Business Planning: The Relationship Between Passion for Inventing, Need for Autonomy and Team Innovativeness in New Venture Teams

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ABSTRACT

Purpose – This paper contributes to research, exploring the influence of the entrepreneur's characteristics on the innovativeness of a new venture team. It, therefore, studies the effect of the need for autonomy and passion for inventing on team innovativeness during the business planning phase. The dependent variable is measured by two constructs, the climate and the work behavior of the team.

Methodology – The research question is answered by studying a sample (n=51) of technology students at a Dutch university, simulating the process of identifying business ideas and founding a start-up along the lean canvas model. The outcomes are analyzed by conducting a correlation and linear regression analysis.

Results – Against the assumption derived from literature, the study was not able to indicate a significant relationship between the individual's need for autonomy and both measurements of team innovativeness. Initially, it was assumed to have a negative effect. The study reveals that passion for inventing has a significant, positive influence on both, the climate for innovation and the innovative work behavior. However, the degree of the passion's identity centrality does not have a significant relationship with team innovativeness.

Discussion – A possible explanation for this paper's findings could lie in the environment and context of the new venture teams, affecting both, the passion-innovativeness as well as the need for autonomy-innovativeness relationship.

Theoretical & Practical Implications – Regarding the effect of passion, the results support the previous literature and expand the existing insights on the team level. The role of environmental and contextual factors should be elaborated on in future studies. Especially for the team composition, this paper provides useful information. Passion is an important aspect for the innovativeness of an entrepreneurial team and should, thus, be paid attention to.

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Keywords

Entrepreneurial Motivation, Need for Autonomy, Entrepreneurial Passion, Team Innovativeness, New Venture Teams

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1. INTRODUCTION

"Ideas don't come out fully formed. They only become clear as you work on them. You just have to get started." Mark Zuckerberg, one of the greatest entrepreneurs in this day and age, made this statement during his Harvard commencement address in 2017. It is applicable to many situations entrepreneurs might find themselves in, often even before becoming an entrepreneur, for example during the business planning process. It gives motivation for entrepreneurial research and underlines Shane & Venkataraman's (2000) statement that the research on the entrepreneur, the entrepreneurial process and new ventures is important. Entrepreneurship is an important driver of innovation and technological development and, thus, generates economic growth (Schumpeter, 1961). Also recent practical reports such as the OECD's "Science, Technology and Innovation Outlook" underline the importance of entrepreneurship as it enhances job creation, brings innovation into the market and society (OECD, 2016) and increases the quality of people's life (Byers, Dorf, & Nelson, 2011).

Engle et al. (2010) define an entrepreneur as someone who starts his or her own business. However, for the purpose of this paper the definition of Byers, Dorf and Nelson (2011) is applied, because it also emphasizes the tasks and challenges of someone who starts a business. They define an entrepreneur as a person that "identif[ies] and pursue[s] solutions among problems, possibilities among needs, and opportunities among challenges" (p.4). The entrepreneurial challenges require the entrepreneur to engage in creative problem-solving and to recombine resources in order to meet external demands or overcome hurdles (Byers et al., 2011)

Recent studies are researching into the influence of the entrepreneur and his or her characteristics on firm innovation (Olivari, 2016). However, a significant amount of innovative start-ups are started by entrepreneurial teams (Ulhøi, 2005; Gartner et al., 1994). Start-ups face many challenges in their first steps of the entrepreneurial process and often it is crucial to found within a team in order to be able to deal with them (Schjoedt et al., 2013). Hunsdiek (1987) found in his study that for tech companies the number of entrepreneurs per start-up increased up to 2.2 in 1984/85 and stated that for these kinds of ventures it is typical to be founded by teams. Therefore, it is only comprehensible that, as Schjoedt et al. (2013) report, the team concept spreads wide and gets increasing attention among entrepreneurship researchers. One designation of this concept is, beside several other terms like *entrepreneurial team*, called *New Venture Team*. Ensley, Carland and Carland (1998) refer in their definition to members of new venture teams as being part of the founding process, having interest in the financial success and having a stake at the strategic decision-making. The topic of new venture teams is an interesting field of study and the volume of research dealing with entrepreneurial teams has increased (Zhou & Rosini, 2015), but not sufficiently is known about the group dynamics and their effect on the innovation output of new venture teams (Khan et al., 2015; Schjoedt et al., 2013).

Schjoedt et al. (2013) outline in their paper specific fields which require further research such as "[h]ow new venture […] teams are formed, the basis for the decisions on who should be involved, the nature of the interactions of team members, what the implications are for ventures with one type of team rather than another" (p. 2) and further questions that address the behavior of team members in the team as well as how it changes over time. Zhou and Rosini (2015) call for further research regarding the relationship between diversity of the new venture team and its performance. They state that there is a knowledge gap regarding factors that influence the team's performance as for example personal identity or differences in team members' attitude.

The purpose of this paper is to contribute to this research gap by exploring the relationship between team innovativeness and both, the entrepreneur's motivations, to be specific the need for autonomy, and his or her passion for inventing. According to West (2002) innovation refers to the exploration of ideas as well as the implementation of these ideas. Innovative teams can, therefore, be considered as frequent generators of ideas and products or processes.

It can be said that entrepreneurial motivation is related to firm innovativeness with the entrepreneur's behavior as a mediator (Olivari, 2016; Romero & Martínez-Román, 2012). The relationship of the entrepreneur's motives, like the need for autonomy, and his or her behavior is already proven to a relatively large extent (Olivari, 2016; Rauch & Frese, 2007; Romero & Martínez-Román, 2012; Herron & Robinson, 1993; Hollenbeck & Whitener, 1988). Especially for small businesses like new ventures, Romero and Martínez-Román (2012) for example link activities and characteristics like innovativeness of the firm to the entrepreneur. This at least suggests a relationship between the individual's need for autonomy and the innovation outcome of his or her founding team. Nevertheless, the influence of a team member's motivation, especially with regard to his or her need for autonomy, on the innovativeness of the team is not a major topic among scholars. The same counts for the team member's passion and team innovativeness. Entrepreneurial passion and its effects on the process of starting a new venture as well as on outcomes like innovativeness are not explored to a satisfying extent (Cardon, Wincent, Singh & Drnovsek, 2009; Cardon, Gregoire, Stevens, & Patel, 2013). Researchers like Montiel-Campos and Palma-Chorres (2016) found a relationship between passion and innovation with creativity as a mediating variable. Their research assessed how the entrepreneur's passion and the innovation output of their firm were related. However, such research is lacking for the early-stage entrepreneurial context and the application to entrepreneurial teams. Thus, this paper focuses on linking the concept of entrepreneurial passion, especially the passion for inventing, to the innovation outcome of new venture teams. The research question and the sub-questions of this paper, therefore, are:

What is the role of team members' entrepreneurial passion and need for autonomy for the team innovativeness during the opportunity recognition and exploration phase?

1. How does the team members' passion for inventing affect the team innovativeness during the opportunity recognition and exploration phase?
2. How does the team members' need for autonomy affect the team innovativeness during the opportunity recognition and exploration phase?

By answering these questions, this paper will contribute findings to research on the influence that entrepreneur's characteristics might have on the team innovativeness in the start-up phases. Especially for scholars that focus on new venture teams, this could be an interesting contribution, because it explores how an individual's passion next to his or her need for autonomy and thereby his or her rather self-referred motivation affect outcomes of a team that is dedicated to start a business.

This paper will begin with a theoretical framework, explaining the concepts behind the research's variables, deriving hypotheses from previous literature for an analysis of the outcomes, resulting in a conceptual model. This is followed by

a description of the methodology, including the set-up and procedure of the study as well as the measurements of the variables. After reporting the results and testing the hypotheses, a discussion will follow, containing possible explanations, limitations, theoretical and practical implications together with recommendations for further research.

2. THEORETICAL FRAMEWORK

2.1 Team Innovativeness

Innovation becomes increasingly important to many industries, which more and more rely on recent technological developments (Schilling, 2013). Schilling (2013) sees the proceeding globalization of markets as one of the reasons for this circumstance. She defines innovation "as the act of introducing a new device, method, or material for application to commercial or practical objectives" (p.1). The definition of the OECD (2005) goes even further. Their minimum requirement for the innovativeness of a product, process or method is that it must be novel or improved from the company's perspective. There are certain behaviors that can improve the innovation output of an organization. De Jong and den Hartog (2010) found that Innovative Work Behavior (IWB) is positively related to the innovative ability and output of an organization. Their four dimensions of IWB are idea exploration, idea generation, idea championing, and idea implementation.

This concept enables to measure a person's innovative behavior and the way it affects organizations and, therefore, is based on the individual as unit of analysis. New venture teams, however, are composed of several individuals with different skills and characteristics (Byers et al., 2011), working towards a joint outcome – starting a business. As soon as groups work towards a certain outcome, as for example innovation, no single group member can carry out all the activities that are required (Liu & Phillips, 2011). Therefore, it is necessary to shift the unit of analysis to the team-level and analyze behaviors, dynamics and the climate within the team in order to measure the innovativeness of these particular new ventures. Analyzing the climate of the team is another way to look at team innovativeness. The four-factor model of work group innovation helps to assess the facet specific climate of innovativeness (Anderson & West, 1998). This model addresses the team climate by referring to the four factors vision, participative safety, task orientation and support for innovation as predictors for innovativeness of a team.

2.2 Need for Autonomy

The decision to start a new business or to join a new venture team is underpinned by individual motivations. In the course of assessing the entrepreneurial intent of the individual, it is assumed that starting a business is an intentional behavior (Krueger, Reilly & Carsrud, 2000; Carter, Gartner, Shaver & Gatewood, 2003). Dyer (1994), while assessing entrepreneurship as a career choice, makes a distinction between three determinants of these career path decisions, namely individual factors (e.g. psychological characteristics), social factors (e.g. relationships) and economic factors (e.g. business opportunities). Many researchers explain entrepreneurial intent with Ajzen's (1991) Theory of Planned Behavior (Autio, Keeley, Klofsten, Parker & Hay, 2001; Engle et al., 2010). In his model, he identifies three antecedents of intent and, therefore, behavior. These antecedents are the attitude towards the behavior, the subjective norm and the perceived behavioral control. The first one refers "to the degree to which a person has a favorable or unfavorable evaluation of appraisal of the behavior in question" (p. 188). The term subjective norm refers to "the social pressure to perform or not to perform the behavior" (p.188). Perceived behavioral control refers to the extent to which the individual believes to control the outcomes of the behavior (Krueger et al., 2000). According to Autio et al. (2001), the individual has to be sure about the feasibility of the planned behavior and believe that the behavior's outcome is for his or her benefit, making the Theory of Planned Behavior more than appropriate to explain entrepreneurial activity.

Not only the antecedents of motivations have to be categorized, but also the intentions itself can be aggregated into several categories. When comparing different reasons to start a business, it has to be distinguished between intrinsic, extrinsic and necessity-driven motivations (Romero & Martínez-Román, 2012). Intrinsic motivations refer to the entrepreneur creating a new venture, because of "the mere pleasure of carrying it out" (p. 180), while the extrinsic motivation refers to the commercial motives of starting a business (Romero & Martínez-Román, 2012). Besides motives as for example the need for approval or personal development, the need for independence, also referred to as need for autonomy, is an identified reason for becoming an entrepreneur (Birley & Westhead, 1994; Kuratko, Hornsby & Naffziger, 1997; Kolvereid, 1996; Carter et al., 2003). An entrepreneur's need for autonomy is classified as an intrinsic motivation for starting a new venture (Olivari, 2016). This motivation could also be seen as instrumental, which means that it acts as a sort of predecessor being a condition for other personal motives (van Gelderen, 2016; van Gelderen & Jansen, 2006). According to Dworkin (2015), the concept of autonomy is in the field of philosophy a basis for many theories, but has never been philosophically assessed to the necessary extent. Although there are many notions and definitions of autonomy, he refers to it as at least including the self-determination of the individual, meaning the ability to decide and act on its own term, as a foundation of the concept of autonomy. Van Gelderen (2016) aggregates this concept to the entrepreneurial level by defining it as having the right to decide over the business' tasks, as well as the timing and way of execution of the business processes. He states that in order to do this, especially strategic autonomy is required. Breaugh (1999) made another specification of autonomy and refers to method, scheduling and criteria autonomy. Although he refers to work autonomy in general, these dimensions can easily be applied in the entrepreneurial field, as they are for example reflected in van Gelderen's (2016) definition. The dimension work method autonomy is referring to the freedom of choosing the way that decisions are implemented, while schedule autonomy refers to the time, when these are implemented (Breaugh, 1999). The ability to choose over the evaluation criteria is automatically included in the freedom to decide over tasks and goals (Breaugh, 1999).

2.2.1 Need for Autonomy and Team Innovativeness

Especially in the early stages of the entrepreneurial process, the entrepreneur's characteristics, such as his or her motivation have a large influence on the path their business is taking (Romero & Martínez-Román, 2012) and, therefore, the entrepreneur's motivation can be considered as being positively related to the success of his or her start-up (Baum, Locke, & Smith, 2001). According to Romero and Martínez-Román (2012) it can be even seen as an influence on innovation. Olivari (2016) found that the entrepreneurial motivation is positively related to organizational innovativeness and argues for the entrepreneur's behavior as a mediator between these two variables. Approvingly, research states that the actions of the entrepreneur are affected by his or her motives (Olivari, 2016; Rauch & Frese, 2007; Romero & Martinez-Roman, 2012; Herron & Robinson, 1993). Herron and Robinson (1993) who

based their work on the Hollenbeck- Whitener model (1988) see motivation as a mediating variable between personality traits and behavior and, therefore, value creation performance. Moreover, the variable *Ability* as a moderator of motivation is included in their adapted model. They, thus, propose that "[m]otivation is moderated by skills in the determination of entrepreneurial behaviors" (p. 291). Following their argumentation and extracting their perspective on motivation, the need for autonomy, as an entrepreneurial motivation, is expected to have an influence on innovativeness.

However, in the context of this study, innovativeness is measured on the team level and therefore team dynamics have to be taken into account. As Hoegl and Parboteeah (2006) state, members of new venture teams are interdependent, because the tasks during phases like opportunity recognition or exploration of ideas require communication and a constant exchange of interaction. Their study found a significant positive relationship between equal rights among the team members regarding decisions and the quality of their teamwork. The need for autonomy and, thus, the focus on individual outcomes does not necessarily fit to this interdependency (Liu & Phillips, 2011), because people with a high need for autonomy are likely to be in control and avoid rules that are imposed by the team (Cromie, 2000). Further, Osterbeek, van Praag and Ijsselstein (2010) connect the need for autonomy with "independent decision-making" and "bring[ing] activities to a successful end on their own" (p. 446). Following this argumentation, it is to assume that an individual with a high level of need for autonomy will probably not be well suited for teamwork and, as a consequence, thereof team innovativeness. Team members that value their independence seem unlikely to subordinate it to a team effort like innovativeness and creative problem-solving. Therefore, it is to expect that a high need for autonomy is negatively related to the innovativeness on the team-level, which leads to the first hypothesis:

H1: Team member's need for autonomy is negatively related to team innovativeness.

2.3 Passion for Inventing

The effects of the entrepreneur's emotions is not researched to a large extent yet (Cardon et al., 2009; Omorede, Thorgren & Wincent, 2015), but the number of publications and citations that take regard to emotions in entrepreneurship has increased significantly during the first decade of this century (Omorede et al., 2015). Nevertheless, Cardon et al. (2013) state that the influence of an entrepreneur's passion on other aspects has not been explored sufficiently and acknowledge the absence of a good instrument for measuring this passion as one of the key reasons.

Despite or maybe as a consequence of their assessment, recent research argues for entrepreneurial passion as a "key driver" (p. 374) for starting a business (Cardon et al., 2013). Additionally, this emotion is viewed as having a positive effect on the entrepreneur's judgment abilities, his or her decision-making, the entrepreneurial intent and the success of the new venture as well as creative behavior (Omorede et al., 2015). Also an important factor of passion is the ability to positively influence the coping with challenges in the entrepreneurial process (Laaksonen, Ainamo & Karjalainen, 2011; Cardon et al., 2009; Cardon et al., 2013). Vallerand et al. (2003) define passion itself as a "strong inclination towards an activity that people like, that they find important, and in which they invest time and energy" (p. 757). Moving the concept of passion towards the field of entrepreneurship, Cardon et al. (2009) conceptualize entrepreneurial passion as a "consciously accessible, intense positive feeling" (p. 515) that "results from engagement in activities with identity meaning and salience to the entrepreneur" (p. 515). Resulting from this definition, two key aspects of entrepreneurial passion can be found, which are the feelings itself and the identity centrality of the particular activity for which the individual has these feelings. Already Vallerand et al. (2003) refer to the importance of the relationship between passion towards a certain behavior and the identity of the individual. Cardon et al. (2009) go even further and explicitly connect entrepreneurial behavior with different identities. Based on the suggestion that entrepreneurial passion cannot be generalized per sé (Laaksonen et al., 2011), they develop three role identities, to which Cardon et al. (2013) refer to as "domains", that can function as categorization of passionate-entrepreneurial behavior and enable a connection to it. These identities are called inventor, founder and developer identity. This research will focus on the passion towards inventing, and, thus, the inventor identity. Entrepreneurs with a salient, meaning more central, inventor identity are opportunity identifiers and explorers that also have the ability to create new opportunities themselves (Laaksonen et al., 2011; Cardon et al., 2009).

2.3.1 Passion for Inventing and Team Innovativeness

Entrepreneurial passion probably influences many factors of the process of starting a new venture. The emotions of an entrepreneur have a clear influence on his or her behavior (Omorede et al., 2015). Thus, it is to assume that passion is influencing the innovation outcomes in certain ways. When referring to entrepreneurial passion in the following parts, the intense positive feeling towards inventing is meant. Montiel-Campos and Palma-Chorres (2016) indeed found a relationship between passion and innovation. They have framed the creativity of the entrepreneur as a mediating variable between his or her passion and the innovation outcome of the start-up. A similar finding was made by Baron and Tang (2011) whose study resulted in recognizing a connection between the positive affect of the entrepreneur and the radicalness of innovations, again with creativity as a mediator. Cardon et al. (2009) back up this relationship by proposing that if the individual's identity is dominantly the one of an inventor, his or her passion will affect the creative problem-solving and hence the effectiveness of recognizing opportunities.

Especially in the beginning of the entrepreneurial process, creativity strongly influences the innovativeness of the company (West, 2002). A possible explanation for how creativity affects the innovativeness of start-ups is delivered by Baron and Tang (2011), who assume that especially in the starting phase of a business, high levels of creativity affect the organizational culture and, thus, shift employees towards valuing creative problem-solving and innovation.

Many scholars already found the enhancing effects of passion on creativity by proving a positive relationship between these two variables (Montiel-Campos & Palma-Chorres, 2016; Omorede et al., 2015; Baron, 2008; Baron & Tang, 2011).

Nevertheless, these papers mainly approached the passion of the entrepreneur affecting the creativity and, only as a consequence, the innovation output of organizations. Since this paper focuses on the relationship between entrepreneurial passion and innovativeness on the team-level, the unit of analysis has to be shifted.

Mathisen, Martinsen and Einarsen (2008) state that the effects of an individual's creative behavior on the innovative team processes are still ambiguous and refer to the research of Taggar (2002), who found a significant relationship, contrary to Pirola-Merlo and Mann (2004), whose study did not. However, with the argument of the team member's actually creating the team climate, Mathisen et al. (2008) perceive it as unlikely that

the characteristics of the team members do not relate to this climate. With regard to the argumentation of Montiel-Campos and Palma-Chorres (2016) that an entrepreneur's passion affects the new venture's innovativeness through his or her creativity and Mathisen et al.'s (2008) assessment of the likelihood that creative team members determine the creative team climate, it is to assume that passion positively affects the innovativeness of the team. This argumentation leads to the second hypothesis of this paper:

H2: Team member's passion for inventing is positively related to team innovativeness.

Taking into account that, as written above, entrepreneurs with a high centrality of the inventor identity are more likely to have the ability of identifying opportunities, exploring them or even creating them from scratch by themselves, the third hypothesis is derived:

H2a: Team member's identity centrality of his or her passion for inventing is positively related to team innovativeness.

2.5 Conceptual Model

To explore the relationship between team innovativeness and the individuals' need for autonomy and passion for inventing, the model, as displayed in Figure 1, is derived. *Team Innovativeness*, consisting of the two concepts Team Climate for Innovation and Innovative Work Behavior, is established as the dependent variable.

The *Need for Autonomy* and the *Passion for Inventing* of the team members will be treated as the predictors in this model. Considering previous research, to which this paper refers, a negative relationship between *Need for Autonomy* and *Team Innovativeness* is expected. Regarding the relationship between *Passion for Inventing* and *Team Innovativeness* as well as the *Identity Centrality of Passion* and the dependent variable in this model, a positive relationship is expected.

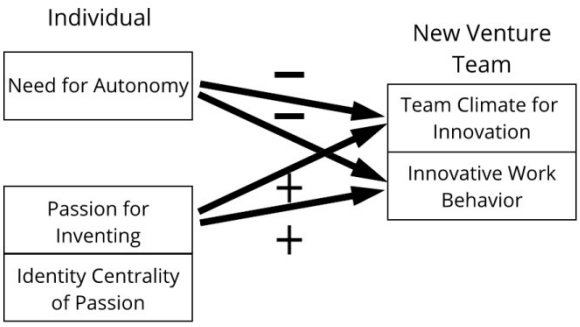

Figure 1. Conceptual Model

3. METHOD

3.1 Sample

When researching nascent businesses, research is likely to have a winner's bias (Lerner, 2016). Yang and Aldrich (2012) name the inclusion of start-ups that were already exposed to risk of termination before even registering as a business, as the reason for this bias. This left truncation refers to researchers excluding start-ups that do not survive until or during the observation period and, therefore, missing the observation of effects that important decisions in the starting phase of the business may have caused (Yang & Aldrich, 2012). Considering this circumstance, the sample for this study, consisting of technology students at a Dutch university that get the task of planning a business within a team, seems appropriate to explore group dynamics within entrepreneurial teams.

The survey for this research was send to 24 groups consisting of four students, meaning that 96 possible respondents received the questions. The response rate was 0.5321, which means that there is a sample of 51 individuals that filled out both of the two surveys, measuring the variables of interest. Several cases had to be deleted due to attrition, which refers to the discontinuity of participants (Dooley, 2010)

With a percentage of 64.71, it can be said that almost two third of the observed individuals are male, while 29.41% are female and 5.88% did either not want to indicate whether they were male or female or fell under the category "others". The majority of the sample is Dutch (n=37), while the second largest nationality group is German (n=4). Other nationalities in the sample are Indonesian, Lithuanian, Bulgarian, Greek, Russian, Australian and Spanish.

3.2 Procedure

During this panel study, the task was to form groups and develop a business idea and afterwards simulate the starting of a business as a new venture team. To facilitate the creation of a business model the participants applied the lean canvas as for example presented by Maurya (2012). This includes identifying and defining problems, customer segments, a unique value proposition, solutions, paths to customers, revenue streams, the business' cost structure, key metrics and the unfair advantage of the business. During this process they received three surveys, measuring several variables over the time of the entrepreneurial process. The quality and the probability of success of the outcome of this process, namely the business model that the students created, are assessed by external judges.

The research consisted of several self-administered online questionnaires that were sent by email at different points in time, which has the disadvantage of requiring a motivated sample that is willing to complete several surveys (Fink, 2014).

3.3 Survey

In order to study the relationship between the team member's need for autonomy and the team innovativeness, as well as their entrepreneurial passion and the team innovativeness, the questionnaires (see Appendix B) include several concepts, which were developed and validated by different researchers. A summary of the different constructs is provided in Table 1.

3.3.1 Team Innovativeness

As already written in the theoretical framework, the variable of team innovativeness is measured by two different concepts, the team climate for innovation and innovative work behavior.

The first construct that is used in this study to measure the innovativeness of the new venture team is the Team Climate Inventory (TCI), developed by Anderson and West (1998). The five different dimensions of the TCI are assessed with a number of different items. The part of the questionnaire dedicated to *Vision* contains 11 items. These items are statements like *'How clear are you about what your team's objectives are?'* with a scale that ranges from *1 = Not at all* to *7 = Completely*. *Participation safety* is measured with eight items that consist of a statement like *'People feel understood and accepted by each other'* with a scale ranging from *1 = Strongly disagree* to *5 = Strongly agree*. For *Support for Innovation* the survey included eight items with a five-point scale ranging from *1 = Strongly disagree* to *5 = Strongly agree*. The factor *Task Orientation* was measured by utilizing a seven-item scale. These items contain statements like *'Does the team have clear criteria which members try to meet in order to achieve excellence as a team?'* with a seven-point scale ranging from *1 = To a very*

little extent to *7 = To a very great extent*. *Interaction frequency* is measured using four items with a scale that ranges from *1 = Strongly disagree* to *7 = Strongly agree*.

De Jong and den Hartog (2010) dedicate their paper to the measurement of Innovative Work Behavior (IWB) in a multi-dimensional manner with individuals as the unit of analysis. However, in order to fit the purpose of this research, this unit is shifted towards the team level. They developed ten items, two for idea exploration, three for idea generation, two for idea championing and three idea implementation, each with scales ranging from *1 = Never* to *5 = Always* (de Jong & den Hartog, 2010). Although they provided proof of the multi-dimensionality of IWB, the correlations between these dimensions, against the expectation that they could have been treated in isolation, indicated that they rather contribute to an overall measurement of IWB. For the purpose of this research, all dimensions will, thus, be added together in order to provide accuracy.

3.3.2 Need for Autonomy

In order to measure the variable *Need for Autonomy* the team members were asked to fill out seven items taken and adapted from Engle et al. (2010), who base their work on van Gelderen and Jansen (2006). The respondents were confronted with certain aspects (e.g. freedom) that refer to autonomy, developed by van Gelderen and Jansen (2006). Therefore, they had to assess the importance of the statements *'Making my own decisions about work goals and methods'*, *'Having personal freedom'*, *'Regulating my own time'*, *'Having direct responsibility for decision and results'*, *'Being able to express my own personality and creativity'*, *'Being in charge and in control of my work'*, *'Not having a boss or rules'* on a seven-point scale (*1 = Very low importance; 7 = Very high importance*).

Variable	Dimension	No. of Items	Source
Innovative Team Climate		38	Anderson &
	Vision	11	West (1998)
	Participation Safety	8	
	Support for Innovation	8	
	Task Orientation	7	
	Interaction Frequency	4	
Innovative Work Behavior		10	De Jong & den
	Idea Exploration	2	Hartog (2010)
	Idea Generation	3	
	Idea Championing	2	
	Implementation	3	
Need for Autonomy		6	Engle et al. (2010)
Intense Positive Feeling for Inventing		4	Cardon et al. (2013)
Identity Centrality of Passion for Inventing		1	Cardon et al. (2013)

Table 1. Variable overview

3.3.3 Passion for Inventing

A scale adapted from Cardon et al. (2013) was utilized to measure the team member's passion for inventing. A four-item scale measures the intense positive feelings towards inventing. The scale contains the statements *'It is exciting to figure out new ways to solve unmet market needs that can be commercialized'*, *'Searching for new ideas for products/services to offer is enjoyable to me'*, *'I am motivated to figure out how to make existing products/services better'*, *'Scanning the environment for new opportunities really excites me'*, to which the respondent is supposed to rate his or her level of agreement ranging from *1 = Strongly disagree* to *7 = Strongly agree*.

The identity centrality of this passion is assessed by an item, consisting of the statement *'Inventing new solutions to problems is an important part of who I am'*, with a seven-point scale ranging from *1 = Strongly disagree* to *7 = Strongly agree*.

3.4 Treatment of the Data

Although the items measure on an ordinal level, the variables and the regarding scores will be treated like measurements with an interval level. This is based on the assumption of equal intervals. This assumption refers to the similarity of the intervals between certain quantifiable answer options as used in e.g. Likert-scales (Hayes & Hatch, 1999). Single missing values were substituted with the average score of the item. Especially for item non-response at a quantitative data set, when the number of missing values per case is at a low level (<5%), this is an appropriate imputation (OECD & Eurostat, 2005). This way it was possible to ensure a larger sample size for an analysis.

For the purpose of this research, it was necessary to compute scores for each of the variables. This was done by adding the scores of the different items belonging to a certain variable together and dividing them by the number of items.

Due to the relatively small sample size, the alpha level was set to .1 (two-tailed testing).

3.5 Reliability

The variables can be considered as reliable, when the scores suggest consistency (American Educational Research Association et al., 1999). Since all of the used measures consist of items with more than five, even up to seven answer options, we can apply Cronbach's alpha as our measure for reliability (Dooley, 2010). According to Hair, Black, Babin and Anderson (2014), we can accept a value of .70 for the variable's reliability coefficient. For *Need for Autonomy* the initial value of the Cronbach's alpha is .675. Further analysis indicates a value of .704 and, therefore, it is meeting our aforementioned requirement, if the last question (*'Not having a boss or rules'*) is not considered. As well as in the study of Engle et al. (2010), the seventh question will be eliminated and only the remaining six will be considered for further analysis. The value for *Intense Positive Feeling for Inventing* is .845. For the construct of the TCI and, thus, the measure of *Team Climate for Innovation,* the reliability coefficient has the value of .955. The reliability score of IWB has the value of .919. For a more distinctive assessment, the scores for the reliability of the constructs' particular dimensions can be seen in Appendix A.

	Cronbach's Alpha	N of Items
Need for Autonomy	.675	7
Intense Positive Feeling	.845	4
Team Climate for Innovation	.955	38
Innovative Work Behavior	.919	10

Table 2. Cronbach's Alpha

4. RESULTS

4.1 Analysis on Individual Level

To test the relationship between the variables, a correlation and a linear regression analysis will be conducted. The analysis of the relationship between the variables will be performed on the individual level. The predictor variables *Need for autonomy* and *Passion for inventing* are already measured on the individual level, because they are characteristics of the particular team member. However, *Team innovativeness* is, in principle, located at the group level, but measured on the individual level. The individual scores on *Team innovativeness*, thus, will be utilized, as they display the perceived innovative team climate and work behavior of the new venture team.

Naturally, this is not ideal for a proper analysis and regarding interpretation. To give more confidence in the analysis on the individual level, the interdependency of the team innovativeness scores within the team will be tested. Similar to De Dreu's (2002) approach, the Eta-squared score was computed for both dependent constructs, measuring the effect of the group affiliation on the outcome variable. Based on the bivariate analysis with *Team Climate for Innovation* as the dependent variable, the Eta-squared is .625, which shows a significant effect size (>.2) (Georgopoulos, 1986). Looking at the stem-and-leaf plot (see Appendix A) this outcome receives approval. Considering the scales ranging up to seven, relatively similar scores can be observed. The value of the Eta-squared for IWB is .439, again, indicating a relatively strong effect. The stem-and-leaf plot supports this interpretation as well. These outcomes give some confidence to analyze the relationship of the predictors with team innovativeness on the individual level, since the results indicate certain interdependency and, thus, consistency of the responses among the members of the new venture teams.

During this analysis, it is controlled for gender, since the effects are unknown, which the gender of a person might have on the innovativeness of the person's team. Table 3 shows the correlations between the independent variables and the dependent variable, consisting of the two constructs used as measurements. The correlation between *Need for Autonomy* and *Team Climate for Innovation* as well as *Innovative Work Behavior*, are not statistically significant. Nevertheless, *Intense Positive Feeling for Inventing* has a moderate positive correlation with *Team Climate for Innovation* (r=.425, p=.002) and a strong one with *Innovative Work Behavior* (r=.624, p<.001). The identity centrality of the passion for inventing has a weak positive correlation with *Team Climate for Innovation* (r=.244, p=.084). Furthermore, it has a weak to moderate positive correlation with *Innovative Work Behavior* (r=.351, p=.011). The demographic control variable *Gender* shows some correlations, which are all either weak or statistically not significant. Although we exclude gender form further analysis, it is noteworthy that the correlations of the control variable are, if statistically significant, weakly, but negatively correlated to the variables *Innovative Work Behavior*, *Intense Positive Feeling for Inventing*, and *Identity Centrality of Passion for Inventing*.

In both regression models, *Need for Autonomy* has no statistical significance. Thus, the variable will be excluded from the analysis. The same holds for *Identity Centrality of Passion for Inventing*. The predictor variable *Intense Positive Feeling for Inventing* accounts for 16.4% of the variance in *Team Climate for Innovation* (Adjusted R^2=.164). Looking at the outcomes of the ANOVA analysis, it can be said that the predictor within this model significantly predicts the team climate (F=10.811, p=.002). The regression model and the coefficients (see Table 4) clearly indicates the positive effect of the *Intense positive feeling for inventing* on *Team Climate for Innovation* (Beta=.273, p=.011).

37.6% of the variance in the team's innovative work behavior is explained by the predictor *Intense Positive Feeling for Inventing* (Adjusted R^2=.376). In addition, the ANOVA analysis shows that the independent variable is able to significantly predict the outcome of *Innovative Work Behavior* (F=31.165, p<.001). With a Beta of .409, there is a strong indication (p<.001) of a positive effect of *Passion for Inventing* on the team's innovative work behavior.

Model[a]		B	Std. Error	Beta	t	Sig,
TCI[b]	(Constant)	3.605	.929		3.883	.000
	Need for Autonomy	-.54	.172	-.043	-.313	.756
	Intense Positive Feeling	.273	.104	.448	2.640	.011
	Identity Centrality of Passion for Inventing	-.010	.082	-.020	-.121	.904
IWB[c]	(Constant)	.885	.854		1.036	.305
	Need for Autonomy	.078	.158	.058	.494	.624
	Intense Positive Feeling	.409	.095	.629	4.300	.000
	Identity Centrality of Passion for Inventing	-.018	.075	-.033	-.234	.816

[a] Analysis on the individual level
[b] Team Climate for Innovation as dependent variable
[c] Innovative Work Behavior as dependent variable

Table 4. Coefficients

Unfortunately, need for autonomy as a motive for starting a business could not show any significant effects on the innovativeness of the new venture team in the presented models. In order to examine if it is possible to have a significant relation between the independent variable *Need for Autonomy* and *Team Innovativeness* with the variable of *Passion for*

			1	2	3	4	5	6
Spearman's rho[a]	1 Team Climate for Innovation	Correlation Coefficient	1					
		Sig (2-tailed)						
		N	51					
	2 Innovative Work Behavior	Correlation Coefficient	.585**	1				
		Sig (2-tailed)	.000					
		N	51	51				
	3 Need for Autonomy	Correlation Coefficient	.068	.214	1			
		Sig (2-tailed)	.633	.132				
		N	51	51	51			
	4 Intense Positive Feeling for Inventing	Correlation Coefficient	.425**	.624**	.253*	1		
		Sig (2-tailed)	.002	.000	.073			
		N	51	51	51	51		
	5 Identity Centrality of Passion for Inventing	Correlation Coefficient	.244*	.351**	.115	.601**	1	
		Sig (2-tailed)	.084	.011	.423	.000		
		N	51	51	51	51	51	
	6 Gender	Correlation Coefficient	.012	-.275*	-.040	-.290**	-.315**	1
		Sig (2-tailed)	.932	.051	.782	.039	.024	
		N	51	51	51	51	51	51

[a] Analysis on the individual level
**. Correlation is significant at the 0.05 level (2-tailed)
*. Correlation is significant at the 0.1 level (2-tailed)

Table 3. Correlation Table

Inventing, to be more specific *Intense Positive Feeling for Inventing*, as a moderator, the standardized values of the two predicting variables are combined into one variable by multiplying them and then included as an interaction term in the linear regression analysis. The outcome of the analysis with *Team Climate for Innovation* (p=.220) as well as with *Innovative Work Behavior* (p=.380) as dependent variable cannot be considered as statistically significant. As a consequence, we cannot assess whether the relationship between *Need for Autonomy* and *Team Innovativeness* is stronger or weaker with *Passion for Inventing* as a moderating variable.

When looking at the hypotheses, it has to be recognized that **H1** must be rejected, since the regression analysis does not show any significant relationship. The same goes for the degree of the identity centrality of the team member's passion for inventing. Therefore, hypothesis **H2a** has to be rejected as well. Only hypothesis **H2** can be accepted. Hence, it can be assumed that *Passion for Inventing* has indeed an effect on *Team Innovativeness*.

4.2 Analysis on the Team Level

As already implied team innovativeness is originally measured at the team-level, whereas *Need for Autonomy* and *Passion for Inventing* are measured on the individual level, since they are characteristics of the particular team members. A post-hoc analysis on the team level will be conducted to verify the findings of the previous analysis. In order to do so, the independent variables will be aggregated to the group-level by taking the average team score of each item. Following this approach, the sample of suitable cases, which are left for an analysis, decreases (n=13), diminishing the reliability and statistical power of the outcomes (Dooley, 2010). According to Biemann and Heidemeier (2012) the highest statistical power is to expect, when there is a response rate between 30 and 50% within the group. Therefore, new venture teams with a lower response rate than 50% were excluded from our sample, which applies for 11 of the 24 groups.

Pearson's rho will be used as an instrument in order to measure the correlations. With an alpha level of .1, there are some correlations between the independent and dependent variables that can be considered as significant. The results in Table 5 show that the variable *Need for Autonomy* is correlated with *Innovative Work Behavior* (r=.531, p=.062). The construct of *Innovative Work Behavior* has additionally a significant and positive correlation with the independent variable *Intense Positive Feeling for Inventing* (r=.603, p=.029). The second dimension of *Passion for Inventing*, *Identity Centrality*, is not significantly correlated to *Innovative Work Behavior.*

The three predictors are indicated to be positively, but not significantly, correlated with the second measurement of *Team Innovativeness*, namely the *Team Climate for Innovation*. These findings display that the predictors *Need for Autonomy* and *Intense Positive Feelings for Inventing* are on a team-level positively associated with *Innovative Work Behavior.*

Model[a]		B	Std. Error	Beta	t	Sig,
TCI[b]	(Constant)	2.326	2.431		.957	.364
	Need for Autonomy	.301	.514	.211	.584	.573
	Intense Positive Feeling	.175	.322	.234	.601	.601
	Identity Centrality of Passion for Inventing	-.018	.200	-.034	-.090	.930
IWB[c]	(Constant)	.033	1.680		.019	.985
	Need for Autonomy	.346	.356	.264	.972	.356
	Intense Positive Feeling	.459	.222	.668	2.063	.069
	Identity Centrality of Passion for Inventing	-.169	.138	-.349	-1,223	.252

[a] Analysis on the team level

[b] Team Climate for Innovation as dependent variable

[c] Innovative Work Behavior as dependent variable

Table 6. Coefficients

To test the hypotheses and the conceptual model, linear regression analyses with the two constructs, IWB and TCI, as dependent constructs were conducted. Due to the small sample size, the adjusted R squared is examined. Depicted in Appendix A, it can be stated that in the model with the variable *Innovative Work Behavior* as dependent variable, 35% of the variance in the outcome variable can be explained by the predictors (Adjusted R^2=.350). The ANOVA analysis shows that the independent variables are predicting *Innovative Work Behavior* significantly (F=3.158, p=.079). When looking at the particular effects on the dependent variable, it has to be mentioned that only *Intense Positive Feeling for Inventing* has statistical significance (see Table 6). It positively affects *Innovative Work Behavior* (Beta=.668, p=.069).

With the measure of the innovative team climate as the outcome variable, the model has no statistical significance (p=.703).

				1	2	3	4	5
Spearman's rho[a]	1	Team Climate for Innovation	Correlation Coefficient	1				
			Sig (2-tailed)					
			N	13				
	2	Innovative Work Behavior	Correlation Coefficient	.557**	1			
			Sig (2-tailed)	.048				
			N	13	13			
	3	Need for Autonomy	Correlation Coefficient	.323	.531*	1		
			Sig (2-tailed)	.282	.062			
			N	13	13	13		
	4	Intense Positive Feeling for Inventing	Correlation Coefficient	.321	.603**	.507*	1	
			Sig (2-tailed)	.284	.029	.077		
			N	13	13	13	13	
	5	Identity Centrality of Passion for Inventing	Correlation Coefficient	.143	.088	.207	.571	1
			Sig (2-tailed)	.641	.776	.497	.041	
			N	13	13	13	13	13

[a] Analysis on the team level

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

*. Correlation is significant at the 0.1 level (2-tailed)

Table 5. Correlation Table

None of the effects of the independent variables on the *Team Climate for Innovation* show any significance either. The Betas would have indicated a positive effect of *Need for Autonomy* on the *Team Climate for Innovation* (Beta=.211, p=.584) as well as the ones of *Intense Positive Feeling for Inventing* (Beta=.234, p=.601). *Identity Centrality of Passion for Inventing* would have had a very weak negative effect on the team climate (Beta=-.034, p=.930).

Considering these outcomes, the hypothesis testing has to be differentiated between the two constructs of the dependent variable. The hypothesis testing with the dependent variable *Team Climate for Innovation* does not indicate any significant relationships between the predictors and the outcome. Hence, all hypotheses regarding the effects on the team's climate have to be rejected.

Furthermore, for *Innovative Work Behavior*, **H1**, has to be rejected, since the team member's need for autonomy does not have a significant effect on the outcome variable. For the same reason **H2a**, stating that the identity centrality of the individual's passion for inventing positively affects team innovativeness, has to be rejected. However, **H2** itself can be accepted as the team member's passion for inventing significantly affects the innovative work behavior of the team.

The results of the relationship analysis did not have the statistical power that was initially aimed for. One reason that accounts for this circumstance could be the small sample size of 13 cases, caused by the analysis on the team level.

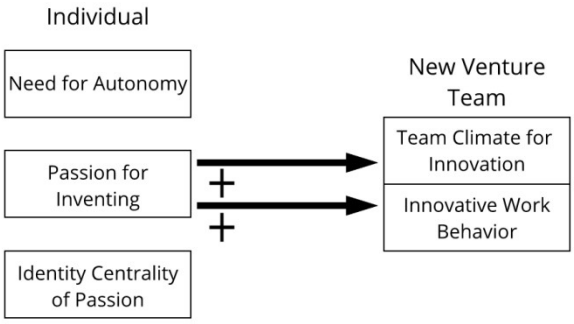

Figure 2. Model's hypotheses tested

5. DISCUSSION

The aim of this paper was to explore the relationship between personal entrepreneurial characteristics that is the need for autonomy and entrepreneurial passion and the innovativeness of new venture teams. Therefore, a panel study was conducted, where students simulated being in nascent entrepreneurial teams, creating a business idea and planning their business along the lean canvas model. The degree of the individual's need for autonomy and their passion for inventing was explored by using established scales in several surveys. Additionally, to measure the outcome variable of this research, the innovativeness of the team was assessed via two particular constructs, the team climate for innovation and the innovative team work behavior.

The empirical analyses established a significant, positive relationship between passion for inventing, meaning the intense positive feeling itself, and the team innovativeness. This outcome means that passion for inventing affects both, the team climate for innovation and the innovative work behavior of the group.

Unfortunately, there was no significant relationship between the motivational factor *Need for Autonomy* and the team's innovativeness. This is no indication for non-existence, but the outcomes of the regression analysis with validated measurements do not present supportive arguments for a connection of these two variables. Additionally, it should be mentioned that it was also not possible to detect a joint effect of autonomy with *Passion for Inventing* as a moderator.

The same accounts for the relationship between the identity centrality of the passion for inventing and the innovation output of the team. The results could not provide arguments for an effect.

This research's results regarding passion and team innovativeness support the findings of Montiel-Campos and Palma-Chorres (2016), who also found a positive relationship between these two variables. They found that entrepreneurial passion for developing, another subscale originating from Cardon et al. (2013), measuring the individual's passion for developing organizations, affected the company's innovativeness of Mexican founders with creativity as a moderator. With the measurement of the entrepreneur's passion for inventing and founding teams as level of analysis, this paper is able to provide a basis for more differentiated interpretations of the relationship between predictor and outcome. This is also because this research distinguishes two dimensions of innovativeness, namely the climate and the work behavior of new venture teams. Comparing the outcomes of this paper with Montiel-Campos and Palma-Chorres' (2016) research it is also interesting to see a similarity of the results regarding entrepreneurial passion and innovativeness between the study in a Latin American and a Central European country.

This research's results of the passion's identity centrality's effect are also in line with Montiel-Campos and Palma-Chorres's (2016) findings. They could not find a significant effect of identity centrality either. Since the same scales are utilized, it does not allow for a conclusion, whether the reason for this is the non-validity of the measurement or the actual absence of a relationship.

Although, this research is not able to support the hypothesis stating that the individual's need for autonomy has a negative effect on the innovativeness of the team, it could also not confirm Olivari's (2016) findings, since none of the results were near statistical significance. She stated that the entrepreneur's motivation in form of his or her need for autonomy has a positive effect on innovativeness.

A possible explanation of this research's findings could be delivered by Foo, Wong and Ong (2005). Differences among team members regarding values and interests are characterized in their paper as non-task diversity. Foo et al. (2005) developed and confirmed the hypothesis that nontask diversity was negatively related to the performance of new venture teams. However, they also found a positive relationship between task diversity and performance and additionally concluded that team size has a moderating effect. Although the sample of this paper's research consists of students participating in the same study programme, it is not possible to make any statements about the task diversity of groups. Zhou and Rosini (2015) also refer to the findings of Foo et al. (2005) and add the environment and leadership behavior as influencing factors of performance. Indeed, the environment of the new venture team could be viewed as a plausible explanation for this study's inability of finding a relationship between the need for autonomy and the team's innovativeness. Already Herron and Robinson (1993) believed to find in situational context and environment the reasons why researchers were not able to detect a relationship between personality traits and the firm's performance. When all environmental factors are constant, for example, motivation is assumed to be very influential in entrepreneurship (Shane, Locke, & Collins, 2003). A support for this constraint could be provided by Mischel (1968), whose

notion is that a person's actions can only be affected by his or her personal characteristics, if the situation, which means the context and environment, makes this possible. Van Gelderen and Jansen (2006), for example, talk about paradoxes when it comes to the gap between motivation and reality. In many of their examples the environment and context constraint the fulfilment of the entrepreneurs' wishes, which were the reasons for starting up a business in the first place. Regarding people with the entrepreneurial motive of wanting autonomy, so that they have more power and control, they say that they "may find as a small business owner they often have very little control, if only because they have to deal with several types of uncertainty" (p.31). These environmental factors are, thus, referred to by van Gelderen (2016) as "autonomy demands". In his qualitative study he confirms these constraints on entrepreneurs, who are restricted by their stakeholders, customers, the competitive environment, laws and regulations. Although the participants of this paper's study probably did not experience these factors, because they only simulated setting up a business, van Gelderen's (2016) "autonomy demands" can still be applied to the results of this paper. A large percentage of the circumstances challenging the entrepreneur's autonomy, which his interviewees faced, were rooted in interactions with "business partners, employees, or advisors" (p. 553). Besides dealing with other team members, or business partners, the new venture teams in this paper's research sample probably faced other constraints as well, like the prescribed procedure, time constraints and the requirement of delivering results at the end of the study. It is, therefore, assumable that environmental and contextual factors affected the sample of nascent new venture teams and thereby the relationship of motivation and innovational team performance.

The environment of the team as a possible explanation is also in line with this paper's findings regarding the positive passion-innovativeness relationship. Passion is declared to positively influence the entrepreneur's recognition of opportunities, his or her ability of acquiring resources and the responsiveness to demands, when the environment is characterized as dynamic and unstructured (Baron, 2008). Montiel-Campos and Palma-Chorres (2016) have similar statements regarding the dynamism of an entrepreneur's environment and the passion-creativity relationship. Referring to creativity as the moderator between passion and innovativeness, they assert that a dynamic environment causes an increased effect of passion on creativity, because it is able to "generate a high level of activation" (p.78). An explanation for that could be delivered by Baron (2008) who states that in an unstable environment the entrepreneur cannot rely on his or her experiences. Not having this knowledge to rely on, passion, thus, can have an extensive influence on his or her cognitions and actions.

The unpredictable and unstructured environment, which is seen as supportive for passion in entrepreneurship, stands in conflict with Shane, Locke and Collins' (2003) above mentioned assumption that motivation is influential in the practice of entrepreneurs, when the contextual factors are held being constant. Therefore, the explanation, referring to environmental and contextual factors, seems to be appropriate for explaining the findings of this paper's research, having found a positive passion-team innovativeness and a non-significant need for autonomy-team innovativeness relationship.

However, since it was not controlled for these factors in this research, it is not possible to say whether these possible reasons are applicable or not. Additionally, it is not possible to make statements about *to which extent* the findings are explained by the factor environment.

5.1 Limitations

One of the major limitations to this study is the size of the sample. For a confirmatory factor analysis, Arrindell and van der Ende (1985) developed a rule of thumb of 20 observations per factor, or in this case per variable (as the research's measurements were already analysed by previous literatures' factor analyses, it is appropriate to refer to it as variable). Unfortunately, there are not only the three independent variables, but also two complex and multidimensional constructs measuring the dependent variable. The TCI, measuring the innovative team climate, has five dimensions and, thus, five factors, as the construct of *Innovative Work Behavior* has four factors on which the different items load. A factor analysis would as a consequence require 240 observations.

For the purpose of conducting a multivariate regression analysis, 15 to 20 cases per independent variable are solid (Hair et al., 2014). Having three independent variables, an optimal sample size would be around 60 cases. Taking only this estimation into account, the sample size of this research (N=51) would be appropriate and allow for a generalizability of the results, when the sample can be considered as representative (Hair et al., 2014).

The question of representativeness and generalizability of the findings is another concern that could limitate the expressiveness of this research. Not only that Gartner et al. (1994) recommends a more differentiated analysis of entrepreneurship, because averaging business founders does not live up to the many incomparable situations particular entrepreneurs find themselves in, also, this panel study is only build on a simulation, or role-play, of the entrepreneurial process. Although some students voiced intentions of pursuing their business ideas, this study did in fact not include real foundations of companies, but "as-if" simulations. The lack of realness is a concern that scholars see as very critical (Carlsmith, Ellsworth, & Aronson, 1976). Some scholars, like Spencer (1978), see extensive threats to validity, when using certain types of role-playing in research. Therefore, the findings have to be interpreted with caution. Especially when it comes to environment and context, the panel study might lack realism, which could have affected the results.

Lastly, it is questionable, if this paper's findings are applicable and valid across national boundaries and for people with different educational backgrounds. Although some findings of this paper are similar to studies of scholars, which conducted their research in other countries with different sample characteristics, the unique approach of this research and the relatively homogenous sample put the generalizability into question. The sample consists of mainly Dutch students coming from the same study programme. This provides us with no variety in educational backgrounds and, since there is no large variation in nationalities either, it does, strictly taken, not allow for adopting the results for entrepreneurs with other national backgrounds.

5.2 Theoretical implications

This paper measured team innovativeness by combining two constructs. Using the scales of Anderson and West (1998) and de Jong and den Hartog (2010), the influence of the individual's characteristics on the climate within the team and the team's work behavior were assessed. This is a relatively unique approach to exploring the effects on the innovation outcome of the team. Not allowing for a direct combination, the analysis and interpretation may be a little more complex, but it also allows for a more differentiated understanding. Therefore, it provides relatively new insights about the relationship between the individual's degree of passion and the innovativeness of

new venture teams. Regarding this relationship, this paper can be viewed as extention to the research on entrepreneurial passion and shows especially the applicability of Cardon et al.'s (2013) measurement tool. This study also strengthens the existing research in the argumentation on how important entrepreneurial passion is. Passion is now not only of importance for building up a business alone, but now proven to be very influential on the innovativeness of new venture teams. Also interesting is that this paper is able to confirm the results of Montiel-Campos and Palma-Chorres (2016) with regard to the identity centrality of the passion. This could mean that the degree of passion indeed influences the innovation output of the team, although it is not necessarily central to the individual's identity. This hypothesis has to be confirmed and, more importantly, explained. Unfortunately, there can be no extensive implications presented on the relationship of entrepreneurial motivation and innovativeness in new venture teams. Eventually there can be found significant results when this sort of relationship is explored with a different measurement and a larger sample size.

5.2 Recommendation for future research

The aim of this paper was not only to replicate the outcomes of previous studies, but to deepen the knowledge on entrepreneurial teams and the predictors of their innovation success by exploring various individual-level dimensions. However, this research also uncovers a variety of questions that would be recommendable to be followed up in future research.

Although a significant relationship between the team member's passion for inventing and the different dimensions of the team innovativeness was found, it does not say anything about the real causal connection between these variables. It could be possible, as previous literature states, that the relationship can be explained with creativity as a moderator (Montiel-Campos & Palma-Chorres, 2016; Baron & Tang, 2011). A perhaps qualitative and longitudinal investigation of the dynamics between these phenomena is, thus, highly recommended.

Furthermore, the analysis of the findings raises questions concerning the environment of the new venture teams. Since the environmental and contextual factors were not included in this research, it would be worthwile to explore their effects on the relationships between the team member's need for autonomy, his or her passion for inventing and the innovativeness of the entrepreneurial team. However, doing this exploration would require caution regarding the research design and the issue of research's closeness to reality. Scholars would then have to decide if a simulation like the one conducted in this study is appropriate for assessing the environment or if they risk their research to suffer from the winner's bias.

Also interesting would be to test the relationship of passion and innovativeness with the other two domains developed by Cardon et al. (2013), namely passion for founding and passion for developing. In addition to this, a different measurement for the identity centrality could be developed, to see whether this paper's findings are caused by the measurement or by an actually non-existent relationship.

Lastly, as already mentioned above, assessing the effect of entrepreneurial motivation, especially the need for autonomy, on the dynamics of the team and its innovation output should be followed up. This should be conducted, using another measurement, in order to see, whether similar results will be found.

5.3 Practical implications

Especially for potential entrepreneurs, which consider founding a company with other like-minded people or business partners, the outcomes of this study can be viewed as interesting. Passion is established as a very important component when creative solutions and innovations are frequently required during the entrepreneurial process. This applies in particular if the members of the new venture teams are passionate about inventing. Therefore, this can be considered as a vital aspect for chosing possible team members or business partners. However, not only for nascent entrepreneurs this research has a certain value.

Entrepreneurs that already have a business, but think about extending the company by finding a business partner, can profit from this paper's insights. When there is a focus on increasing the innovativeness, entrepreneurs should seek for possible team members that show a notable entrepreneurial passion, especially for inventing.

If an entrepreneurial team already exists, this research can help to strengthen the self-awareness regarding a person's passion and possible impacts on the innovativeness of the team. This could act as a basis for a different communication and division of tasks, when the development of new ideas is of importance. Additionally, this could be important for companies that would like to build up a new venture with a selected project team responsible for the development. These findings can provide a basis for the team composition. This could imply that in order to increase the creative problem-solving and as a consequence the probability of the team's success, the team members' passions should be supported in certain ways.

Supporting entrepreneurial passion should also be an important part in the entrepreneurial education. Curriculums of such programmes should include the promotion and encouragement for the individual to develop his or her passion. The findings of this research not only underline the support of building entrepreneurial passion, but also teaching which effects this can have on teams and their innovativeness.

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8. APPENDIX A

8.1 Cronbach's Alpha for dimensions of dependent variable

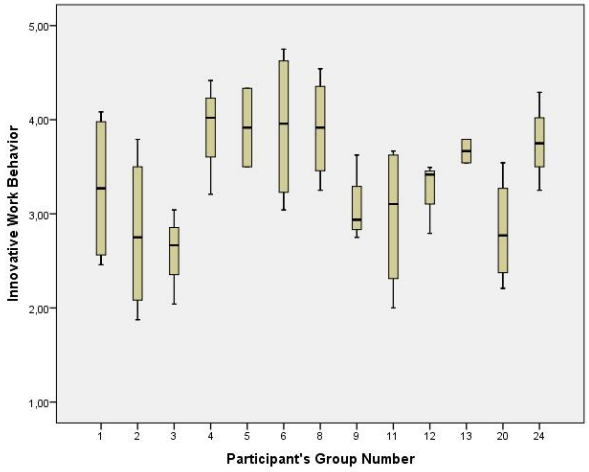
	Cronbach's Alpha	N of Items
TCI_Vision	.905	11
TCI_Participation Safety	.916	8
TCI_Support for Innovation	.917	8
TCI_Task Orientation	.925	7
TCI_Interaction Frequency	.921	4
IWB_Idea Exploration	.593	2
IWB_Idea Generation	.826	3
IWB_Idea Championing	.850	2
IWB_Implementation	.823	3

8.2 Analysis on the individual level

Directional Measures

			Value
Nominal by Interval	Eta	Innovative Work Behavior Dependent	,662
		Participant's Group Number Dependent	,945

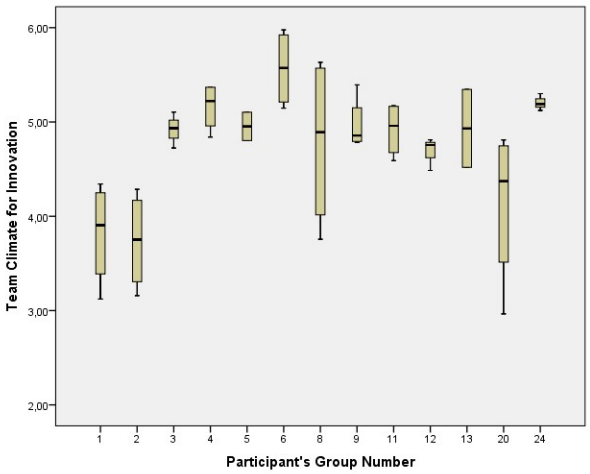
Eta squared: 0,438548



Directional Measures

			Value
Nominal by Interval	Eta	Participant's Group Number Dependent	1,000
		Team Climate for Innovation Dependent	,791

Eta squared: 0,625347



Assumption of normally distributed DV:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Team Climate for Innovation	,116	51	,084	,958	51	,066
Innovative Work Behavior	,067	51	,200*	,988	51	,891

*. This is a lower bound of the true significance.

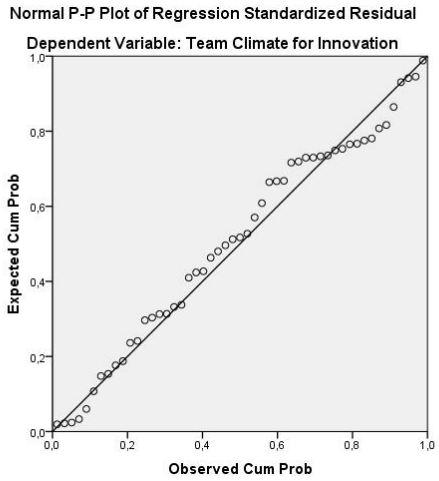
a. Lilliefors Significance Correction

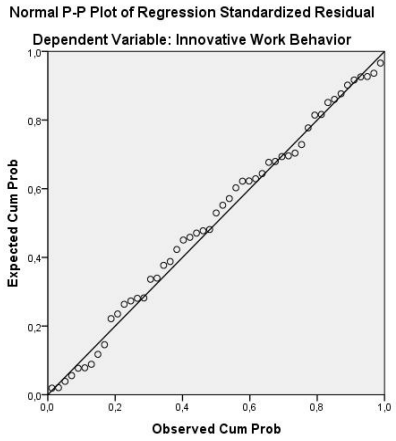
Shapiro-Wilk score is not significant (0.066 and 0.891 > 0.05), therefore we can assume that the DV is normally distributed.

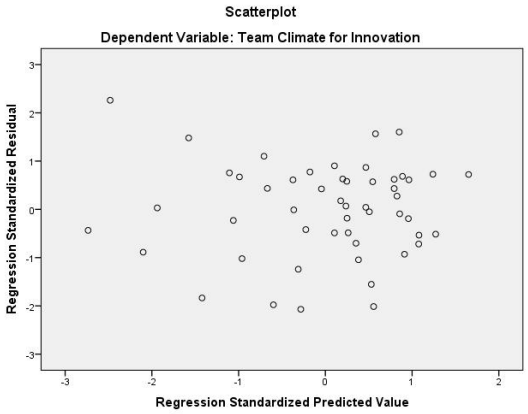
Assumption of no Multicollinearity between the IV:

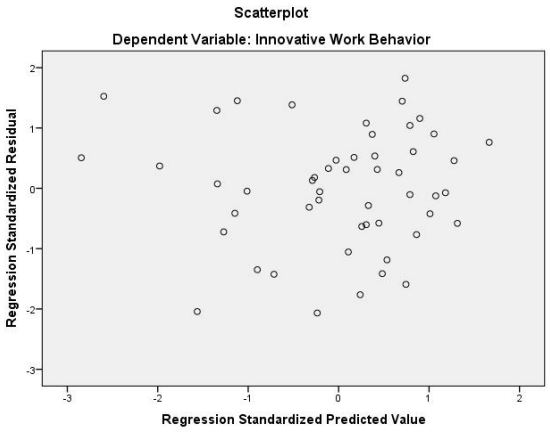
The correlation coefficient between *Need for Autonomy* and *Intense Positive Feeling for Inventing* is only 0.253, which is smaller than 0.7. We can, therefore, assume that the predictor variables are not mutlicollinear.

Assumption of Linear relationship:









The P-P Plot indicates that, although the graph for Team Climate for Innovation has some larger deviations, both models fulfill the assumption of a linear relationship.

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3,7945	5,1465	4,6375	,30822	51
Std. Predicted Value	-2,735	1,651	,000	1,000	51
Standard Error of Predicted Value	,109	,387	,181	,054	51
Adjusted Predicted Value	3,5886	5,1052	4,6409	,31129	51
Residual	-1,39213	1,52049	,00000	,65202	51
Std. Residual	-2,070	2,261	,000	,970	51
Stud. Residual	-2,117	2,463	-,002	1,016	51
Deleted Residual	-1,52474	1,80459	-,00345	,71771	51
Stud. Deleted Residual	-2,202	2,611	-,005	1,039	51
Mahal. Distance	,322	15,572	2,941	2,657	51
Cook's Distance	,000	,283	,026	,052	51
Centered Leverage Value	,006	,311	,059	,053	51

a. Dependent Variable: Team Climate for Innovation

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,8953	4,0701	3,2675	,48223	51
Std. Predicted Value	-2,845	1,664	,000	1,000	51
Standard Error of Predicted Value	,100	,356	,166	,050	51
Adjusted Predicted Value	1,8165	4,0301	3,2753	,48776	51
Residual	-1,27848	1,12828	,00000	,59959	51
Std. Residual	-2,067	1,824	,000	,970	51
Stud. Residual	-2,498	1,880	-,006	1,025	51
Deleted Residual	-1,88861	1,19747	-,00784	,67384	51
Stud. Deleted Residual	-2,653	1,934	-,010	1,045	51
Mahal. Distance	,322	15,572	2,941	2,657	51
Cook's Distance	,000	,772	,034	,109	51
Centered Leverage Value	,006	,311	,059	,053	51

a. Dependent Variable: Innovative Work Behavior

Both Std. Residuals are in the range of -3 and 3. Maximum of Cook's Distance is below 1.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,427[a]	,183	,130	,67250	,183	3,501	3	47	,023

a. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

b. Dependent Variable: Team Climate for Innovation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,627[a]	,393	,354	,61843	,393	10,134	3	47	,000

a. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

b. Dependent Variable: Innovative Work Behavior

Due to the relatively small sample size, the Adjusted R Square value will be interpreted. Looking at the regression model of *Team Climate for Innovation*, it can be said that this model explains only 14.8% of the variance of the outcome variable. In the case of the *Innovative Work Behavior*, with *Intense Positive Feeling for Inventing* and *Need for Autonomy* as predictors, the linear regression model explains 36.7% of the dependent variable's variance. When measuring with an alpha of 0.05, we can state that both values are statistical significant.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4,750	3	1,583	3,501	,023[b]
	Residual	21,256	47	,452		
	Total	26,006	50			

a. Dependent Variable: Team Climate for Innovation

b. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11,627	3	3,876	10,134	,000[b]
	Residual	17,976	47	,382		
	Total	29,603	50			

a. Dependent Variable: Innovative Work Behavior

b. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

Due to the statistical significance of the ANOVA we reject the null hypothesis that the slope of both regression lines equals zero.

8.4 Analysis with passion as a moderator

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,175[a]	,030	,011	,71733	,030	1,541	1	49	,220

a. Predictors: (Constant), Need for Autonomy with Passion as a Moderator

b. Dependent Variable: Team Climate for Innovation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,126[a]	,016	-,004	,77111	,016	,786	1	49	,380

a. Predictors: (Constant), Need for Autonomy with Passion as a Moderator

b. Dependent Variable: Innovative Work Behavior

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,793	1	,793	1,541	,220[b]
	Residual	25,214	49	,515		
	Total	26,006	50			

a. Dependent Variable: Team Climate for Innovation

b. Predictors: (Constant), Need for Autonomy with Passion as a Moderator

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,467	1	,467	,786	,380[b]
	Residual	29,136	49	,595		
	Total	29,603	50			

a. Dependent Variable: Innovative Work Behavior

b. Predictors: (Constant), Need for Autonomy with Passion as a Moderator

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4,608	,103		44,670	,000					
	Need for Autonomy with Passion as a Moderator	,118	,095	,175	1,241	,220	,175	,175	,175	1,000	1,000

a. Dependent Variable: Team Climate for Innovation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3,245	,111		29,262	,000					
	Need for Autonomy with Passion as a Moderator	,090	,102	,126	,886	,380	,126	,126	,126	1,000	1,000

a. Dependent Variable: Innovative Work Behavior

8.5 Analysis on the team level

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,372[a]	,138	-,149	,58096	,138	,482	3	9	,703

a. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

b. Dependent Variable: Team Climate for Innovation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,716[a]	,513	,350	,40154	,513	3,158	3	9	,079

a. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

b. Dependent Variable: Innovative Work Behavior

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,488	3	,163	,482	,703[b]
	Residual	3,038	9	,338		
	Total	3,526	12			

a. Dependent Variable: Team Climate for Innovation

b. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,527	3	,509	3,158	,079[b]
	Residual	1,451	9	,161		
	Total	2,979	12			

a. Dependent Variable: Innovative Work Behavior

b. Predictors: (Constant), Identity Centrality of Passion for Inventing, Need for Autonomy, Intense Positive Feeling for Inventing

9. APPENDIX B

9.1 Items measuring *Need for Autonomy*

	Very low importance (1)	Low importance (2)	Fairly low importance (3)	Moderate importance (4)	Fairly high importance (5)	High importance (6)	Very high importance (7)
Making my own decisions about work goals and methods. (1)	❍	❍	❍	❍	❍	❍	❍
Having personal freedom. (2)	❍	❍	❍	❍	❍	❍	❍
Regulating my own time. (3)	❍	❍	❍	❍	❍	❍	❍
Having direct responsibility for decision and results. (4)	❍	❍	❍	❍	❍	❍	❍
Being able to express my own personality and creativity. (5)	❍	❍	❍	❍	❍	❍	❍
Being in charge and in control of my work. (6)	❍	❍	❍	❍	❍	❍	❍
Not having a boss or rules. (7)	❍	❍	❍	❍	❍	❍	❍

9.2 Items measuring *Passion for Inventin* (Intense Positive Feelings and Identity Centrality)

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
It is exciting to figure out new ways to solve unmet market needs that can be commercialized. (1)	❍	❍	❍	❍	❍	❍	❍
Searching for new ideas for products/services to offer is enjoyable to me. (2)	❍	❍	❍	❍	❍	❍	❍
I am motivated to figure out how to make existing products/services better. (3)	❍	❍	❍	❍	❍	❍	❍
Scanning the environment for new opportunities really excites me. (4)	❍	❍	❍	❍	❍	❍	❍
Inventing new solutions to problems is an important part of who I am. (5)	❍	❍	❍	❍	❍	❍	❍

9.3 Items measuring *Team Climate for Innovation* (Vision, Participative safety, Task orientation, Support for innovation, Interaction frequency)

	Not at all (1)	Little (2)	Somewhat (3)	Moderately (4)	Much (5)	Very much (6)	Completely (7)
How clear are you about what your team's objectives are? (1)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think they are useful and appropriate objectives? (2)	❍	❍	❍	❍	❍	❍	❍
How far are you in agreement with these objectives? (3)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think other team members agree with these objectives? (4)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think your team's objectives are clearly understood by other members of the team? (5)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think your team's objectives can actually be achieved? (6)	❍	❍	❍	❍	❍	❍	❍
How worthwhile do you think these objectives are to you?	❍	❍	❍	❍	❍	❍	❍

(7) How worthwhile do you think these objectives are to the potential organization you may found together? (8)	❍	❍	❍	❍	❍	❍	❍
How worthwhile do you think these objectives are to the wider society? (9)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think these objectives are realistic and can be attained? (10)	❍	❍	❍	❍	❍	❍	❍
To what extent do you think members of your team are committed to these objectives? (11)	❍	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
We share information generally in the team rather than keeping it to ourselves. (1)	❍	❍	❍	❍	❍
We have a 'we are in it together' attitude. (2)	❍	❍	❍	❍	❍
We all influence each other. (3)	❍	❍	❍	❍	❍
People keep each other informed about work-related issues in the team. (4)	❍	❍	❍	❍	❍
People feel understood and accepted by each other. (5)	❍	❍	❍	❍	❍
Everyone's view is listened to even if it is in a minority. (6)	❍	❍	❍	❍	❍
There are real attempts to share information throughout the team. (7)	❍	❍	❍	❍	❍
There is a lot of give and take. (8)	❍	❍	❍	❍	❍

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
This team is always moving toward the development of new answers. (1)	❍	❍	❍	❍	❍
Assistance in developing new ideas is readily available. (2)	❍	❍	❍	❍	❍
This team is open and responsive to change. (3)	❍	❍	❍	❍	❍
People in this team are always searching for fresh, new ways of looking at problems. (4)	❍	❍	❍	❍	❍
In this team we take the time needed to develop new ideas. (5)	❍	❍	❍	❍	❍
People in the team co-operate in order to help develop and apply new ideas. (6)	❍	❍	❍	❍	❍
Members of the team provide and share resources to help in the application of new ideas. (7)	❍	❍	❍	❍	❍
Team members provide practical support for new ideas and their application. (8)	❍	❍	❍	❍	❍

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a moderate extent (4)	To a fairly great extent (5)	To a great extent (6)	To a very great extent (7)
Do your team colleagues provide useful ideas and practical help to enable you to do the job to the best of your ability? (1)	❍	❍	❍	❍	❍	❍	❍
Do you and your colleagues monitor each other so as to maintain a higher standard of work? (2)	❍	❍	❍	❍	❍	❍	❍
Are team members prepared to question the basis of what the team is doing? (3)	❍	❍	❍	❍	❍	❍	❍
Does the team critically appraise potential weaknesses in what it is doing in order to achieve the best possible outcome? (4)	❍	❍	❍	❍	❍	❍	❍
Do members of the team build on each other's ideas in order to achieve the best possible outcome? (5)	❍	❍	❍	❍	❍	❍	❍
Is there a real concern among team members that the team should achieve the highest standards of performance?	❍	❍	❍	❍	❍	❍	❍

(6) Does the team have clear criteria which members try to meet in order to achieve excellence as a team? (7)	❍	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
We keep in touch with each other as a team. (1)	❍	❍	❍	❍	❍	❍	❍
We keep in regular contact with each other. (2)	❍	❍	❍	❍	❍	❍	❍
Members of the team meet frequently to talk both formally and informally. (3)	❍	❍	❍	❍	❍	❍	❍
We interact frequently. (4)	❍	❍	❍	❍	❍	❍	❍

9.4 Items measuring *Innovative Work Behavior* (Idea exploration, Idea generation, Idea championing and Idea implementation)

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
... pay attention to issues that are not part of your task? (1)	❍	❍	❍	❍	❍
... wonder how things can be improved? (2)	❍	❍	❍	❍	❍
... search out new working methods, techniques or instruments? (3)	❍	❍	❍	❍	❍
... generate original solutions for problems? (4)	❍	❍	❍	❍	❍
... find new approaches to execute tasks? (5)	❍	❍	❍	❍	❍
... make important team members/colleagues enthusiastic for innovative ideas? (6)	❍	❍	❍	❍	❍
... attempt to convince people to support an innovative idea? (7)	❍	❍	❍	❍	❍
... systematically introduce innovative ideas into work practices? (8)	❍	❍	❍	❍	❍
... contribute to the implementation of new ideas? (9)	❍	❍	❍	❍	❍
... put effort in the development of new things? (10)	❍	❍	❍	❍	❍