associating their participation with any kind of reward from the program. NVT members of five NVTs agreed to be followed over time, providing me also with the access to their reports and business plans. Though five NVTs may not seem as a rich number of cases, it is considered sufficient for the development of theory (Eisenhardt, 1989). To increase the variation (heterogeneity) among these relatively homogeneous NVTs and therefore obtain more nuanced findings, I included NVTs that fulfilled the following criteria: 1) NVTs in which the members possess similar and different knowledge, skills, and backgrounds; 2) NVTs aimed at developing technology-based products or services; and 3) NVTs with only male or only female members as well as mixed-gender NVTs. Table 3.4 provides more details about the five cases (NVTs) and the participants (NVT members).

Table 3. New venture teams and NVT members' characteristics

Team	Sector	Technology-based product/ service	Member	Education	Work experience	Prior start-up experience
Beta/ Blue	Health care sector	Product	1	BSc in political science	Nursing assistant, employee in a grocery store	None
			2	BSc in social science	Employee at a playground, waitress, football coach, volunteer work	Co-founded a "youth enterprise" before
			3	BSc in marine engineering	Volunteer work	None, owner of the business idea
Zeta/ Green	Fitness sector	Service	1	Nursing studies	Employee in a nursing home, employee in a clothing store, volunteer work	None
			2	BSc in economics psychology studies (one year)	Employee in a bank, employee in an airline company, on-call teacher, cashier, cleaning employee	None, owner of the business idea
			3	BSc in economics	Employee in a bank, accountant, waitress, band teacher	None
Alpha/ Red	Food production sector	Product	1	BSc in technology design and management	Employee in stores and warehouses, volunteer work	None
			2	MSc in molecular genetics	Employee in a biotechnology firm, volunteer work	None
			3	BSc in Food production technology	Newspaper distributor, volunteer in an aquaponics farm	None, owner of the business idea
Omega/ White	Entertainment sector	Product	1	Art studies	Employee in theatre, employee in stores, cleaning employee, voluntary work	None
			2	BSc in business administration	Employee in a grocery store, volunteer in an elementary	Founded a new venture before (currently

Team	Sector	Technology-based product/ service	Member	Education	Work experience	Prior start-up experience
					school for troubled kids	holds CEO position), owner of the business idea
			3	BSc in Economics	Employee in an insurance company, volunteer work	None
Sigma/ Yellow	Information technology sector	Service	1	MSc in industrial chemistry and biotechnology	Volunteer work	Co-founded two new ventures before
			2	BSc in film production	Host in a local radio station, trainee at Norwegian Broadcasting Corporation, radio and TV journalist	None, owner of the business idea
			3	High school specialization in building and construction, BSc in logistics engineering	Carpenter	None
			4	BSc in economics Psychology studies	Consultant	Co-founded two new ventures before (currently involved in one of them)

3.5 Data collection

Most of the existing NVT studies rely primarily on quantitative cross-sectional data and thus have a limited possibility to directly explore the processes as well as the cognitive and affective properties of NVTs (Bolzani et al., 2019). Moreover, NVT research is largely characterized by "success bias" that refers to the tendency to include NVTs that have already created new venture (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). As a result, much of our knowledge stems from NVTs that have been operating for a considerable amount of time and have already reached some

level of success (Ruef, Aldrich and Carter, 2003). Since the formation of NVTs normally precedes their formal establishment and venture creation, several critical processes and properties of NVTs may remain undetected and unexplored in archival secondary data, which are typically obtained from registered new ventures and thus already established NVTs (Rasmussen, Mosey and Wright, 2011). Indeed, NVTs' early activities are likely to stay unobservable, as they usually leave little public trace (Lazar et al., 2020). To overcome this limitation and gain better insights on how NVT members begin to coordinate their competence to develop initial teamwork NVT research should rely on primary data collected from the very early phases of NVTs (Bolzani et al., 2019; Davidsson and Gruenhagen, 2021; Ruef et al., 2003). Using a venture creation program as a setting allowed me to follow newly formed NVTs, and as such, examine teamwork from the early phase of new venture development.

3.5.1 Primary data

To obtain primary longitudinal data from the very early phases of NVTs, me and my colleagues collected data from the five cases (NVTs) in four rounds, starting the interviews (15) few days after the team-selection was finalized. The second round of interviews (20) took place after several months and revealed the processes and properties NVT members mobilized to collectively develop NVT's business idea. The third round of interviews (17) was conducted almost a year after NVTs were formed. During this phase, three of the five cases managed to establish and register their new ventures. Of these three cases, two proceeded as team-based new ventures, while one split and continued as a single-entrepreneur new venture. The remaining two cases (NVTs) were dissolved and ceased their entrepreneurial operations. Finally, the fourth round of interviews (5) included NVT members from the two remaining NVTs. The five NVTs were followed for approximately 17 months in Paper 1 and 12 months in Paper 2, respectively. Paper 3 was mainly based on 52 individual and group interviews. In particular, Paper 2 (TMSs) and Paper 3 (role formalization) required data from operating NVTs. However, after approximately 12 months—and respectively 52 interviews—only two cases (NVTs) continued operating and these two cases (after 12

months) did not exhibit notable additional nuances in regard to coordination of NVT members' competence. Paper 1 studied the transition from groups of co-founders to founding teams (NVTs), therefore, a longer period of time (17 months) revealed interesting nuances in regard to processes and properties that rendered these two cases well-functioning NVTs. This thesis employs data from NVT members and their NVTs. Data on NVT members stem from individual interviews and reviews of NVT members' CVs and motivation letters, while data on NVTs stem from group interviews and new ventures' business plans. Incorporating data from NVT members and their NVTs, this thesis recognizes the importance of both NVT members' characteristics and their interactions in coordination of NVT members' competence (de Mol et al., 2015) and development of effective teamwork in NVTs (Bolzani et al., 2019). Moreover, data from both individuals and their teams can reduce the risk of biases or limitations that characterize many of the previous studies on the coordination of competence NVT members jointly possess (Ployhart and Moliterno, 2011). Therefore, employing data from NVT members and their NVTs allows this thesis to obtain an in-depth understanding of how NVT members achieve effective teamwork through the coordination of their competence. Here, I should note that at such an early phase, the team and firm levels overlap, since NVT members provide new ventures with the required resources and competence (Brush et al., 2001). Besides, at an early phase, lack of firm-level data allows to fully associate new ventures with the NVTs that establish them.

The primary data consist of 57 face-to-face semi-structured interviews. Of these, 45 interviews were conducted with NVT members (to obtain individual level data) and 12 group interviews with their respective NVTs (to obtain team-level data). Though all three papers use the same underlying dataset, the availability of a large number of interviews and secondary data enabled me to present nonoverlapping data across the three papers. Furthermore, Paper 1 uses additional data collected in a fourth round, which have not been used in the other two papers. Finally, all three papers rely on different literatures, use various approaches to analyze data, examine different topics,

and generate different contributions (more details in summary section) and thus employ the dataset in substantially different way. In particular, Paper 1 examines a phenomenon (transition from groups of co-founders to founding teams) that is expected to unfold over a longer period of time, as it entails more than just gathering co-founders that are interested in the same business idea (Lazar et al., 2020; Patzelt et al., 2021). Paper 2 (development of transactive memory systems in NVTs) and Paper 3 (role formalization in NVTs) study phenomena that—though affected by time—are expected to emerge sooner since related literatures associate them with NVTs at an early phase (de Mol et al., 2015; Jung et al., 2017; Ren and Argote, 2011; Sine, Mitsuhashi and Kirsch, 2006). To ensure I captured the development of NVTs' processes and properties as well as their role in the emergence and evolution of the phenomena examined in this thesis, I deliberately collected data during different periods, conducting the interviews in four rounds each separated by several months. All NVT members were present during most of the group interviews. This provided me the chance to observe NVT members' non-verbal communication (i.e., posture, gestures, and facial expressions) as well as their tone of voice. Moreover, it allowed me to monitor the way the NVT members interacted with each other, revealing team dynamics that might have been (intentionally or unintentionally) concealed by the participants during the individual interviews. In addition, group interviews helped me examine and compare the level of consensus between the statements NVT members made in the absence (individual interviews) and presence (group interviews) of their co-members. As a result—in few occasions—group interviews revealed friction or inconsistency among NVT members, suggesting issues of disagreement and trust that otherwise might have been unobserved. Almost all of the interviews were conducted in the program's facilities, but a few were conducted online due to participant's inability to attend the interview.

The interview guide used in this thesis—though significantly inspired by NVT and team literatures—was constructed to evoke a discussion on the phenomena this thesis examines (coordination of competence and development of effective teamwork).

Overall, the interview guide aimed at capturing the experiences, thoughts, and feelings generated during the NVT members' collective efforts to develop their business idea and successfully launch their new venture. To better correspond to the different phases that NVTs undergo, the interview guide was modified (to some extent) for each round of data collection.

3.5.2 Secondary data

Data from interviews were supplemented with secondary data, consisting of NVT members' CVs and motivation letters, new ventures' business plans—and additionally for Paper 2—reports of NVT members' individual and group experiences and reflections on teamwork in their NVTs. CVs offered me a clear and detailed view of knowledge and skills of each NVT member. Moreover, CVs allowed me to understand whether these knowledge and skills were obtained from education, prior work, or prior start-up experience. Motivation letters provided the initial insights on NVT members' motivation to engage in entrepreneurship. Reviewing motivation letters helped me understand why NVT members are interested in becoming entrepreneurs and what they expect from their engagement in entrepreneurship, helping me to distinguish NVT members with strong (at least initially) entrepreneurial intentions. Combined, CVs and motivation letters—as well as reports in Paper 2—were used to form a better understanding of the context and its particularities. Obtaining from the beginning of my study a more comprehensive view of NVT members' individual and NVT's collective pool of competence and understanding the motivation that drives each NVT member helped me to select cases that could potentially enhance the insights on the coordination of NVT members' competence and development of effective teamwork in NVTs. Furthermore, providing a more formal record of NVT members' knowledge and skills, CVs allowed me (later on) to examine whether NVT members relied on their formal knowledge and skills during teamwork, which set of these knowledge and skills they utilized, and how. The business plans of the five NVTs included in this thesis confirmed participants' intentions to establish real new ventures, with three of the cases being legally incorporated in the company register in Norway in 2018 and 2019.

Furthermore, new ventures' business plans helped me to better understand the business idea of each NVT, and thus, the required for its development knowledge and skills. In addition, business plans outlined NVTs' intended and accomplished entrepreneurial activities as well as the vision NVT members jointly developed in regard to their business idea. Finally, incorporating NVT members' formal and shared understanding of: (1) what they develop (description of solution, product, service), (2) how they intend to develop it (requirements in terms of resources, including knowledge and skills), and (3) why they want to develop it (vision), business plans allowed me to compare all this information with NVT members' interview statements and observe differences/similarities between these two sources. A more detailed description of the collected dataset is provided in Table 3.5.

Table 4. Dataset

		Beta/Blue	**Zeta/Green**	**Alpha/Red**	**Omega/White**	**Sigma/Yellow**	**Total interviews**
1st month of operation	Individual interviews	2	3	3	3	- *	**11**
	Group interviews	1	1	1	1	- *	**4**
	Documents	NVT members' CVs and motivation letters New venture's business plans	NVT members' CVs and motivation letters New venture's business plans	NVT members' CVs and motivation letters New venture's business plans	NVT members' CVs and motivation letters New venture's business plans	NVT members' CVs and motivation letters New venture's business plans	
5th month of operation	Individual interviews	2	3	3	3	4	**15**
	Group interviews	1	1	1	1	1	**5**
12th month of operation	Individual interviews	3	3	3	3	3	**15**
	Group interviews	-	1	-	1	-	**2**
17th month of operation	Individual interviews	-	1	-	3	-	**4**
	Group interviews	-	-	-	1	-	**1**

* Team 5 joined interviews after the first data collection round

3.6 Data analysis

To address each paper's topic more efficiently, this thesis draws on different data analysis approaches associated with theory development in qualitative research (Gehman, Glaser, Eisenhardt, Gioia, Langley and Corley, 2018). Paper 1, focusing on how groups of co-founders transition to founding teams, employs data from five cases followed for 17 months and its data analysis—mainly inspired by Langley (1999)—relies on sensemaking techniques like narratives, grounded theory, and temporal bracketing. Paper 2, examines how NVT members collectively develop TMSs in NVTs, employing data from five cases followed for 12 months. In Paper 2, data analysis—inspired by Gioia, Corley and Hamilton (2013) as well as Langley (1999)—relies on grounded theory and temporal bracketing. Finally, to investigate role formalization in NVTs, Paper 3 employs primarily data from 52 interviews obtained from five cases and its data analysis—mainly inspired by Gioia, Corley and Hamilton (2013)—relies mostly on grounded theory. The choice to draw on different data analysis approaches to study thesis's overall research question (development of effective teamwork in NVTs through the coordination of NVT members' competence) is aligned with critical realism (Easton, 2010), which is the research philosophy that inspired this thesis. The use of different data analysis approaches in the papers of this thesis allows me to select the approach that can better address the research question of each paper, and thus, enhance its findings. In particular, suggestions from Langley (1999) are valuable in studies of processes that are greatly affected by the passage of time, such as team formation in Paper 1 (Kozlowski, 2015) and TMS development in Paper 2 (Ren and Argote, 2011). Suggestions from Gioia, Corley and Hamilton (2013), are useful in the investigation of relatively understudied topics like development of TMSs in newly formed self-organizing teams (e.g., NVTs) (Ren and Argote, 2011) and role formalization in NVTs and their new ventures (Burton, Colombo, Rossi- Lamastra and Wasserman, 2019). In all three papers, the analysis of primary data (individual and group interviews) is supplemented with the analysis of secondary data (NVT members' CVs, motivation

letters, and new ventures' business plans). Similarities and differences between data analysis of the three papers included in this thesis are outlined below.

First similarity concerns the construction of case summaries based on the transcribed interviews, notes taken during these interviews, and the available secondary data. The developed case summaries contained a chronological description of experiences and events that occurred in the five cases—continuously updated with newly obtained information—allowing me to familiarize myself with the collected data. This way, instead of overwhelming me, the rich longitudinal data I collected helped me understand better the five cases and uncover their nuances. Although case summaries served as a significant initial step in data analysis of each paper, their role was particularly important in Paper 1 that employed greater amount of data and examined a broader topic (team formation)—and as such—required all-encompassing information from the five cases. Another similarity in data analysis of the three papers concerns the use of grounded theory to conceptualize the collected data. Thus, each of the three papers employs the collected data to answer its research question—and subsequently, the overall research question of this thesis—allowing the concepts that address the research question to emerge from the data. The emerged concepts were coded and labelled—staying as close as possible to participants' expressions—to develop first-order codes (first level categories). Similarities and differences among the cases began to emerge from the data-grounded first-order categories, revealing recurring patterns across the five cases (Corbin and Strauss, 2015). Next, first-order codes were grouped to construct second-order themes (second level categories). The labels of second-order themes were developed to reflect accurately and logically the generated data (Gioia et al., 2013), relying mostly on authors' interpretations. Finally, second-order themes were merged to develop aggregate dimensions (systems of categories). At this point, it was possible (and logical) to connect these aggregate dimensions to the related existing literatures to obtain a meaningful and complete understanding of the examined topics. This way, the emerged concepts enabled me to construct theory that is "grounded" in longitudinally collected and systematically

analyzed data (Gioia et al., 2013). Finally, to manage more effectively the considerable amount of collected data, all three papers use NVivo 12 during the coding process.

However, the three papers included in this thesis present two significant differences in their data analysis. One major difference concerns the importance of the passage of time. Inspired largely by Langley (1999), Paper 1 (team formation) and Paper 2 (TMS development) center on temporality, treating it as a crucial element of data analysis. As such, Paper 1 and Paper 2 extend their focus beyond the emergence of founding teams (i.e., NVTs) and TMSs in NVTs, respectively, to examine how these phenomena evolve once they emerge. Following Langley's (1999) suggestion, Paper 1 and Paper 2 use temporal bracketing to organize and make sense of the coded data. The data collection periods serve to decompose the coded data, enabling a more thorough observation of the changes that time introduces to team formation (Paper 1) and TMS development (Paper 2). Furthermore, temporal bracketing facilitates the comparison among the five cases, helping me to identify any replication patterns (Langley, 1999). Paper 3, on the other hand, is rather atemporal, since it focuses on how NVTs achieve role formalization without delving deeper into how role formalization evolves in NVTs once it is established. Another noteworthy difference in data analysis of the three papers concerns the focus. In particular, Paper 1 and Paper 2 focus primarily on the flow of events, paying special attention to how these events affect team formation (Paper 1) and TMS development (Paper 2) in the context of NVTs. Paper 3, on the other hand, focuses primarily on the relationships between the emerged from data concepts, unpacking how these relationships lead to role formalization in NVTs.

3.7 Reflections on research quality

An important step in every research study is to assess the criteria established in the research methodology to ensure the quality of the work. Scholars acknowledge credibility (or validity) and dependability (or reliability) as the main criteria to evaluate the quality of both qualitative research and quantitative research (Dougherty, 2002).

Credibility refers to the soundness of findings and conclusions in relation to the subjects under study (Nolan and Behi, 1995) and evaluates how well a qualitative study has been conducted (Lewis, Ritchie, Ormston and Morrell, 2003). Dependability, refers to the consistency of findings and conclusions in terms of replication regardless of the researchers (Ali and Yusof, 2011) and evaluates whether and to what extent the results of a study can be repeated by another study applying the same methods (Lewis et al., 2003). In particular, credibility is concerned with what should be examined, while dependability is concerned with how it is examined (Hair Jr., Black, Babin and Anderson, 2014). Inspired by critical realism, the papers of this thesis focus on achieving analytic rather than statistical generalization (Yin, 2014). Instead of making inferences about a population based on findings from the collected data (statistical generalization), the papers of this thesis compare the findings from the examined cases to previously developed theory and existing concepts (analytic generalization), acknowledging the particularities of the context (Polit and Beck, 2010). As with most qualitative research, the results of this thesis cannot (and do not intend to) generate findings that are certain but rather findings that are likely (Polkinghorne, 1988). This is aligned with critical realism that advocates that there is not a unique correct understanding of the world and the phenomena it encompasses (Maxwell, 2012). Indeed, capturing the different yet evolving experiences, thoughts, and emotions of participants (NVT members) may guarantee richness of the generated findings and depth of the obtained conclusions but not a universal representation.

To achieve credibility, this thesis employs prospective longitudinal data from multiple (individual and team) levels, including both NVT members and their respective NVTs. Such research design enhanced thesis' credibility since the likelihood of generating credible findings and conclusions is increased by extended real-time multilevel data (Kirtley, 2022). The main characteristics of the selected NVTs and their NVT members were displayed in data tables to accurately depict the sources of the gathered data. Additional secondary data (NVT members' CVs, motivation letters, new ventures' business plans) were used to compare and complement the individual and

group interviews. Furthermore, all the papers included in this thesis provide a plethora of quotes that exhibit a strong connection between the collected data and the generated findings. Finally, co-authors of the papers participated (to a greater or lesser extent) in data collection and data analysis processes to ensure the generated findings align with the raw data (Yin, 2014), reinforcing their credibility. The criterion of dependability was addressed through several data collection and data analysis procedures. First, all the interviews included in this thesis were recorded (Peräkylä, 2004). In addition, with very few exceptions, each round of data collection consisted of individual and group interviews conducted within the same day or the next day. Such time proximity ensured participants' experiences, thoughts, and emotions were equally affected by the events and conditions of the broader external environment. Dependability was further enhanced by the fact that almost all interviews were conducted in the presence of at least two researchers. Finally, in all the papers, co-authors engaged in discussions of the findings and conclusions (Miles, Huberman and Saldaña, 2018), verifying the generated insights. However, studying dynamic phenomena like NVTs and their teamwork (Brattström, 2019; Patzelt et al., 2021), entails considerable challenges in regard to dependability, as constantly evolving phenomena may lead to potential inconsistency in findings and conclusions (Agar, 1985). Therefore, studies like this one can reveal interesting nuances, while simultaneously imposing severe limitations on dependability.

During my PhD journey, apart from collecting primary data and developing the papers of this thesis, I participated in various practical activities aimed at disseminating and discussing my research on NVTs and their teamwork. Engaging in these activities allowed me to exchange research insights and concerns related to the topic of my thesis and thus acquire a better understanding of NVTs and their concepts/phenomena. Furthermore, presenting my work at several conferences and workshops allowed me to receive constructive feedback on my work, reminding me the importance of generating findings with practical relevance. In addition, the opportunity to invite a leading NVT scholar and organize a seminar and workshop on NVTs at my home

institution enhanced the dissemination of prior and current research on NVTs, identifying fruitful directions for future research. Finally, working on papers with my co-authors allowed me to gain first-hand experience in collaboration (teamwork) and contributed significantly to the development of the papers as well as the entire thesis. Table 3.7 provides an overview of the practical activities involved in my research process.

Table 5. Overview of practical activities

Practical activities involved in the research process	
2017	Presented my research proposal at developmental workshop on entrepreneurial teams and collective entrepreneurship research in Paris, France
2018	Presented a previous version of Paper 3 at the EGOS conference in Tallinn, Estonia
2018	Presented a previous version of Paper 3 at the RENT conference in Toledo, Spain
2019	Presented a previous version of Paper 3 at the Future of Conducting and Publishing Research in Entrepreneurship, Innovation Management and Strategy workshop in Bologna, Italy
2019	Presented a previous version of Paper 3 at the BABSON conference in Boston, USA
2019	Presented Paper 3 at the Academy of Management Annual Meeting conference in Boston, USA
2019	Participated in the Mapping Entrepreneurial Group Trajectories workshop in Berlin, Germany
2019	Organized a seminar and workshop on entrepreneurial teams research at Nord University in Bodø, Norway
2021	Presented Paper 1 at the Academy of Management Annual Meeting conference held online
2023	Paper 1 in review in Entrepreneurship Theory and Practice Journal. Paper 2 accepted for publication in International Small Business Journal. Paper 3 received R&R in Strategic Entrepreneurship Journal.

3.8 Ethical considerations

Ethical considerations are an integral part of any research effort that should respect individuals and institutions that might be influenced by its results. To address ethical issues and considerations, I took specific measures related to two different dimensions of ethics in qualitative research: procedural ethics and ethics in practice (Lewis, 2003). Procedural ethics typically involve “seeking approval from a relevant

ethics committee to undertake research involving humans," while ethics in practice refer to "everyday ethical issues that arise in the doing of research" (Guillemin and Gillam, 2004, p. 263). To design a research process that complies with the ethical guidelines in Norway, I sent an application to the Norwegian Center for Research Data (NSD) where I stated the purpose of my study and the measures I intended to take to protect my information sources and the collected data. My application included the interview guide that would be used during individual and group interviews. This application was approved by NSD. Due to the longitudinal research design, I revised this application to incorporate any new/additional information concerning the processes of data collection, data management, and data storage, taking the necessary measures to ensure the secure storage of the collected data. To address ethics in practice, I took measures to protect all the participants from potential disclosure or any other negative consequences they might experience due to my study (Yin, 2014). To ensure participants' protection and secure treatment of the data, I followed the steps proposed by Christians (2000). First, I provided (verbally and in writing) participants with all the necessary information related to the purpose of this study and the use of collected data. My goal was to offer participants sufficient information, avoiding any deception in regard to this study's research intentions (Christians, 2000). Participants were informed that the participation in this study was voluntary and that they could withdraw whenever they wanted. In addition, I ensured that all the members (participants) of each NVT (case) wished to participate in the study to obtain NVT members' acceptance without causing any disagreements or conflicts in their NVTs.

Ethical issues related to privacy and confidentiality deal with undesirable and unacceptable exposure of participants as well as to sensitivity and accuracy in how collected data are handled (Christians, 2000). The topic of this study concerns experiences, thoughts, and emotions associated with the participants' professional lives and does not directly involve information related to sensitive private matters. Nevertheless, prior to starting the interviews, the participants and I clarified and

agreed upon any issues related to anonymity and all the participants received signed confidentiality agreements. To ensure the identities of the participants and cases are not revealed, all the NVT members and NVTs included in this thesis have been anonymized. To further enhance the protection of participants and cases, I avoided including quotes/statements that incorporate any kind of confidential information. For quotes/statements that include more specific information, I informed and obtained acceptance from the participants to use such information. I also addressed ethical considerations concerning the research community. In particular, in this thesis, I followed the principles of transparent research by presenting accurately all the collected data and using tables and figures to display all the required information. Furthermore, I detailed the methodological approaches used in each paper to clearly illustrate the connection between the collected data and the generated findings.

4 SUMMARY OF EMPIRICAL STUDIES

This section presents summaries of the three papers included in this thesis, which help address the overall research question of this study.

4.1 Paper 1 - From groups to teams: A longitudinal study of mechanisms that enable the transition

(In review in Entrepreneurship Theory and Practice Journal)

4.1.1 Introduction and theoretical background

This paper studies the mechanisms (team processes and collective properties) that facilitate groups of co-founders to transition into well-functioning founding teams (NVTs), illuminating our understanding of how NVT members work together when they bond as an NVT. Increasingly more scholars acknowledge that groups (e.g., employees, co-founders) do not spontaneously and instantly become teams (e.g., high performance teams, founding teams), emphasizing the need to understand this transition process (Einola and Alvesson, 2019; Klotz et al., 2014; Lazar et al., 2020; Mathieu et al., 2014). Despite the interchangeable use of the terms "team" and "group", many scholars consider teams a subset of groups (Salas et al., 2000) and advocate that simply gathering some individuals (group) does not necessarily mean forming an effectively performing team (Mathieu, Tannenbaum, Donsbach and Alliger, 2014). Questioning the notion that team characteristics, structures, goals, and membership are rather stable (Tannenbaum, Mathieu, Salas and Cohen, 2012), scholars agree that team processes and properties (i.e., emergent states) are dynamic team-level constructs that "do not simply spring into being" (Kozlowski, 2015, p. 271) but gradually emerge due to members' (co-founders') interactions over time (Kozlowski and Klein, 2000). This calls for a non-linear, more dynamic approach in studies of teams (Delice et al., 2019; Einola and Alvesson, 2019), especially self-organizing teams like founding teams (Brattström, 2019; Patzelt et al., 2021). Such teams face increased novelty and uncertainty that further advocates the need to

understand how groups of co-founders become founding teams (Knight et al., 2020; Shepherd and Williams, 2019).

Establishing and leading a significantly large number of new ventures (Bolzani et al., 2019; Klotz et al., 2014), founding teams become an appropriate setting to study how self-organizing groups (i.e., co-founders) transition to teams (i.e., founding teams). An extensive research on how founding teams are formed has identified different endogenous and exogenous factors that influence the creation of founding teams (Harper, 2008; Jung et al, 2017; Lazar et al, 2020). However, the transition from co-founders to founding teams, especially during the pre-venture creation phase, remains understudied (Bolzani et al., 2019; Klotz et al., 2014; Knight et al., 2020). Thus, we lack a complete understanding of how a group of co-founders jointly develops characteristics of a well-functioning founding team. This is mainly due to the fact that many prior studies have been conducted in founding teams that have already achieved some level of success in their development (Ruef et al., 2003), relying primarily on registration data (i.e., data collected from established new ventures) (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012). This, in turn, indicates that the examined founding teams have already reached fairly good level of performance, and therefore, have already become well-functioning founding teams. This only reinforces the implicit assumption that a founding team automatically and immediately comes into existence. We challenge this assumption and suggest—in line with Knight et al. (2020) — reconsidering the current notion that all founding teams are indeed founding teams. Instead, we propose recognizing that all founding teams begin as groups of co-founders who intend to become founding teams, with some of them managing and some of them failing to make this transition. As a result, we should expect that many groups of co-founders will split and cease to exist, as it often happens in the real world. To study the transition from groups to teams in the setting of founding teams, we ask the research question: *How does a group (e.g., co-founders) evolve into a team (e.g., founding team)?*

4.1.2 Methodology

To address this research question, we employ a qualitative longitudinal multiple case study research design, tracing five groups of co-founders (cases) for 17 months from the moment these groups are formed. The cases were selected from a venture creation program offered by a Norwegian University. The program educates and supports individuals who wish to develop a business idea and establish new venture. We conducted four rounds of data collection over 17 months that generated 57 interviews (45 individual and 12 group). To supplement these interview data, we additionally included secondary data (co-founders' CVs, motivation letters, new ventures' business plans) received from both the program organizers as well as from the groups themselves. During data analysis we applied sensemaking techniques associated with process research, namely: narratives, grounded theory, and temporal bracketing. These techniques allowed us to observe the complex and dynamic interplay between team processes and collective properties, revealing the mechanisms that enable or prevent the process of transition (Langley, 1999).

4.1.3 Findings and contributions

Our findings have three main contributions. First, we contribute to founding teams' literature by addressing the call to adopt a more temporal and processual approach in studies on founding teams and their team-level constructs (team processes and collective properties) (Bolzani et al., 2019; Klotz et al., 2014). This way, we decrease the effect of "left-truncation" or "success bias" inherent in most of the entrepreneurship literature (Davidsson and Gruenhagen 2021; Yang and Aldrich, 2012). Furthermore, our prospective longitudinal study of team formation – particularly at the pre-venture creation phase – offers a unique opportunity to comprehend the complex and dynamic nature of team formation in parallel to venture creation (Patzelt et al, 2021). Finally, our findings indicate that groups of co-founders become founding teams prior to venture creation, suggesting that the transition from a group of co-founders to a founding team, especially at pre-venture phase, can enhance our understanding of both founding team performance and venture creation (Bolzani et al.,

2019; Knight et al., 2020). Second, challenging the existing teams' literature, our findings demonstrate that collective properties are more dynamic than traditionally assumed, particularly during the early phase of team formation (Cronin, Weingart and Todorova, 2011; Kozlowski, 2015). Our data show that the identified collective properties frequently change, following different paths, and significantly altering the content of team processes. Therefore, teams' and founding teams' scholars might need to reconsider the current measurement of collective properties. Third, we contribute to teams' literature by unpacking the complexity and dynamism that team formation entails (Kozlowski, 2015; Ramos-Villagrasa, Marques-Quinteiro, Navarro and Rico, 2018; Raveendran, Silvestri and Gulati, 2020). Studying team formation prospectively, without the possibility to predict whether any of our five groups will manage to become founding team, our findings illustrate how team processes and collective properties mutually affect each other and drive the process of team formation forward. Our data indicate that balancing the developed (cognitive and affective) collective properties enables groups to transition to teams. On the other hand, an imbalance of these collective properties prevents groups from becoming well-functioning teams. We hope that these three contributions advance our understanding of founding teams and potentially other self-organizing teams, offering interesting directions for future research. Overall, this paper contributes to a better understanding of what constitutes an NVT (founding team). This is particularly important, as an in-depth understanding of teamwork requires an understanding of what characterizes a team when it acts like a team (McIntyre & Salas, 1995). Considering that teams differ greatly from groups (Salas et al., 2000), unpacking the collective properties that differentiate an NVT from a group of co-founders and showing the development of these properties over time shed light into how these properties help NVT members to coordinate their competence – and thus – achieve effective teamwork.

4.2 Paper 2 - Development of transactive memory systems in new venture teams

(Accepted for publication in International Small Business Journal)

4.2.1 Introduction and theoretical background

This paper investigates how NVT members develop transactive memory systems (TMSs) – mechanisms team members employ to integrate and coordinate team members' competence – revealing the processes and properties that help NVT members to build TMSs and thus utilize the expertise they jointly possess (collective expertise) in NVTs. Research indicates that the majority of new ventures are founded by new venture teams (NVTs) (Klotz et al., 2014; Knight et al., 2020). An undisputable advantage of NVTs is their ability to immediately provide new ventures with a larger pool of knowledge and skills (henceforth expertise) compared to solo entrepreneurs (Brush et al., 2001; Lazar et al., 2020). However, merely aggregating NVT members' expertise is not sufficient for their effective teamwork and successful performance (de Mol et al., 2015; Lam, 2000). NVT members' collective – and often – complementary expertise needs to be integrated and coordinated to generate superior entrepreneurial outcomes (Bolzani et al., 2019; Colombo and Grilli, 2005). Prior research emphasizes the crucial role of transactive memory systems (TMSs) in the coordination and utilization of the competence NVT members jointly possess (e.g., Dai et al., 2017; Lazar et al., 2022; Zheng, 2012). Described as systems for shared cognitive division of labor in teams (Wegner, 1987), TMSs emerge as team members learn about "who knows what" in their teams and begin to rely on each other's expertise in various yet complementary domains (Lee, Bachrach and Lewis, 2014). By helping team members understand, trust, and use each other's expertise, TMSs can improve teams' overall coordination (Ilgen et al., 2005), reduce the cognitive load and redundant information within teams (Peltokorpi, 2008), enhance teams' adaptation to novel tasks (Lewis, Lange and Gillis, 2005), and advance teams' ability to perform complex tasks (Argote

and Ren, 2012). As result of all the above, a TMS can promote the utilization of the unique expertise each NVT member brings to a team.

Indeed, quantitative research on TMSs in NVTs reveals that TMSs facilitate the effective integration and coordination of NVT members' expertise (Zheng, 2012) and allow NVTs to improvise in response to unexpected events, especially negative surprises (Zheng and Mai, 2013). Moreover, studies suggest that TMSs can enhance new ventures' entrepreneurial orientation (Dai et al., 2016) as well as improve their ambidexterity (i.e., simultaneous pursuit of exploration and exploitation activities) (Dai et al., 2017). However, there is a limited insight into the exact processes guiding the emergence and evolution of TMSs as well as the mechanisms that can promote or hinder their development (Ren and Argote, 2011). Previous studies, the vast majority of which are quantitative, mainly examine the effects of TMSs on work teams (e.g., Lewis et al., 2005; Mell, Van Knippenberg and Van Ginkel, 2014) and top management teams (e.g., Heavey and Simsek, 2015; Heavey and Simsek, 2017). Furthermore, prior research tends to focus on rather mature teams, overlooking the emergence and evolution of TMSs in newly formed settings. Nevertheless, a deeper understanding of TMSs requires research on newly established teams, whereby TMS development can be captured from the very beginning (Ren and Argote, 2011). However, despite the potentially mutual value of TMS theorizing in NVTs, scarce qualitative research is evident in this context. To address this gap, we ask the following research question: *How are transactive memory systems developed in new venture teams?*

4.2.2 Methodology

To answer this research question, we conducted a qualitative longitudinal case study of five technology-based NVTs selected from a venture creation program offered by a leading Norwegian University. This unique context offered us insights on how TMSs emerge and evolve over time in self-organizing teams (like NVTs) (Lewis and Herndon, 2011; Ren and Argote, 2011), revealing the processes through which TMSs manifest in NVTs. We followed the NVTs for approximately one year, starting from the

early days of their formation, collecting data in three rounds. Treating TMSs as dynamic systems (Ren and Argote, 2011), we employed real-time longitudinal data to examine their development as it occurred rather than studying them through retrospective data (Kanawattanachai and Yoo, 2007). Primary data—obtained through individual and group interviews—were supplemented with secondary data (NVT members' CVs and motivation letters, reports of NVT members' individual and group experiences and reflections on teamwork in their NVTs, new ventures' business plans). Our data analysis was largely inspired by Langley (1999) considering that a process-oriented approach could reveal how and why phenomena emerge and evolve over time. During our data analysis we focused on the passage of time and its effects on the development of TMSs, observing the sequences of events and activities that unfolded in the five NVTs throughout the period of one year.

4.2.3 Findings and contributions

Our findings indicate that TMSs unfold in three stages in NVTs. At the pre-formation stage, NVT members self-declare their expertise, developing an initial specialization (one of the elements that indicate presence of TMS [Lewis, 2003]) in NVTs. Self-declaration is driven by NVT members' motivation and members' expectations about each other's expertise and its contribution to business idea development. Together, self-declaration, members' motivation and members' expectations constitute the TMS enabling process. Next, at the formation and collaboration stages, we observe the identified in TMS literature processes: TMS encoding, TMS storage, and TMS retrieval (Borgatti and Cross, 2003; Wegner, 1987). Our data show that these three processes manifest in NVTs through self-assessment and assessment of co-members (TMS encoding); shared understanding and role formalization (TMS storage); decision making and task performance (TMS retrieval). These processes, in turn, strengthen specialization—developed at pre-formation stage—and lead to gradual development of credibility and coordination in NVTs. Given that specialization, credibility, and coordination are identified in TMS literature as the three indicators of TMSs (Lewis, 2003), observing these elements in NVTs at the formation and collaboration stages

signals the presence of fully developed TMSs. Though the TMS processes of encoding, storage, and retrieval manifest in the same NVT processes at the stages of formation and collaboration, the collaboration stage introduces a more shared (among NVT members) and accurate understanding of each other's expertise and its contribution to business idea development. In particular, collaboration stage is characterized by further improved specialization, credibility, and coordination—and as such—stronger TMSs. Finally, our findings reveal that NVT members' motivation, trust, and shared ownership are the features (properties) that enable the TMS reinforcing process. Enacted throughout the stages of formation and collaboration, this reinforcing process updates and refines TMSs, rendering them more effective in the utilization of NVT members' collective expertise. Thus, our study clearly illustrates the dynamic development of TMSs (Lewis and Herndon, 2011; Ren and Argote, 2011) in NVTs, enhancing our understanding of how TMSs facilitate the integration and coordination of NVT members' collective expertise (Dai et al., 2017; Kollmann, Stöckmann, Linstaedt, Peschl and Wales, 2020; Lazar et al., 2022). Overall, this paper contributes to an in-depth understanding of how NVT members develop TMSs that respond to the dynamism of NVTs (Brattström, 2019; Knight et al., 2020) and foster the integration and coordination of collective expertise in NVTs, leading to effective teamwork.

4.3 Paper 3 - Every step you take: Role formalization in new venture teams

(Received R&R in Strategic Entrepreneurship Journal)

4.3.1 Introduction and Theoretical background

This paper studies how NVT members formalize roles, showing the processes and properties that foster the development of clear yet flexible role structure that enables the coordination of the competence NVT members jointly possess. Scholars increasingly emphasize the importance of understanding how new venture teams (NVTs) develop and formalize their organizational design, especially in regard to the role structure (Burton et al., 2019; Jung et al., 2017; Sine et al., 2006). Given that new

ventures—and subsequently—NVTs suffer from the lack of a clear role structure (Stinchcombe, 1965), understanding how NVTs manage this challenge through the coordination of their members' joint efforts at an early phase becomes particularly important (Burton et al., 2019). Besides, studies indicate that NVTs with formalized role structure are more likely to develop effective teamwork and achieve successful performance (Jung et al., 2017; Sine et al., 2006). Role formalization describes "the identification and designation of particular functional roles and their assignment to specific individuals" (Dalton, Todor, Spendolini, Fielding, and Porter, 1980, p.58) —and as such—enhances functional specialization in NVTs with the two aspects being intertwined (Sine et al., 2006). NVT members' increased specialization, in turn, is associated with new venture's economic and innovative performance (Haeussler, Hennicke and Mueller, 2019; Lahiri, Pahnke, Howard and Boeker, 2019). Indeed, the presence of diverse and complementary expertise in NVTs is a significant precondition for ventures' creation and growth (Beckman, Burton and O'Reilly, 2007; Chen, Cui, Hunt and Li, 2020).

However, merely including diverse and complementary expertise will not necessarily result in competitive advantage (Haeussler et al., 2019). Effective teamwork and successful performance rest upon NVTs' ability to coordinate their members' unique competence (Bolzani et al., 2019; Colombo and Grilli, 2005; de Mol et al., 2015). In particular, assigning roles and allocating decision authority to team members that possess the required knowledge and skills can lead to faster and more efficient decision making (Colombo, Lamastra and Mattasini, 2016). Moreover, studies suggest that a formalized role structure can improve new ventures' chances to attract competent employees (Baron, Hannan and Burton, 2001) and acquire financial resources (Ferguson, Cohen, Burton and Beckman, 2016). All the above advocate the need to examine role formalization in NVTs, which – surprisingly – remains relatively understudied (Burton et al., 2019; Colombo et al., 2016), especially during the early phase of NVTs' formation and ventures' creation (Davidsson and Gruenhagen, 2021; Shepherd, Souitaris and Gruber, 2021). Thus, we ask: *How does role formalization*

unfold in new venture teams and what team-level factors, if any, influence this formalization?

4.3.2 Methodology

To address this research question, we employed a qualitative longitudinal case study of five NVTs (cases) formed to develop technology-based business ideas. The NVTs were selected from a venture creation program organized by a Norwegian University. Following the suggestion of Davidsson and Gruenhagen (2021), we selected relatively homogeneous NVTs that enabled us to separate the idiosyncratic from the more general insights, and thus, obtain a more accurate understanding of role formalization in NVTs. Though all our NVTs aimed at developing technology-based business ideas, these business ideas were related to different sectors, namely: health care, fitness, food, entertainment, and information technology. Our primary data consisted of individual and group interviews conducted in three waves, starting from the early days of NVTs' formation. The interviews were complemented with secondary data (NVT members' CVs and motivation letters, new ventures' business plans). Our data analysis was mainly inspired by (Gioia et al., 2013) and included frequent comparisons of the emerging data.

4.3.3 Findings and contributions

Our findings indicate that role formalization in NVTs consists of a structural element that brings relative stability and a processual element that enables relative flexibility. In particular, role formalization in NVTs unfolds through three recursive processes: self-selection, reassessment, and restructuring. Furthermore, our findings provide evidence of a dynamic interplay between structure and process that allows NVTs to benefit from the presence of both (Desantola and Gulati, 2017). As such, we extend prior work on role formalization (Jung et al., 2017; Sine et al., 2006), revealing the dual nature of role formalization (structural and processual) and thus addressing the call to demonstrate whether role formalization is structural or processual (Ferguson et al., 2016; Klotz et al., 2014; Lazar et al., 2020; Patzelt et al., 2021). In

addition, the recursive processes of reassessment and restructuring indicate that the efficient organizational design of new ventures entails a considerable degree of flexibility, and therefore, is more dynamic than traditionally assumed (Burton et al., 2019; Colombo et al., 2016; Patzelt et al., 2021). Indeed, in NVTs, self-selection is merely the first step in the process of role formalization, as formalized role structure requires frequent reassessment and reorganization of NVT members' skills, roles, and tasks. Acknowledging the dynamic nature of role formalization can enhance our understanding of why some NVTs and their new ventures exhibit better performance, especially at the early phase (Davidsson and Gruenhagen, 2021). Finally, our findings uncover how the collective properties (cognitive and affective emergent states) — strategic consensus, cognitive trust, and team identification—influence role formalization in NVTs by combining the crucial for successful performance role clarity and task flexibility (Desantola and Gulati, 2017). Overall, this paper contributes to a better understanding of how NVT members formalize roles and develop a clear yet flexible role structure that enables the coordination of NVT members' competence, improving teamwork in NVTs.

4.4 Similarities and differences between the three papers

The papers of this thesis share few similarities that I should note. In particular, decision making is encountered in Paper 1 as a team process and in Paper 2 as manifestation of TMS retrieval process. Role formalization is encountered in Paper 2 as manifestation of TMS storage process and is studied in Paper 3 as a process that reflects the utilization of NVT members' competence, and thus, contributes to the development of effective teamwork in NVTs. When it comes to collective properties, shared sense of ownership and trust are encountered in Paper 1 as some of the properties that guide the transition from groups to teams and in Paper 2 as two of the three properties that reinforce TMSs in NVTs. Trust (cognitive) is also encountered in Paper 3 as a property that—combined with strategic consensus—results in role clarity. The main reason for these similarities is the major role these team processes and

properties play in the coordination of NVT members' competence and the development of effective teamwork in NVTs (Bolzani et al., 2019; de Mol et al., 2015; Klotz et al., 2014; West, 2007). Another reason is the fact that all three papers relied on the same dataset – analyzed differently in each paper (more details in data analysis section above) – with Paper 1 using additional data collected in a fourth round. However, the three papers differ significantly in their theoretical background, findings, and contributions (more details in summaries of the papers below). As such, Paper 1 builds primarily on general team literature, Paper 2 builds on TMS literature, and Paper 3 builds mainly on organizational design literature. When it comes to findings, Paper 1 uncovers how groups of co-founders become founding teams, contributing to team formation in self-organizing teams in general, and founding teams (NVTs) in particular. Paper 2 demonstrates how NVT members jointly develop TMSs, relying on processes identified in TMS literature and contributes to NVT and TMS literatures. Paper 3 shows how NVTs achieve role formalization and contributes to NVT and organizational design of new ventures literatures. The three papers are currently at different stages in the publication process. Paper 1: In review in Entrepreneurship Theory and Practice Journal. Paper 2: Accepted for publication in International Small Business Journal. Paper 3: Received R&R in Strategic Entrepreneurship Journal. I should note that, when submitting the papers, we informed the editors of these journals about the similarities among the three papers, which I described above.

5 CONCLUSIONS AND IMPLICATIONS

In this section, I discuss the way the three papers of this thesis advance our knowledge on how NVT members coordinate their competence to develop effective teamwork in NVTs. I start with a discussion of how the findings from the three papers, separately and in combination, contribute to NVT literature by unpacking the team processes and properties that are involved in the coordination of NVT members' competence and showing their role in the development of effective teamwork in NVTs. This section proceeds with a discussion of how the combined findings from the three papers contribute to a better understanding of the way NVT members initiate the development of effective teamwork in NVTs at the early phase of new venture development. Next, the practical implications of this thesis are discussed. Finally, limitations and suggestions for further research are presented.

5.1 Contribution to a better understanding of how NVT members coordinate their competence in NVTs

The coordination of NVT members' competence—competence being reflected in NVT members' knowledge, skills, abilities, and other characteristics— is mainly addressed through the Paper 2 and Paper 3. Together, these papers reveal the specific team processes (e.g., decision making, task performance, reassessment, restructuring) NVT members mobilize and the collective properties (e.g., trust, shared ownership, strategic consensus, team identification) they develop to coordinate the competence they jointly possess (de Mol et al., 2015; West, 2007). Furthermore, these papers show the interplay between these team processes and properties, clearly indicating that merely the presence of a larger pool of competence in NVTs is not sufficient for effective teamwork and successful new venture development. Thus, Paper 2 and Paper 3 unpack the coordination of NVT members' competence, extending this coordination from a rather abstract process (Bolzani et al., 2019) to a complex process that involves an interplay of specific team processes and properties. In addition, Paper 2 and Paper 3 identify the changes that team processes undergo—often as a result of the

developed properties—revealing the dynamism inherent in NVTs and their teamwork (Brattström, 2019; Knight et al., 2020). Finally, examining the coordination of NVT members' competence from the beginning of NVTs' formation and throughout 12 months sheds light into how NVT members start coordinating competence in NVTs, and how they continue doing it during the fragile early phase of new venture development (Patzelt et al., 2021). This, in turn, uncovers the significant changes that the ongoing process of coordination can undergo over time and offers insights on why some—but far from all—NVTs manage to successfully coordinate the competence of their NVT members (de Mol et al., 2015; Knight et al., 2020).

More precisely, Paper 2 investigates the development of transactive memory systems (TMSs)—mechanisms team members jointly develop to integrate and coordinate the competence they jointly possess—in thus far overlooked context of NVTs (Dai et al., 2017; Ren and Argote, 2011). Paper 2 reveals that in NVTs, TMSs unfold in three stages; pre-formation, formation, and collaboration. Pre-formation stage includes the TMS enabling process and leads to the development of the initial specialization in NVTs (specialization being the first indicator of TMSs in a team [Lewis, 2003]). TMS enabling process is driven by NVT members' motivation to develop their business idea, self-declaration of their expertise, and members' expectations regarding each other's expertise. Formation and collaboration stages include the TMS processes of encoding, storage, and retrieval. According to TMS literature, TMSs function through these three "transactive" processes (Borgatti and Cross, 2003; Wegner, 1987). Identifying the TMS processes of encoding, storage, and retrieval, Paper 2 shows how exactly these TMS processes are manifested in NVTs. More precisely, TMS encoding is reflected in self-assessment and assessment of co-members expertise. Subsequently, TMS storage is reflected in the establishment of a shared understanding among NVT members regarding their expertise and its contribution to NVT's business idea development as well as in the formalization of NVT members' roles. Finally, TMS retrieval, in NVTs, is reflected in decision making and task performance. By engaging in these processes, NVT members enhance the previously developed specialization, while

gradually develop credibility and coordination (credibility being the second and coordination the third indicators of TMSs in a team [Lewis, 2003]). Although consisting of the same processes, the formation and collaboration stages differ significantly in the content of these processes. In particular, compared to the formation stage, the collaboration stage involves a more shared (among NVT members) and accurate understanding of each other's unique expertise. Last but not least, Paper 2 identifies a TMS reinforcing process that occurs throughout all three stages. Driven by members' motivation, trust, and shared ownership, TMS reinforcing process strengthens TMSs, rendering them more effective over time. This finding reveals the dynamic nature of TMSs (Ren and Argote, 2011), advocating the need for frequent reexamination and—whenever necessary—readjustment of TMSs to improve their ability to integrate and coordinate NVT members' collective expertise.

Studying how NVT members begin to develop TMSs to integrate and coordinate their complementary characteristics and competence (Ren and Argote, 2011) simultaneously reveals interesting insights regarding the utilization of collective expertise in NVTs (de Mol et al., 2015; West, 2007). In particular, Paper 2 shows how the specialization developed through assessment of each other's expertise is used during decision making and task performance, rendering these processes more effective. Subsequently, more effective decision making and task performance strengthen coordination, which reflects an improved use of NVT members' collective expertise. Thus, examining the development of TMSs in NVTs improves our understanding of how NVT members successfully integrate NVT members' collective expertise (Lazar et al., 2022) and enhance coordination in NVTs (Ren and Argote, 2011) through the enactment of specific team processes and properties (Bolzani et al., 2019; Klotz et al., 2014). Furthermore, by revealing how specific team processes and properties influence the development of TMSs, Paper 2 responds to the need to uncover the precise team processes and properties that enable the utilization of collective expertise in NVTs (de Mol et al., 2015; West, 2007). Although Paper 2 contributes primarily to NVT literature, it sheds light into the emergence and evolution

of TMSs in self-selected/self-organized teams (like NVTs), contributing also to TMS literature (Peltokorpi, 2008; Ren and Argote, 2011). More precisely, findings from Paper 2 demonstrate that in NVTs, TMSs incorporate a broad range of competence, highlighting the importance of NVT members' professional and social skills as well as their personality traits. This finding differentiates the TMSs of NVTs from the TMSs developed in work teams, suggesting that members of self-selected/self-organized teams (like NVTs) may utilize more their members' all-encompassing characteristics. Taking this finding into consideration, current TMS measures, such as the widely applied measurement scale developed by Lewis in 2003, could be adjusted to capture the broad range of expertise in self-selected/self-organized teams (including NVTs).

Paper 3 examines how NVT members begin to develop a formalized role structure in NVTs—a relatively understudied context for role formalization (Burton et al., 2019; Colombo et al., 2016)—to improve the coordination of NVT members' competence during the performance of entrepreneurial activities. In particular, findings from Paper 3 show that role formalization in NVTs unfolds via three processes: self-selection, reassessment, and restructuring. Interacting over time, NVT members gradually develop three collective properties—strategic consensus, cognitive trust, and team identification—that drive the formalization of role structure in NVTs. Showing that NVTs' role formalization is a dynamic concept that evolves over time, Paper 3 suggests that the coordination of NVT members' competence is an ongoing process that requires continuous efforts from NVT members. This is in line with Paper 2 that identifies a TMS reinforcing process and thus uncovers the dynamic nature of TMSs in NVTs. Moreover, findings from Paper 3 show that formalized role structures in NVTs incorporate NVT members' professional and social skills as well as their personality traits. This suggests that NVTs employ a broad range of competence while engaging in their entrepreneurial activities. Both Paper 2 and Paper 3 demonstrate the broad range of knowledge, skills, and personality traits (characteristics) that NVT members mobilize to develop TMSs and formalized role structures—and thus—successfully coordinate NVT members' competence. Finally, identifying role formalization as a

concept that includes both a structural (stability) and a processual (flexibility) components, Paper 3 reveals how NVT members can achieve a beneficial for the organizational design balance between stability and flexibility (Desantola and Gulati, 2017).

Studying how NVT members develop formalized role structure provides interesting insights regarding the coordination of the competence NVT members jointly possess. Given that a formalized role structure facilitates the coordination of NVT members' competence (Jung et al., 2017; Sine et al., 2006), the formalization of role structure enables a better utilization of NVT members' complementary characteristics and competence and enhances teamwork in NVTs. Taking into account that: (i) young NVTs typically lack formal documents and organizational routines that explicitly describe each NVT member's role (Sine et al., 2006) and (ii) the formalization signals a significantly convergent understanding among NVT members (as our data suggest), role formalization allows NVT members to coordinate their competence and synchronize their efforts during the fragile early phase of new venture development. All in all, Paper 3 enhances our understanding of how NVTs utilize the competence of their NVT members—developing formalized role structure—to coordinate more efficiently NVT members' complementary knowledge, skills, abilities, and other characteristics. Furthermore, by unpacking the role of team processes (reassessment and restructuring) and collective properties (strategic consensus, cognitive trust, and team identification) in role formalization of NVTs, Paper 3: (i) uncovers the precise team processes and properties that NVT members jointly mobilize to coordinate their competence (de Mol et al., 2015; West, 2007) and (ii) reveals the importance of the—often overlooked—interplay that unfolds between these team processes and properties (Bolzani et al., 2019; Klotz et al., 2014) and significantly affects the coordination of NVT members' competence, leading to a more effective teamwork in NVTs. Although Paper 3 contributes primarily to NVT literature, it offers interesting insights on the organizational design of self-selected/self-organizing teams that

coordinate their competence and synchronize their efforts without the managerial interventions (Raveendran et al., 2020).

5.2 Contribution to a better understanding of how NVT members develop effective teamwork in NVTs

All the papers included in this thesis contribute to a better understanding of how NVT members begin to develop effective teamwork that enables the establishment of new venture. Combined, the three papers show how NVT members achieve effective teamwork in NVTs through the coordination of their competence, unpacking the precise team processes and properties that guide this entire process. Given that the coordination of NVT members' competence—competence being reflected in NVT members' knowledge, skills, abilities, and other characteristics— is a crucial initial step in the development of effective teamwork (Brush et al., 2001; Salas et al., 2000), the papers of this thesis reveals what NVT members do when they coordinate the competence they jointly possess (de Mol et al., 2015; West, 2007) and how this contributes to effective teamwork in NVTs (Bolzani et al., 2019; Klotz et al., 2014). Furthermore, by showing that NVT members coordinate their competence, and subsequently, develop effective teamwork through the enactment of specific team processes and properties, the papers of this thesis address the call to extend the studies on NVTs' effective teamwork and successful performance (successful new venture development in the case of newly formed NVTs) beyond mere consideration of NVTs' composition (Bolzani et al., 2019; Klotz et al., 2014). In fact, all three papers of this thesis demonstrate how NVTs' composition can be incorporated in teamwork through team processes and properties to increase its effectiveness. Moreover, all three papers uncover a connection (interplay) between the identified team processes and properties, indicating the existence of a more complex and indirect relationship between processes and properties, something NVT literature reviews have suggested to examine (Bolzani et al., 2019; Klotz et al., 2014). In addition, showing that the means NVT members jointly develop to coordinate their competence are rather dynamic

(TMSs in Paper 2 and role formalization in Paper 3) and that NVTs (founding teams) themselves constantly undergo significant changes that determine the effectiveness of their teamwork (Paper 1), all the papers of this thesis advocate the need to incorporate complexity and dynamism to NVT research (Brattström, 2019; Knight et al., 2020). Lastly, all the papers offer insights on the development of effective teamwork from the beginning of NVTs' formation and throughout the early phase of new venture development, shedding light into the important changes NVTs and their teamwork undergo during this fragile yet overlooked early phase (Davidsson and Gruenhagen, 2021; Patzelt et al., 2021; Yang and Aldrich, 2012) and explaining why some—but far from all—NVTs manage to develop effective teamwork that enables the establishment of new venture (Knight et al., 2020).

More precisely, Paper 1 examines NVTs' formation to illuminate our understanding of how NVT members work together when they become an NVT. There are significant differences in the way NVT scholars conceptualize NVTs, which in turn, affect our understanding of how NVT members coordinate their competence and develop effective teamwork (de Mol et al., 2015; Knight et al., 2020). Differentiating teams from groups in order to study teamwork is particularly important, since an in-depth understanding of teamwork requires an understanding of what a team does when it acts like a team (McIntyre and Salas, 1995; Salas et al., 2000). Therefore, to investigate how NVT members develop effective teamwork in NVTs through the coordination of the competence NVT members jointly possess, I first clarify what constitutes an NVT in this thesis. In particular, Paper 1 outlines the collective (cognitive and affective) properties that characterize NVTs, revealing how these properties can gradually alter the content of team processes and thus differentiate groups of co-founders from founding teams (NVTs). This, in turn, indicates that NVT formation is a complex process that unfolds over time. Moreover, Paper 1 shows how groups of co-founders engage in the processes of communication, decision making, and task performance, and subsequently, develop the collective properties: alignment, equal/fair ownership, sense of achievement, sense of commitment, mutual respect, sense of concern, safety,

and trust. These collective properties allow groups of co-founders to become founding teams and exhibit effective teamwork at pre-venture creation phase. As such, Paper 1 clearly demonstrates the importance of the—often overlooked (Bolzani et al., 2019; Klotz et al., 2014)—interplay that unfolds between team processes and properties and significantly affects NVTs' formation and development of effective teamwork. Thus, the mechanisms (team processes and collective properties) that drive the transition from a group of co-founders to a founding team, especially during the fragile pre-venture phase, may better explain both founding teams' performance and ventures' creation (Bolzani et al., 2019; Knight et al., 2020). Indeed, an in-depth understanding of NVTs as well as the interplay between team processes and properties can enhance our understanding of how NVT members coordinate their competence and achieve effective teamwork in NVTs (Bolzani et al., 2019; de Mol et al., 2015; Klotz et al., 2014). Furthermore, addressing the need to use a more temporal and processual approach when studying founding teams and their team-level constructs—team processes and collective properties—(Bolzani et al., 2019; Klotz et al., 2014), Paper 1 reduces the effect of "left-truncation" bias" or "success bias" incorporated in many studies on founding teams and venture creation (Davidsson and Gruenhagen 2021; Yang and Aldrich, 2012). Finally, Paper 1 shows how a complex and dynamic interplay of team processes and (cognitive/affective) collective properties enables groups of co-founders to successfully transition to founding teams. As such, Paper 1 reveals that collective properties (i.e., emergent states) are more dynamic than traditionally assumed (Cronin et al., 2011; Kozlowski, 2015), suggesting that scholars might need to reconsider the way collective properties are typically treated and measured in founding teams. Next, I discuss how the findings from Paper 2 and Paper 3 help me to answer the overall research question.

Studying how TMSs and role formalization unfold in NVTs, Paper 2 and Paper 3 (respectively) reveal the processes and properties through which the coordination of NVT members' competence contributes to effective teamwork in NVTs. Thus, Paper 2 and Paper 3 contribute to NVT literature by revealing the way coordination of NVT

members' competence enables NVTs to develop effective teamwork (Bolzani et al., 2019; de Mol et al., 2015; Klotz et al., 2014; West, 2007). In particular, Paper 2 identifies assessment of each other's expertise, development of shared understanding, role formalization, decision making, and task performance as the processes that guide the emergence and evolution of TMSs in NVTs. In addition, Paper 2 demonstrates how developing TMSs through these processes allows NVT members to coordinate their collective expertise and achieve effective teamwork in NVTs. Furthermore, Paper 2 shows how the collective properties of trust and shared ownership gradually improve the identified processes (assessment of each other's expertise, development of shared understanding, role formalization, decision making, and task performance) and subsequently increase coordination in NVTs. Increased coordination, in turn, is highly associated with effective teamwork in NVTs (Jones and Schou, 2022). Paper 3, on the other hand, identifies reassessment and restructuring as team processes that lead to role formalization and thus better use of NVT members' complementary characteristics and competence (Jung et al., 2017; Sine et al., 2006), helping NVTs to develop effective teamwork that enables the establishment of new venture. Furthermore, Paper 3 demonstrates how the collective properties of strategic consensus, cognitive trust, and team identification drive role formalization, facilitating the coordination of NVT members' competence—and therefore—enhancing teamwork in NVTs (Colombo and Grilli, 2005). Combined, Paper 2 and Paper 3 advance NVT literature by showing how the team processes and properties that NVT members mobilize to coordinate their competence enable effective teamwork in NVTs. This, in turn, helps to open the "black box" of team processes and properties that contribute to the development of effective teamwork in NVTs (Bolzani et al., 2019; Klotz et al., 2014). Finally, by depicting how TMSs evolve through TMS reinforcing process and role formalization evolves through the processes of reassessment and restructuring, Paper 2 and Paper 3 (respectively) adopt a more dynamic and complex approach to NVTs' effectiveness (Brattström, 2019; Knight et al., 2020), revealing the substantial changes that characterize NVTs and their teamwork at an early phase of new venture

development. In particular, Paper 2 and Paper 3 follow NVT members as they initiate the coordination of the competence they jointly possess, and subsequently, uncover how NVT members begin to develop effective teamwork. As such, Paper 2 and Paper 3 capture the development of effective teamwork during the fragile yet significant early phase of new venture development (Patzelt et al., 2021), overcoming the inherent in most NVT studies "success bias" (Davidsson and Gruenhagen, 2021; Yang and Aldrich, 2012).

5.3 Implications for practice

In addition to the theoretical contributions to NVT literature discussed above, the findings from this thesis have several practical implications. These practical implications concern founders who intend to engage in team-based entrepreneurship as well as venture creation programs and incubators that facilitate entrepreneurs. In particular, Paper 1 indicates that founders—alongside the development of business idea—could benefit from developing fair sense of ownership, shared sense of commitment, mutual respect, concern, safety, and trust among each other. These properties can turn a group of co-founders into a founding team (NVT), and thus, affect the way co-founders work together. As such, Paper 1 suggests that founders, programs, and incubators do not expect the benefits ascribed to team-based entrepreneurship prior to ensuring that NVT members have established a solid relationship and have formed an actual NVT. Another practical suggestion for founders, programs, and incubators generated from Paper 1 concerns the emphasis on "how" co-founders implement their activities (e.g., communication, decision making, task coordination) instead of "what" activities they implement. According to Paper 1, it is the "how" that determines the effectiveness of co-founders' teamwork and enables the establishment of new venture, as groups of co-founders and founding teams (NVTs) tend to implement pretty similar activities but in significantly different ways. Next, in Paper 2, founders, programs, and incubators can find practical suggestions for the development and utilization of TMSs, which are systems teams develop to integrate and coordinate

their members' collective expertise. Paper 2 identifies the actions founders, programs, and incubators can take to develop TMSs in NVTs, highlighting the importance of continuously re-evaluating one's own as well as co-founders' expertise and acknowledging each other's contributions. Furthermore, Paper 2 indicates that founders could benefit from cultivating motivation, trust, and shared ownership in NVTs, since these features can reinforce TMSs, enhancing the integration and coordination of NVT members' collective expertise, and thus, improving their teamwork. Finally, Paper 2 shows that, in NVTs, expertise can stem from professional knowledge, social skills, and personality traits, suggesting founders, programs, and incubators consider a broad range of characteristics when forming NVTs and building TMSs. Lastly, Paper 3 indicates that founders could benefit from a frequent re-examination and—whenever necessary—readjustment of NVTs' role structures. Moreover, Paper 3 suggests that founders, programs, and incubators invest in developing strategic consensus, cognitive trust, and team identification in NVTs to facilitate role structure formalization and avoid potential conflicts during this process. Finally, Paper 3 shows how founders can build role structures that incorporate both role clarity and task flexibility and thus respond better to the uncertain and dynamic conditions that usually characterize the entrepreneurship.

5.4 Limitations and Future research

All the papers included in this thesis contain a section about specific limitations and suggestions for future research. Therefore, in this section, I present the overarching limitations associated with the entire thesis. One limitation concerns the empirical data on which all three papers in this thesis are based. More precisely, the entire study has been conducted within the context of a particular venture creation program organized by a leading Norwegian University, drawing on longitudinal qualitative data from five cases (NVTs). This context renders the findings of this thesis less generalizable. Although the goal of qualitative studies is to obtain novel and interesting (and not necessarily generalizable) insights, the fact that the findings of this thesis may not be

directly transferable to other settings constitutes a considerable limitation. Another limitation concerns the characteristics of the participants (NVT members). Most of the NVTs in the specific venture creation program, and thus, most of the cases included in this thesis consist of young entrepreneurs with no or insignificant prior start-up experience. Despite the fact that some participants previously participated in venture creation, the majority of the participants engaged in entrepreneurship for the first time. This means that while all the participants intended to become entrepreneurs, some of them were not entirely sure they would end up as entrepreneurs as this was their first attempt to develop a business idea and create a venture. Naturally, these participants' (lack of) experience can affect the findings, for example, in terms of how committed some NVT members were or how well they could navigate the increased uncertainty and novelty that characterizes the entrepreneurship.

Finally, while this thesis examines how NVT members achieve effective teamwork in NVTs through the coordination of NVT members' competence, I encourage future studies to research—separately or in tandem—how the emotions and moods NVT members jointly develop influence the effectiveness of teamwork in NVTs. For instance, a fruitful direction for future research could be the examination of effective teamwork in NVTs through the development and use of collective affect (e.g., cohesion, trust, positive moods), as it may also play a significant role in the achievement of effective teamwork in NVTs (Brattström, 2019; Klotz et al., 2014). In fact, findings of this thesis support this notion, as properties like trust, shared sense of commitment, and team identification appear to play an important role in the coordination of the competence NVT members jointly possess—and subsequently—the development of effective teamwork in NVTs. Furthermore, this thesis centers on transactive memory systems (TMSs), a concept highly associated with utilization of NVT members' competence and effective teamwork in NVTs (Dai et al., 2016; Dai et al., 2017; Lazar et al., 2022). However, future research could investigate the role of other concepts related to the utilization of NVT members' competence (e.g., team shared mental models, team learning), as they may be equally significant to the

development of effective teamwork in NVTs (Bolzani et al., 2019; Chandler and Lyon, 2009). Finally, this thesis unpacks team processes and properties involved in the coordination of NVT members' competence, which is a crucial initial step in the development of effective teamwork (Brush et al., 2001; Salas et al., 2000). Future research could examine team processes and properties that contribute to the creation of collective knowledge in NVTs, which is a subsequent—yet utterly important—step in the development of effective teamwork and successful performance in NVTs (de Mol et al., 2015; West, 2007).

6 REFERENCES

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7 EMPIRICAL RESEARCH PAPERS

7.1 I. From groups to teams: A longitudinal study of mechanisms that enable the transition

Eleni Georgiadou, Raj Krishnan Shankar, Tommy Høyvarde Clausen

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II. Development of transactive memory systems in new venture teams

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Development of transactive memory systems in new venture teams

Eleni Georgiadou
Business School, Nord University, Norway

Marianne Terese Steinmo
Business School, Nord University, Norway

Thomas Lauvås
Nord University Business School, Norway

Abstract

This article examines how new venture teams (NVTs) develop transactive memory systems (TMSs) to integrate and coordinate their member's collective expertise. Applying a longitudinal case study of five Norwegian NVTs in their first year, we find that the development of TMSs in NVTs unfolds in three stages. At the pre-formation stage, NVTs undergo a TMS enabling process that includes member motivation, self-declaration and member expectations, which lead to initial specialisation in NVTs. Subsequently, at the formation and collaboration stages, NVTs proceed with TMS processes of encoding, storage and retrieval that encompass self-assessment, assessment of co-members, shared understanding, role formalisation, decision-making and task performance, which enhance specialisation and result in the gradual development of credibility and coordination in NVTs. Furthermore – through member motivation, trust and shared ownership – NVTs engage in a TMS-reinforcing process that helps NVTs to strengthen their TMSs over time, enabling them to increase their ability to integrate and coordinate NVT collective expertise.

Keywords

new venture teams, transactive memory systems, expertise utilisation

Introduction

Entrepreneurship research shows increased interest in the formation and performance of new venture teams (NVTs), as approximately 80% of all new ventures are team based (Kollmann

Corresponding author:
Eleni Georgiadou, Business School, Nord University, Post Box 1490, Bodo, NO-8049, Norway.
Email: eleni.georgiadou@nord.no

et al., 2016; Lechler, 2001). NVTs are described as a 'group of individuals that is chiefly responsible for the strategic decision-making and ongoing operations of a new venture' (Klotz et al., 2014, p. 227). The strength of an NVT lies in the immediate access to a broader and deeper set of knowledge and skills (henceforth expertise) that NVT members possess, which are utilised to found, develop and lead the new ventures (Shane, 2000; West, 2007). Particularly in the initial phase, the expertise resides within NVT members and not within the ventures themselves (Brush et al., 2001). Hence, the successful exploitation of entrepreneurial opportunities requires the integration and coordination of the complementary expertise of NVT members (Colombo and Grilli, 2005).

Prior research has identified transactive memory systems (TMSs) as the mechanisms that help to integrate and coordinate the expertise NVT members collectively possess (Dai et al., 2017; Lazar et al., 2022; Zheng, 2012). Described as systems for shared cognitive division of labour in teams (Wegner, 1987), TMSs emerge as team members learn about 'who knows what' in the team and begin to rely on each other's expertise in various complementary domains (Lee et al., 2014). By helping team members understand, trust and use each other's expertise, TMSs are found to improve a team's overall coordination (Ilgen et al., 2005), reduce cognitive load of redundant knowledge (Peltokorpi, 2008), enhance adaptation to novel tasks (Lewis et al., 2005) and advance the team's ability to perform complex tasks (Ren and Argote, 2011). Furthermore, prior research on TMSs in NVTs reveals that TMSs enable the effective integration of NVT member expertise (Zheng, 2012) and allow NVTs to respond better to unexpected events (Zheng and Mai, 2013). TMSs are also found to enhance new venture entrepreneurial orientation (Dai et al., 2016; Kollmann et al., 2020), improve ambidexterity (Dai et al., 2017), facilitate learning in NVTs and thus, lead to better entrepreneurial outcomes (El-Awad, 2019; Lazar et al., 2022).

Hence, from prior – mostly quantitative – research, we can identify the outcomes of teams that have developed TMSs, but we have a scarce understanding of how TMSs were actually developed. In fact, as far as we know, only Schmickl and Kieser (2008), Peltokorpi (2014) and El-Awad (2019) have taken a qualitative approach to examine TMSs, in which they applied single case studies. Consequently, there are limited insights into TMS processes and dynamics that lead to TMS outcomes as well as the processes that can promote the development of TMSs, especially in self-organising teams (Lewis and Herndon, 2011; Ren and Argote, 2011). Furthermore, most of the prior research has examined the effect of TMSs on more mature work teams (Lewis et al., 2005; Mell et al., 2014) and top management teams (Heavey and Simsek, 2015, 2017), inducing a need to explore the development of TMSs in newly formed teams that perform complex tasks (Peltokorpi, 2008; Ren and Argote, 2011).

The purpose of this article is to address these gaps through a qualitative, longitudinal case study of five technology-based NVTs established in a venture creation programme (VCP) at a Norwegian University, guided by the research question: *How are transactive memory systems developed in new venture teams?* We followed the NVTs for approximately one year, starting from the point of their formation. This unique setting provided us with insights into how TMSs emerge and evolve over time (Lewis and Herndon, 2011; Ren and Argote, 2011), revealing the processes through which TMSs are manifested in NVTs. Hence, our findings provide detailed evidence of the dynamic development of TMSs in NVTs, enhancing our understanding of how NVTs integrate and coordinate members' collective expertise. This article proceeds as follows. Section 2 contains the theoretical background that informs this study. Section 3 outlines the methodological approach used in the study while Section 4 describes the findings. Finally, we conclude this paper with a discussion of its contributions to the NVT and TMS literatures.

Theoretical background

Utilisation of collective expertise in NVTs

There are several terms to describe teams that establish new ventures, such as entrepreneurial teams, founding teams, start-up teams and NVTs (Vyakarnam et al., 1999; Watson et al., 1995). NVTs can be understood as 'groups of individuals that are chiefly responsible for the strategic decision-making and ongoing operations of the new ventures' (Klotz et al., 2014, p. 227). Being responsible for founding, developing and leading new ventures (Beckman et al., 2007), NVTs have a significant impact on their performance (Bolzani et al., 2019). Furthermore, NVTs often play a critical role in investor decisions and in the growth development of new ventures (Agarwal et al., 2016). As a result, NVTs tend to outperform solo entrepreneurs (Lechler, 2001; Stockley and Birley, 2000) due to their deeper and broader pool of expertise (Shane, 2000). Because NVT members are the main providers of a new venture's initial resources (Brush et al., 2001), the appropriate use of NVT member expertise is one of the determinants of effective performance by new ventures (Jin et al., 2017). However, a larger pool of expertise does not necessarily lead NVTs to a better performance, as a fruitful exploitation of entrepreneurial opportunities is highly dependent on the integration and coordination of complementary knowledge and skills (i.e. technological, marketing and managerial) distributed among different NVT members (Colombo and Grilli, 2005; Kollmann et al., 2020).

Indeed, an NVT's collective expertise can be less than the sum of individual expertise (Lam, 2000). For instance, teams are typically associated with better decision-making compared to decisions each team member would make individually (Hollingshead, 2001). Nevertheless, decisions made by teams are often worse than one would expect considering the sum of the individual knowledge and abilities of all members (Laughlin and Hollingshead, 1995). Unlike the performance of teams in large and mature firms, the performance of relatively small and new teams – like NVTs – is more directly linked to team member characteristics and interactions (Jin et al., 2017). This is especially true for technology-based new ventures (Ensley and Hmieleski, 2005) that exhibit a strong reliance on NVT member expertise, as technology-based new ventures are typically characterised by complex tasks that require the ability to rapidly manage a large amount of information (Zheng, 2012). Hence, such NVTs depend on the successful integration and coordination of the expertise that NVT members collectively possess (Bechky, 2006). This, in turn, requires the development of supportive coordination mechanisms (Brush et al., 2001) that can help members identify each other's expertise and assign tasks to the expert who will perform them best (Huang and Chen, 2018). However, creating such coordination mechanisms is not straightforward. All the above advocate the crucial role TMSs can play in the integration, coordination and – subsequently – utilisation of collective expertise in NVTs (Dai et al., 2017; Zheng, 2012).

Transactive memory systems

TMSs have received increased attention in research on teams and their performance (Peltokorpi, 2008; Ren and Argote, 2011). A widely used definition of TMSs describes them as shared systems that people in close relationships develop for encoding, storage and retrieval of knowledge about different substantive domains (Hollingshead, 1998; Wegner, 1987). Based on Wegner et al. (1985) notion that people may serve as external memory support to each other, TMSs emerge as individuals – motivated by problems that they cannot solve alone – search for help by contacting others and remember these contacts as well as their contributions in order to use them as possible sources in the future (Nebus, 2006). This way, TMSs enable team members to effectively use each other's

unique expertise. The primary preconditions for TMS development are the cognitive interdependence (Hollingshead, 2001) and face-to-face interactions (Lewis, 2004) of team members. Incorporating knowledge into team member interactions enables teams to transfer knowledge internally while hindering external knowledge transfer to competitors (Argote and Ingram, 2000). Indeed, TMSs do not reside within any individual but rather constitute a property of the team (Gibson, 2001). With interdependence and interactions as building blocks, TMSs are formed when team members accept responsibility for the encoding, storage and retrieval of knowledge related to their domain of expertise (Peltokorpi, 2008).

Consequently, TMSs are found to function through three 'transactive' processes: encoding, storage and retrieval (Wegner, 1987). (i) Encoding refers to the creation of a shared cognitive directory based on team members' awareness of 'who knows what' in the team. (ii) Storage refers to the allocation of knowledge to a team member based on the team member's awareness of his or her willingness and ability to store it. (iii) Retrieval refers to a team member's understanding of the location, accessibility, and value of knowledge and skills that another team member possesses (Borgatti and Cross, 2003). The use of the term 'transactive' during the description of these three processes underlines the interactive and dynamic nature of these systems.

To trace the presence of TMSs in teams, Lewis (2003) advocates that one should search for three specific elements that characterise well-developed TMSs: (i) specialisation (i.e. differentiated knowledge structures), (ii) credibility (i.e. team member perceptions regarding reliability of knowledge and skills that the other team members possess) and (iii) coordination (i.e. efficient use of team member knowledge and skills during the performance of tasks). Effective TMSs are associated with high levels of specialisation, credibility and coordination (Lewis, 2003) – and consequently – better utilisation of expertise among team members (Ren and Argote, 2011). As team members interact to perform various tasks (e.g. decision-making and problem-solving), they get the opportunity to validate each other's expertise, increasing the accuracy and consensus regarding 'who knows what' in the team (Austin, 2003). This leads team members to develop a more accurate and shared (similar) understanding of each other's expertise and its value (Lewis and Herndon, 2011), rendering expertise utilisation in teams more effective. Considering the benefits that scholars ascribe to TMSs, they might be particularly valuable to knowledge-intensive teams, like NVTs that aim at commercialising new technology. However, despite the potential importance of TMS theorising in a better understanding of expertise utilisation and the suggested benefits of conducting TMS research in NVTs (Ren and Argote, 2011), very few studies have examined TMSs in the context of NVTs.

Role of TMSs in the utilisation of expertise in NVTs

After forming the team, NVT members strive to overcome the lack of an accurate understanding of each other's expertise as well as their actual contribution to the new venture's performance. Through a better understanding of each other's expertise, NVT members can reduce overlaps in their expertise, providing NVTs with a greater diversity of task-related knowledge (Peltokorpi, 2008). However, since the relevant expertise held by each NVT member, as well as fit to the tasks, may not be directly observable, the members depend on any available characteristics to initiate the allocation of roles and responsibilities in NVTs (Jung et al., 2017). Such role allocation can lead to a poor use of each NVT member's expertise – both current and future – considering the imprinting effect that the initial allocation of roles can have on the new venture's subsequent design (Bryant, 2014). As such, TMSs enable a more accurate delegation of tasks in NVTs, aligning NVT member competences or expertise with the appropriate roles and responsibilities and thus, increase overall efficiency (Zheng, 2012).

Moreover, TMSs are particularly relevant to NVTs, as these teams tend to perform complex tasks that involve the integration and coordination of a considerably large amount of information (Dai et al., 2017; Zheng, 2012). By developing a shared awareness of expertise, TMSs decrease the cognitive load and redundant knowledge in teams (Peltokorpi, 2008). Ren et al. (2006) demonstrated that TMSs are more beneficial in teams with dynamic environments that are characterised by rapid data changes, where knowledge quickly becomes obsolete. Furthermore, TMSs have been shown to improve a team's adaptation to new tasks (Lewis et al., 2005) and foster the creation of new knowledge in teams (Mitchell and Nicholas, 2006). As a result, TMSs facilitate the utilisation of collective expertise of team members providing teams with a broader and deeper knowledge pool.

Another reason TMSs are important to the utilisation of expertise in NVTs is their ability to discourage the acquisition of external knowledge while fostering improvisation in response to unexpected events and negative surprises (Zheng and Mai, 2013) that NVTs often encounter. In addition, research shows that TMSs can increase a new venture's entrepreneurial orientation (Dai et al., 2016; Kollmann et al., 2020) and enhance ambidexterity (Dai et al., 2017), supporting NVTs during the discovery, evaluation and exploitation of entrepreneurial opportunities (Kollmann et al., 2020). Finally, TMSs help NVTs develop learning systems that can result in superior performance (El-Awad, 2019; Lazar et al., 2022). More precisely, El-Awad (2019) demonstrates how TMSs enable individual experience to become gradually embedded in organisational routines, fostering multilevel entrepreneurial learning in new ventures. Moreover, Lazar et al. (2022) suggest that by promoting coordination among NVT members with diverse expertise, TMSs facilitate the development of effective learning repertoires and thus, lead to better performance at an early stage. All these studies indicate that well-established TMSs may become the mechanisms that NVTs employ to enact optimal use of each NVT member's unique expertise and – subsequently – achieve better entrepreneurial outcomes. However, as the exact processes that guide the development of TMSs in newly formed teams that perform complex tasks (such as NVTs) remain poorly understood (Peltokorpi, 2008; Ren and Argote, 2011), we present the main insights from prior TMS literature regarding the antecedents and the development of TMSs in other types of teams (primarily work teams).

Antecedents and development of TMSs

According to the TMS literature, the development of TMSs starts when team members gain some knowledge about the expertise of their co-members (Lewis and Herndon, 2011). This is mainly achieved through communication over time and allows team members to evaluate the quality, value and accessibility of knowledge and skills of their co-members (Hollingshead and Brandon, 2003; Kanawattanachai and Yoo, 2007; Lewis, 2004; Su, 2012). Communication is recognised as a critical part of the encoding, storage and retrieval of knowledge in TMSs, especially as new knowledge emerges and areas of expertise are reassigned (Tang et al., 2015). Indeed, communication sets the stage for the establishment of an accurate and shared understanding of each member's expertise, facilitating the development of TMSs (Peltokorpi and Hood, 2019). Several studies (Lewis, 2004; Liang et al., 1995; Moreland and Myaskovsky, 2000; Moreland et al., 1996) focus specifically on face-to-face communication, highlighting the fact that apart from facilitating the development of TMSs, face-to-face communication enhances subsequent knowledge retrieval.

In addition to communication, scholars have identified other aspects that can promote the development of TMSs in teams. Prichard and Ashleigh (2007) show that training in problem-solving, interpersonal relationships, goal-setting and role allocation – provided by team leaders or managers – helps teams develop TMSs. Training allows members to form more accurate perceptions of a team's collective expertise, leading to more effective TMSs (Moreland et al., 1998). Other studies

have indicated that team member familiarity and interpersonal trust are positively related to the development of TMSs (Akgün et al., 2005; Lewis, 2004). Furthermore, team characteristics such as task interdependence, cooperative goal interdependence and support for innovation are also associated with strong presence of TMSs in teams (Zhang et al., 2007).

Overall, prior TMS literature indicates that TMSs can emerge in any team where members have some knowledge about each other's expertise. This knowledge can be based on prior shared teamwork experience (if any), perceptions, expectations or the available explicit information (Ren and Argote, 2011). Perceptions and expectations are typically reflected in role identification behaviours (i.e. team members request information about a co-member's role or responsibilities and provide information about their own roles or responsibilities) that can promote the initial development of TMSs (Pearsall et al., 2010). However, such initial TMSs can be inaccurate, leading team members to gradual refinements based on ongoing communication and performance feedback (Brandon and Hollingshead, 2004). Indeed, teams that are characterised by trivial interactions and weak interdependence among their members are likely to develop less accurate and less shared (similar) understanding of each other's expertise – and thus – less effective TMSs (Barnier et al., 2018). As a result, the development of TMSs seems to depend on the quality and quantity of member interactions, which are likely to change over time. Furthermore, as Rico, Sánchez-Manzanares et al. (2008) note, TMSs do not solely reflect the static distributed knowledge about each member's expertise but also incorporate processes like directory update and knowledge retrieval. All the above advocate the dynamic development of TMSs in teams (Brandon and Hollingshead, 2004; Lewis and Herndon, 2011; Ren and Argote, 2011).

In summary, our review illustrates that NVTs are highly dependent on the integration and coordination of the expertise that their members collectively possess. TMSs, in turn, can facilitate the integration and coordination of collective expertise, leading to its utilisation. However, the TMS literature has mainly touched upon the antecedents of TMSs and their development in more mature work teams. As a result, there is still a lack of in-depth understanding of the emergence of TMSs in newly formed teams that perform complex tasks as well as their dynamic development over time (Lewis and Herndon, 2011; Ren and Argote, 2011), especially since most of the existing TMS studies have been conducted in controlled settings (Peltokorpi, 2008). To address these calls, we pursued a longitudinal multiple case study to explore how NVTs develop TMSs to utilise the collective expertise of NVT members.

Methodology

Research design

To examine the development of TMSs in NVTs, we applied an inductive, qualitative case study approach, tracing five NVTs for approximately one year. This research design was selected to provide an in-depth understanding of the rather unexplored phenomenon (Yin, 2013) of TMSs in NVTs, given that – to the best of our knowledge – few qualitative studies have been conducted on TMSs in general (notable exceptions are Schmickl and Kieser (2008), Peltokorpi (2014) and El-Awad (2019)). The longitudinal design was applied to obtain nuance regarding the dynamic and processual development of TMSs (Lewis and Herndon, 2011; Ren and Argote, 2011), as fine-grained qualitative process data are particularly important for demonstrating how and why phenomena emerge, evolve or terminate over time (Langley, 1999). To utilise this research design, we focused on the passage of time and its effects on TMS development, as we observed the sequence of events and activities that unfolded in the NVTs throughout the period of their first year.

Research setting and case selection

To build a theory on TMSs, we used theoretical sampling in the case selection process (Eisenhardt and Graebner, 2007). This implies that the cases were selected based on their theoretical appropriateness for this study, which is to extend the theoretical concept (Eisenhardt, 1989) of TMS. The cases (i.e. NVTs) were selected from the School of Entrepreneurship organised by the Norwegian University of Science and Technology (NTNU), an ambitious two-year VCP at the master level, in which students start new ventures as a part of their education (Entreprenorskolen, 2022; Sørheim et al., 2021). The VCP is located in Trondheim, Norway, with the vision of educating the best business developers in the world; the slogan is 'Not because it is easy' (Entreprenorskolen, 2022). The programme is highly competitive and receives hundreds of applicants, only accepting around 35 students yearly (30–40% females), based on academic results, work experience and interviews regarding their motivation to join the VCP. The background of the VCP participants is approximately 50% from engineering, 35% from social sciences and the remaining from other subject areas in the sciences (Sørheim et al., 2021). This renders the programme particularly suitable for studying the development of TMSs in NVTs formed by members with diverse expertise.

Similar to an early-stage incubator, the programme provides its participants with access to critical infrastructure and resources, such as its own pre-incubator (Sørheim et al., 2021). We chose this VCP because of the possibility of studying the teams from the point of their formation as well as the emphasis on the development of real ventures. In fact, 82 ventures that were created in the time span between 2005 and 2017 had a collective revenue of approximately $60 million in 2017. Furthermore, around 50% of the students work in their own ventures after their graduation (Sørheim et al., 2021). Another important criterion for selecting the programme was the faculty's lack of intervention during NVT formation and their subsequent teamwork, as the faculty writes:

> NSE [NTNU School of Entrepreneurship] students spend the first semester searching for and evaluating [five] business opportunities and ideas. At the end of the first semester, students self-group into teams and develop a new venture based on one of the ideas they have evaluated (Sørheim et al., 2021, p. 273).

It is also possible for the participants to develop their business ideas as solo entrepreneurs. Moreover, both participants and faculty members of the programme stated in interviews that, whenever participants requested it, the faculty provided informal advice that resembled the advice founders receive from mentorship programmes and business incubators during the process of venture creation. Selecting the cases from this programme offered us the particularly rare – yet valuable in process studies – opportunity to follow NVTs from the precise moment of their formation (Davidsson and Gruenhagen, 2020).

In a particular year between 2016 and 2020, we asked permission to study the 10 newly formed NVTs in this VCP. Because none of the authors were faculty members, the teams could decide freely if they wanted to participate, mitigating potentially biased answers. Five teams granted us access and agreed that we would follow them over time. Although there is no ideal number of cases, five is deemed to be within the range that works well in building theory from multiple cases (Eisenhardt, 1989). Table 1 contains information about the five NVTs and their members' characteristics.

Data collection

In line with qualitative inquiries, we relied on semi-structured interviews as the main source of data. Following the suggestion of Ren and Argote (2011), we started collecting data from the moment

Table 1. NVTs and member characteristics.

Team	Industry	Technology-based product/service	Member	Education	Work experience	Prior start-up experience	Prior teamwork experience with co-members
Blue	Healthcare	Product	B1 (female)	BSc in Political Science	Assistant nurse, employee in supermarket	None	Has worked with B2 & B3 during programme activities
			B2 (female)	BSc in Social Science	Employee in a playground, waitress, football coach, voluntary work	Co-founded a 'youth enterprise' scheme before	Has worked with B1 during programme activities
			B3 (female)	BSc in Marine Engineering	Voluntary work	None Owner of business idea	Has worked with B1 during programme activities
Green	Fitness	Service	G1 (female)	Nursing studies	Employee in nursing home, employee in clothing store, voluntary work	None	Has worked with G2 during programme activities
			G2 (female)	BSc in Economics Psychology Studies (one year)	Employee in bank, employee in airline company, supply teacher, cashier, cleaner	None Owner of business idea	Has worked with G1 & G3 during programme activities
			G3 (female)	BSc in Economics	Employee in bank, accountant, waitress, band teacher	None	Has worked with G2 during programme activities
Red	Food production	Product	R1 (male)	BSc in Technology Design and Management	Employee in stores & warehouses, voluntary work	None	Has worked with R2 during programme activities
			R2 (male)	MSc in Molecular Genetics	Employee in biotechnology firm, voluntary work	None	Has worked with R1 during programme activities
			R3 (male)	BSc in Food Production Technology	Newspaper distributor, volunteer on aquaponics farm	None Owner of business idea	Has not worked with co-members during programme activities
White	Entertainment	Product	W1 (female)	Art studies	Employee in theatre, employee in shops, cleaner, voluntary work	None	Has worked with W2 & W3 during programme activities

(Continued)

Table 1. (Continued)

Team	Industry	Technology-based product/service	Member	Education	Work experience	Prior start-up experience	Prior teamwork experience with co-members
			W2 (male)	BSc in Business Administration	Employee in supermarket, volunteer in elementary school for troubled children	Founded a new venture before (currently holds CEO position) Owner of business idea	Has worked with W1 & W3 during programme activities
			W3 (female)	BSc in Economics	Employee in insurance company, voluntary work	None	Has worked with W1 & W2 during programme activities
Yellow	Information technology	Service	Y1 (female)	MSc in Industrial Chemistry and Biotechnology	Voluntary work	Co-founded two new ventures before	Has worked with Y2, Y3 & Y4 during programme activities
			Y2 (male)	BSc in Film Production	Host in local radio station, trainee in Norwegian Broadcasting Corporation, radio and TV journalist	None Owner of business idea	Has worked with Y1 during programme activities
			Y3 (male)	BSc in Logistics Engineering, secondary school specialisation in building & construction	Carpenter	None	Has worked with Y1 & Y4 during programme activities
			Y4 (male)	BSc in Economics Psychology Studies	Consultant	Co-founded two new ventures before (currently involved in one of them)	Has worked with Y1 & Y3 during programme activities

NCT: new venture team.

NVTs were formed in order to trace the process of TMS development in newly formed teams. The primary data source consists of 52 in-depth – individual and group – interviews conducted with members of five NVTs over three data collection rounds, which took place during the NVTs' first year of operation (see Table 2). In addition, secondary data were collected, which consisted of the curricula vitae (CVs) of the NVT members, their motivation letters, reports of an NVT member's individual and group experiences and reflections on teamwork in their NVTs, and new venture business plans.

The first data collection round took place immediately after the participants had selected co-members and formed the NVTs, shedding light on co-members' expectations of each other's contributions and their first joint activities. The interview template started with questions about the participant's background (e.g. educational and functional background, prior start-up experience). Next, we asked the participants to describe the concept of their business idea and explain the reasons they decided to commercialise this business idea with the specific team members. The main focus at this point was to uncover the participants' expectations and perceptions.[1]

The second and third data collection rounds took place 5 and 12 months after the formation of the NVTs, respectively. The interviews covered the same themes to enable us to trace changes in the content of the processes of NVT members, revealing potential nuances. The interview protocol focused on the experiences, thoughts and feelings generated by the co-members in their attempt to develop their business idea. The participants described how they experienced communication, decision-making, role division and coordination in their team. They were also asked whether they had faced any challenges, disagreements or conflicts in relation to task performance or collaboration with their co-members and how they were handled. Furthermore, they were asked to identify and explain the current strengths and weaknesses of their NVT and to describe its present and future activities.

Table 2. Overview of primary and secondary data collected with timelines.

Primary data	Team Blue	Team Green	Team Red	Team White	Team Yellow	Total interviews
1st month of operation						
Individual interviews	2	3	3	3	–	11
Group interviews	1	1	1	1	–	4
5th month of operation						
Individual interviews	2	3	3	3	4	15
Group interviews	1	1	1	1	1	5
12th month of operation						
Individual interviews	3	3	3	3	3	15
Group interviews	–	1	–	1	–	2
Secondary data	Team members' CVs					
	Team members' motivation letters to join the programme and become entrepreneurs					
	Reports of team members' individual and group experiences and reflections on teamwork in their new venture teams					
	New venture teams' business plans					

Data analysis

When analysing the collected data, we combined an inductive approach and a temporal bracketing strategy to achieve deeper and more accurate results in this process study (Langley, 1999). Due to a lack of prior studies on TMS development in NVTs, we relied on an inductive approach to develop theory based on deep and rich descriptions of the five NVTs (Gioia et al., 2013). Temporal bracketing, on the other hand, enabled us to capture the essence of the timely processes by which TMSs unfold in NVTs (Langley, 1999). Using both approaches in the same study allowed us to increase the strength that the combination of inductive data analysis and temporal bracketing can introduce to the longitudinal exploration of process-oriented phenomenon (Langley, 1999) of TMSs' development processes, which are explained in more detail in the next two sections.

Inductive approach to coding the data

First, we studied the transcribed individual and group interviews as well as the notes we made during data collection. Afterwards, we reviewed and organised the obtained secondary data. Next, following Langley (1999), who advocates the use of rich descriptions to identify distinct processes that can be analysed and compared in depth, we constructed summaries of the five cases. These narrative accounts enabled a systematic comparison of these five cases regarding the processes that informed the development of TMSs in NVTs.

During this process, we paid particular attention to the passage of time and the changes it introduced to the development of TMSs. The examination of these summaries revealed the presence of specific features as well as the enactment of the processes that facilitate the emergence and subsequent evolution of TMSs in NVTs. Despite the differences in the content, we noticed that all cases undergo the same processes while developing TMSs, namely self-declaration, self-assessment, assessment of co-members, role formalisation, decision-making and task performance. Furthermore, we observed that some features (members' motivation, trust and shared ownership) – developed during NVT members' interaction over time – can reinforce the development of TMSs in NVTs.

Considering the richness of data, the qualitative analysis software NVivo 12 was applied to facilitate the coding process. We coded all the concepts that emerged, using labels that expressed the participants' own words as accurately as possible (Gioia et al., 2013). Grouping participant quotes (see Tables 3 and 4), we created first-order codes. Next, we categorised and labelled these codes to develop second-order themes, which uncovered various NVT member activities (e.g. assessment of co-member's expertise, decision-making). Finally, we merged second-order themes to arrive at aggregate dimensions. At this stage, the connection between our aggregate dimensions and TMS processes (e.g. TMS encoding, TMS storage) emerged.

We paid specific attention to the sequence in which processes emerged, as well as the differentiation in their content, not only across cases but also across different periods of time (Langley, 1999). This way, we tried to incorporate the passage of time into the study. At this point, we focused on integrating our own interpretations of the findings with the terms that exist in TMS and team literatures, connecting them to prior TMS and team research. The identified processes as well as the observed across cases and time content differences were organised into a meaningful – generated from the data – whole, presented in our process model (Figure 1). To organise and illustrate the longitudinal findings in a more comprehensive manner, we combined the inductive approach with temporal bracketing, which is discussed below.

Temporal bracketing approach to exploring changes over time

Despite the need to study TMSs throughout the life cycle of teamwork (Lewis and Herndon, 2011), TMS literature is still characterised by a lack of process studies (Ren and Argote, 2011), overlooking the importance of temporality in the development of TMSs. Addressing the need to approach TMSs as dynamic systems that can change significantly over time, we applied temporal bracketing to make sense of the coded data. Our first step was to organise the large amount of data into distinct – while at the same time – closely related chunks of data. We decomposed the data into three time periods, which corresponded to three rounds of data collection. This enabled us to monitor more accurately how the five NVTs developed TMSs throughout the period of one year by arranging the rich descriptions of processes, events and participant experiences in a more systematic way. Finally, the construction of three distinct timelines enabled the creation of comparative units of analysis, which enhanced the exploration and replication of the generated insights (Langley, 1999). Thus, temporal bracketing helped us make better sense of the detailed longitudinal data, demonstrating the changes – across cases and time – in the content of the identified processes and showing the extent of TMS dynamics.

Findings

Our findings reveal patterns of how NVTs develop TMSs over time, which, in turn, leads to the integration and coordination of NVT members' collective expertise. First, our data confirm that to efficiently use each other's expertise, NVT members engage in transactive processes that involve encoding, storage and retrieval of knowledge related to member expertise (Borgatti and Cross, 2003; Wegner, 1987). Second, and more importantly, we demonstrate how these TMS processes unfold in NVTs – and subsequently – how NVTs develop TMS indicators of specialisation, credibility and coordination (Lewis, 2003) during three stages: (i) pre-formation stage (when NVTs are just formed); (ii) formation stage (when NVTs begin to develop their business idea) and (iii) collaboration stage (when NVTs further advance their business idea). Our findings are outlined in Figure 1 and presented in more detail below.

Pre-formation stage – TMS enabling process

Immediately after the formation of the NVT (see Figure 1), members introduce each other to their expertise, initiating the development of TMSs and thus, laying the foundation for expertise utilisation in NVTs. At this stage of TMS pre-formation, NVT members declare their own expertise motivated by their desire to contribute to the development of NVT's business idea. Lacking an accurate understanding of each other's expertise and how this expertise can contribute to the development of a vague – at this point – business idea, NVT members rely on their expectations regarding each member's expertise and its contribution. Thus, at the pre-formation stage, we observe the emergence of initial specialisation (one of the TMS indicators, according to Lewis (2003)). However, this specialisation is based on NVT member expectations rather than knowledge about each member's expertise and its role in the development of NVT's business idea (see Table 3).

Member motivation to contribute to business idea development. The analysis of NVT member interviews and motivation letters indicates that – at the pre-formation stage – motivation guides the process of self-declaration in NVTs. Driven by a strong desire to develop their business idea and establish a successful new venture, NVT members eagerly discuss their expertise and its potential contribution. Furthermore, NVT members often choose to extend their contribution beyond what is traditionally regarded as professional expertise. B1 notes: '*I am a person who likes to have things in order. This can be important to our business idea, as we are in an industry*

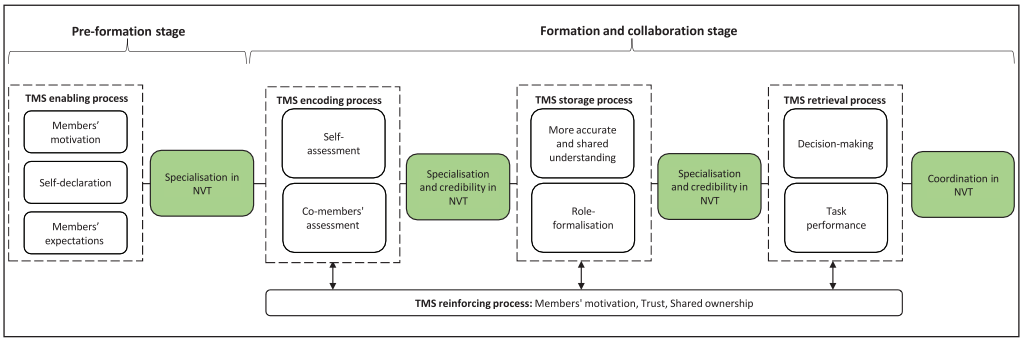

Figure 1. Process model on the development of TMSs in new venture teams.
TMSs: transactive memory systems.

Table 3. Pre-formation stage quotes.

	Pre-formation stage: Illustrative quotes
	TMS enabling process
Members' motivation	'*It is very important to us that everyone wants this 100% and is motivated to work on it [business idea]. Because if we are going to develop this idea together and start a new venture, we need to put a lot of work into it*'. (G2)
	'*I think all of us – well, at least I – really mean it when we say that we will do something, it will be done*'. (W3)
	'*Our diversity and the dynamic chemistry between us are great advantages. I feel like we will all work on achieving something great together*'. (R3)
Self-declaration	'*I think I am pretty good at having discussions, being fair, making good decisions and helping others to get to good decisions*'. (R1)
	'*I have a background in food science and food production. And I always have been a kind of inventor, interested in robotics and programming*'. (R3)
	'*I have been writing business plans and applications and been in negotiating meetings with important people. I have been there before. So, I can contribute with that*'. (B2)
	'*I can contribute with marketing and branding. That's what I really like best. Building the concept, designing and being creative*'. (G3)
Members' expectations	'*I think G3 is very good at branding. (. . .) She has done a lot of those things in the past, and that is very important for our case*'. (G2)
	'*I think that G3 is very good at design. And it is quite important in our sector, as we are building the brand*'. (G1)
	'*R1 is very good at human relations. He is a kind of instigator, the person who brings people together and motivates them. (. . .) I also think that R1, who has some technical skills, can work on computer modelling*'. (R3)

[healthcare] that requires a lot of documentation. So, I think I am going to get many of the administrative tasks'. As a result, NVT members declare their own expertise and undertake an initial specialisation – based at this stage on their expectations – creating a collaborative atmosphere and building the foundation for the development of TMSs in NVTs: '*I feel we are honest about our expertise. We have faith that each of us will put the effort and knowledge that is required to make this business idea work*'. (B3)

Self-declaration of expertise. We find that self-declaration enables the emergence of TMSs in NVTs, allowing NVT members to develop initial specialisation at the pre-formation stage. R2 states: '*I have a very strong technical background. Now at the start, I will probably contribute most with technical aspects*'. Interestingly, the analysis of NVT members' interviews and CVs shows that NVT members are willing to mobilise any of their skills or personality traits that may help in the development of NVT's business idea. In other words, NVT member specialisation does not rely strictly on their professional knowledge and skills: '*Our business idea is very like that "go to market" so we will have to talk a lot with customers and users from the beginning. (. . .) I think my biggest contribution is that I am very happy to talk to people*'. (G1) Thus, our findings identify self-declaration as the process that initiates the formation of distinct areas of expertise among NVT members, enabling the emergence of TMSs in NVTs.

Member's expectations of expertise. One of the first issues that NVT members discuss immediately after NVT's formation is the use of each member's expertise, unfolding the expectations regarding their own as well as a co-member's contribution to NVT's business idea development. Lacking prior shared teamwork experience related to the development of NVT's business idea, the statements of each NVT member seem to be the most solid criterion for judging 'who is an expert on what'. As stated by B3: '*I have technical background, so I am looking forward to start working on the technical part. (. . .) It is nice to get that freedom from your co-members. They see the importance of what I do*'. Hence, prior to obtaining personal observations of a member's competence, NVT members tend to rely on each other's statements about one's own expertise – supported by education and prior work experience – as well as the motivation to succeed as entrepreneurs. In sum, at the pre-formation stage, NVT members declare their own expertise to each other and obtain an initial expectation-based specialisation, which enables the development of TMSs in NVTs (see Figure 1).

Formation and collaboration stages – TMS processes of encoding, storage and retrieval

After developing the initial specialisation at the pre-formation stage, the NVTs enter the stages of formation (approximately five months after NVT formation), where they begin to develop their business ideas – and subsequently – collaboration (approximately 12 months after the NVT's formation), where they further advance their business ideas. As NVT members collectively work on the development of their business idea, the TMS processes of encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987) gradually unfold.

At the formation stage, we observe that the self-assessment and assessment of co-members by NVT members replaces self-declaration. Working together on the development of NVT's business idea allows members to form a better understanding and recognition of each other's expertise, triggering TMS encoding. At this point, NVT members re-examine and – whenever necessary – readjust the initial specialisation, establishing specialisation that relies on performance rather than expectations. Moreover, the formation stage introduces the gradual development of credibility in each other's expertise.[2] As NVT members form a more accurate and shared understanding and recognition of each other's expertise, their knowledge regarding 'who is an expert on what' in NVT is gradually incorporated into NVT's role structure through the process of role formalisation. Role formalisation enables NVT members to allocate knowledge related to each other's expertise more efficiently and, as such, reflects TMS storage. Finally, TMS retrieval is manifested in decision-making and task performance, as these processes allow NVT members to use their unique expertise during NVT's business idea development. At this point, NVTs improve significantly their

coordination. In sum, at the formation stage, NVTs engage in TMS encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987) and begin to develop TMSs, exhibiting considerable levels of specialisation, credibility and coordination (Lewis, 2003).

Subsequently, the NVTs enter the collaboration stage. At this stage, TMS encoding, storage and retrieval are manifested in the same processes: self-assessment, assessment of co-members, role formalisation, decision-making and task performance. Nevertheless, the collaboration stage is characterised by a further improvement of NVT understanding of each other's expertise – and therefore – its better utilisation. As a result, specialisation and credibility become stronger, while coordination is more evident at the collaboration stage. Furthermore, our data indicate that motivation, trust and shared ownership facilitate the development of TMSs in NVTs (see Figure 1 and Table 4).

TMS encoding process through self-assessment and assessment of co-members. We observe that NVTs begin to engage in TMS encoding at the stage of formation and continue at the stage of collaboration. TMS encoding is reflected in NVTs through self-assessment and assessment of co-members, whereby NVT members develop a better understanding of 'who is an expert on what' in the NVT. This, in turn, leads to the refinement of the initial specialisation (developed at the pre-formation stage) as well as the gradual emergence of credibility in NVTs.

Self-assessment of expertise. After having exercised their actual expertise for some time, NVT members re-examine their own competence, aligning their expertise with NVT's needs. At the formation stage, expertise is no longer based on expectations but rather on observations and reflections about the value of their expertise: '*When it comes to interaction with customers, I believe I am the right person. When W2 and W3 try to contact our customers, they usually do not get any replies, while I get them almost straight away*'. (W1) In some NVTs, even during the stage of collaboration, the members continuously re-evaluate whether their professional knowledge, social skills, or personality traits are sufficient to accomplish the undertaken tasks or whether they should alter their specialisation: '*I realised that my strength is neither at the finances nor at the technology side. My strength is at interacting with our customers and getting feedback from them*'. (W1)

Assessment of co-member expertise. Having worked together on the development of NVT's business idea for several months, NVT members gradually gain a better understanding of each other's expertise, forming their own judgement about 'who is an expert on what' instead of relying on the statements of the member himself: '*I trust my co-members' expertise more and more. It was more difficult at the beginning. Now we are more certain about what each of us is good at*'. (R2) At the collaboration stage, in some NVTs, NVT members continue re-examining whether each NVT member's expertise is properly utilised. W3 states: '*W1 had to learn a lot of technical stuff, when she is so good at customer interaction. None of us saw that she was so incorrectly used, but then it became clear*'. Therefore, our findings indicate that the processes of self-assessment and assessment of co-members refine the initial specialisation (developed at the pre-formation stage) and enable the gradual development of credibility in NVTs.

TMS storage process through role formalisation. Furthermore, our findings show that, in NVTs, TMS storage manifests in role formalisation. Guided by a more accurate and shared understanding and recognition of each other's expertise, NVT members initiate role formalisation that incorporates this improved understanding of 'who is an expert on what' in the NVT.

More accurate and shared understanding of each other's expertise. Jointly working on the development of NVT's business idea, NVT members continuously improve their understanding of each

Table 4. Formation and collaboration stages quotes.

		Formation stage: Illustrative quotes from interviews and extracts from reports	Collaboration stage: Illustrative quotes from interviews and extracts from reports
TMS encoding process	Self-assessment	'*I am good at handling meetings, negotiating, and saying the right things. Often, when our partners are sceptical or ask a critical question, I can give a good answer. That is also the feedback I receive from my co-members*'. (G2)	'*I really think it works better now that I am writing applications, managing our finances and working on parts related to economics and planning*'. (G2)
		'*I am good at seeing the whole picture and making sure that everything is moving towards the same direction (. . .) And I am also good at business models*'. (W3)	'*I like having the leadership role. I think I have a more realistic picture of time and resources required to develop our business idea. And I am good at taking things down to the ground and making them more concrete*'. (Y1)
		'*I am clearly a technical person who works on product development. It is very clear that I take responsibility for this part*'. (R3)	'*I know this programme* (names the specific programme) *from before, so I can help with prototyping. In addition, I have knowledge about marketing, also from before. And then, I have 'people skills', which are also an important contribution to the team*'. (R1)
	Assessment of co-members	'*I think W1 is going to thrive in her role because she is so competent at talking to people and understanding what they are saying. Not just hearing the words they say, but truly listening to their thoughts and feelings and putting herself in their shoes. And she does this on a completely different level compared to me and W2*'. (W3)	'*It is amazing that W1 works only with customer interaction because she is so good at it*'. (W2)
		'*Y2 is very creative and has taught me a lot about content creation and market contact*'. (Y3)	'*G3 is better at leading because she has a slightly better overview of the team. Instead of focusing only on her tasks, she sees the team as a whole*'. (G1)
		'*We have decided that every time we assess each other, we should also try to say something positive to each other. (. . .) We want to be generous with each other's strengths, encourage each other's development and efforts*'. *(Report Team Green)*	'*Gradually, we have realised the value of daring to give each other feedback that potentially can be experienced as painful, but which is vital to discuss in order to achieve constructive collaboration*'. (Report Team White)

(Continued)

Table 4. (Continued)

		Formation stage: Illustrative quotes from interviews and extracts from reports	Collaboration stage: Illustrative quotes from interviews and extracts from reports
TMS storage process	More accurate and shared understanding	'*I think we need to get to know each other better and learn how each of us works. Then, working routines will be developed more organically*'. (R2)	'*We realised that we are good at the same things. Therefore, it became difficult to delegate responsibilities, difficult for someone to direct or have authority without having three co-members asking questions and preferring to do things differently*'. (Y2)
		'*We distribute the responsibilities, but very often another person becomes responsible. For some strange reason, we suddenly switch responsibilities along the way*'. (Y1)	'*Later, we realised that our team consisted of four managers. This is totally unacceptable*'. (Y4)
		'*I think it's very important that everyone has a very good insight into what everyone is doing. (. . .) We need some focus areas. If not, it could soon be that no one will know what responsibility he has for anything*'. (G1)	'*Despite of being seemingly a homogeneous team that consists of members with roughly similar backgrounds, we have experienced that each of us is competent at his own field*'. (Report Team Green)
	Role formalisation	'*Now we all decided that W1 will be dedicated to the thing she is really good at. I believe we will benefit a lot from her knowledge about the customers*'. (W3)	'*We talked about it and agreed that she should return to being a customer interaction expert. (. . .) Because, otherwise, it's such a bad use of her time. So, she has gone from having also technical responsibility to not having product responsibility at all*'. (W3)
		'*One starts by saying that he will do this and that, but afterwards, he finds the most suitable role*'. (G1)	'*Now we know the importance of delegating clear responsibilities to all the members of the team. Everyone cannot work on everything because it will result in poor use of our resources and time*'. (Report Team Blue)
		'*We originally allocated roles based on the short-term focus, without considering future tasks like funding, recruitment, investors relations. Since the roles have been very general, it has been difficult for us develop a great sense of responsibility for our own tasks. (. . .) We have realised now that this negatively affected our efficiency and the progress of our business idea*'. (Report Team Blue)	'*Deciding jointly who is suitable for which task, and who should take the leadership role has often resulted in discussions that "went in circles" and never led to a definitive answer*'. (Report Team Red)

(Continued)

Table 4. (Continued)

		Formation stage: Illustrative quotes from interviews and extracts from reports	Collaboration stage: Illustrative quotes from interviews and extracts from reports
TMS retrieval process	Decision-making	'*Sometimes it seems that our decisions are based on R3's gut feeling, and not based on a good research and discussion among us*'. (R2)	'*Now we must make a big overall decision for the company, so we will all get involved. We try not to keep anything hidden, making sure that everything is open to everyone*'. (W2)
		'*Product developer [R3-business idea owner] does not want to spend time on market research at all. He understands that it is important but believes that then we will lose time with product development. (. . .) He just wants to develop the product. It is very difficult for me [as someone responsible for marketing] to give my input*'. (R1)	'*I feel that we* [she, G2 and G3] *have a very good way of communicating. We can disagree a lot, but we are respectful towards each other*'. (G1)
		'*We have been discussing how to navigate potential disagreements on major decisions. There has been a common consensus that, when it comes to strategic decisions, the majority decides, and that it should be okay not to agree on everything every time*'. (Report Team White)	'*When R2 left the team, R3 found it liberating because he could now avoid many disagreements between him and R2. At the same time, R3 thinks it was a shame to lose the potential contribution of R2*'. (Report Team Red)
	Task performance	'*We need better routines to follow up what each of us has done within the week. We should get that to see the progress*'. (Y1)	'*Everyone is responsible for their own thing*'. (W2)
		'*We are a dynamic team because we constantly re-examine how we work*'. (W3)	'*All the pieces must correlate, and we must coordinate our work with each other. It's a bit challenging, but also a lot of fun*'. (G3)
		'*We have realised that we may not have been as efficient and organised. One of the reasons for that is that we like to work on the same thing. Not in the sense that we do the same task, but that we all work on the same type of tasks*'. (Report Team Blue)	'*It becomes clear that we have different expectations about the amount of time we work, our priorities, and the division of labour (. . .) We finally agree that tasks will be divided more clearly, and that everyone will get more freedom to decide where and for how long he will work on his tasks*'. (Report Team Green)

(Continued)

Table 4. (Continued)

		Formation stage: Illustrative quotes from interviews and extracts from reports	Collaboration stage: Illustrative quotes from interviews and extracts from reports
TMS reinforcing process	Members' motivation	'*Very often, I feel really happy when I have been in these meetings with partners, and I have managed to convince them to sign the agreement*'. (G2)	'*I believe that we now work more in a way that gives everyone an incentive to make things work, and everyone is motivated because he understands things in every aspect*'. (W3)
		'*The most important thing about my tasks is that I like talking to people. And I like our customer group so incredibly much*'. (W1)	'*I have always been very motivated to work on this business idea, but it has been really difficult to find my place in the team*'. (R1)
		'*All three of us are dedicated to developing this business idea because it is linked to* [area]'. (Report Team Blue)	'*We all agree that we become more motivated to work even harder when we can see how efficient we are and how well our new venture is progressing*'. (Report Team Green)
	Trust	'*I think trust is at the bottom of a lot of what we do*'. (W2)	'*You can ask W1 about it* [refers to workshops with customers], *because she handles the whole process. We've discussed it a little bit, but we trust what she does*'. (W2)
		'*We have some outbursts when everyone is stressed about how much work we have. Sometimes it can be healthy too. (. . .) We are open and honest, and if something bothers someone, we say so. I also feel very safe with them* [co-members]'. (G1)	'*I have a bit more experience of start-ups than they* [co-members] *do. And I know that such decisions can go very wrong because I have made such mistakes before. But it is very difficult to convince them about things I know from my previous experience, when they have not experienced it themselves*'. (Y1)
		'*We have agreed that it is good that we express concerns and talk about various problems, since honesty and openness is something our team highly values. (. . .) We can both have fun together and talk about personal difficulties*'. (Report Team Green)	'*The extent to which we are honest and direct with each other depends on how much we can trust each other. That is why we dare to give each other direct and personal feedback*'. (Report Team Green)
		'*We trust each other, but we also remember to ask whether someone in the team needs help with his tasks. (. . .) We are committed to give each other honest and direct feedback*'. (Report W2)	
	Shared ownership	'*Probably they* [co-members] *feel that I have a little bit more ownership. But it is like giving away your baby and sharing it with others. (. . .) Letting go of control is difficult*'. (R3)	'*I think it is important that everyone in the team feels they have a say in decisions and that everyone feels that their work is respected*'. (G2)
		'*When he* [Y2-business idea owner] *takes over my tasks, I get a bit bitter. I sit back and look at how he does it. And I can certainly make some passive–aggressive comments here and there*'. (Y1)	'*R1 wanted to get more of his own responsibilities*'. (R3)
		'*For me, it is important to feel that I am heard and recognized when I give my input, and I really believe this applies to everyone in the team*'. (Report G2)	'*R2 has announced that he decided to leave the team. He has been thinking about it a lot and he feels that he lost his passion to work on this business idea and feels no ownership over it*'. (Report Team Red)

other's expertise. In fact, our findings indicate that, at the stage of formation, NVT members are able to evaluate each other's expertise and use it to develop NVT's business idea. R1 notes: '*We are figuring out what is the best way to organise our work by making to-do lists and separating our tasks based on what we all know that we are good at*'. Subsequently, at the stage of collaboration, we observe that NVT members further enhance their understanding and recognition of each other's expertise, which – in turn – facilitates role formalisation and expertise utilisation in NVTs: '*W1's role has changed a bit. When we started, she was supposed to work with the customer, that was the idea. Then, it slipped a little bit over the product development, on which she spent a lot of time. But we have found that it is very poor use of her expertise*'. (W3)

Role formalisation. According to our findings, NVT members' improved understanding of each other's expertise is gradually incorporated into NVT's role structure through role formalisation process. As R2 states: '*We managed to divide roles according to the strengths of each member and we rely on each other a lot. There was less of this feeling in the beginning. (. . .) Roles become clearer and clearer. I think we are on our way to find our natural roles*'. Thus, we observe an increasing consensus regarding 'who is an expert on what' in the NVT. Furthermore, our findings indicate that some NVTs frequently re-evaluate their formalised roles throughout the stages of formation and collaboration. This results in the development of a clear – yet flexible – specialisation that responds to NVT's current needs. In these NVTs, members jointly define the domain in which each member can thrive, enabling the coordination of the collective expertise of NVT members: '*We have redefined some "who does what" in the team. We have gained important focus areas, so there has been a lot of independent work. But everyone knows what each of us is doing and that is very good*'. (W3)

TMS retrieval process through decision-making and task performance. The analysis of our data shows that TMS retrieval emerges at the formation stage and is further developed at the collaboration stage through the processes of decision-making and task performance. By making decisions and performing tasks related to their area of expertise, NVT members enact their expertise and its contribution. As a result, during TMS retrieval, the unique expertise of each NVT member – an expertise assessed and formalised during TMS encoding and storage – is utilised to advance NVT's business idea, strengthening the specialisation and credibility, and improving the coordination in NVTs.

Decision-making. The process of TMS retrieval is reflected in NVT's decision- making, as NVT members learn to rely on each other's expertise to make decisions under the time pressure and uncertainty that often surround NVTs. G1 states: '*We make many decisions. It does not mean that everyone should be involved in absolutely everything, because it takes awfully a lot of time*'. Over time, some NVTs extend the understanding and recognition of each NVT member's unique expertise to the point of allowing members to make independent decisions related to their domain. These NVTs employ expertise-based allocation of decision-making authority – except for important strategic decisions – to increase the speed of decision-making, while maintaining its quality, as reflected by W2:

> *When it comes to strategic things, we make the decision all together. But on an everyday basis, we have divided decision-making responsibilities into financing and administration, marketing, product and customer. But I think we can become even better at taking some decisions by ourselves.*

Therefore, decision-making – especially at the collaboration stage – demonstrates a greater utilisation of each NVT member's unique expertise. Nevertheless, in some NVTs, the knowledge

and information brought by an NVT member – assigned as an expert in this area – can be overlooked during NVT's decision-making. For instance, R3 admits: '*I know that the other two (co-members) feel a little bit ignored sometimes. I have opinions that I do not want to let go of. I understand that, but I still cannot let go of it*'.

Task performance. Another NVT process that reflects TMS retrieval is task performance. During the formation stage, NVT members begin to apply their expertise to perform the entrepreneurial tasks associated with their specialisation. The value of diverse expertise lies in increased autonomy, which gradually leads NVT members to more coordinated efforts: '*Autonomy is important. The fact that my co-members can complete their tasks. That they can understand how to solve the problem, and actually solve it. (. . .) People should be able to contribute to the team in such way*'. (Y2) Furthermore, task performance allows NVT members to observe the actual contribution of each other's expertise, clarifying the boundaries of each member's domain. W3 and W2 note:

> *Had it been someone else than W1 running that workshop, it would have been harder to stay away. (. . .) W1 does not get any fuss from either me or W2 before the workshop about whether it should be like this or that. (W3) She (W1) has full freedom to run these workshops with our customers. (W2)*

Hence, our findings indicate that through task performance, NVT members exercise specialisation, demonstrate credibility in each other's expertise and enhance their coordination. At the collaboration stage, task performance is further aligned with each NVT member's expertise, as NVT members obtain a deeper understanding of 'who is an expert on what' in the NVT and use this understanding to synchronise their collective efforts which, in turn, improves NVT's coordination.

Likewise decision-making, the process of task performance reveals differences among the five NVTs. In some NVTs, the members struggle to appreciate and enact each other's knowledge and skills, resulting in unexploited expertise: '*It's hard to be trusted. Although I have got feedback from my co-members that I have a lot of good input, it doesn't really work like that in practice. (. . .) I really do not feel that I have fully utilized my assets. I have not really used what I am good at*'. (Y1) Therefore, in some NVTs, we observe a less efficient integration and coordination of NVT members' expertise. Next, we present the findings related to the TMS reinforcing process and the features that facilitate the development of TMSs in NVTs.

TMS reinforcing process through motivation, trust and shared ownership. From the moment NVTs engage in TMS encoding, storage and retrieval and begin to develop TMSs, a reinforcing process takes place. This evolution occurs at the formation and collaboration stages and, though unfolded differently in our five NVTs, is driven by the same features: NVT member motivation as well as trust and shared ownership developed among NVT members. These features update and reinforce self-assessment and assessment of co-members – gradually leading to a more accurate and shared understanding of each other's expertise – and enhance role formalisation, decision-making and task performance. Thus, through members' motivation, trust and shared ownership, NVTs refine TMS encoding, storage and retrieval, facilitating the development of stronger specialisation, credibility and coordination.

Member motivation. To mobilise any of their professional or social skills or personality traits in order to contribute to NVT's business idea development is the first observed reinforcing feature. Thus, the motivation that enables the development of the initial expectations-based specialisation (at the pre-formation stage) also sets the stage for the creation of a collaborative atmosphere

in NVTs, which – in turn – fosters the development of TMSs in NVTs throughout the stages of formation and collaboration. Y2 states: '*I feel confident about the knowledge of my co-members in their field. (. . .) I am very happy with the composition of our team because they (co-members) are extremely resourceful, hardworking, and independent people*'. Furthermore, motivation inspires NVT members to alter or extend their expertise whenever it serves the needs of their NVT and its business idea. Y4 notes: '*My responsibilities are related to the user side. But I have also been 'all hands-on deck' person, whenever it was needed, taking on some meetings and some administrative tasks*'. As a result, highly motivated NVT members strive to use their expertise in a way that benefits the development of NVT's business idea. As W2 declares: '*Now we all have prioritised the new venture over everything else*'.

However, in some NVTs, member motivation is gradually reduced as they begin to feel that their expertise is not utilised properly and – thus – does not really contribute to the development of NVT's business idea. R1 states: '*I was always very motivated to work on this business idea, but it has been very difficult to find my own place in the team*'. Considering that TMS literature (Peltokorpi, 2008; Ren and Argote, 2011) and our data identify motivation as an antecedent of TMSs, this finding indicates that – subsequently – TMSs can affect member motivation, suggesting a reciprocal relationship between motivation and TMSs. This is illustrated in the quote of the same participant (R1): '*It is important to me to be able to contribute with something I am good at, and that this contribution is respected and my opinion is heard*'.

Trust. Trust, gradually formed among NVT members, also seems to enhance TMSs in NVTs. Having worked together for some time, NVT members begin to exhibit signs of trust, which strengthens member confidence in their own competence in the domain they have undertaken: '*I had no faith in myself, but my co-members had faith in me. They trusted me to do it because they believed in me. This helps a lot*'. (W1) In addition, the presence of trust improves the recognition of each other's expertise and its contribution, encouraging NVT members to use their expertise more actively. This, in turn, significantly advances the development of TMSs. As W3 declares:

> *I am completely confident that W1 does her work in the best possible way. It feels great knowing that I can trust her. It is only natural that W1 runs a workshop by herself, and I have full confidence that it will be good. There is no stress or worry about how it is going. I know it's going well, and I could not have done it better myself* .

However, not all NVTs are characterised by the same level of trust. In fact, we observe a differentiation among the five NVTs regarding the development of trust and – consequently – its role in the reinforcement of TMSs in NVTs. Y1 notes: '*There was extremely low trust in the team. Especially when Y4 and I had found something together, we were very sure of what we had found, it was completely rejected and not believed in. One could not continue like that because it did not work*'. The effect of trust on the development of TMSs and the utilisation of NVT member expertise is illustrated by the quote of G3: '*I do not exactly trust my co-members. I wish I could trust that what we plan will be completed. Unfortunately, sometimes they do not finish their tasks within the agreed deadline*'.

Shared ownership. Among NVT members, representing NVT members' perception that NVT's business idea belongs equally to all members, can also foster the development of TMSs in NVTs. Indeed, our findings indicate that shared ownership further stimulates an NVT member's desire to contribute to the development of NVT's business idea: '*In order to contribute, people must be motivated. And having the same ownership over our business idea works pretty well as motivation*'. (G1) Shared ownership also allows NVT members to actively use their expertise during decision-

making and task performance. This is supported by the reports of the same team: '*Everyone in the team feels that there is room to share their input and express their opinion. It is important for the team to provide equal space to everyone to express their thoughts*'. (Report Team Green)

However, similarly to motivation and trust, shared ownership is not developed in the same way across the five NVTs. We observe that in NVTs that do not exhibit a considerable degree of shared ownership, some NVT members struggle to exercise their expertise – especially during decision-making – leaving it unexploited. For example, R3 (business idea owner) states: '*If I have an opinion of which I am convinced, then I am determined to do it, even though we are a team and we should be basically equal, making decisions together. So then, R1 and R2 do not feel that we make decisions together*'. As such, a reduced degree of shared ownership can restrict a member's substantial participation in the development of NVT's business idea: '*Y2 had already entered my territory. I asked, "Is it you who takes over the job now?" He said, "Yes." And that's probably because, as business idea owner, he has a lot of ideas about what is best to do and how to do things'.* (Y1)

In sum, increased levels of motivation, trust and shared ownership update TMS processes of encoding, storage and retrieval and further reinforce the development of TMSs in NVTs throughout the stages of formation and collaboration (see Figure 1).

Discussion

This article provides detailed evidence of the dynamic development of TMSs (Lewis and Herndon, 2011; Ren and Argote, 2011) in NVTs, extending our understanding of how TMSs enable the integration and coordination of the collective expertise of NVT member during the development of the business idea (Dai et al., 2017; El-Awad, 2019; Kollmann et al., 2020; Lazar et al., 2022). Moreover, this study addresses the call to examine TMS processes at both the individual (self- assessment and assessment of co-members) and collective (role formalisation, decision-making) levels (Yuan et al., 2010; Lewis and Herndon, 2011), extending the work of Michinov and Juhel (2018) – who examined TMSs from a multilevel perspective – by applying a multilevel perspective to the context of newly formed self-organising teams (NVTs).

Our findings illustrate how TMS processes of encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987) unfold in NVTs at three stages and how these TMS processes gradually result in the development of specialisation, credibility and coordination, indicating the establishment of TMSs in NVTs (Lewis, 2003). Overall, our findings offer a twofold contribution: (i) describing the underlying dynamics leading to TMS encoding, storage and retrieval in NVTs as well as identifying two new critical TMS processes: TMS enabling process and TMS reinforcing process (emerged from our data) and (ii) developing theoretical insights into TMS indicators of specialisation, credibility and coordination in NVTs as well as their role in the integration and coordination of collective expertise. This process is visualised in Figure 1.

First, our findings indicate a TMS enabling process. Reflecting prior research, TMS emerges early and continues to develop through member interactions over time (Hollingshead, 2001; Hollingshead and Fraidin, 2003). We nuance these findings, showing that the TMS enabling process occurs at the pre-formation stage and involves the NVT member's motivation to contribute to NVT's business idea development, their self-declaration of expertise and expectations regarding the expertise of each NVT member. TMS enabling process leads to the development of an initial – expectations-based – specialisation, which is one of TMS indicators (Lewis, 2003). Hence, we extend prior literature on initial TMS development (Pearsall et al., 2010) by including an enabling process of TMS that lays the ground for the TMS processes of encoding, storage and retrieval.

Second, at the formation and collaboration stages, our process model describes the underlying dynamics on how TMS processes of encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987) unfold through specific NVT processes, informing the development of TMSs in NVTs. Furthermore, our process model identifies an additional TMS process – reinforcing process – which helps NVTs strengthen their TMSs over time. These four TMS processes are discussed below.

TMS encoding process is manifested in self-assessment and assessment of co-members regarding the expertise that each NVT member possesses. Having worked jointly on the development of their business idea over several months (formation and collaboration stages), NVT members can validate the expectations they formed at the pre-formation stage regarding each member's expertise and its contribution. As a result, TMS encoding process strengthens specialisation in NVTs. Our findings align with Brandon and Hollingshead (2004), who suggest that initial specialisation can be inaccurate, and therefore, may require gradual refinements obtained from members' continuous interaction and performance feedback. Moreover, by incorporating the assessment of each other's expertise, TMS encoding enables the emergence of credibility in NVTs.

TMS storage process in NVTs is manifested in role formalisation. Developing a more accurate and shared understanding and recognition of each other's expertise over time, NVT members' knowledge about 'who is an expert on what' in the NVT becomes more crystallised and incorporated into NVT's formalised roles. Formalised roles enable NVT members to allocate knowledge related to the expertise of each NVT member more efficiently. Consequently, role formalisation allows NVT members to validate each other's expertise and link it to the specific – business idea related – tasks. Therefore, through role formalisation, TMS storage strengthens specialisation and credibility – which indicates stronger TMSs (Lewis and Herndon, 2011) – and enables the emergence of coordination in NVTs. Hence, we show how role formalisation, supported by a better understanding and recognition of each member's expertise, contributes to the further development of TMSs in NVTs.

TMS retrieval process is manifested in the NVT's decision-making and performance of tasks related to entrepreneurial activities. Prior research has shown the importance of TMSs in participative decision-making (Kollmann et al., 2020). Our findings nuance this relationship by demonstrating the role of decision-making in TMS retrieval process, and subsequently, the development of TMSs in NVTs. Over time, decision-making and task performance become more autonomous and efficient, demonstrating an improved use of each NVT member's expertise. As a result, NVTs gradually exhibit coordination – the third element that indicates the presence of TMS (Lewis, 2003) – with NVT members taking independent decisions and actions related to their area of expertise. This way, NVTs enhance the utilisation of the expertise that NVT members collectively possess. Once NVTs have engaged in the TMS processes of encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987), the presence of the three TMS indicators (i.e. specialisation, credibility and coordination [Lewis, 2003]) is apparent. However, we observe the existence of an additional process – TMS reinforcing process – that occurs over time and allows NVTs to further enhance TMSs, improving the utilisation NVT members' collective expertise.

TMS reinforcing process is enacted throughout the stages of formation and collaboration, through member motivation, trust and shared ownership, enabling NVTs to proceed in a subsequent loop of TMS encoding, storage and retrieval processes. Accordingly, the motivation of NVT members to contribute to business idea development as well as trust and shared ownership among such members, reinforce TMSs in NVTs. Hence, we confirm that TMS processes are updated and refined via task performance (Lewis et al., 2005; Lewis and Herndon, 2011). In addition, we demonstrate that, in the context of NVTs, retrieval also includes decision-making. Furthermore, we show under which conditions (i.e. member motivation, trust and shared ownership) task performance strengthens TMSs in NVTs.

Consequently, our findings reveal that motivation, trust and shared ownership foster the development of TMSs in NVTs, rendering specialisation, credibility and coordination stronger and more effective over time. Moreover, our findings indicate that in NVTs that exhibit strong specialisation, credibility and coordination and thus, strong TMSs (Lewis, 2003) – NVT members are likely to become more motivated to further contribute to the development of NVT's business idea, as they experience increased trust in their own expertise and increased recognition by other co-members of its contribution. Thus, we confirm motivation as a TMS antecedent (Peltokorpi, 2008; Ren and Argote, 2011), while we also suggest that NVT member motivation can be further enhanced by the presence of strong TMSs in NVTs. Conversely, our findings demonstrate that member motivation does not necessarily increase in teams over time (Peltokorpi, 2008). Thus, we provide evidence on how decreased motivation can influence the development of TMSs in NVTs, proposing a reciprocal relationship between motivation and TMSs (i.e. motivation affects but is also affected by TMSs). Furthermore, confirming the findings of Akgün et al. (2005) as well as Liao et al. (2015) – who showed the beneficial role of trust and team identification in TMSs of multidisciplinary teams, respectively – we extend their work by suggesting that, in NVTs, shared ownership can play a similar role.

Supported by the presence of motivation, trust and shared ownership, the processes of self-assessment and assessment of co-members continue to guide TMS encoding (Borgatti and Cross, 2003; Wegner, 1987) in NVTs. Indeed, driven by motivation, trust and shared ownership, NVT members can undertake new or additional responsibilities, altering or extending their expertise and thus updating TMS encoding. Notably, over time, assessment of co-members becomes a crucial element in TMS encoding, as co-members form a considerably deeper understanding of each other's expertise. Similarly, role formalisation continues to inform the process of TMS storage (Borgatti and Cross, 2003; Wegner, 1987), incorporating updated awareness by members of 'who is an expert on what'. Finally, decision-making and task performance continue to drive TMS retrieval (Borgatti and Cross, 2003; Wegner, 1987) in NVTs, demonstrating the actual use of each NVT member's expertise and its current value in the development of NVT's business idea. Subsequently, we observe a greater shift towards autonomy in decision-making and task performance over time. Therefore, TMS reinforcing process addresses the need for a frequent refinement of TMS encoding, storage and retrieval (Lewis and Herndon, 2011; Ren and Argote, 2011), leading to an even more accurate and shared understanding of each NVT member's expertise (Austin, 2003) and thus, further enhancing specialisation, credibility and coordination (Lewis, 2003) in NVTs.

Practical implications

Our findings offer implications to self-organising teams seeking to benefit from the diverse expertise of team member. The insights from the study can facilitate the development of practices that foster TMSs, and thus, the integration and coordination of knowledge and skills that team members collectively possess. First, our findings suggest that – unlike typical work teams, where building effective TMSs is primarily a manager's responsibility (Peltokorpi, 2008; Ren and Argote, 2011) – the development of effective TMSs in self-organising teams (like NVTs) requires an effort from all the team members, as it may not occur spontaneously. Second, our findings show the importance of features like motivation, trust and shared ownership in the utilisation of the diverse expertise of team members, suggesting that their cultivation may reinforce TMSs in self-organising teams. Third, our study acknowledges TMSs as dynamic systems, emphasising the need for team members to continuously update and refine TMSs to render them more effective.

Limitations and future research

The main limitation of the study concerns the selection of cases from an entrepreneurship programme organised by a Norwegian University. The informants were participants of a programme that applied action-based education (Rasmussen and Sørheim, 2006) and – at the same time – members of NVTs that aimed at developing technology-based business ideas and creating new ventures. This renders the findings less generalisable. However, the importance of this limitation might be outweighed by the fact that the confirmed goal of this programme was the development of real new ventures (Sørheim et al., 2021). Furthermore, the specific programme did not interfere with NVT formation and teamwork. In fact, the participants viewed the programme as a supportive mechanism during venture creation, not as an educational programme. On the other hand, using this programme as a research setting allowed us to select all the cases from the same environment and – more importantly – follow them from the point of NVT formation and throughout the period of one year, providing us with crucial to process studies real-time longitudinal data.

The above limitation provides suggestions for future research on the development of TMSs in NVTs. To increase their generalisability, the findings obtained from the five cases should be examined in a richer number of NVTs selected from a different research setting, of which it would be interesting to compare dyadic teams with larger teams. Another suggestion is to apply quantitative tools to test the extension of the presented findings to the population at large. When it comes to TMS literature, we believe that future research could benefit from the examination of TMS development in different types of newly formed self-organising teams, paying particular attention to the nature of team tasks and stages. In this study, we suggest that simply borrowing concepts from other fields (e.g. psychology, organisation studies and sociology) is not the best approach, as one risks missing important nuances that could increase the value of TMSs in a specific context. Therefore, we call for more explorative studies on the development of the widely acknowledged concept of TMS in newly formed self-organising teams, such as NVTs.

Conclusion

To explore how TMSs are developed in NVTs, we conducted an inductive, qualitative case study, following five NVTs from a Norwegian VCP throughout the first year of their formation. While previous studies have focused on TMS outcomes, we examined the dynamic development of TMSs in NVTs (Lewis and Herndon, 2011; Ren and Argote, 2011), and thus provide detailed insights into how NVTs integrate and coordinate collective expertise over time. First, at the pre-formation stage, our findings show that a TMS enabling process sets the ground for the development of TMSs through motivation, self-declaration and member expectations, resulting in the emergence of initial specialisation (Lewis, 2003) in NVTs. Second, at the formation and collaboration stages, NVTs engage in the TMS processes of encoding, storage and retrieval (Borgatti and Cross, 2003; Wegner, 1987), which encompass self-assessment, assessment of co-members, shared understanding, role formalisation, decision-making and task performance. These processes, in turn, refine and enhance the initial specialisation, leading to the gradual development of credibility and coordination in NVTs. Throughout the stages of formation and collaboration – relying on the member's motivation, trust and shared ownership – NVTs engage in a reinforcing process that helps them to strengthen their TMSs over time, enabling NVTs to increase their ability to integrate and coordinate NVT collective expertise.

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ORCID iD

Eleni Georgiadou https://orcid.org/0000-0001-6255-3645

Note

1. The actual year is withheld to preserve team anonymity.
2. To ensure that the specialisation and credibility refer to the expertise that contributes to the development of NVT's business idea, we reviewed NVTs' business plans alongside the analysis of interviews.

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Author biographies

Eleni Georgiadou is PhD candidate at Nord University Business School, focusing on team-based entrepreneurship. Her research interests also include collective cognition, transactive memory systems, and knowledge management in teams.

Marianne Terese Steinmo is an Professor in innovation at the Division of Innovation and Entrepreneurship at Nord University Business School, Norway. Her PhD is in Business Economics from Nord University Business School and her main research interests are in the areas of university-industry collaboration, innovation and sustainability. She publishes regularly in international journals such as Research Policy, Industry & Innovation, Journal of Business Research, International Journal of Technology Management and Journal of Cleaner Production.

Thomas Lauvås is an associate professor in innovation at Nord University Business School, where he also received his PhD in business economics, focusing on university-industry collaboration. His research interests also include entrepreneurship, innovation, sustainability, and circular economy, in which he has published papers, chapters and edited Handbooks.

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Effective teamwork in new venture teams:
Unpacking the coordination of team members' competence

This thesis examines how co-founders who form teams to found and lead new ventures—new venture teams (NVTs)—coordinate NVT members' competence to achieve effective teamwork that enables new venture development. Associated with high chances of new ventures' survival and growth, effective teamwork typically entails the coordination of NVT members' knowledge, skills, abilities, and other characteristics, and as such, contributes to successful development of new ventures. Despite NVTs' importance in the creation of successful new ventures, we lack a clear understanding of precisely how NVT members coordinate their competence and achieve effective teamwork during the fragile early phase of new venture development. Recent NVT literature advocates extending our focus beyond the mere aggregation of NVT members' demographic characteristics and competence—reflected in NVTs' composition—and more thoroughly examine the role of team processes and properties in the coordination of NVT members' competence and the development of effective teamwork in NVTs. To address this call, this thesis asks: *How do NVT members coordinate their competence to develop effective teamwork?*

This research question is examined through a longitudinal case study of five NVTs from a venture creation program organized by a leading Norwegian University. This setting allowed me to trace NVTs from the point of their formation, which is particularly important when studying how NVTs begin to coordinate NVT members' competence to develop effective teamwork. This thesis consists of three empirical papers that draw on general team and NVT literatures. Overall, the findings of this thesis uncover: (i) the specific processes and properties NVT members mobilize to coordinate their competence during the early phase of new venture development and (ii) how these team processes and properties—as well as their interplay—contribute to the development of effective teamwork in NVTs. Focusing on the processes and properties developed in NVTs, this thesis contributes to NVT literature by illuminating why a mere aggregation of NVT members' competence is insufficient for effective teamwork in NVTs and suggesting to view the development of effective teamwork as a complex ongoing process.

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