Tampere University

TAHANI Z. ALDAHDOUH

Individual Innovativeness in Higher Education

Antecedents and Consequences

Tampere University Dissertations 244

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TAHANI Z. ALDAHDOUH

Individual Innovativeness in Higher Education: Antecedents and Consequences

(يوسف، 76)

"Above everyone who has knowledge there is the One who is all knowing"
(Yusuf, 76)

ACKNOWLEDGEMENTS

Undertaking this PhD has truly been a mind-changing experience for me, and I owe a lot to being given this vital experience. Despite the hard days, frustrating situations and endless trial and error, this experience has really been a milestone in my life where my academic and professional worlds have taken a new turn. I started to see things differently, my conceptions of scientific research expanded and my identity as an educational researcher started to take shape, along with my engagement with the scientific community. I am really beholden for such an experience.

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not and still does not hesitate to provide job opportunities and funding for my research.

The initial steps towards my real integration into the university and, specifically, the faculty of education, was thanks to my supervisor Dr Vesa Korhonen, who became the main supervisor of my PhD study after one year. Dr Vesa helped me a lot with conducting the study procedures. I do not remember a single case where I sent him an email and he ignored it. He always listened and responded with attention. His suggestions were the key to my professional development. He suggested that I attend the University's Pedagogy course to experience the university teaching here in Finland. He was also in support of joining the international project between the Tampere University and the Islamic University of Gaza, Palestine. Moreover, he facilitated a lot of job opportunities, which have certainly expanded my social network in the science community. Finally, I would like to thank you both, Prof. Petri and Dr Vesa, for your openness and patience regarding the many emails and questions I sent to you. I admit that I was an inquisitive and hot-headed person. However, I have learnt a lot from your answers and suggestions.

I greatly appreciate the constructive feedback provided by the pre-examiners of this dissertation; thank you, Dr Vesa Taatila and Prof. Eva Kyndt, for your helpful comments and suggestions. I would also like to thank Prof. Auli Toom for agreeing to be my opponent in the thesis defence. My thanks also go out to Ms Laura Lalu, the owner of a smiley face, who supports international newcomers at Tampere University. I am also grateful to all my colleagues at the faculty of education, and my classmates at the PhD seminars, especially Jouko Jousea, Tanja Hautala, Vesna Holubek and Anne Tornberg, who were always so helpful and willing to provide assistance throughout my dissertation.

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Thanks to my family, those who are close to me who are living a great distance away: my father, my mother, my brother and my sisters. Without your prayers and your support during hardship and easier times, your accompaniment to the airport and your support for me and my children during my life course, this PhD would not have been completed. Thanks to my second family, the family of my husband. Thanks to my husband's sisters and my mother-in-law, the perfect example of giving, sacrifice, a love of knowledge and endless sincerity.

The cover of this dissertation carries one name as the author. However, the work presented in this dissertation was the result of the efforts of my whole family. Thanks to my husband who is always my hero and my supporter in both my personal and professional lives. Without your sustained help and encouragement, this dissertation would never have been completed. Warm thanks to my lovely children: Jana, Momin, Mamoon and Ahmad. In spite of being naughty, you are the flavour of my life. I love your beautiful and expressive drawings and messages that give me energy to continue my path.

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Tampere 02.02.2020

Tahani

ABSTRACT

Today, intense competition among higher education institutions (HEIs) is ongoing to achieve cutting-edge publications, attain research funding, possess scientific patents, keep abreast of emerging technologies and adapt quickly to everyday changes. *Innovativeness* has become the buzzword in HEIs, especially in those seeking prosperity and advancement. Innovativeness here refers to the individual's disposition to accept changes, try new experiences, deal with ambiguity, take risks and embrace novel ideas. In the digital age, staff members experience nonstop changes in their workplace environments and have no option but to welcome such changes with open arms. Otherwise, they will most likely get a warm job farewell party. Despite the obvious significance of individual innovativeness, there remains a paucity of evidence on the antecedents and consequences of individual innovativeness in higher education.

Two aims were established for this doctoral dissertation. For one, the dissertation sought to investigate the psychological and organisational factors contributing to individual innovativeness. For the other, the dissertation pursued the examination of the consequences of innovativeness and provided evidence on whether models studied in business and management fields are also valid for the higher education context.

This article-based dissertation consists of four publications. Each one forms a part of the whole project. *Study I*, which was dedicated to organisational factors, explored how staff members perceive the cultures and growth atmospheres and the relationship between them in their departments/schools. It also examined whether differences exist in cultural perceptions based on staff members' demographic variables. *Study II*, which was dedicated to psychological factors, examined the roles of implicit theory and goal orientation as predictors of innovativeness. *Study III* investigated the interaction between psychological factors (implicit theory and goal orientation) and organisational culture in predicting innovativeness. *Study IV* had a twofold objective. It inspected the staff members' usage of technological devices, Office 365 (O365) Cloud services and social media. It also set out to prove the power of individual innovativeness in predicting technology usage.

The research followed a cross-sectional correlational survey design. A total sample of 742 staff members working at Tampere University participated in the research. Two online self-reported questionnaires were administered during the 2015–2016 and 2016–2017 academic years. We analysed the data employing basic and advanced statistics, including structural equation modelling (SEM) and multilevel Bayesian path analysis.

The findings suggested that one's goal orientations are most relevant in interpreting his/her innovativeness or willingness to change. More specifically, individuals adopting mastery goal orientations (focusing on learning and improving one's knowledge and skills) are more likely to be innovators, whereas individuals adopting performance-avoidance goal orientations (avoiding looking incompetent and incapable relative to others) are less likely to be innovators. Furthermore, our findings indicated that the dominant perceived culture at Tampere HEIs is Clan culture, which is characterised by coherent relationships among staff members and considerable attention paid to their professional development and gratification. In addition, only the Clan and Adhocracy culture types were found to support professional growth. Contrary to previous studies, this dissertation showed that departmental culture had neither a direct effect on innovativeness nor a moderation effect on the relationships between psychological factors and innovativeness. In terms of consequences, the results showed that technology was satisfactorily used by the staff members, although their professional usage was less than their personal usage. Our findings also confirmed that innovativeness is a significant positive–albeit weak–predictor of staff members' usage of devices, non-academic social media and institutional O365 services. Finally, the dissertation showed that academics who were earlier adopters of academic social media and commercial services were later adopters of institutional O365 services.

The findings have a number of important implications for theory and practice. Theoretically, this dissertation is one of the first attempts to integrate implicit theory and goal orientation, together with organisational culture, into one model predicting innovativeness. The model is also among the few that employ a multilevel modelling technique, which is more appropriate for this kind of data. It is worth noting that the results of the multilevel analysis emphasised the essential role of goal orientations, but not implicit theory, in predicting innovativeness. These results call researchers to revisit the mediation role of goal orientation between implicit theory and human attributes, taking into account the nested structure of their data. Moreover, this dissertation calls for a re-examination of the role of culture, taking the type of institution into account (academic vs business). Practically, the findings

suggest several implications for HEI administrators and practitioners. First, the dissertation draws the attention of managers in that by allowing the staff flexibility, discretion and autonomy, this implicitly guarantees their professional growth. Second, administrators and supervisors should stimulate staff members' orientations towards mastery goals and inhibit their orientations towards performance-avoidance goals. For example, feedback and appraisal should be self-referenced rather than other-referenced based. The criterion for performance judgment should focus on efforts rather than ability. Third, HEIs should take wise and fast decisions about technology adoption because late adoption implicitly means that staff members will resort to other commercial alternatives.

Keywords: innovativeness, goal orientation, implicit theory, mindset, organisational culture, professional development and growth, structural equation modelling, multilevel modelling, antecedents, consequences, technology adoption, social media, higher education

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ORIGINAL PUBLICATIONS

This doctoral dissertation is based on the following four co-authored[1] articles. The articles are referred to in the text by Roman numerals. Articles I, II, III and IV are reprinted with the kind permission of the publishers.

I. Aldahdouh, T. Z., Korhonen, V., & Nokelainen, P. (2017). How does an organisation's culture relate to professional growth? A study of Finnish higher education institutions. *Ammattikasvatuksen Aikakauskirja*, *19*(1), 9–30.

II. Aldahdouh, T. Z., Nokelainen, P., & Korhonen, V. (2018). Innovativeness of staff in higher education - Do implicit theories and goal orientations matter? *International Journal of Higher Education*, *7*(2), 43–57. https://doi.org/10.5430/ijhe.v7n2p43

III. Aldahdouh, T. Z., Korhonen, V., & Nokelainen, P. (2019). What contributes to individual innovativeness? A multilevel perspective. *International Journal of Innovation Studies*, *3*(2), 23–39. https://doi.org/10.1016/j.ijis.2019.06.001

IV. Aldahdouh, T. Z., Nokelainen, P., & Korhonen, V. (2020). Technology and social media usage in higher education: The influence of individual innovativeness. *SAGE Open*, *10*(1), 1–20. https://doi.org/10.1177/2158244019899441

[1]Tahani Aldahdouh was in charge of the studies' conception and design, data collection, data analysis and interpretation and the writing of the manuscripts (*studies I*, *II*, *III* and *IV*). Vesa Korhonen supervised the research and provided feedback and comments on the manuscripts. Petri Nokelainen contributed to the research conception and design and provided consultation and assistance with the statistical analysis.

1 INTRODUCTION

"Change is hard at first, messy in the middle, and gorgeous at the end."

Robin Sharma

HEIs are in a race to adopt new technologies, to advocate new initiatives and to restructure themselves so as to cope with changes and to survive in the ever-changing world. Competition is hectic and accelerated. History is full of successful stories of institutions with tremendous achievements, and it is also full of institutions that failed to adapt to change and remain only as an entry in history books. According to Cameron and Quinn (2006), three-quarters of organisation change initiatives "have failed entirely or have created problems serious enough that the survival of the organisation was threatened" (p. 1). The main causes of failure may be due to ignoring the cultural aspects of their organisations and the personal factors of their employees.

The changes are prevalent, and HEIs are no exception (Tierney & Lanford, 2016). According to Stocks et al. (2017), finance and technology are the two main forces driving change in HEIs. At the beginning of this dissertation, our focus was to track the adoption of O365 Cloud Computing services, which represent one of the recent technologies adopted in the three HEIs in Tampere: the University of Tampere (UTA), Tampere University of Technology (TUT) and Tampere University of Applied Sciences (TAMK). But as time passed during the course of this dissertation, the first seeds of the Tampere3 initiative, which aimed to merge these HEIs, began to come to light, and by the end of the dissertation, this merger process had been launched. Therefore, we expanded our focus to track change in general, rather than change in terms of accepting a specific technology.

Five years ago, the UTA, TUT and TAMK proposed an initiative to join forces and develop a new kind of cooperation. A new foundation, called Tampere University (formerly known as Tampere3), was planned to allow students and staff members from the three HEIs to collaborate and establish the second largest university in Finland with an inspiring globally attractive multidisciplinary

environment for research and learning. Huge efforts, however, were certainly needed to bring this great idea down to earth. What we know from studying the literature is that caution should be taken when different institutions work together on a 'reengineering' change initiative. According to a report by Myklebust (2019), the Tampere University merger process encountered almost all the challenges mentioned in the literature, specially difficulties that were due to "organisational, political and cultural differences, different interests and power struggles" (p. 1).

Thus, this dissertation set out to investigate factors contributing to the willingness to accept changes and adopt innovations in higher education. The focal point of the investigation was the *individual* as the unit of adoption. The individual acceptance of innovation will be referred to hereafter as innovativeness. Innovativeness has been repeatedly cited as an important determinant of innovation adoption. Three different conceptualisations of innovativeness have been proposed in the literature: behavioural, general and domain-specific innovativeness (Bartels & Reinders, 2011; Kaushik & Rahman, 2014). In this dissertation, we measured innovativeness based on its behavioural and general levels. The behavioural approach defines innovativeness as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 242). In other words, the behavioural approach focuses on the real act of innovation adoption, and that is why it has been sometimes referred to in the literature as *actualised innovativeness* (Midgley & Dowling, 1978) or *innovative behaviour* (Jong & Hartog, 2007). The general approach conceives innovativeness as a psychological construct or individual characteristic that shapes individual disposition towards newness regardless of the kind of innovation (Aldahdouh, Nokelainen, & Korhonen, 2018). General innovativeness has been mentioned in the literature under several names: *life innovativeness* (Roehrich, 2004), *personality-trait innovativeness* (Hurt, Joseph, & Cook, 1977), *global trait innovativeness* (Goldsmith & Foxall, 2003) and *innate innovativeness* (Midgley & Dowling, 1978).

It seems that the study of the factors predicting innovativeness has gained considerable attention from researchers across nations and over time (Anderson, Potočnik, & Zhou, 2014; Frambach & Schillewaert, 2002; Parzefall, Seeck, & Leppänen, 2008; Patterson, Kerrin, & Gatto-Roissard, 2009; Wisdom, Chor, Hoagwood, & Horwitz, 2014), yet the literature lacks clarification on the role of the interaction between two distinct levels: psychological and organisational factors. There have been scattered previous efforts to investigate this interaction, and their results were inconclusive (Miron, Erez, & Naveh, 2004; Montani, Odoardi, & Battistelli, 2014; Scott & Bruce, 1994). In addition, none of the previous studies has

examined the function of two important psychological factors: implicit theory and goal orientations. Those two factors have been shown to have effects on multi-domains of human behaviour (Dweck, 2006; Dweck & Grant, 2008), and it may be the case that they have similar roles in shaping one's innovativeness.

Additionally, the nature of the relationship between general innovativeness and actualised innovativeness is still vague (Bartels & Reinders, 2011; Kaushik & Rahman, 2014). It is worth noting that the value of general innovativeness remains questionable if we do not confirm its predictive power regarding the actual adopting behaviour. The results of previous studies, although limited, were mixed.

It should not escape our notice that the studies on which we have built our hypotheses about the interaction between psychological and organisational predicting factors or the predictive power of general innovativeness were conducted in the management and business domains. This shortage adds additional uncertainty as to whether their models are applicable to other domains, including higher education.

Needless to say, in the postindustrial age, the age of artifical intelligence (AI), the need for one to innovate is not an option anymore. It is a must. In their work, Nokelainen, Nevalainen and Niemi (2017) have made it clear that the labour market will witness, within the next 20 years or so, dramatical changes unfold, in that humans will lose a lot of jobs to automation, even the cognitive ones. Only highly cognitive, creative and innovative tasks will remain for humans to do. Of even greater concern would be the high competition among organisations, emergent initiatives and technologies, and the steep growth in knowledge. All of these factors stimulate us to be innovators. Even more motivating is that staff members at HEIs are knowledge workers who are expected to accept changes, take risks and cope with ambiguities. It is really surprising that the staff members at HEIs, who most need to innovate, are precisely those who have received the least amount of research attention.

1.1 Objectives and research questions

The main objective of this dissertation is to examine the antecedents and consequences of individual innovativeness. Specifically, the aims are the following:

1. To investigate the perceived organisational cultures and growth atmospheres at Tampere HEIs.

2. To explore the roles of implicit theory and goal orientation as psychological predictors of general innovativeness.
3. To inspect the interaction between psychological and organisational factors in influencing general innovativeness.
4. To examine the predictive power of general innovativeness.

To achieve these objectives, four research questions were formulated as follows:

RQ1. What do the staff members of the Tampere HEIs perceive their schools' or departments' cultures and growth atmospheres to be like?

RQ2. Do implicit theory and goal orientations predict general innovativeness?

RQ3. How do both psychological and organisational factors interact to influence general innovativeness?

RQ4. Does general innovativeness predict the actual usage of technology?

Figure 1 shows an overview of the dissertation with the research questions addressed.

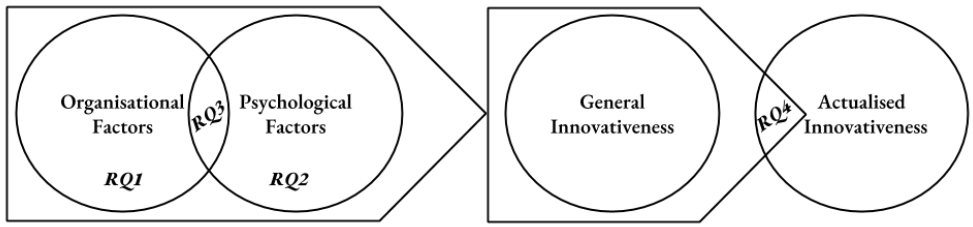

Figure 1. Overview of dissertation research questions

At first, the investigation explored the organisational cultures and atmospheres that prevailed at Tampere HEIs before the merger (*study I*). Our intention was to examine how staff members perceived the cultures in their departments and whether these cultures supported or hindered their professional growth. Then, we sought to investigate the psychological factors contributing to staff members' innovativeness (*study II*). Considering that our sample included staff members working in different departments and/or faculties at Tampere University, *study III* was devoted to examining the possibility that innovativeness is attributed to one's psychological attributes or is shaped by the workplace environment. An alternative possibility examined was that innovativeness is a function of both: the psychological and organisational aspects. *Studies I*, *II* and *III* investigated the antecedents of staff members' innovativeness in higher education, while *study IV* established the aim of investigating the consequences of general innovativeness. Specifically, we explored

the usage of social media, technological devices and cloud services among staff members and examined the capability of innovativeness in predicting the actual use of those technologies.

The idea behind the aforementioned distribution of RQs over different studies is that the number of investigated factors was large, and thus, the best way to handle the main research problem was to divide it into smaller parts. That is to say, we decided to study and understand the organisational (*study I*) and psychological (*study II*) factors separately at first, and then to look at the big picture by examining the interaction effect (*study III*). The current distribution helped us to focus, in *study III*, on only the important factors revealed by conducting *studies I* and *II*.

1.2 Structure of the dissertation

This article-based doctoral dissertation consists of four publications and an overview summary. The dissertation consists of five chapters. Chapter 1 is a brief introduction to the research problems and objectives. Chapter 2 covers the theoretical framework. Chapter 3 presents the research design and method as well as the underlying philosophical view of the research design. Chapter 4 provides an overview of the four separate studies and of the main findings of each study. Chapter 5 offers a synthesis and discussion of the findings across the studies and sheds light on some of the dissertation's contributions, limitations, implications and directions for future plans. Thereafter is the list of references and appendices. The original publications are placed at the end of the summary.

2 THEORETICAL FRAMEWORK

Individual innovativeness has been presented in several disciplines: education, psychology, information and communication technology (ICT) and business and management. The current dissertation is grounded in the literature on innovativeness in the higher education context, despite using a term that has also long been used in other contexts. Thus, in this research, the term is used according to educational research tradition. More specifically, the research was largely informed by the diffusion of innovation theory, implicit theory and goal orientations, the competing values framework, growth-oriented atmospheres and contemporary technologies adoption. This chapter reviews the literature on innovativeness as being the focal point in the dissertation and then moves on to other factors. The chapter is organised so as to present factors that pertain to psychological attributes (implicit theory and goal orientations) and then factors related to organisational aspects (culture and atmosphere). The later sections present the role of culture in shaping the psychological factors and the consequences of innovativeness on actualised innovation adoption.

2.1 Innovativeness

The literature on innovation and innovativeness has been overwhelmed with a mix of overlapping conceptualisations, measures and different levels of analysis. This mixture makes it difficult to interpret and compare results across studies. Thus, our intention first is to briefly review the literature and to allocate the term under investigation within this foggy and heterogeneous mixture.

There are two lines of conceptualisations about the nature of the relation between creativity and innovation. For some researchers, the distinction is quite clear in that creativity refers to idea generation, while innovation refers to idea implementation. The other line of definition consolidates the link between creativity and innovation, viewing creativity as the first step to innovativeness. And thus, creativity is "the ideation component of innovation and innovation as encompassing both the

proposal and applications of the new idea" (West & Farr, 1990, p. 10). Tierney and Lanford (2016) argued that while creativity is a substantial requirement for innovativeness, not all creative people are innovative. The term innovativeness in this dissertation belongs to the latter approach in that the aim is not only directed towards investigating the ability to generate ideas, but also towards implementing and accepting those ideas created either by staff themselves or by others. We also adopt the definition of innovation suggested by Rogers (2003): "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11).

Innovativeness has been defined in three approaches (see Figure 2): behavioural, general and domain-specific. In the behavioural approach, innovativeness is viewed as the actual act of adopting innovations (actualised innovativeness). This definition corresponds to a low level of abstraction because it concerns tracking *observed behaviour*. On the other hand, the general approach views innovativeness as a deep construct or a psychological characteristic that shapes the individual disposition towards innovations. Domain-specific innovativeness lies somewhere in between these two approaches. The notion behind domain-specific innovativeness is that individuals show varied tendencies and interests towards different domains of innovations and, thus, the domain-specific innovativeness approach seeks to understand the individual tendency to adopt innovation within a specific domain, such as those of technology and pedagogy (Roehrich, 2004, p. 672). It is worth noting that actualised innovativeness is always domain-specific. In this dissertation, both actualised and general innovativeness were investigated while the domain-specific approach remained beyond our scope.

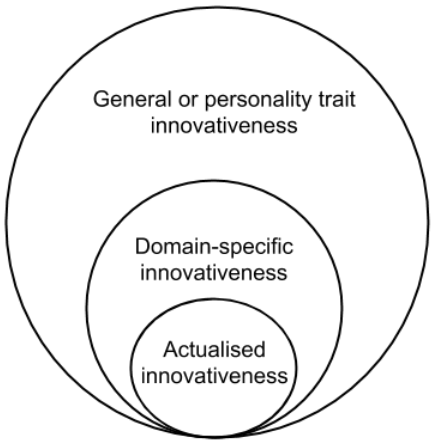

Figure 2. Three conceptualisations of innovativeness

Actualised innovativeness has been measured using two methods: the time-of-adoption and cross-sectional methods. In the time-of-adoption method, respondents are asked to recall and indicate when they started to adopt a specific innovation. The earlier one adopts the innovation, the more innovative he/she is. On the other hand, the cross-sectional method requires the respondents to select the innovations that they have adopted from among a comprehensive list of innovations. The more innovations one has embraced, the more innovative an individual he/she is. The cross-sectional method was devised to overcome the recall problem associated with the time-of-adoption method. Moreover, the cross-sectional method has been preferred due to its aggregated nature (i.e. one may include a wide spectrum of innovations). Despite these advantages, the cross-sectional method is not without limitations. The first limitation is that the cross-sectional method suffers from common method bias issues (Bartels & Reinders, 2011; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In addition, this method neglects the distinction between a participant who started using the technology only recently (a late adaptor) and a participant who was among the first to acquire it (an innovator), and thus, we lose a certain amount of variation between participants.

It is worth mentioning here that both methods are post-hoc techniques. This means that adoption is only tracked after the occurrence of innovation. And thus, they lack predictive power when innovation has yet to occur. Considering this shortcoming, general innovativeness has been introduced so that it enables us to predict the adoption beforehand. This particular advantage entails its shortcoming, however. General innovativeness is now too deep, so its ability to predict actual behaviour is at stake.

Finally, previous work made use of three levels of analysis, based on the aim of the research: some studies targeted the *organisation* as the unit of adoption (Salavou, 2004), others targeted the *team* as the unit of adoption (Liu, Liu, & Zeng, 2011), while many went for the *individual* as the unit of adoption, as is the case in the current dissertation.

Individual innovativeness is defined in this dissertation as an "underlying personality construct, which may be interpreted as a willingness to change" (Hurt et al., 1977, p. 59). Individual innovativeness here is a concept with a wide scope that implicitly encompasses other concepts, such as risk-taking, openness to experiences and opinion leadership. It is a hidden power that differentiates individuals in terms of their willingness to change the status quo and to propose, implement and/or accept new initiatives and novel ways of doing things. It could be argued that innovativeness overlaps with the concept of one's openness to experiences. In this

regard, Ali (2018) found, in a study examining the relationship between the big five personality traits and innovativeness, that openness to experiences and individual innovativeness were positively related, yet distinct, constructs.

Goldsmith and Foxall (2003) and Hurt, Joseph and Cook (1977) contended that general innovativeness is best measured using self-report validated scales. Accordingly, different scholars sought to propose different measures, such as the NEO Personality Inventory, the Jackson Personality Inventory, the Kirton Adaption-Innovation Inventory or KAI, Leavitt and Walton's Open Processing Scale or OPS and Hurt, Joseph and Cook's scale (for more discussion on innovativeness scales, see Goldsmith & Foxall, 2003; Roehrich, 2004). A convergent validity study conducted by Goldsmith (1986) on the latter four measures revealed that these scales measure similar but not identical constructs. This dissertation adopted Hurt and colleagues' (1977) scale for three reasons: First, it was built based on Rogers' theoretical framework of innovation diffusion theory. Second, it showed considerable reliability and validity as indicated by different studies (Goldsmith, 1986, 1990; Hurt et al., 1977; Pallister & Foxall, 1998). Third, it has been used in the higher educational context (Çuhadar, Bülbül, & Ilgaz, 2013). In addition, it is worth noting that Hurt et al.'s instrument suits the higher educational definition of what is considered to be an innovator as it usually refers to individual innovativeness as a willingness to change and to not resist newness. In the business and management field, on the contrary, making changes is what really matters, rather than just accepting others' proposed changes.

In the higher educational context, staff members work in a knowledge-intensive environment where innovativeness is a necessary feature for coping with work demands and changing conditions. Rowley (1996) argues that "higher education is by culture a developmental environment" (p. 14). It means that staff members are subject to continuous administrative (Aldahdouh, Korhonen, & Nokelainen, 2017) and academic changes (Brancato, 2002). Benson and Brown (2007, p. 125) define academics as knowledge workers whose main duty is to acquire, find, curate, apply and generate knowledge–thus constituting their main tool and output–and whose core task is thinking. Since knowledge is the primary feature of the current era and it changes rapidly, knowledge workers are continuously required to learn new skills, take risks, accept ambiguity, welcome new ideas and respond quickly to changes (Brancato, 2002; Ruohotie & Nokelainen, 2000; Senge, 1990). Evidence from the

aforementioned studies supports the relevance of staff's innovativeness in their readiness for lifelong learning.

The main aim of the current dissertation is to examine the antecedents and consequences of general innovativeness. Recognising the antecedents has great value for those seeking to find ways to foster and stimulate employees' innovativeness. Recognising the consequences, on the other hand, serves those seeking to employ innovativeness's predictive power in anticipating the adoption of innovation.

The next sub-sections present the factors at play as antecedents of innovativeness, categorised into factors related to psychological attributes and organisational contexts.

2.2 Antecedents of innovativeness: Psychological factors

Research has identified several psychological factors that contribute to innovativeness. Examples include the big five personality dimensions, self-efficacy, thinking styles, intrinsic motivation and attitudes (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). Among those factors predicting general innovativeness, implicit theory (Dweck, 2006) and achievement goal orientation (Midgley et al., 1998) represent the most promising models and have not been studied yet, as far as we know.

2.2.1 Implicit theory

Implicit theory refers to an individual's belief about the malleability or fixedness of human qualities and attributes, such as ability and personality (Dweck, 2006; Dweck, Chiu, & Hong, 1995). Extensive research over decades has recognised that people may hold two beliefs: incremental theory and entity theory. Incremental theorists believe that human attributes are malleable, flexible and can be developed through dedication and effort. In contrast, entity theorists believe that human attributes are fixed, static and cannot be changed. Individuals generally tend to espouse one of these two beliefs, while they may embrace different theories in different domains; for example, one may follow incremental theory regarding his/her personality while supporting entity theory in terms of his/her ability (Dweck, 1999). Early work on implicit theory investigated individuals' beliefs about human attributes in general (i.e. people's intelligence is changeable), but recent developments have revised and

extended the theory to investigate an individual's beliefs about the nature of one's own attributes (i.e. my intelligence is changeable; De Castella & Byrne, 2015).

The research on implicit theory was initiated within a school context, targeting students as research subjects (Dweck, 1999; Dweck & Leggett, 1988). Later works have gradually been extended to include the higher education context (Yorke & Knight, 2004). Some studies have focused on undergraduate students (Chen & Wong, 2015; Komarraju & Nadler, 2013; Robins & Pals, 2002), while others have paid attention to academic staff (Rissanen, Kuusisto, Hanhimäki, & Tirri, 2016; Thadani, Breland, & Dewar, 2015). Yet, previous studies have focused on academics' implicit beliefs about their teaching capabilities (Thadani, Breland, & Dewar, 2010) or their students' learning (Rissanen et al., 2016; Yorke & Knight, 2004; Zhang, Kuusisto, & Tirri, 2017), and little attention has been paid to studying staff members' implicit beliefs about their own abilities and personalities.

A large body of research has demonstrated how implicit beliefs contribute to the meaning individuals give to their experiences and how they influence their cognitive, affective and behavioural responses (Dweck & Leggett, 1988). These beliefs help to understand how people deal with setbacks, cope with failures, react to risks and interact with people, and how they behave, perceive and make decisions during many other fundamental events in their lives. As Molden and Dweck (2006) put it, "When we want to know 'who someone really is', we are often asking questions about their underlying beliefs and goals" (p. 200).

Although it seems too simple, the notion of implicit theory has proven to be influential and has had considerable implications on human behaviour. Consistent evidence across studies revealed that increment theory is associated with adaptive outcomes, while entity theory is associated with maladaptive outcomes and in many different contexts: academic achievement (Komarraju & Nadler, 2013), professional learning and development, workplace learning (Meyer, 2012), work engagement (Heslin, 2010), managerial styles (Heslin, Latham, & VandeWalle, 2005) and many others (see Dweck's [2006] book for a wide spectrum of implicit theory's influences).

Prior theoretical models suggested the linkage between an individual's implicit theory and his/her innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009). According to research results (Dweck et al., 1995; Molden & Dweck, 2006), advocating incremental theory encourages one to focus on the *process* of developing oneself when the task at hand is outside of one's current capabilities. Advocating entity theory, on the other hand, encourages one to focus on one's current *traits* and capabilities. There is no way one can achieve a task that exceeds his/her current capabilities, according to entity theorists. Accordingly, incremental

theorists were found to embrace challenges, persist during setbacks, perceive effort as a way to achieve mastery, learn from criticism, view failure as a learning opportunity, confront mistakes, overcome deficiencies and seek solutions. Entity theorists, in contrast, were found to avoid challenges, give up easily, perceive effort as fruitless, see criticism as a threat, view failure as a deficiency, hide mistakes, obscure deficiencies and blame others or the circumstances (Dweck, 2006). Given these characteristics, it seems logically sound to claim that underlying beliefs, such as the implicit theory of ability and personality, could contribute to one's dispositions towards newness in general. In our view, we hypothesised that individuals holding incremental theory are more oriented towards change acceptance, effort dedication, mistake tolerance and risk welcoming, all of which are mandatory characteristics for innovativeness. On the other hand, individuals supporting entity theory are more oriented towards change resistance, effort withdrawal, mistake intolerance and risk aversion.

2.2.2 Achievement goal orientation

Achievement goal theory proposes that individuals hold a motivational propensity to pursue different goals. Before delving into discussing the theory of achievement goal orientation, it is worth noting that there are two views of a *goal*. For some, a goal is defined as the *reason* behind doing what one does. This definition includes the work of Dweck (1999) and Midgley et al. (1998). Other researchers, including Elliot and colleagues (Elliot & Harackiewicz, 1996; Elliot & Murayama, 2008), define a goal as the desired outcome that one strives to achieve.

Achievement goal theory initially sets apart two goals: mastery *versus* performance (Dweck, 1992; Linnenbrink & Pintrich, 2002; Midgley et al., 1998). According to this theory, individuals who work towards mastery goals are seeking to *improve* their competence, while individuals who are holding performance goals are seeking to *prove* their competence (Dweck, 1992). Thus, the main aim of mastery goals is to develop oneself. On the contrary, the main aim of performance goals is to show others how good one is. The initial assumptions were that mastery goals would result in more adaptive outcomes while performance goals would result in maladaptive outcomes (Linnenbrink & Pintrich, 2002; Midgley, Maehr, Hruda, Anderman, Anderman, Freeman, & Urdan, 2000). The former assumption was confirmed with substantial consistency between different studies in different settings, while the latter did not enjoy such agreement (Elliot & McGregor, 2001; Linnenbrink & Pintrich,

2002; Midgley et al., 1998). As a consequence, scholars (Elliot & Church, 1997; Midgley et al., 1998) split performance goals into two categories: performance-approach and performance-avoidance. Performance-approach goals seek to outperform others and appear superior, whereas performance-avoidance goals seek to avoid looking incomplete or incapable in front of others. The results of Midgley et al.'s (1998) studies indicated that having performance-avoidance goals results in maladaptive outcomes more than having performance-approach goals. This dissertation employed this taxonomy of the three goal orientations: mastery, performance-approach and performance-avoidance. However, the reader should be aware that the research investigating the dimensionality of goal orientations is still active and expanding. For example, later works (Elliot, Murayama, & Pekrun, 2011; Mascret, Elliot, & Cury, 2015) have classified mastery goal orientation into the *self-approach*, *self-avoidance*, *task-approach* and *task-avoidance* categories. Moreover, recent attempts (Senko & Tropiano, 2016) have sought to classify performance goal orientation into *normative* goals (e.g., to outperform colleagues and teachers) and *appearance* goals (e.g., to show oneself, teachers, parents and peers how well one does), considering that each category has two facets (approach and avoidance). In addition, *work-avoidance* goal orientation was also explored, referring to the goal of doing a task with minimal effort (Butler, 2007).

As is the case in implicit theory, goal orientations were initiated originally in a school context where the aim was to examine the influence of students' goal orientations on their learning achievements (Ames, 1992; Pintrich, 2000) or to investigate the effect of school or classroom structure on students' goal orientations (Ames, 1992; Shim, Cho, & Cassady, 2013). Later research was extended to include teachers' goal orientations in schools (Butler, 2007; Mascret et al., 2015; Nitsche, Dickhäuser, Fasching, & Dresel, 2011) and in the higher education context (Daumiller, Grassinger, Dickhäuser, & Dresel, 2016; Han, Yin, & Wang, 2015; Kunst, van Woerkom, & Poell, 2018; Van Preen & Janssen, 2002; Van Yperen & Orehek, 2013; Wosnitza, Helker, & Lohbeck, 2014; Yin, Han, & Lu, 2017). For instance, various studies have assessed the influence of university teachers' goal orientations on their teaching quality (Daumiller et al., 2016), teaching approaches (Han et al., 2015; Yin et al., 2017), job satisfaction (Van Preen & Janssen, 2002) and willingness to participate in professional development activities (Kunst, van Woerkom, & Poell, 2018).

Experimental and correlational studies (Kaplan & Maehr, 2007) showed that individuals oriented towards mastery goals are more likely to invest in tasks, persist in the face of setbacks and seek challenges. Individuals oriented towards

performance-avoidance goals, on the other hand, were found to have lower levels of learning achievement and self-efficacy, while having higher levels of anxiety, help-avoidance and self-handicapping. The results on performance-approach goals were inconsistent; some studies reported that they were associated with surface learning and negative affect (Ames, 1992; Dweck & Leggett, 1988), and others reported their association with positive outcomes, such as self-efficacy and performance attainment (Elliot & Moller, 2003). Others reported no association (Butler, 2007; Chen & Pajares, 2010; Middleton & Midgley, 1997; Papaioannou & Christodoulidis, 2007; Retelsdorf et al., 2010).

The relationship between implicit theory and goal orientation has been well studied in the literature since 1988 when Dweck proposed a model in which "implicit theories predict social goals and social goals provide the framework for social behavior" (p. 265). According to Dweck's model, implicit beliefs are expected to orient individuals towards different goal achievements. Since then, a considerable body of research has examined the validity of the model in different contexts, including attributions, affect, self-esteem (Robins & Pals, 2002), academic motivation, academic achievement (Chen & Pajares, 2010) and self-handicapping (Ommundsen, 2001). Cross-sectional (Chen & Pajares, 2010; De Castella & Byrne, 2015), longitudinal (Robins & Pals, 2002) and experimental studies (Dinger & Dickhäuser, 2013) showed that incremental theory predicts mastery goals while entity theory predicts performance-approach and performance-avoidance goals.

Even though several theoretical studies referred to the potential role of goal orientation in individual innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014), an empirical investigation of such a relationship has rarely been carried out. Among the few studies is a study by Keong and Hirst (2010), which found that mastery and performance-approach goals are positively, while performance-avoidance goals are negatively, associated with attitudes towards innovation adoption. Another study by Lu et al. (2012) found that mastery goal orientation is positively associated with innovative performance. Based on these consistent results, we hypothesised that goal orientations may provide an avenue for understanding differences among individuals regarding their willingness to change.

2.3 Antecedents of innovativeness: Organisational factors

2.3.1 Organisational culture

A huge amount of attention has been paid to studying organisational culture in the past century. The main motives were to understand organisation behaviour and to identify factors influencing organisational effectiveness and performance. Several definitions have been proposed for organisational culture, all of which have agreed that culture represents the core values, beliefs and assumptions held by members, which guide their behaviour in the organisation. In Cameron and Quinn's (2006) words, organisational culture

> *encompasses the taken-for-granted values, underlying assumptions, expectations, collective memories, and definitions present in an organisation. It represents 'how things are around here.' It reflects the prevailing ideology that people carry inside their heads. It conveys a sense of identity to employees, provides unwritten and often un-spoken guidelines for how to get along in the organisation, and it enhances the stability of the social system that they experience* (p. 16).

Research evidence over the years has shown that understanding the culture of an organisation is one vital element in achieving success, improving productivity and enhancing long-term effectiveness (Quinn & Rohrbaugh, 1981, 1983).

Organisational culture is one of the main research areas in the context of HEIs. Maassen (1996) argued that "the study of higher education can be divided into two aspects: the substantive activities of academics … and the organisation of the work of academics, including the attitudes and values of academics towards their work and their profession" (p. 157–158). Many researchers have repeatedly affirmed the same thought (Austin, 1990; Beytekin, Yalçinkaya, Doğan, & Karakoç, 2010). Austin (1990), for example, indicated that analysing college or university culture leads to a deeper understanding of staff's behaviours, concerns, problems and perspectives.

Organisational culture has been studied in HEIs at four primary levels (Fralinger & Olson, 2007; Kuh & Whitt, 1988; Maassen, 1996): (a) the academic profession, (b) the discipline, (c) the academy as an organisation within a national system and (d) the specific type of institution. The academic profession represents the culture that holds academics together, distinguishing them from other professionals. For example, workers at a library or those in a technical support department may have

different cultures than teachers at a university. The culture of discipline gathers those who work with the same nature of knowledge together: soft or hard. The academy culture refers to a set of beliefs and values that sets the HEIs apart from other institutions. The fourth culture points to what makes a named institution what it is and what differentiates it from other institutions, even those within the same type of institution. This dissertation focuses on studying organisational culture at all the aforementioned levels.

Different academic disciplines represent different subcultures. In reference to those disciplinary cultures, Clark (1989) indicated that a university is considered a heterogeneous entity comprising of different small worlds. Becher (1994) used an analogy of disciplines as academic tribes inhabiting different academic territories. Disciplines differ from each other both cognitively and socially. Each discipline has its own traditions, norms, values and beliefs espoused by its members. Becher (1981) argues that disciplines "are embodied in collections of like-minded people, each with their own codes of conduct, sets of values, and distinctive intellectual tasks" (p. 109).

We focus our attention on disciplinary cultures because many authors have emphasised their importance as being the central source of staff's identity (Becher, 1981, 1994; Clark, 1989). Austin (1990) insisted that disciplines are "value-laden cultures that frame the beliefs and behaviors of faculty members" (p. 64). Maassen (1996) indicated that disciplines are the major shaping force of specific attitudes, values and behaviours of academics. Becher (1994) argued that "an awareness of disciplinary cultures is helpful, and in some cases even essential, to the conduct of research and the development of policy in higher education" (p. 159). Thus, understanding differences among disciplines can help higher education policymakers in their decisions by taking into consideration the behaviour of different subcultures dwelling in the organisation. This, of course, can also help in facilitating the success of any organisational change and avoid difficulties during the implementation of decisions because, in some cases, those difficulties result from clashes among different subcultures (Cameron & Quinn, 2006).

Many attempts have been made to categorise disciplines based on different criteria. Among the most cited attempts are the works of Biglan and Becher. Biglan (1973b, 1973a) classified disciplines into eight categories based on three dimensions: (1) a single paradigm of knowledge (hard vs soft), (2) the application of knowledge (pure vs applied) and (3) life-related systems (life vs nonlife). Later on, Becher (1981, 1994) classified disciplines according to the nature of knowledge and the nature of disciplinary cultures into four categories: hard-pure, soft-pure, hard-applied and soft-

applied. This dissertation pays particular attention to studying the differences among disciplines based on the hard versus soft classification.

Many different approaches, models and frameworks have been drawn up to measure organisational culture. For example, Jung et al. (2009) reviewed 70 instruments and approaches used for assessing organisational culture. In a higher educational context, Cai (2008) indicated that the dominant studies dealing with organisational culture follow a qualitative method and can be categorised into two tracks: The first track uses a dimensional approach and identifies key elements of institutional culture, as in the work of Tierney (1988). The second track uses a typological approach and identifies types or typologies of institutional culture, as in the work of Bergquist (1992). Bergquist (1992) proposed that four cultures exist in an academy of higher education: the collegial, the managerial, the developmental and the advocacy. Later, Bergquist and Pawlak (2008) added two additional culture types (the virtual and the tangible) to the four-culture model to make it a model that includes six academy cultures. In the typological approach, instruments were most often derived from the business field. One of the most widely used typological frameworks in the higher education context is the competing values framework (CVF; Cai, 2008).

The CVF is a well-known and robust framework that was developed mainly as a result of efforts devoted to identifying organisational effectiveness (Quinn & Rohrbaugh, 1981, 1983). Using multi-dimension analysis, Quinn and Rohrbaugh found that effective organisations lay within three competing values dimensions. The first dimension refers to the organisational focus, ranging from an emphasis on internal orientation and integration to an emphasis on external orientation and differentiation. The second dimension refers to the organisational structure, ranging from an emphasis on stability and control to an emphasis on dynamism and flexibility. The third dimension refers to the organisational means and ends, ranging from an emphasis on the processes and procedures to an emphasis on the targets or the final outcomes. The first two dimensions produce four quadrants, representing four organisational typologies named Clan, Adhocracy, Hierarchy and Market (see Figure 3).

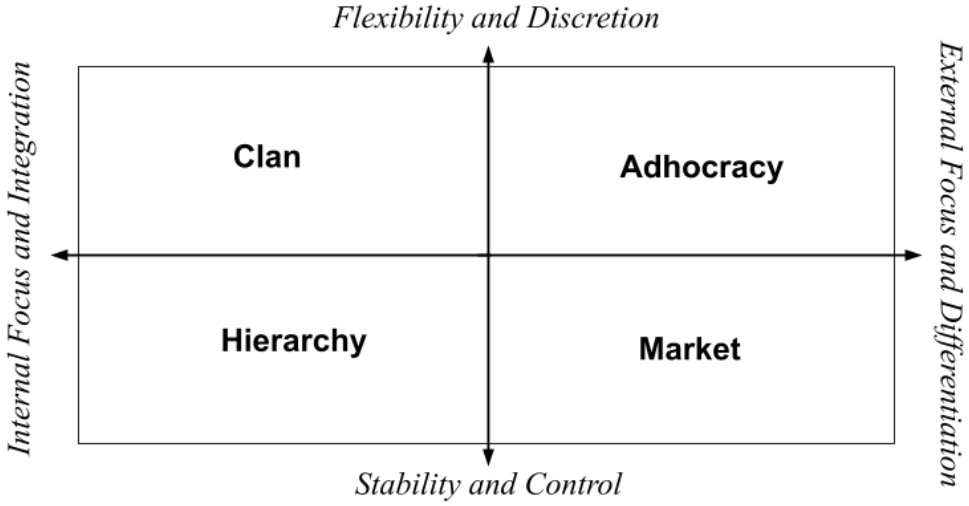

Figure 3. Competing values framework adopted from Cameron and Quinn (2006)

In a Clan culture, the HEI focuses on internal flexibility, individuality and spontaneity. It emphasises strong relationships among staff members, cohesion and morale. It pays great attention to teamwork; this means that all members are working together for the sake of their institution. A Clan culture focuses on internal processes where staff's participation is welcomed in higher level decision-making processes and creates a warm atmosphere where staff members feel that they are included. A Clan culture's practices aim to achieve the professional development, empowerment, satisfaction and involvement of staff.

In a Hierarchy culture, the HEI focuses on internal control. It emphasises that all resources and information management should run smoothly and as planned. It outlines procedures and guidelines that all members should follow. A Hierarchy culture's practices aim to achieve stability, continuity, predictability and efficiency. Employees in a Hierarchy culture should follow the rules in order to keep their institutions alive, regardless of their personal needs and development.

In an Adhocracy culture, the HEI focuses on external flexibility. It supports openness, innovation, risk-taking and a readiness to change in order to achieve growth and progress. It focuses on innovative ideas and opportunities that make the institution a pioneer in the higher education context. Staff members' flexibility and freedom is encouraged, along with the desire to 'innovate'. In the higher educational context, this means that staff are expected to generate cutting-edge research ideas, to conduct novel study programmes and to apply unprecedented pedagogical practices.

In a Market culture, the HEI focuses on external control. It emphasises achieving goals and enforcing rules and guidelines for staff in order to increase the institution's productivity, efficiency and competence. It seeks to prevail over other international HEIs. Attention is paid to its ranking in relation to others. Employees are judged based on their final output. Achieving goals and keeping the institution above other institutions are what really matters, regardless of staff's personal or professional needs.

2.3.2 Organisational atmosphere

As mentioned in the previous section, culture represents hidden, deep and implicit aspects of the institution. It is the unwritten rules that govern employees' behaviour in an institution. Those rules interact with the institution's personnel and impact their growth motivations, attitudes towards the job, inclination towards teamwork, and tendencies towards specific managerial styles. These dimensions refer to the institutional atmosphere or climate. Denison (1996) argues that atmosphere dimensions rooted in the culture are relatively temporary and subject to direct control. Cameron and Quinn (2006) argue that atmosphere is something more overt that refers to observable attributions of an organisation. An analogy of the relation between culture and atmosphere–as organisational theorists would argue–is to see culture as a trait-like attribute, such as personality, while atmosphere as a state-like attribute, such as mood.

Organisational atmosphere carries in its aspects supportive or inhibitive factors for employees' professional growth (Nokelainen, 2008; Nokelainen & Ruohotie, 2009; Ruohotie, 1996b, 1996a, 1999; Ruohotie & Nokelainen, 2000). In this dissertation, the focus is on an atmosphere that should support employees' professional growth because this is the kind that is expected to foster innovativeness. By professional growth, we mean the continuous learning that keeps individuals updated when faced with changes in their workplace environments (Nokelainen, 2008).

In the management field, different research has been undertaken regarding seeking to achieve employees' professional growth. For example, a *learning organisation* is one of the concepts which was proposed in the literature, and it is defined as a place where "people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole

together" (Senge, 1990, p. 3). Many strategies for creating a learning organisation have been suggested in the literature (Bui & Baruch, 2010; Marsick & Watkins, 2003; Ruohotie, 1996b, 1999; Senge, 1990). For example, Brancato (2002) contended that the HEI should offer its staff members activities that employ the five components of a learning organisation: personal mastery, team learning, mental models, shared vision and systems thinking (see Senge, 1990). In a learning organisation, it is not only the responsibility of the staff to learn continuously but also the responsibility of the institution to create and maintain a culture of learning (Nokelainen, 2008). The institution should support, invest in and reward staff members' learning.

Ruohotie and Nokelainen (2000) proposed a 14-dimensional theoretical model for a growth-oriented atmosphere, based on the results of the Growth Needs Project Finland (Ruohotie, 1996a, 1996b, 1999). Later, Nokelainen and Ruohotie (2009) reduced the model to four major factors, divided into thirteen sub-factors, as shown in Figure 4.

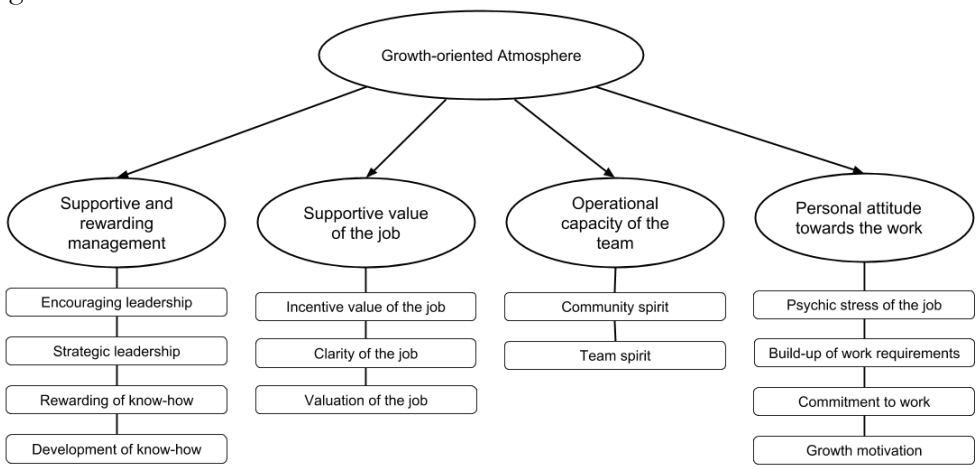

Figure 4. Growth-oriented atmosphere model adopted from Nokelainen and Ruohotie (2009)

In the proposed model, the four main factors were as follows:

1. Supportive and rewarding management: This refers to managerial practices that set learning goals and development plans for employees. Management motivates employees to learn and rewards their learning and development achievements.
2. The incentive value of the job: This refers to the developing nature of the job and the extent to which the job is valued by the employee, colleagues and management. Professional growth is fostered when the job challenges ability, makes one feel autonomous and provides versatile tasks. Job goals and responsibilities are clear for employees.

3. The operational capacity of a team or a group: This refers to the capability of employees to operate and learn together. Professional growth increases steadily when staff members live the community and team spirit. This spirit stimulates their engagement to develop their work and to participate in collaborative planning.
4. Personal attitudes towards the work: This refers to the feelings that the employees develop towards the work. Research showed (Nokelainen, 2008; Nokelainen & Ruohotie, 2009; Ruohotie, 1999; Ruohotie & Nokelainen, 2000) that work-related stress, non-clear job specifications, too heavy a mental load and continuous changes in the job tasks all negatively affect professional growth and lead to job burnout.

2.4 Role of culture in shaping psychological factors

Being an individual in a workplace does not mean that you complete your tasks independently and in isolation from others. The fact is that the workplace is created by its employees, and it itself affects how they perform their work. It is an interactive, bidirectional, reciprocal relationship in which each part affects and is affected by the other partners. Thus, there is no way that individual behaviour can be understood unless the context is considered.

Several contributions have emphasised the role of workplace culture in shaping individuals' implicit beliefs and goal orientations (Hamstra, Van Yperen, Wisse, & Sassenberg, 2014; Kunst, van Woerkom, van Kollenburg, & Poell, 2018). In their study, Murphy and Dweck (2010) provided evidence on how shared norms and beliefs about the nature of human intelligence prevailing in an organisation affect its employees' cognition, affection and behaviour. Murphy and Dweck (2010) proposed two cultural mindsets: a culture of genius and a culture of growth. A culture of genius seeks to hire employees based on their talents and intelligence. It praises them based on 'innate' attributes. In contrast, a culture of growth seeks to hire employees based on their passion to learn and praises them based on their efforts. These two cultures have resulted in substantial implications for the way the administration acts in institutions. A culture of genius does not invest much in employee training, holding the assumption that talented people do not need training as they are just talented. It seduces employees to 'show' their talents, competences and abilities. A culture of growth, on the contrary, invests more in training its employees and encourages them

to seek learning opportunities, holding the assumption that a human is a learnable entity. Furthermore, previous research also contended the roles of culture and managerial styles in directing the employees towards specific achievement goals (Hamstra et al., 2014; Kunst, van Woerkom, van Kollenburg et al., 2018; Potosky, 2010). For example, Hamstra et al. (2014) found that transformational leadership–a managerial style that starts with employees' needs in order to achieve their intellectual development while maintaining team spirit–predicts employees' mastery goal orientations. Moreover, in a longitudinal study conducted by Kunst, van Woerkom, van Kollenburg and Poell (2018), facilitative managerial coaching was positively associated with mastery goal orientation and supported the transition of employees towards it. Similarly, Potosky (2010) followed a firm over a five-year period–before and after a fundamental restructuring change–and monitored employees' psychological characteristics (learning self-efficacy and goal orientations) along with their perceptions of the organisational climate. This study suggested that although goal orientation is a relatively enduring individual characteristic, it is still responsive to perceptions of organisational climate, especially a supportive innovation policy and supervisory encouragement. Moreover, consistent evidence revealed that both Clan and Adhocracy cultures are important contributors to innovativeness (Ashraf, Kadir, Pihie, & Rashid, 2013; Cameron & Ettington, 1988; Smart & John, 1996; Sokol, Gozdek, Figurska, & Blaskova, 2015)

Organisational culture has been studied as a direct determinant of employees' psychological attributes as well as a moderator of the relationship among the psychological variables. For instance, a study by Hon and Leung (2011) found that organisational culture moderated the effect of intrinsic motivations on creative performance. Another study by Miron, Erez and Naveh (2004) examined whether cultures serve as moderators between individual creativity and innovation performance. The results revealed that, in a highly innovative culture, individuals' creative ideas are often transformed into innovation, while individuals' creative ideas remain stagnant in a low-innovative culture.

2.5 Consequences of innovativeness

The value of innovativeness is examined by its power to predict actual human behaviour in terms of adopting innovations and in different contexts. Many studies over the past decades were dedicated to investigating just this (Arts, Frambach, & Bijmolt, 2011; Bartels & Reinders, 2011; Im, Bayus, & Mason, 2003; Jin, 2013; van

Rijnsoever & Donders, 2009). The results, however, were mixed (Arts et al., 2011; Bartels & Reinders, 2011; Goldsmith, Freiden, & Eastman, 1995; Im et al., 2003; Jin, 2013; Roehrich, 2004; van Rijnsoever & Donders, 2009). For example, the study by Arts, Frambach and Bijmolt (2011) involved the meta-analysis of 77 studies concerning consumer innovativeness. Their study confirmed that general innovativeness is a positive predictor of innovative behaviour. A systematic review of the literature by Bartels and Reinders (2011), which tracked 79 relevant empirical articles, stated that the relationship between general innovativeness and innovative behaviour is ambiguous. Although ten studies supported the existence of a positive relationship, four reported only partial support, and six indicated no support for such a relationship. In the educational context, research revealed that individual innovativeness influences the implementation of ICT (Drent & Meelissen, 2008), predicts the usage of technology (Gökçearslan, Karademir, & Korucu, 2017; Jin, 2013), is related to perceived competences in e-learning (Loogma, Kruusvall, & Ümarik, 2012) and techno-pedagogical skills (Çuhadar et al., 2013) and is associated with an awareness of Web 2.0 tools (Mutlu Bayraktar, 2012).

3 METHODOLOGY

3.1 Research paradigm

The philosophical paradigm underpinning the current research is the postpositivist world view, which grew from the positivist paradigm but emphasised the importance of contexts and cultures. From an ontological perspective, postpositivists believe that reality exists out there in the world but that it cannot be perfectly known (Creswell, 2014). From an epistemological perspective, knowledge is perceived to be conjectural and revisable in the light of new evidence (Creswell, 2014). The world is governed by theories and laws that need to be examined and refined (Cohen, Manion, & Morrison, 2007). The best metaphor for describing the postpositivist view of perceiving knowledge is an old story narrated by Al-Ghazali (Aldahdouh, Osório, & Caires, 2015). *Al-Ghazali resembled the knowledge as an elephant which was introduced to a village's habitants for the first time. Those habitants, who happened to be blind, sought to discover this elephant and to know how it looks. Each one touched a different part of the elephant and then they returned back to their village to describe what they experienced. The first person who touched the elephant's leg, argued that the elephant resembles a big tough cylinder. The second person who touched the elephant's tusk said that it looks like a small smooth pipe. The third person who touched its ear, contended that elephant looks like a thin skin. The point here is that each one of those blind people was honest in describing his/her experience, but none of them provided the absolute truth about what the elephant really is.* The blind people in the story resemble postpositivist scientists who seek to discover reality and investigate the surrounding phenomena. Obviously, any investigation which counts solely on a unique method will yield a non-complete and error-prone understanding of reality. In addition, any means of measuring is not error-free. And thus, postpositivism encourages the use of multiple measures to approach objectivity as closely as possible (Cox & Hassard, 2005).

In addition to believing that the absolute truth cannot be found, postpositivists also emphasise that researchers are not independent and separate from their research. They are value-laden and inherently biased by their backgrounds, cultural experiences and theoretical frameworks (Saunders, Lewis, & Thornhill, 2009). To explain the importance of context and culture in a postpositivist's view, consider the

following analogy. Assume a scenario of a researcher conducting an experiment to investigate the impact of a certain drug on a specific kind of bacteria, and another researcher conducting an experiment to investigate the impact of a teaching method on individuals' performance. In the case of the bacteria, do we expect to obtain different results if *exactly the same* experiment was conducted by different hands and on different samples of bacteria and in different labs? Most likely no. That is because, in the bacterial case, we have full control over the experimental conditions and our subject, which is a sample of bacteria and does not possess free will as humans do. Neither is it a value-laden entity nor does it carry perceptions and a history. Thus, the results and interpretations are most likely to be similar and replicated. In the case of the individuals, however, if we repeated the same experiment using different researchers and in different contexts, we would expect different results. That is because individuals are value-laden, and we cannot ignore their backgrounds and cultural experiences, which may affect the results and interpretations. Moreover, it is hardly possible to control all conditions in experiments on individuals. Even if we drew a random sample and assured all the conditions were the same, we are still unable to control individuals' cognitions, behaviours, thinking and emotions at the time of conducting the experiment (Guba & Lincoln, 1994).

Nevertheless, the postpositivist view has been critiqued for many reasons, and chief among them includes the fact that it ignores the voice of the researcher. What is more, a *disinterested scientist*, under postpositivism, is still "privileged at the expense of the voice of the subject, who has been neglected, mutilated or even pronounced dead" (Cox & Hassard, 2005, p. 113). In addition, critiques have involved the inapplicability of general data to individual cases and the exclusion of the discovery dimension in enquiry (Guba & Lincoln, 1994).

In sum, this research study followed the postpositivist paradigm, which has to do mostly with the quantitative research and generally aims at verifying theories and predicting relationships among study variables (Cohen, Manion, & Morrison, 2007). In this dissertation, we hypothesised a model in which a handful of psychological and organisational factors interplay together to predict one's innovativeness, and this innovativeness is theorised to predict one's actual usage of technology. We believe that the hypothesised model may present how staff members react in such situations, and our role is to develop numeric measures of observations to obtain true statements that explain what the case is (the reality; Creswell, 2014).

3.2 Research design

In line with the postpositivist assumptions, the current research was devoted to studying the relationships among variables, with the hope of assessing the causes that influence outcomes (Creswell, 2014, p. 7). We followed a cross-sectional correlational survey design with two approaches (Cohen et al., 2007, p. 207): (1) an analytical survey in *studies I, II, III* and *IV* and (2) a descriptive survey in *study IV*.

The cross-sectional correlational survey is a commonly used design in educational, social and psychological contexts where the variables under study are located outside the control of the researcher, usually due to ethical considerations. For example, it is apparently unethical to manipulate human subjects (using experimental design) as this manipulation will lead them to adopt entity theory or performance-avoidance goal orientation, whereas we know from several previous studies (Dweck, 1999; Dweck & Leggett, 1988; Grant & Dweck, 2003; Molden & Dweck, 2006) that these psychological factors are pertaining to maladaptive behaviours. It is worth mentioning that there are still some studies (Dinger & Dickhäuser, 2013) that challenged these constraints and conducted experimental design manipulation, for example, relating to participants' self-theory. However, we still believe that taking a snapshot of reality, which leaves no permanent or temporary harmful effects on participants, is a safer approach in cases like ours.

Additionally, a survey design is a perfect way to get *numerical* data, to reach aggregated patterns of answers and to conduct the analysis on a macro level. In addition, a survey gathers standardised information, asking the same questions to all participants. Unifying the data collection context serves the research objectivity that postpositivist principles are striving to achieve. Unlike in interviews and observations, a researcher's presence has a minimal effect on a participant's responses. It has been said that a survey is quicker to conduct and cheaper to administer. However, in the current research, it has proved difficult to distribute and collect data from busy staff members in the HEIs.

A survey design, however, suffers from substantial weaknesses, which reduce its statistical power. Most importantly, a cross-sectional survey design is a less effective method when the aim is to test the causal relationships among variables. A lack of control over the independent variables means that we cannot be absolutely sure about whether the independent variables are exclusively those which give rise to the differences in the dependent variable. It may be the case that there were some other variables that we failed to add to the study that were behind those observable differences. Or, it may be the case that the variation in both the dependent and

independent variables was due to the effect of an excluded third variable. Moreover, other limitations exist in terms of using a survey design, such as sampling bias (resulting from using a non-probability sampling method), nonresponse bias (resulting from the difference between those who refused to participate in the survey and others who did), item characteristic effects and item context effects. Although there are procedural and statistical remedies to handle these kinds of answers–some of which have been used in this dissertation (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003)– no guarantee of having answers free of bias is achievable. Another drawback of a survey design returns to its limitation in terms of exploring and providing rich details about each individual's thoughts and opinions in regard to the subject matter. This is because "the individual instance is sacrificed to the aggregated response" (Cohen et al., 2007, p. 207).

3.2.1 Causal models

According to Breiman (2001), researchers usually adopt two statistical cultures when modelling or drawing conclusions from data. The first relatively less eminent but fast-growing culture is called *algorithmic modelling* (appearing first in the field of machine learning). The second more dominant culture is called *data modelling*. In this approach, researchers have a model in advance with which they assume the direction of the relationships among the study variables (which one is the dependent variable and which one is the independent variable). They then compare this model with the sample data and examine how much the model deviated from the given data. If the model fits the data well (using some goodness-of-fit indices), then they do not have any reason to reject the model. And therefore, the researchers can draw conclusions from the model. Otherwise, the model should be rejected because it deviates significantly from the data. The analysis in the current dissertation follows the data modelling culture. We started by proposing a model based on the literature and then tested it using statistical modelling techniques, as will be discussed in section 3.6.

The directions of the relationships among variables in the data modelling approach are determined based on theoretical assumptions and evidence from previous studies. However, to prove those causal assumptions, one should fulfil the causality conditions, which may be beyond the cross-sectional design capabilities. These conditions were listed by Sloman (2005) as follows. The variable X is believed to cause variable Y if:

1. Changing X is likely to end up with a change in Y.

2. Causes and effects are asymmetric: changing Y will not budge X.
3. Causes and effects go together over time.
4. Y does not occur before X.

In the survey design undertaken and especially in educational and behavioural settings–as is the case in the current dissertation–it could be unachievable to meet these aforementioned conditions, and it may be that we cannot be sure, by any means, whether one variable has caused the other variable or the other way around. However, we lean solely on our theoretical assumptions to affirm such causal effect. For example, it is reasonably sound that implicit beliefs of ability or personality give rise to one's tendency to accept changes. On the other hand, we do not have any reason to believe that the tendency to accept changes shapes one's implicit beliefs.

3.3 Research context

The current research took place at Tampere HEIs, namely the UTA, TUT and TAMK, before they merged. Conducting this dissertation synchronised with several major changes at Tampere HEIs: adopting O365 Cloud services and the organisational restructuring process, to mention a couple. Tampere HEIs have signed an agreement with Microsoft Corporation to provide Cloud Computing services (O365) to their students and staff members. The UTA, TAMK and TUT started offering O365 services to their staff and students in 2014, 2015 and 2016, respectively. Thus, Tampere HEIs' staff members who were asked to adopt these initiatives were the focus of our investigation. In the current research, we saw that it was more logical and valuable to trace the staff members' willingness to change in general, rather than to assess their willingness to adopt specific innovations, whether it was a big reengineering initiative, such as the Tampere merger, or something on a smaller scale, such as adopting new technology like O365.

3.4 Measures and procedures

Research data were collected by means of online self-reported questionnaires. Two questionnaires were designed to serve the aim of the research. The first questionnaire was devoted to exploring staff members' innovativeness, the implicit theories of ability and personality, goal orientations and the perceptions of their departments' cultures and growth atmospheres. Instruments were adapted from international

measures, translated to the Finnish language and piloted on a sample of 25 participants before being used. The second questionnaire was dedicated to examining staff members' actual usage of technology, namely, social media, technological devices and O365 Cloud services.

3.4.1 Measures of questionnaire I

Organisational culture: Staff members' perceptions of their schools'/departments' cultures were assessed using the organisational culture assessment instrument (OCAI) devised by Cameron and Quinn (1999, 2006). The OCAI was developed based on the competing values framework (CVF), and it consists of twenty-four questions: six for each of the four cultures (Clan, Hierarchy, Adhocracy and Market). The OCAI's validity and reliability have been confirmed in other studies (Cameron & Quinn, 2006; Heritage, Pollock, & Roberts, 2014; Jung et al., 2009). A Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree).

Professional growth: Staff members' perceptions of their schools' growth climates were measured using the growth-oriented atmosphere questionnaire (GOAQ). The GOAQ was developed in the Finnish higher education context (Nokelainen & Ruohotie, 2009; Nokelainen, Ruohotie, Silander, & Tirri, 2003; Nokelainen, Silander, Ruohotie, & Tirri, 2007; Ruohotie, 1996b, 1996a, 1999; Ruohotie & Nokelainen, 2000), and the latest version of it consists of twenty-six items representing four main factors and 13 sub-factors. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used.

Innovativeness: We adopted Hurt and colleagues' (1977) innovativeness scale to measure the staff members' orientations towards change. An item example was 'I enjoy trying new ideas'. The scale has shown strong psychometric characteristics and has repeatedly demonstrated its usefulness as a valid measure of general innovativeness (Goldsmith, 1990; Pallister & Foxall, 1998). A shortened version (13 items) of the measure with a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used.

Goal orientations: Staff members' goal orientations were measured using Midgley and colleagues' (2000) achievement goal orientation (AGO) scale. We adapted the scale to fit the higher education context by replacing, for example, 'school' with 'work'. The AGO consisted of three subscales: mastery orientation (e.g., 'One of my goals

is to master a lot of new skills this year'), performance-approach orientation (e.g., 'One of my goals is to show others that I'm good at my work') and performance-avoidance orientation (e.g., 'One of my goals in work is to avoid looking like I have trouble doing the work'). The AGO was validated by several studies (Anderman, Urdan, & Roeser, 2005; Midgley et al., 1998; Ross, Shannon, Salisbury-Glennon, & Guarino, 2002). A shortened version of the measure (10 items) with a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used.

Implicit theories: Two domains of implicit theory were measured: ability and personality. For the personality domain, we adopted the eight-item measure developed by Levy et al. (1998), and we adapted another eight items for ability (namely talent) in a similar manner. Furthermore, items were reworded so that they reflected first-person beliefs because our focus was to measure one's own beliefs about the nature of his/her attributes rather than human attributes in general. An item example for incremental theory is 'No matter what kind of person I am, I can always change substantially', and one for entity theory is 'I am a certain kind of person, and there is not much that can be done to really change that'. The items were measured on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The validity and reliability of the implicit theory measures have been assessed by a large volume of published studies (Chen & Wong, 2015; Dweck et al., 1995; Hughes, 2015; Levy et al., 1998; Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011). It is worth noting that there are two basic assumptions concerning the dimensionality of implicit theory. The first one conceives implicit theory as a bipolar measurement in which the incremental and entity theories are two independent dimensions (Dupeyrat & Mariné, 2005; Hong, Chiu, Dweck, Lin, & Wan, 1999; Lou, Masuda, & Li, 2017), while the other assumption considers it as a unipolar measurement in which the incremental and entity theories are two extreme points on one continuous dimension (Blackwell, Trzesniewski, & Dweck, 2007; De Castella & Byrne, 2015; Hughes, 2015; Robins & Pals, 2002). We adopted the latter approach in this dissertation to avert losing the predictive power associated with typologising variables (Cohen, 1983). Consequently, we reverse scored the incremental items such that larger scores reflected relatively strong entity theory.

3.4.2 Measures of questionnaire II

Technology usage questionnaire (TUQ): This questionnaire was developed by the author specifically to measure the level of technology usage among staff members. For each

section other than the demographic variables, we asked the participants to specify when they started using the technology and how often they use it, on a scale ranging from 1 (never) to 6 (all the time). The questionnaire consisted of four sections, namely the following:

1. Demographic data: included faculty, age, gender, educational level and job type (academic/administrator).

2. Social media: included questions about Facebook, Twitter, Mendeley, LinkedIn, ResearchGate, Academia.edu and institutional O365 Yammer SNSs.

3. Technological devices: included questions about smartphones, tablets, laptops and desktop computers.

4. Technological services: included questions about institutional O365 services (as provided by the institution to its staff members) and commercial services (services other than those provided by the institution). These technological services included email, online documents, calendar, web-based conferencing services, storage space, instant messaging, sites and tasks. We opted to ask the participants about their usage of both commercial and institutional services because it might be the case that staff members used commercial services long before the services offered by the institution. Thus, considering only the institutional services in measuring the actual usage of technology would mislead the results and conclusions. The TUQ is listed in the appendix.

Figure 5 depicts the measures used in each study. The variables measured in the first questionnaire were employed in the first three studies (*studies I, II* and *III*). More specifically, in *study I*, we focused on organisational factors and analysed the OCAI and GOAQ measures. In *study II*, we focused on psychological factors and analysed measures of the implicit theories of ability and personality in addition to goal orientations. In *study III*, both organisational and psychological factors were considered and, hence, we analysed the OCAI together with implicit theory and goal orientations. The GOAQ was excluded from the analysis because it failed to meet the requirements of the pre-analysis as will be explained in section 3.6 later. In *study IV*, analysis was conducted using a paired sample (as will be explained next in section

3.5) and based on data collected from both questionnaires, namely the innovativeness factor measured in the first questionnaire and the actual technology usage measured in the second questionnaire. Because the two questionnaires were administered at different times, this action represented a procedural remedy for common variance issues (Podsakoff et al., 2003).

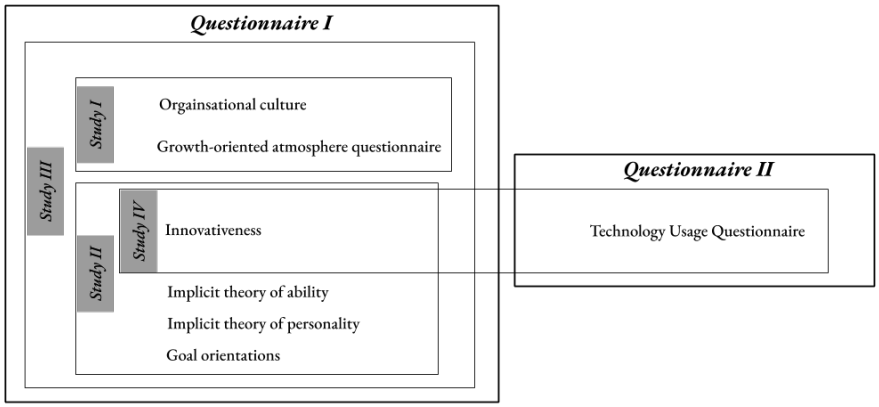

Figure 5. Questionnaires and study variables

3.5 Sample

A total of 742 Finnish staff members working at Tampere HEIs participated in the current research during the 2015–2016 and 2016–2017 academic years. The sample was drawn through a non-probability sampling method. In the UTA, an email was sent to 1,014 staff members inviting them to respond to the online questionnaire, which was built on a UTA survey management system called 'elomake'. In TUT and TAMK, the same online questionnaire was published on the institutions' intranets. Follow-up and reminder procedures were carried out through faculty managers. Participants were invited to answer the first questionnaire and to leave their email if they wished for their responses to the first and second questionnaires to be connected. A total of 106 staff members left their emails and took part in *both* questionnaires, 236 staff members responded exclusively and anonymously to the *first* questionnaire, while 400 staff members responded exclusively to the *second* questionnaire. Table 1 shows the sample distribution over the two questionnaires by institutions.

Table 1. Sample distribution over the two questionnaires by institutions

Institution	*Questionnaire I*		*Questionnaire II*		Paired sample
	N	Response rate	N	Response rate	
UTA	124	12%	184	18%	42
TUT	130	9%	179	12%	16
TAMK	88	11%	143	18%	48
Sum	**342**		**506**		**106**
Total	**742**				

3.6 Analysis

Several preliminary analyses were carried out before conducting the primary analysis of the data. Table 1 shows the numbers of valid responses retained after data screening. Out of 342 total responses to questionnaire I, only 322 responses in *study I* and 315 responses in *studies II* and *III* were considered for analysis. In questionnaire II, 502 out of 506 total responses were valid in *study IV*.

Table 2. Number of valid responses across studies

Questionnaire (N collected)	N (valid)			
	Study I	Study II	Study III	Study IV
I (342)	322	315	315	--
II (506)	--	--	--	502

Missing data were handled using an imputation method (i.e. replacing missing data with the mean in case of the continuous variables, such as age and experience, and with the median in case of the categorical variables, such as the items from the Likert scales). Non-normal data were adjusted using a two-step normalising transformation technique (Templeton, 2011). Sample homogeneity regarding the dependent variable (in our case, it was the innovativeness factor in *studies II* and *III*) was assured by conducting a series of difference tests, such as a t-test and a one-way ANOVA. Common method variance was examined using Harman's one-factor test (Podsakoff et al., 2003). Finally, intra-class correlation coefficients (ICCs) and the degree of agreement among individuals within a group (Rwg) were computed to check data eligibility for multilevel analysis (Bliese, 2000).

The statistical analysis conducted in the current dissertation involved basic analysis methods (t-test, one-way ANOVA, Pearson and Spearman correlation) and

advanced analysis methods (categorical principal component analysis, structural equation modelling and multilevel modelling). In what follows, we will present a brief description of the advanced statistics and for what purpose they were used in this dissertation.

3.6.1 Categorical principal component analysis

Categorical principal component analysis (CATPCA), also known as nonlinear principal component analysis (NLPCA), is a method for reducing large datasets of variables into smaller numbers of meaningful uncorrelated components that explain as much as possible of the variance in the data (Linting & Van Der Kooij, 2012). Conceptually, CATPCA is similar to principal component analysis (PCA) in that they both seek to find a reduced a number of representative components out of a large dataset of variables. However, CATPCA was designed mainly to find those components for a dataset consisting of variables with different measurement scales (nominal, ordinal and numerical). An additional advantage of CATPCA is that it can capture nonlinear relationships within datasets. PCA, on the other hand, can only be conducted on numeric variables with linear relationships.

In *study IV*, participants were asked to indicate their actual use of a sum of 29 different technologies (including software and devices). This made it hard to draw conclusions and induced us to reduce this number to meaningful components. Furthermore, the measurement scale of the questionnaire was ordinal (an ordered list of years starting from the launch of the technology to the publishing of the questionnaire). Thus, CATPCA met our analysis demands.

Currently, two major commercial software packages support CATPCA analysis: SAS and SPSS. Some related functions in an R package can help in conducting CATPCA. The current research followed the step-by-step tutorial guide provided by Linting and Van Der Kooij (2012) on how to conduct categorical component analysis using a CATPCA procedure in SPSS.

3.6.2 Structural equation modelling

Structural equation modelling (SEM), also known as covariance structure modelling or causal modelling, is an advanced statistical method for testing theory and developing explanatory structural models of causal effects (Green, 2016). SEM is widely used in different fields, including social, behavioural and educational contexts,

where the aim is usually to study relationships among deep latent unobserved human constructs.

What distinguishes SEM from other techniques is its capability of dealing with both latent unobserved variables and observed variables and of combining regression and factor analysis techniques into one predictive model (Green, 2016). By doing so, SEM has the power to test complex multivariable models simultaneously, and to study both direct and indirect effects of variables (Tenko & Marcoulides, 2006). Moreover, SEM enables researchers to handle measurement error in the observed variables (both dependent and independent), and this is in comparison with traditional regression, which neglects measurement error in the independent variable, something which may result in misleading results (Tenko & Marcoulides, 2006).

We opted to use SEM in the current research for two main reasons. First, the variables under investigation in the study including innovativeness, implicit theory, goal orientations and perceptions of departmental culture and atmosphere as deep and hidden constructs. Another reason was that we assumed causality between the study variables, and we had already built our hypotheses. SEM was thus a good choice for testing these hypotheses.

However, obtaining rigorous results from SEM requires a number of statistical assumptions to be met before conducting the analysis, such as linearity, normality and homoscedasticity. Furthermore, some SEM estimation methods have strict constraints on the ratio between a sample size and the number of free parameters to be estimated.

Many commercial software packages support SEM analysis, such as LISREL, AMOS, EQS, Mplus and, recently, the R laavan package. In the current dissertation, we used R lavaan since it has on-board statistical tests for non-normal data, a feature that is absent in other software packages, such as AMOS (Arbuckle, 2013; Rosseel, 2012). R laavan supports the robust maximum likelihood (MLM) estimation for this purpose. MLM with robust standard error and mean adjusted chi-square (Satorra & Bentler, 1994) is used when the data fail to meet the assumption of multivariate normality.

3.6.3 Multilevel modelling

Multilevel modelling, also known as mixed-effects models or hierarchical analysis, is an evolved statistical method for analysing hierarchical data (i.e. individual

observations nested within groups). Multilevel modelling is commonly used in social, educational and organisational research where the focus is on filtering out the variation that is attributed to each level from the others (i.e. individual and group levels). By doing so, the researchers can examine the relationships within each level and between levels (interactions). In educational research, hierarchical data are almost everywhere and can present themselves in individuals within groups, classes, schools, departments or institutions.

Our data have the merit of conducting multilevel analysis because they comprise staff members within departments (the assumption of the observations' independency is violated).

Traditional multilevel analysis does have some drawbacks, however. Examples are that it does not support measurement models (latent variables), and it does not examine either mediator effects (only dependent or independent variables) or offer goodness-of-fit measures (Rosseel, 2017). That is why a recent approach combining the capabilities of both multilevel and SEM is named multilevel SEM. In our study, the variables were assumed to have structural dependencies, and, thus, we resorted to multilevel SEM analysis.

There are multiple ways to conduct multilevel SEM, and the topic is still under investigation in the statistical field (Hox, 2010). In our case, we followed the within-and-between approach to multilevel path analysis. The general idea behind this approach is that the same variable incorporates within it a variation pertaining to individual differences and another variation pertaining to group differences. The group variation can be extracted by computing the mean of each group (i.e. we have 34 departments, and this means that we have a new version of the variable consisting of 34 scores). This new version of the variable is modelled at the *between-level*. By subtracting the between-level version from the original variable, we obtain the *within-level* variable. Put differently, the within-level variable represents the deviation of the individual score from the mean of his/her departmental score. At this point, we already have two models. One comprises within-level versions of the variables, and the other comprises between-level versions of the variables. The analysis of each model can be carried out using a regular SEM analysis, which counts on estimating the covariance matrix to see how much the model deviates from the data. Separate estimates for within the covariance matrix (individual-level) and between the covariance matrix (group-level) are determined (Hox, 2010). Thus, multilevel SEM at both levels is conducted separately but simultaneously.

As is the case in SEM, common estimation methods in multilevel modelling, such as maximum likelihood (ML), impose strict requirements on sample size, especially

at the group level because the sample size at the group level is usually smaller and more difficult to increase than the individual-level sample size. In a simulation study to determine the influence of different sample sizes at the group level on the accuracy of the estimates and their standard errors, Maas and Hox (2005) found that a small sample size of 50 or less, at the group level, leads to biased estimates. In our study, where the number of departments was 34, it seemed challenging to use traditional estimation methods, and thus, moving to the Bayesian approach was an alternative option as it performs superiorly in small samples (Stegmueller, 2013). Unlike inferential techniques, the Bayesian approach does not rely on any distributional assumptions about the data, such as normality (Finch & Bolin, 2017, p. 286).

Although the Bayesian approach is less widely used, several packages were developed to support it (for a review, see Mai & Zhang, 2018). In the current dissertation, we employed the Mplus Bayes package offered in Mplus version 8.0 (Muthén & Muthén, 1998–2017).

3.7 Ethical considerations

Research ethics are rules that guide researchers during all research stages to avoid causing harm to others. Ethical issues are controversial subjects in all academic fields, however, and researchers are asked to follow the main principles of research ethics, which mainly include (1) minimising harm, (2) respecting autonomy, (3) protecting privacy, (4) offering reciprocity and (5) treating people equitably (Hammersley & Traianou, 2012).

The Finnish Advisory Board for Research Integrity (TENK) points out all the principles and instructions that researchers should follow to conduct research in Finland (2012, pp. 30–31). As for the current dissertation, several steps were taken to ensure the ethical guidelines were met:

1. The data protection file published by the data protection ombudsman was filled in and signed. The data protection file stated what we should do with the data after publishing the articles. We chose to destroy the data after the study.
2. In the questionnaire cover letter, participants were introduced briefly to the research aims, significance, voluntariness of participation and confidentiality of data.

3. For more details on the research, a Participant Information document was developed and attached to the email invitation. The Participant Information document provided information at length about the research aim, benefits, procedures, data analysis, participants' anonymity and autonomy and their right to withdraw from the research at any time.
4. As part of *study IV*, paired sampling was planned for, and thus, we had to collect participants' identities to link their responses to both questionnaires. However, we maintained participants' autonomy and discretion by asking them to choose whether to leave their emails as identifiers or to discard the request.

3.8 Research evaluation (validity, reliability and trustworthiness)

The cross-sectional correlational design with a self-reported questionnaire in this dissertation represents a weak point, since this design lacks control over the measured variables, and this thus decreases its scientific power. However, measurement validity and reliability procedures were carefully undertaken to guarantee the trustworthiness of the study. Nevertheless, the results of the dissertation should be taken with caution.

Measurement validity refers to "the extent to which a concept is accurately measured in a quantitative study" (Heale & Twycross, 2015, p. 66). Two kinds of validity are constantly referred to: internal and external. Internal validity refers to the extent to which our conclusions can be sustained by the research design and measures. In other words, internal validity ensures that the differences we see in the dependent variables can only be attributed to the differences in independent variables. External validity refers to "the degree to which the results can be generalized to the wider population, cases or situations"(Cohen et al., 2007, p. 136).

Measurement reliability refers to the accuracy and consistency of an instrument. In other words, a reliable measure will tend to generate similar results if it is administered multiple times to the same participants but at different times.

All measures adopted in the dissertation were international and were validated through several studies (Cameron & Quinn, 2006; Dweck et al., 1995; Goldsmith, 1990; Hurt et al., 1977; Levy et al., 1998; Midgley et al., 1998; Nokelainen & Ruohotie, 2009). The measures have shown strong psychometric characteristics and have repeatedly demonstrated their use as valid measures. However, considering the

fact that the questionnaires were translated to the Finnish language, we sought to ensure the measurement validity and reliability with a series of procedures:

1. Piloting the translated questionnaires on a sample consisting of 25 participants. The misunderstanding of the survey questions threatens the validity of the questionnaires, and, thus, pre-testing or piloting is recommended. Based on the pilot results, some items were excluded, and some other interface enhancements were made to improve the response experience.
2. Conducting SEM to ensure that the items loaded properly on their respective factors (measurement model).
3. Reporting Cronbach's Alpha as an indicator of the reliability of all measures.

In addition to the pre-listed steps, each sub-study involved specific procedures to ensure the validity and reliability of the measures.

Study I: The results of *study I* showed significant differences in staff members' perceptions of organisational culture, attributed to their institutions, job types, disciplines, gender and educational levels. However, the effect sizes of these differences were not reported in *study I*. Effect size (also known as Cohen's d) refers to how much these significant differences lead to concrete and plausible differences (Cohen et al., 2007). Because the significance level is a function of sample size, if the sample size is quite large, any small difference will tend to be significant. Effect size is just used to address whether this small difference is worthwhile. Table 1 below reports the effect sizes of all significant differences reported in *study I*.

The effect size for independent samples in a t-test was calculated using the following formula (Cohen et al., 2007, p. 522):

$$Eta\ squared = \frac{t^2}{t^2 + (N_1 + N_2 - 2)}$$

Where t refers to the t-value of the difference between the two group means, and N_1 and N_2 refer to the sample size in the first and second group, respectively.

The effect size for the analysis of variance was calculated using the following formula (Cohen et al., 2007, p. 523):

$$Eta\ squared = \frac{sum\ of\ squares\ between\ groups}{Total\ sum\ of\ squares}$$

According to Cohen et al. (2007), we interpreted the effect size as follows: weak effect (0-.20), modest effect (.21-.50), moderate effect (.51-1.00) and strong effect (>1.00).

Table 3. Effect sizes of all significant differences in study I

Independent variable	Dependent variable	Effect size	Interpretation
University	Market	.035	Modest
	Hierarchy	.046	Modest
Job type	Adhocracy	.058	Moderate
	Market	.043	Modest
	Hierarchy	.093	Moderate
Discipline	Market	.020	Weak
Gender	Adhocracy	.043	Modest
	Market	.052	Moderate
Educational level	Hierarchy	.050	Moderate
	Growth-oriented atmosphere	.034	Modest

A general observation from Table 1 is that all the effect sizes range between a modest and a moderate effect except for the effect of discipline on Market culture.

Studies II and *IV*: We assessed the goodness-of-fit of the model using several well-established indices: confirmatory fit index (CFI), the Tucker-Lewis Index (TLI), the standardised root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) as well as chi-square test statistics. We used cut-off values for these indices as indicated by Hu and Bentler (1999): CFI > .90, TLI > .90, RMSEA < .06 and SRMR <. 08 are typically considered acceptable. For the ratio of χ^2 to *df*, values less than 3 represent an adequate fit (Schreiber et al., 2006). Furthermore, we used a bootstrapping method with 5,000 bootstrap samples and 95% bias-corrected confidence intervals (CIs) to assess the significance of mediation (Preacher & Hayes, 2008). Our results for *studies II* and *IV* met all the above-mentioned criteria.

Study III: We applied Harman's one-factor test to examine the issue of common method variance, and the result indicated that this was not a major concern in this study. Moreover, we calculated ICC1 (i.e. the proportion of group-level variance in respect to the total variance in the variable), ICC2 (i.e. the reliability of the group means) and Rwg (i.e. the degree of agreement among staff members within a

department). All values were within the acceptable ranges (ICC1 > 0.05; ICC2 >= 0.40; Rwg > 0.70). It is worth noting here that growth-oriented atmosphere factors failed to show acceptable values of ICC1 and ICC2, and thus, they were excluded from the multilevel modelling in *study III*. Furthermore, we employed Bayesian graphs to investigate whether the MCMC algorithm approach smoothly to the reported results. Moreover, model fit was assessed using a posterior predictive p-value (PPP) and a credibility interval (CI). A PPP value close to 0.50 indicates optimal fit (Finch & Bolin, 2017). A 95% CI, which contains zero, indicates a good fit to the data. Again, our results resided within acceptable ranges.

In terms of external validity, our findings were not far off those from a lot of previous studies. For example, mastery goal orientation was associated with adaptive outcomes (Dweck & Leggett, 1988; Pintrich, 2000), whereas performance-avoidance goal orientation was linked to maladaptive outcomes (Elliot & Church, 1997). Our results are in line with these previous results, and, thus, the reader can rest assured that these results tend to be consistent over studies. Yet, our results departed from some other previous findings. Specifically, the role of organisational culture on innovativeness has been emphasised in several previous studies (Ahmed, 1998; Anderson et al., 2014; Frambach & Schillewaert, 2002; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). Despite this, in *study III*, where we adopted multilevel analysis, this result failed to be replicated. We consider the possible sources of these deviations in the discussion section. The reader, in such cases, should take our and other results with caution. One possible source of the deviation is the analysis approach used. In *study II*, for instance, the relationship between the implicit theory of ability and mastery goal orientation was only confirmed using SEM analysis. However, when using *multilevel* SEM in *study III*, this relationship was no longer significant. We tend to believe the result of the multilevel SEM because it was designed to separate the common variance attributed to the group level and, thus, report only the individual effects. We do not invite the reader to believe one study's results over the others, yet the reader should pay attention to the source of the deviation and keep an eye on ongoing research in the field to reach decisive conclusions.

At the end of this chapter, we present, in Table 4, an overview of the RQs/hypotheses addressed by each sub-study, along with the methodology used in each one.

Table 4. Overview of sub-studies (RQs/hypotheses and methods)

Study	RQs/Hypotheses	Data collecting tool	Sample	Analysis
I	RQ1. What do the staff members of the Tampere HEIs perceive their schools' or departments' cultures to be like? RQ2. Are there significant differences in the perception of a school's culture when staff members' institutions, job types, disciplines, gender, educational levels, ages or work experience are considered? RQ3. What do staff members perceive the growth atmospheres of their schools or departments to be like? RQ4. Are there significant differences in the perception of the growth atmosphere when staff members' institutions, job types, disciplines, gender, educational levels, ages or work experience are considered? RQ5. How do the cultures of the Tampere3 institutions relate to a growth atmosphere?	Questionnaire I Measures: OCAI GOAQ	N = 322	Descriptive analysis: computing means and standard deviations Inferential analysis: • Two independent samples' t-tests • One-way ANOVA • Pearson correlation
II	H1. Entity theories are negatively related to individual innovativeness. H2. Mastery goal orientation is positively related to individual innovativeness.	Questionnaire I Measures: Innovativeness	N = 315	Descriptive analysis: computing means and standard deviations Inferential analysis:

	H3. Performance-approach goal orientation is positively related to individual innovativeness. H4. Performance-avoidance goal orientation is negatively related to individual innovativeness. H5. Entity theories are negatively related to mastery goal orientation. H6. Entity theories are positively related to performance-approach goal orientation. H7. Entity theories are positively related to performance-avoidance goal orientation. H 8. Goal orientation mediates the relationship between entity theories and individual innovativeness.	Implicit theory Goal orientations		• Pearson correlation • SEM using R laavan
III	H 1. The entity theory of ability and performance-avoidance goal orientation contribute negatively to predicting innovativeness, while mastery goal orientation contributes positively to predicting innovativeness. H 2. The entity theory of ability is negatively associated with mastery goal orientation while positively associated with performance-avoidance goal orientation. H 3. Clan and Adhocracy cultures contribute positively to predicting innovativeness, while a Hierarchy culture contributes negatively to predicting innovativeness.	Questionnaire I Measures:	N = 315	Descriptive analysis: computing means and standard deviations Inferential analysis: • Pearson correlation • Bayesian multilevel path analysis using Mplus Bayes package

H 4. Culture moderates the relationship among the implicit theory of ability, goal orientation and innovativeness, leading to the following hypotheses:
H 4.1. Cultures supporting flexibility and discretion (Clan and Adhocracy) mitigate the negative effects of the implicit theory of ability and performance-avoidance goal orientation on innovativeness, while strengthening the positive effect of mastery goal orientation on innovativeness.
H 4.2. A culture emphasising control and stability (Hierarchy) worsens the negative effects of the entity theory of ability and performance-avoidance goal orientation on innovativeness, while reducing the positive effect of mastery goal orientation on innovativeness.
H 4.3. Cultures supporting flexibility and discretion (Clan and Adhocracy) mitigate the negative effect of the implicit theory of ability on mastery goal orientation, while weakening the positive effect of the implicit theory of ability on performance-avoidance goal orientation.
H 4.4. A culture emphasising control and stability (Hierarchy) reduces the positive effect of the entity theory of ability on mastery goal orientation, while worsening the negative effect of the entity theory of ability on performance-avoidance goal orientation.

Innovativeness
Implicit theory
Goal orientations
OCAI

IV	**Phase I:** RQ1. What kinds of technologies are used by staff members and who are the users? RQ2. How heavily is social media used? RQ3. How heavily are technological devices used? RQ4. How heavily are O365 services used?	Questionnaire I Measures: TUQ	N = 502	Descriptive analysis: computing means and standard deviations Inferential analysis: • chi-squared test and Cramer's V
	Phase II: H1. General innovativeness contributes positively to predicting actualised innovativeness. H2. Young participants are earlier innovation adopters than older participants. H3. Male participants are earlier innovation adopters than females. H4. Participants with education qualifications are earlier innovation adopters than participants with fewer education qualifications. H5. Participants working in hard disciplines are earlier innovation adopters than participants working in soft disciplines. H6. Participants with more job experience are earlier innovation adopters than participants with less job experience.	Questionnaire II Measures: TUQ Innovativeness	N = 106	Descriptive analysis: computing means and standard deviations Inferential analysis: • Spearman correlation • SEM using R laavan

4 RESULTS

4.1 What do the staff members of Tampere HEIs perceive their schools' or departments' cultures and growth atmospheres to be like? (Study I)

The goal of this study was to explore staff members' perceptions of their schools'/departments' cultures and growth atmospheres at Tampere HEIs. In addition, we examined how the culture of an organisation relates to its growth-oriented atmosphere. Particularly, the study sought to examine which HEI cultures support employees' growth and to what extent the current cultures in Tampere HEIs foster it.

The results showed that the four cultures (Clan, Hierarchy, Market and Adhocracy) were moderately experienced throughout Tampere HEIs, with a Clan culture being the most dominant.

The findings also revealed significant differences in staff members' perceptions of organisational culture, attributed to their institutions, job types, disciplines, gender and educational levels. More specifically, results of a one-way ANOVA showed no differences in staff members' perceptions of either Clan or Adhocracy cultures, which means that staff members from the three institutions tended to agree on the degree of flexibility, freedom and discretion in their institutions. However, differences emerged in the perception of Market and Hierarchy cultures. More precisely, TUT staff members perceived that their school oriented more towards a Market culture and less towards a Hierarchy culture than their counterparts at the UTA and TAMK.

In terms of job type, the two independent samples' t-tests showed that the academics, more than the administrators, perceived their schools' cultures as being oriented towards Adhocracy and Market cultures, whereas the latter perceived their schools as heading more towards a Hierarchy culture.

Differences among the academics themselves based on their disciplines (either hard or soft) were also examined. The two independent samples' t-tests showed no significant differences except for in the case of a Market culture. That is to say, hard

scientists perceived their schools as heading towards a Market culture more than soft scientists did.

The two independent samples' t-tests showed that males perceived their schools' cultures as externally oriented (Adhocracy and Market) more than females did.

With reference to educational level, staff members with lower educational qualifications (bachelors, masters and others) perceived their schools' cultures as leaning towards a Hierarchy culture more than the professors or docents did.

It is notable that the differences reported among the three HEIs in terms of demographic variables were all refereed to in the perception of Market culture. Moreover, the TUT sample comprised more males than females, more academics than administrators and more hard than soft scientists. Therefore, we ran an extra analysis to examine whether the reported differences were in fact due to one factor and not the others. The results of the two-way ANOVA showed no significant interactions among the variables, and thus, each variable had its own effect on the Market mean score, independently of the other factors.

When asked to rate departmental atmosphere, staff members generally agreed that their schools'/departments' atmospheres encouraged professional growth, since the score for the perception of growth-oriented atmospheres was above the average.

Finally, and with regard to the relationship between culture and a growth-oriented atmosphere, only the Clan and Adhocracy cultures were found to support professional growth. In other words, allowing the staff flexibility, discretion and autonomy implicitly guarantees their professional growth.

4.2 Do implicit theory and goal orientation predict general innovativeness? (Study II)

This study aimed to examine a model in which the implicit theories of ability and personality and goal orientations acted as predictors of individual innovativeness.

To do so, we first inspected the correlation matrix for the study variables. Performance-approach goal orientation did not correlate with any of the study variables, and thus, it was excluded from further analyses. Additionally, the correlation matrix revealed that both domains of implicit theory (i.e. the entity theories of ability and personality) are highly correlated. Therefore, we examined the effect of each domain on the other variables in a separate model to isolate the variance explained by each domain.

We followed Baron and Kenny's (1986) four steps for a mediation test. The results for *direct effects* proved our hypotheses. First, the entity theories of ability and personality significantly predicted innovativeness, and the models fit the data well. Second, both mastery goals and performance-avoidance goals predicted innovativeness. Third, with regard to the effect of implicit theory on goal orientations, the results showed that the entity theory of ability only contributed to predicting mastery goals. Likewise, the implicit theory of personality also only predicted mastery goal orientation.

Moving forwards to test the *mediation effects*, the results revealed a non-significant direct effect of the entity theory of ability on innovativeness, thus indicating a full mediation effect of mastery goal orientation. Similarly, the effect of the entity theory of personality on innovativeness was shown to be fully mediated by mastery goal orientation. Both models acceptably fit the data and accounted for 16% of the variance in innovativeness. The significance of the mediation was assessed using the bootstrapping method and indicated a significant full mediation in both models.

Since the study aim is to examine all factors predicting innovativeness, either directly or indirectly, two summary integrative models were examined. Controlling for the entity theory of personality, the first summary model (see Figure 6) included the entity theory of ability, mastery goals and performance-avoidance goals as predictors.

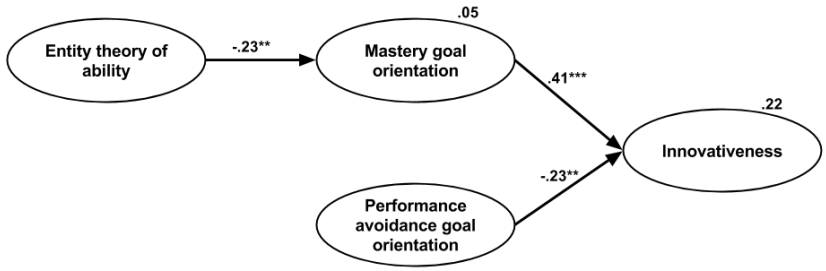

Figure 6. Summary model adopted from Aldahdouh et al. (2018) – The entity theory of ability and goal orientations as predictors of innovativeness. Standardised regression coefficients reported. $^{**}p < .01$; $^{***}p < .001$.

The results showed that the model fit the data well ($\chi^2 = 549.231$, $df = 341$, $p < .001$, $\chi^2/df = 1.611$, CFI = .922, TLI = .914, RMSEA = .047, SRMR = .065), showed a *significant* full mediation ($\beta = -.094$, 95% CI [-.111, -.015], $p < .05$) and accounted for 22% of the variance in innovativeness.

In contrast and controlling for the entity theory of ability, the second summary model (see Figure 7) included the entity theory of personality, mastery goals and performance-avoidance goals as predictors.

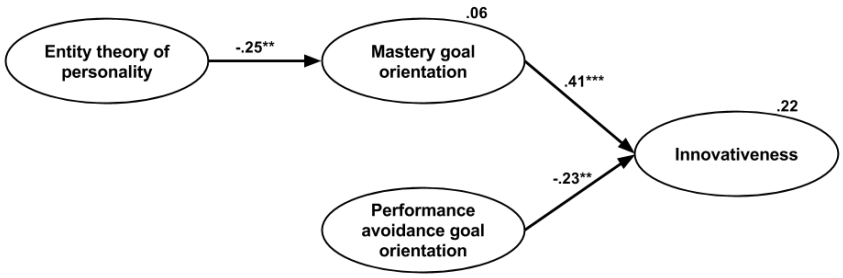

Figure 7. Summary model adopted from Aldahdouh et al. (2018) – The entity theory of personality and goal orientations as predictors of innovativeness. Standardised regression coefficients reported. ***p* < .01; ****p* < .001.

The results showed that the model fit the data well ($\chi 2 = 559.280$, df = 342, $p < .001$, $\chi 2/df = 1.635$, CFI = .925, TLI = .917, RMSEA = .048, SRMR = .066), indicated a significant full mediation ($\beta = -.100$, 95% CI [-.130, -.021], $p < .05$) and explained 22% of the variance in innovativeness.

4.3 How do both psychological and organisational factors interact to influence general innovativeness? (Study III)

This study sought to employ multilevel analysis to examine the role of psychological (implicit theory and goal orientation) and organisational factors (departmental culture) and their interaction in predicting individual innovativeness. Three models were developed: the random intercept, random slopes and cross-level interaction models.

First, we tested the random intercept model (see Figure 8). A PSR value (<1.05) as well as the posterior parameter trace and autocorrelation plots indicated good convergence of the parameter estimates. The model showed a good fit to the data in terms of both PPP and the credibility interval: the PPP was .278, and the 95% credibility interval had a lower bound of -16.494 and an upper bound of 32.025. The DIC value was 1143.358.

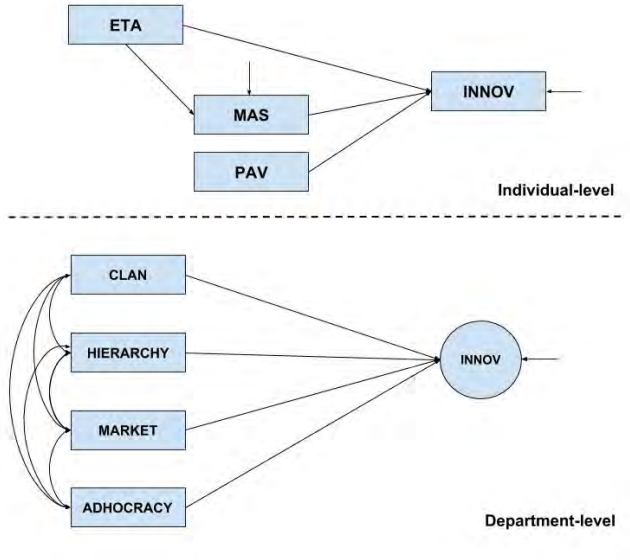

Figure 8. Random intercept model adopted from Aldahdouh, Korhonen and Nokelainen (2019). INNOV = innovativeness; ETA = entity theory of ability; MAS = mastery goal orientation; PAV = performance-avoidance goal orientation. Performance-approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

Investigating the model parameters revealed that the entity theory of ability was negatively associated with mastery goal orientation and innovativeness, while mastery goal orientation was positively associated with innovativeness. Performance-avoidance goal orientation, on the other hand, was negatively associated with innovativeness.

Unexpectedly, none of the cultures was found to contribute to predicting the variance in innovativeness's random intercept.

Then, we tested the random slopes model (see Figure 9) by allowing the slopes to vary across departments. The DIC value in that model was 1122.479, which is lower than in the previous model, and this indicated that allowing slopes to vary across departments contributed to a better fit with the data.

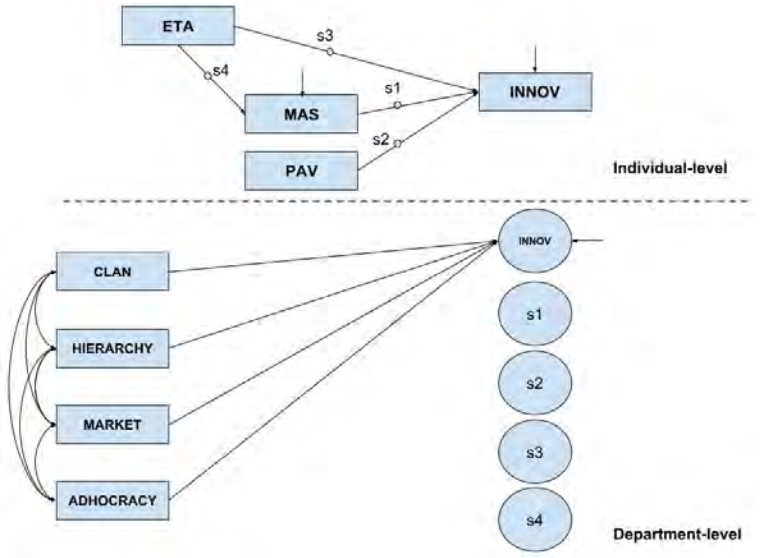

Figure 9. Random slopes model adopted from Aldahdouh, Korhonen and Nokelainen (2019). INNOV = innovativeness; ETA = entity theory of ability; MAS = mastery goal orientation; PAV = performance-avoidance goal orientation. Performance-approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

The parameter estimates results showed that only mastery and performance-avoidance goal orientations were found to be significant positive and negative predictors of innovativeness, respectively.

Finally, we tested the cross-level interaction model (see Figure 9) in which the cultures served as moderators of the relationships between the psychological variables and innovativeness. The DIC value was 1015.440, which is smaller than in the previous model, indicating that the cross-level interaction model demonstrated a better fit with the data.

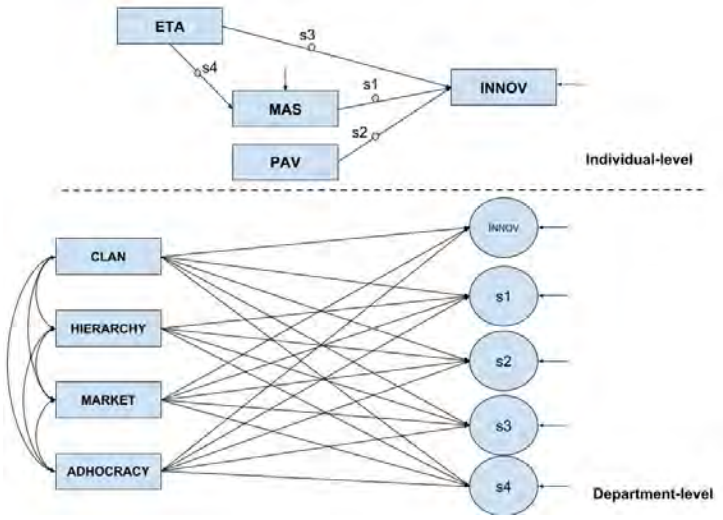

Figure 10. Cross-level interaction model adopted from Aldahdouh, Korhonen and Nokelainen (2019). INNOV = innovativeness; ETA = entity theory of ability; MAS = mastery goal orientation; PAV = performance-avoidance goal orientation. Performance-approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

The results of the cross-level interaction model showed that the cultures did not have a direct effect on innovativeness nor a moderation effect on the relationships between the psychological variables and innovativeness. Yet, and once again, mastery goal orientation showed a positive effect while performance-avoidance goal orientation showed a negative effect on innovativeness.

4.4 Does general innovativeness predict the actual usage of technology? (Study IV)

This two-phase study set out with a twofold aim. The first objective was to explore the usage of technology in higher education. Specifically, we attempted to explore the staff members' usage of social media, technological devices and cloud computing services with demographic variables being considered. Second, this study aimed to investigate the consequences of individual innovativeness or, in other words, to examine the role of general innovativeness in predicting the actual use of technology.

The results of the first phase (N = 502) showed that the staff members used technology satisfactorily. Facebook was the most widely used social networking site (SNS), followed by LinkedIn, Twitter and Yammer, respectively. Furthermore, the staff reported similar usage percentages for smartphones, laptops and desktop

computers, with tablets being the least used device. Overall, commercial services were more popular than the O365 services offered by the institution. In particular, the most used services were email, calendar, online documents, e-conferencing tools and storage space services. The instant messaging, site, tasks and contacts services were the least popular services.

The findings also pointed to significant differences in the usage of social media, technological devices and services attributed to gender, job type and discipline. Female participants were more inclined towards using tablet devices, generic social media such as Facebook and Twitter and O365 services such as Outlook email, the calendar, Skype and Lync. Male participants, on the other hand, were more disposed towards using ResearchGate SNS, online documents and storage space services.

In terms of job type, the study revealed some expected and some unexpected findings. On the one hand, academics–according to the nature of their jobs–were more oriented towards academic social media, such as ResearchGate and Mendeley. On the other hand, academics were less oriented towards using O365 services and Twitter and Yammer SNSs.

As for discipline, the results showed that Academia.edu, Facebook, Twitter, Skype and Outlook services were the most popular technologies for staff in soft fields, while ResearchGate, site and tasks services were the most popular technologies for staff in hard fields.

The study also sought to explore the amount of usage in terms of personal and work purposes. Results suggested that for both Twitter and Facebook, the amount of usage for personal purposes outweighed that for work purposes, while the opposite is true in the case of LinkedIn and the institution's O365 Yammer. As expected, both smartphones and tablets were used more heavily for personal purposes, while laptops and desktop computers were used more heavily for work purposes.

Regarding the use of O365 services for international communication, O365 Outlook was in the lead, followed by Skype. Other services were reported to have similar usage percentages.

The results on the dimensionality of technologies conducted by CATPCA were in line with expectations. Social media items yielded two dimensions (academic and non-academic SNSs) and accounted for 63.4% of the variance. Items related to technological devices were represented in one dimension, accounting for 52% of the variance. Finally, technological service items were suggested to form two dimensions (commercial and O365 services) and accounted for 66.7% of the variance.

In the second phase (N = 106), we examined the contribution of general innovativeness and demographic variables in predicting the adoption of technologies (i.e. actualised innovativeness). The findings partially confirmed our hypotheses (see Figure 11). While general innovativeness positively predicted the devices, non-academic SNSs and institutions' O365 services, it showed a non-significant effect on the adoption of academic SNSs and commercial services.

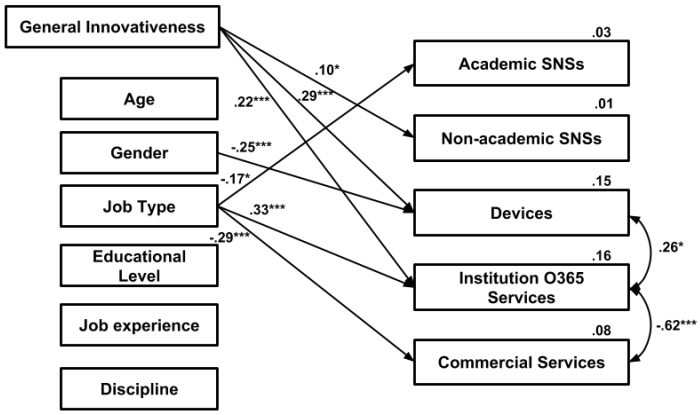

Figure 11. Path model of general innovativeness and the demographic variables as predictors of actualised innovativeness, adopted from Aldahdouh, Nokelainen and Korhonen (2020). Standardised regression coefficients reported. Non-significant paths were omitted for clarity. ***$p < .001$; *$p < .05$.

Furthermore, the male participants tended to start using devices earlier than the female participants. Academics were found to be earlier adopters of academic SNSs and commercial services, while they seemed to lag behind the administrators in terms of using O365 services.

Finally, the findings suggested that staff members who adopted commercial services before long seemed to adopt O365 services lately.

5 DISCUSSION

Several theoretical and empirical attempts have been made over decades to study the factors contributing to individual innovativeness. Part of the work was devoted to unfolding the psychological attributes (Aldahdouh et al., 2018; Batra & Vohra, 2016; Lu et al., 2012; Vinarski-Peretz, Binyamin, & Carmeli, 2011), while other work concentrated on workplace attributes (Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2016; Shanker, Bhanugopan, van der Heijden, & Farrell, 2017; Si & Wei, 2012). Yet, just a few studies (Miron et al., 2004; Montani et al., 2014; Scott & Bruce, 1994) integrated both psychological and organisational factors. This dissertation is a continuation of the efforts, and it aims to uncover whether individual innovativeness results from employees' psychological attributes or is shaped by their workplace environments. Or, it may also be a function of both psychological and organisational aspects. Additionally, the dissertation contributes to the existing debate in the literature concerning the consequences of innovativeness and seeks to provide evidence on whether models studied in business and marketing fields are also valid for the higher education context. Below, the discussion consists of five sub-sections. The main findings are presented in two sub-sections: (1) antecedents and (2) consequences of individual innovativeness. The third sub-section is devoted to presenting the theoretical and practical implications. The following sub-section focuses on the dissertation's limitations and methodological considerations and narrates how we handled the challenges of conducting different analysis methods during the research. Finally, directions for future research are proposed in the final sub-section.

5.1 Antecedents of individual innovativeness

In the current dissertation, we attempted to examine the role of implicit theory and goal orientations in predicting innovativeness, taking into account organisational culture as a predictor and a moderator.

Results of SEM in *study II* confirmed the mediating role of goal orientation between innovativeness and the implicit theories of both ability and personality. This

relationship was no longer significant in *study III*, after accounting for the departmental level. In plain English, most of the statistical analyses that seek to identify the differences between variables are, in one way or another, based on the assumption of the observation independency condition. This condition states that the responses of one participant on the scale do not affect and should not be affected by others' responses. In most social studies, this constraint is violated. For example, in our case, participants who belong to a specific department could have something in common in terms of their views on organisational culture. And thus, the response of employee A is not independent from the response of his/her colleague B working in the same department. Multilevel SEM was developed to handle the violation of observation independency by removing the common variance among members of a department (departmental-level variance). In *study III*, we removed the departmental-level variance, which resulted in erasing the significant relationship between the implicit theory of ability and mastery goal orientation. On the other hand, mastery and performance-avoidance goal orientations still maintained their significant positive and negative effects on innovativeness, after accounting for the departmental level. And this result leads us to the conclusion that individual innovativeness seems to be a function of psychological factors, namely goal orientations.

5.1.1 Goal orientations as the drivers of innovativeness

Taking the results of the second and third studies (*studies II* and *III*) together, it can be said that one's goal orientations are most relevant in interpreting his/her willingness to change. In other words, individual innovativeness can be thought of as a human characteristic driven by the internal power of one's motivation to learn, to search for the new, to satisfy one's curiosity and to dive into new experiences. Individual innovativeness, moreover, seems to deteriorate when one's aim is to avoid looking incapable in front of his/her colleagues or when one is trying to avoid failure and mistakes.

Innovativeness implicitly entails continuous learning and self-development, higher levels of initiative and openness, fearlessness of challenges and failure and bravery to confront uncertainty and risks. To understand what makes mastery goal and performance-avoidance goal orientations contribute to one's innovativeness, it may be helpful to refer to the results of abundant studies conducted on goal orientation in a variety of contexts, including education (Dweck & Leggett, 1988;

Grant & Dweck, 2003) and workplace environments (Hirst, Van Knippenberg, & Zhou, 2009; Janssen & Van Yperen, 2004; Keong & Hirst, 2010; Lu et al., 2012).

Evidence from several studies has shown that mastery goal orientation not only evokes individuals to develop deep learning strategies that help them to confront challenging tasks but also triggers their engagement and intrinsic motivation to seek unfamiliar approaches and novel solutions that may encounter high levels of risks and failure, which implicitly imply the need to be innovators. When facing setbacks, mastery-oriented individuals view a challenge as a learning opportunity rather than a threat. Thus, they attribute failure to a lack of effort rather than a lack of ability (Blackwell et al., 2007), and hence, they seek to invest more effort in developing new skills. They are more likely to cope effectively with negative feedback and adopt more vigorous and effective strategies to overcome obstacles with determination and enthusiasm (Robins & Pals, 2002). In the same vein, Payne et al. (2007) argued that mastery goal orientation "would be most valuable for jobs requiring employees to embrace new learning opportunities and adapt to change" (p. 142).

In their discussion of innovation triggers in higher education, Tierney and Lanford (2016) identified intrinsic motivation among three other positive dimensions. By intrinsic motivation (Amabile, 1993), we mean the internal desire derived from one's interest and passion to learn, to develop creative initiatives and to invent new ways of working and problem-solving methods. In contrast to intrinsic motivation, Amabile (1998) contends that external drivers of motivation do not induce employees to like what they do. In her words, "A cash reward can't magically prompt people to find their work interesting if in their hearts they feel it is dull." (p. 79). We acknowledged that intrinsic motivation and mastery goal orientation are conceptually distinct, but, despite this, they largely intersect. According to Montani and colleagues (2014), intrinsic motivation is the key to generating new ideas because these creative ideas are more likely to stand out as a result of one's passion and joy. Mastery goal orientation is the key to bringing these ideas to life because this process certainly requires one to master skills and develop competences.

Another remarkable finding is that performance-avoidance goal orientation hinders innovation adoption. Driven by their name, performance-avoidance goals tend to stimulate individuals to avoid negative and harmful experiences and, thus, they stand in the way of self-development and growth. Consistent research showed that they are greatly associated with a fear of failure and low competence expectancies (Elliot & Church, 1997). Individuals who espouse performance-avoidance goals experience anxiety and tend to adopt self-protection strategies and avoidance-based processes, such as revoking effort-requiring situations and

displaying self-handicapping and procrastination (Elliot & Church, 1997). When facing setbacks, they tend to view challenges as threats rather than learning opportunities.

Moreover, studies showed that performance-avoidance goals induce individuals to avert risks. They are vigilant individuals, and they keep their eyes open for anything that could threaten their reputations and abilities in front of others (Roskes, 2015). Moreover, they adhere to a systematic way of thinking, focus on details and have a narrow attention scope. These characteristics contradict creativity and block the way to innovation. Roskes (2015) showed that creative performance is difficult and depleting, especially for performance-avoidance-oriented individuals.

To our knowledge, no study has examined goal orientation in relation to innovativeness as a psychological deep construct other than the current work. Yet, our results are in line with previous studies that examined the relationship between goal orientation and (1) attitudes towards innovation adoption (Keong & Hirst, 2010) and (2) innovative work behaviour (Janssen & Van Yperen, 2004; Lu et al., 2012; Montani et al., 2014).

When it comes to performance-approach goal orientation, our results can contribute to the long-standing debate about its consequences (Butler, 2007; Mascret et al., 2015; Retelsdorf et al., 2010). The current dissertation supports the line of research that indicates that performance-approach goals may lack the power to predict individual differences in different contexts (Butler, 2007; Chen & Pajares, 2010; Middleton & Midgley, 1997; Papaioannou & Christodoulidis, 2007; Retelsdorf et al., 2010). According to Elliot (1999), performance-approach goal orientations can be viewed as hybrid goals with mixed effects, which are highly dependent on the context.

It is also worth noting here that the present dissertation found a high correlation between the two dimensions of performance orientations: approach and avoidance. Prior studies have emphasised the same results in different contexts (Daumiller et al., 2016; Nitsche et al., 2011; Was, 2006). The findings are theoretically sound since the dimensions may be considered two sides of the same coin. In essence, both dimensions share a common interest in the ego-social aspect; while performance-oriented individuals seek to show off, performance-avoiding individuals seek to maintain their self-image. It seems that staff members do not perceive a difference between performance-approach and performance-avoidance goal orientations. A stronger relationship between the two dimensions was also reported in Daumiller and colleagues' (2016) study (r = 0.93). A possible explanation for such a high

correlation could be the inappropriate splitting of the performance orientation of the staff in higher educational institutions.

5.1.2 Organisational culture encourages professional growth, but with no effect on innovativeness

Considering the cultural aspects of the staff's incubator (institution), our findings suggested that the dominant culture in Tampere HEIs was perceived as Clan. This result supports the literature that indicates that HEIs generally have a unique culture, characterised by autonomy and flexibility (Berrio, 2003; Smart & John, 1996). It is also differentiated by coherent relationships among staff members and an exclusive focus on professional development and self-gratification.

Furthermore, Clan and Adhocracy cultures were found to promote a growth-oriented atmosphere. Based on the CVF, both cultures shared the dimensions of flexibility and discretion. Therefore, one may infer that providing staff with a space to think, learn and try without control or threats will boost innovativeness and professional growth. Such a relationship is well-documented in previous studies (Ashraf et al., 2013; Cameron & Ettington, 1988; Smart & John, 1996; Sokol et al., 2015). For instance, Raj and Srivastava (2013, p. 201) concluded that in order to "increase learning and innovativeness, organizations have to focus on building a culture that incorporates a sense of competitiveness and market leadership and at the same time, provide employees flexibility, autonomy, opportunities for growth and rewards them for their contributions".

Study I in the current dissertation was conducted two years before the Tampere merger launch date. Our aim was to investigate whether the cultures in the three HEIs were homogeneous or if there were significant differences within them. The other aim was to examine cultural differences in relation to demographic variables. The results showed that the three HEIs tended to similarly endorse the extent to which their institutions are Clan and Adhocracy. The difference in perceptions of the culture was between TUT, on one side, and TAMK and the UTA, on the other side, in terms of Market and Hierarchy cultures. TUT was more likely to orient towards a Market culture and less likely to demonstrate a Hierarchy culture. The orientation of TUT towards a Market culture was best manifested in its mission, vision and strategic plan (2016-2020). An example was in its contribution to "the creation of new business opportunities, companies and jobs arising from 'our' research", to "strengthen the industrial competitiveness and export industry of

Finland" and to "support the commercialization of research results and the establishment of new companies" (TUT, 2015, p. 2).

The major difference in the perception of a Market culture, however, was not only seen among the three HEIs. It was also observed with regard to other demographic variables. Males perceived culture as oriented towards Market and Adhocracy more than females. Moreover, hard scientists perceived their schools as heading towards a Market culture more than soft scientists. Furthermore, academics saw their schools' cultures as directed towards Adhocracy and Market cultures, while administrators saw their departments as having a Hierarchy orientation. We conducted further analysis with a two-way ANOVA to examine the main factors behind these differences. In other words, we aimed to examine whether these differences emerged because the TUT sample had a higher percentage of male staff who mostly worked in hard disciplines. The results suggested no significant interaction among the investigated demographic variables, and this means that each variable had its own effect independently of the other variables.

Even though the perceived cultures at Tampere HEIs were found to be supportive of staff professional growth, this study has been unable to demonstrate that culture has a direct or moderating effect on individual innovativeness. Thus, this result does largely depart from the plentiful empirical (Miron et al., 2004; Montani et al., 2014; Scott & Bruce, 1994), as well as review, studies emphasising the role of culture in innovativeness (Ahmed, 1998; Anderson et al., 2014; Frambach & Schillewaert, 2002; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). This discrepancy could be attributed to the inconsistency with regard to innovativeness's conceptualisation and level of measurement. For example, Montani et al. (2014) and Miron et al. (2004) adopted the concept of innovative behaviour rather than innovativeness as a broad psychological concept. Moreover, a general review of the literature reveals that the focus of researchers' attention was on organisational innovativeness rather than individual innovativeness. Examples are a systematic review by Tian, Deng, Zhang and Salmador (2018) and a meta-analytic review by Büschgens, Bausch and Balkin (2013).

A note of caution is due here because the distinction between the current work and others is manifested in that they largely relied on innovativeness from a behavioural perspective in comparison to innovativeness as a deep psychological construct. These two perspectives of innovativeness are related but conceptually different. Otherwise stated, we were deprived from comparing our results with those of other studies because we did not measure the same constructs. And, what they refer to as antecedents of innovativeness do simply not apply to our case, and what

is more, we have not found in the literature so far any study that targets organisational culture and innovativeness as psychological traits. More research should be directed to further examine this.

Another source of distinction is that the majority of the previous research focused on business rather than academic organisations. Therefore, what other studies emphasised cannot simply be transferred to the academic context. The academics, who make up most of the study sample, seem to take their decisions to innovate because they focus on themselves rather than on the environments in which they interact. They do not care whether the environment is Clan- or Market-based when they decide on a particular change, but rather make that decision based on their individual differences in terms of their tendencies towards change. However, further studies are still needed to examine the role of culture in innovativeness while considering the organisation type in the analysis.

5.2 Consequences of individual innovativeness

In *study IV*, we pursued exploring technology usage among staff members as an indicator for actualised innovativeness. Data from staff members' general innovativeness were modelled together with their actualised innovativeness to examine if general innovativeness has a predictive value.

The results showed that a wide spectrum of technologies is prudently used by the staff members of Tampere HEIs. The current study added evidence from Finland to similar findings obtained from the United States, Italy and the Middle East, stating that the usage of SNSs for personal purposes outweighed their usage for work purposes (Al-Daihani, Al-Qallaf, & AlSaheeb, 2018; Manca & Ranieri, 2016a; Moran, Seaman, & Tinti-Kane, 2011). Facebook was at the top of the most used technologies list. However, the good thing is that the academics' orientation has started to shift towards specific SNSs, such as LinkedIn and ResearchGate, as these appeared almost as much as Facebook in the most used technologies ranking. This could be explained by the growing awareness of the potentiality that SNSs can bring for academics in terms of increasing research visibility, fostering research Altimetric, establishing scholar identity and increasing expertise communication with other researchers worldwide. Relatedly, a study by Manca and Ranieri (2017) on a sample of 6,139 Italian academics reported similar results. They attributed the increasing orientation towards the use of academic over general SNSs to the fact that academics might face pressure to increase their academic performance and visibility. It is worth

noting that while some studies (Holland, Cooper, & Hecker, 2016) showed that the personal use of social media during work time has positive consequences on morale, retention, job performance and satisfaction, there are also studies that refer to cyberloafing, where the use of internet for personal or non-related purposes has negative consequences, such as perceived injustice, disengagement and stress (Holland et al., 2016; McDonald & Thompson, 2016). Thus, here we are not arguing for a decrease in the personal usage of technology but rather for an increase in its professional usage to gain optimal benefits.

O365 email was used by 100% of academics, reflecting the fact that it is an official communication tool at Tampere HEIs. Following this, the most used services were the calendar, online documents, e-conferencing services and storage space. The instant messaging, site, tasks and contacts services were the least popular services. As technology and its features overlap and are rapidly changing, it seemed that staff often substitute one service with another service. Examples were Lync with Skype or tasks with the calendar service. One is enough, in their perception. It is worth noting that as time goes by, the offered services change. For example, between the time of conducting *study IV* and the time of writing this dissertation, more services have emerged, such as Teams, To-Do, Sway, Stream, Planner, Flow and Forms, while the Lync service has disappeared. Notwithstanding this rapid change in technologies, our findings highlighted the dominance of traditional email services. This result was in line with that of Roblyer, McDaniel, Webb, Herman and Witty (2010) who compared the use of email and Facebook by staff members and found that staff were significantly more likely to check their email than to check Facebook and that they did not use Facebook for daily communication in the same way that they did email.

The differences in technology usage in relation to demographic variables corroborated previous works (Davison & Argyriou, 2016; Rowlands, Nicholas, Russell, Canty, & Watkinson, 2011). Female participants seemed to prefer using generic social media, such as Facebook and Twitter, while male participants leaned more towards using ResearchGate. This result could be interpreted as that females are more oriented towards socialisation and males towards their professional careers and building up their academic profiles.

As expected, academics were more disposed towards ResearchGate and Mendeley than administrators, but they dropped back them in the usage of O365 services, Yammer and Twitter. Soft scientists showed more interest in using Academia.edu, Facebook, Twitter, Skype and Outlook services, while hard scientists were more likely to use ResearchGate, site and tasks services. Recently, Greifeneder

and colleagues (2018) investigated researchers' attitudes towards the use of SNSs in four countries (Germany, Singapore, the UK and the USA) and confirmed the findings of the tendency of soft scientists to use Academia.edu and hard scientists to prefer ResearchGate. A possible explanation for this disparity can be attributed to the way in which staff members value the content on social media. For example, Moran, Seaman and Tinti-Kane (2012) showed that staff in the mathematics, computing and natural sciences complained about the lack of relevant content on social media sites for their particular disciplines. Besides, Manca and Ranieri (2016a, p. 227) also found that soft scientists tended to appreciate more the other affordances–such as facilitating communication, sharing and content creation–in comparison to the relevant content on social media.

The second general aim of *study IV* was devoted to investigating the predictive power of general innovativeness. Our findings confirmed that innovativeness measured at a deep level was a significant positive, albeit weak, predictor of adopting some technologies, namely, devices, non-academic SNSs and institution O365 services. Thus, the results of *study IV* in the higher educational context were in line with previous efforts in the business and marketing fields (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003; Jin, 2013; van Rijnsoever & Donders, 2009).

An interesting finding from the model presented in *study IV* was the negative correlation between the adoption of institutional O365 services and commercial services. This means that staff members who were early to adopt commercial services were more likely to adopt institutional O365 services later on, which somehow offered the same functionalities. Our interpretation intersects with Rijnsoever and Donders (2009, p. 985), as they said, "When the relationship between innovations is very close in terms of functionality, the chances of adopting both technologies simultaneously can decrease because it is not very useful to buy two different items with exactly the same function".

5.3 Theoretical and practical implications

The findings of this research suggest a number of theoretical and practical implications for HEIs seeking to enhance their staff members' innovativeness.

From a theoretical viewpoint, this dissertation is one of the first attempts to integrate implicit theory and goal orientation together with organisational culture into one model to predict psychological-trait innovativeness. It adds further evidence, emphasising the role of goal orientations in stimulating or hindering the

general tendency towards innovation adoption, as was the case with behavioural innovativeness (Lu et al., 2012; Montani et al., 2014). This idea is essential to bear in mind because we can now say that one's goal not only influences his/her adoption of a given innovation but also influences his/her willingness to adopt any innovation, and across domains. The result could open up a new avenue for researchers in terms of delving further into the recent categorisations of mastery goal orientation, such as those of self-approach, self-avoidance, task-approach and task-avoidance (Mascret et al., 2015). Generally speaking, self-reference with its two categories (approach and avoidance) seems to be associated with personality-trait innovativeness because both are driven by developing one's self. Task-reference, on the other hand, seems to be associated with behavioural innovativeness because both focus on developing the task itself. It would be interesting to know if our pre-listed assumptions stand up to other empirical studies. It would also be worthwhile to examine the applicability of other motivational theories, such as expectancy-value theory in interpreting innovativeness.

From a practical perspective, our results are self-pronouncing for human resources (HR) and administrators. Our study invites institutions to put the bulk of their attention on practices that positively impact their employees' willingness to adopt changes. The findings suggest that cultivating staff members' orientations towards mastery goals could enhance, in one way or another, their innovativeness. Practices, such as judging performance based on talent rather than on efforts, imposing severe control over employees' time schedules rather than encouraging self-censorship and viewing failure as a threat rather than an opportunity for learning, encourage an orientation towards performance-avoidance rather than mastery goals. Institutions could also pay attention to employees' mastery goal in the recruitment process and select those with this orientation for positions requiring regular innovative changes.

There are two reasons that make us optimistic regarding the role of goal orientation in innovativeness. For one, results from interventions (Wang, Wu, Parker, & Griffin, 2018) and longitudinal studies (Kunst, van Woerkom, van Kollenburg et al., 2018) have proven that the possibility of altering goal orientations exists, although they are relatively stable traits. More specifically, a study by Kunst and colleagues (2018) emphasised the role of *facilitative managerial coaching* in changing teachers' goals towards mastery goal orientation. Administrators and supervisors should follow such practices to orient their employees towards mastery goals. Examples are fostering "self-referenced rather than other-referenced feedback and compensation systems that focus on effort, personal improvement, skill

development, experimentation and cooperation" (Janssen & Van Yperen, 2004, p. 382).

For another reason, performance-avoidance goal orientation should not be seen as an unsolvable barrier for innovativeness (Roskes, 2015). The diffusion of performance-avoidance goals among staff members is indeed a barrier for institutions seeking innovation. Yet, findings from five experimental studies showed that avoidance-oriented individuals tend to adopt creative paths, but only when these creative paths serve as a means to their goals (Roskes, De Dreu, & Nijstad, 2012). Creative paths seem to require extra effort from performance-avoidance individuals because they consume their working memory capacity on judging their abilities, thinking about the consequences of their actions and imagining themselves in the worst-case scenarios, and they even feel depleted after doing the tasks. Even though these individuals showed their readiness to pay this high price of creativity in the cases when their benefits lay within the results of the creativity. Administrators could play on this point very well. For instance, they could stimulate the sense of competence for avoidance-oriented staff via external motivators, such as bonuses and rewards. It is interesting to know that this same result has been recognised even in the earlier stages of research. In Amabile's (1993) words, "extrinsics in the service of intrinsics" (p. 194).

In addition, there is another option for activating performance-avoidance-oriented staff members. Experimental studies showed that individuals who are highly in need of structure perform better on creative tasks, but only when they are given detailed instructions to follow (Rietzschel, Slijkhuis, & Van Yperen, 2014) and controlled feedback (Slijkhuis, Rietzschel, & Van Yperen, 2013). This is contrary to individuals who are low in personal need, whose creative performances suffer when they are directed to follow instructions (Rietzschel et al., 2014) and are given controlled feedback (Slijkhuis et al., 2013). Based on this evidence, Roskes (2015) suggested that the characteristics of individuals who are highly in need of structure are in one way or another representing the characteristics of performance-avoidance-oriented individuals. And thus, the creativity of avoidance-oriented individuals, in particular, would be enhanced if administrators provided them with clear, predefined, fragmented and structured job tasks. Such structure would fit their preferences and their systematic ways of thinking, reducing uncertainty, mitigating ambiguity, preventing work cognitive overload and helping them focus on their efforts regarding creativity-relevant rather than irrelevant actions.

The current research highlighted the primary role of goal orientations but not implicit theory in interpreting the individual differences in innovativeness. The

implicit theory of ability failed to show its effect when we controlled for the departmental variance (*study III*). These results call for researchers to revisit the mediation role of goal orientation between implicit theory and human attributes, taking into account the nest structure of data if there is any. Studies that confirmed the relationship (Chen & Pajares, 2010; De Castella & Byrne, 2015) drew their samples from hierarchical data but neglected group variance. To our knowledge, few studies controlled for group variation (Chen & Wong, 2015; Leondari & Gialamas, 2002) and confirmed the mediation role. A distinction of the current research from the above-mentioned works resides in two points: First, the control method for the group-level variation is different. For example, Chen and Wong (2015) conducted a one-way ANOVA, while Leondari and Gialamas (2002) added the school variable as a predictor in the model. On the other hand, we used a multilevel approach. Second, all previous studies actually targeted students in the school or university context. To our knowledge, no studies examined the relationship between implicit theory and goal orientation in workplace environments other than ours. Therefore, the nature of the relationship between implicit theory and goal orientations remains unclear, and there is a call for further studies in both higher education and other workplace settings.

The current dissertation sheds some light on the value of measuring individual innovativeness. Based on our results, general innovativeness can have a small though significant influence on actualised innovativeness. Yet, previous studies (Arts et al., 2011; Bartels & Reinders, 2011; Kaushik & Rahman, 2014; Marcati, Guido, & Peluso, 2008) showed that domain-specific innovativeness is closer and more relevant than general innovativeness in predicting actualised behaviour. Here we argue that it seems unreasonable to use the domain-specific one when we do not know the domain of the innovation in the first place or when we are interested in tracking innovative behaviour but *across* domains. In such cases, the value of general innovativeness steps in, providing insights with a broader perspective and regardless of the kind, time or place of the innovation. However, in cases where we specifically know the innovation domain and we are interested in a certain innovative behaviour, then it would be more purposive to use the domain-specific innovativeness concept.

The current dissertation invites researchers and academics to boost their professional use of social media and be aware of the possibilities that technology can bring to them in terms of research collaboration, dissemination and Altimetric. In addition, HEI administrators should lend a helping hand to their staff by offering them courses to promote their technological competencies and by recalculating their workloads to include new tasks, such as disseminating their work through social

media channels and participating in scientific dialogues on the web. Finally, HEIs should recognise the consequences of being late to adopt technology. That is, staff members make use of the alternative options and adopt them instead, and when the HEI finally decides to use the technology, staff members will most likely be late adopters of this technology. Thus, this dissertation encourages HEI administrators to be fast and wise in their decisions to adopt in such cases because, as the proverb says, 'The early bird gets the worm, but the second mouse gets the cheese'.

5.4 Limitations and methodological considerations

The current dissertation is among the first to employ a multilevel approach in examining the influence and interaction of implicit theory, goal orientation and organisational culture on individual innovativeness. However, the dissertation has several limitations pertaining to (1) the research design and (2) the analysis methods. The cross-sectional and correlational survey design used in the study limited our ability to confirm the causal relationships. Future studies with a longitudinal design could prove our claims. Moreover, collecting the data of study variables from the same respondents gives rise to a concern over a common method variance (CMV) issue. Podsakoff et al. (2003) suggested a number of practical and statistical remedies for handling CMV. In *studies II* and *III,* Harman's one-factor solution was applied. The other suggested solutions were not applicable due to the limited sample size in comparison to the number of model parameters. In *study IV*, however, we allowed for a time lag between the first and second questionnaires as a procedural remedy for common variance issues (Podsakoff et al., 2003). We expect that this should handle most–but not all–of the common rater effects, item characteristic effects and item context effects. Further studies should consider collecting data with different means. For example, a variable such as organisational culture can be assessed via consensus among representatives from management, employees and the union, while other variables, such as technology usage, can be retrieved from log data, after taking into account any ethical considerations.

The limitations of the analysis method are fundamentally related to the adoption of the *data modelling* school, in which researchers hypothesise a model and then examine how much this model deviates from the data. By doing so, they, by no means, are sure of whether this model is *the only* one which represents the data. In other words, the suggested model may or may not represent the relationships among the study variables. There could be other better and more worthy models that they

did not take into account either due to the dearth of them in the literature or because of their thinking styles. Future studies can make use of recent advances in the *algorithmic modelling* school, which tends to generate the best model for representing data (Breiman, 2001).

Limitations other than those related to the research design and analysis methods include the fact that our aim was to investigate the antecedents and consequences of individual innovativeness, but actually the weight of the antecedents was larger throughout the dissertation. Future research could pay more attention to innovativeness's consequences in higher education. Additionally, it is important to note that job characteristics were not examined in the current dissertation. Thus, differences among educational degrees in regard to cultural perceptions, which were reported in *study I*, could be viewed as a consequence of the differences in position and job function.

Anyway, the analysis of data throughout this dissertation has been confronted by many challenges and methodological considerations. The first consideration lies in the fact that our sample was small. The number of valid responses for the analysis was 315, and it was challenging to collect more responses from busy staff members. And, this limitation was recurrent across the analyses of the four studies. For example, when we resorted to an asymptotically distribution free (ADF) estimation technique in *study II* as a solution for violating the assumption of multivariate normality, the number of responses fell short of meeting the requirement of the ADF method. Thus, the second option was to conduct a parcelling method, but even this suffers from major weaknesses (Little, Rhemtulla, Gibson, & Schoemann, 2013). The option was then to adopt MLM estimation technique, which was one of the recent statistical developments to handle non-normal data. However, MLM was not supported by SPSS AMOS, for which we had a license. That is why we ended up using the R laavan package, which supports the MLM technique. The issue of sample size occurred once again in *study III*, where multilevel modelling was used. The recommendation was to have at least 50 groups at the group level (Maas & Hox, 2005). Our data, however, consisted of only 34 groups at the group level. Thus, it seemed challenging to proceed with multilevel modelling using traditional estimators, such asMLM. Therefore, we resorted to the Bayesian approach, which was proven effective in handling the analysis of small sample sizes.

Another consideration is related to measuring actualised innovativeness and objectively reducing the number of measured technologies using CATPCA. The current dissertation employed a combination of time-of-adoption and cross-sectional approaches, in an attempt to overcome the disadvantages pertaining to each

individual method. Instead of providing the participants with a checklist of technologies, they were asked to indicate the year in which they started using each technology from among a predefined list of years (the drop-down list of years was ordered from the year the questionnaire was distributed to the year the technology was launched). Moreover, at the top of each list, two additional items were added: (1) "I don't know about this technology", which indicated that the participant was the least innovative, and (2) "I have never used this technology", which indicated that the participant was a little bit more innovative (since he/she at least knew about the technology). Therefore, the coding was built so that lower values represented lower innovativeness scores, while higher values represented higher innovativeness scores (see the TUQ in the appendix).

What sets *study IV* apart from previous studies is that it employed CATPCA to reduce the large number of technologies into a handful of meaningful dimensions. Earlier works, for example, listed all the technologies, as in the study by Manca and Ranieri (2016b), or created composite variables based on the correlation among variables, as in the study by Davila et al. (2012).

5.5 Future research

This research has thrown up many questions in need of further investigation. First, it seems that the current literature on innovativeness is messy. The literature presents different kinds of innovativeness conceptualisations and ways to operationalise it and its levels of measurement (individual vs team vs organisational). Clear boundaries of the antecedents and consequences associated with innovativeness in each case are still missing. Comparing the findings across studies is indeed painful, not to mention the overlapping among related concepts, such as creativity, innovation as a product, innovation as a process and innovation adoption. Therefore, this dissertation calls for an integrative review so that newcomers to the field locate their and others' results within the literature carefully and confidently.

This dissertation provides the following insights for future research. As we suggested earlier, the survey design entails serious drawbacks, and one possible solution is to adopt alternative research methods. We realised and acknowledged this issue during this dissertation and, therefore, planned and initiated a method to capture staff members' attitudes towards change at Tampere University. Specifically, we employed the method of empathy-based stories (MEBS), which is "well-suited for examining the informants' perceptions, reasoning, expectations, and values

regarding a specific phenomenon or experience" (Wallin, Koro-Ljungberg, & Eskola, 2018, p. 1). In MEBS, participants are usually asked to write a short imaginary story based on a predefined script given by the researcher. The idea of MEBS seems very close to the traditional experimental research design in that the researcher *randomly* assigns participants to two (or more) groups and provides each group with a specific version of the script. If the participants' stories clearly vary in response to different scripts, then this variation can be attributed to the script. In other words, researchers with a quantitative approach tend to treat the script as a 'stimulus' in regular experimental design (See Table 5).

Table 5. The idea of MEBS

Script#1	→	effect#1
Script#2	→	effect#2

In Table 5, the original script version (Script#1) will encourage the participants to write their stories in a specific way (effect#1). Manipulating the stimulus a little bit (Script#2) may result in different stories (effect#2). If the output stories of both scripts are significantly different (effect#1 ≠ effect#2), then this difference should be due to introducing different scripts.

We also know from the literature that attitudes towards change are situational or domain-specific. In other words, one may accept change related to technology but resist change related to job tasks. It all depends on how the individual perceives the nature of change, its value and its consequences. Therefore, we designed two different innovation adoption contexts: (1) change in technology and (2) change in job. For each context, two opposite scripts were developed: (1) accept versus reject robot and (2) accept versus reject risky job.

The aim is to investigate participants' positive and negative attitudes towards accepting or rejecting change and to examine how these attitudes are related to participants' scores in terms of innovativeness, implicit theory and goal orientations. During the period of January–May 2018, a total of 157 invitations were sent, from which 68 responses were received (43% response rate). Data analysis will be started later on, and it will be based on a quantitative content analysis.

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APPENDIX

TECHNOLOGY USAGE QUESTIONNAIRE

Social Media

In this section, you will be asked about social media usage. If you have an account on any of the following social media, please indicate when you established your account:

Academia.edu
I don't have account

ResearchGate
I don't have account

Mendeley
I don't have account

Twitter
I don't have account

Facebook
I don't have account

LinkedIn
I don't have account

Institution's Office 365
Yammer
I don't have account

Please indicate how often do you use the following social media according to the scale below:

1=Never
2= Once or several times a month
3= Once or several times a week
4= Once or several times a day
5= Once or several times an hour
6=All the time

	1	2	3	4	5	6
ResearchGate	○	○	○	○	○	○
Academia.edu	○	○	○	○	○	○
Mendeley	○	○	○	○	○	○
Twitter for work-related purposes	○	○	○	○	○	○
Twitter for personal purposes	○	○	○	○	○	○
Facebook for work-related purposes	○	○	○	○	○	○
Facebook for personal purposes	○	○	○	○	○	○
LinkedIn for work-related purposes	○	○	○	○	○	○
LinkedIn for personal purposes	○	○	○	○	○	○
Yammer for work-related purposes	○	○	○	○	○	○
Yammer for personal purposes	○	○	○	○	○	○

Devices

In this section, you will be asked about technological devices usage. Please indicate when did you use the following devices for the first time:

Smartphone

Not selected

Tablet

Not selected

Laptop

Not selected

Desktop Computer

Not selected

Please indicate how often do you use the following devices according to the scale below:

1=Never
2= Once or several times a month
3= Once or several times a week
4= Once or several times a day
5= Once or several times an hour
6=All the time

using smartphone for sending or receiving text (SMS) or multimedia messages (MMS)

using smartphone for sending or receiving instant messages (e.g. FB Messenger, Whatsapp, Viber,..)

using smartphone for making or receiving phone calls

using smartphone for work related purposes

using smartphone for personal purposes

using smartphone provided by your university for any purpose (select 1 if you don't have)

using desktop computer for work related purposes

using desktop computer for personal purposes

using desktop computer provided by your university for any purpose (select 1 if you don't have).

using tablet for work related purposes

using tablet for personal purposes

using tablet provided by your university for any purpose (select 1 if you don't have).

using laptop for work related purposes

using laptop for personal purposes

using laptop provided by your university for any purpose (select 1 if you don't have).

Services

This section is divided into 4 parts. In the first part, you will be asked about when you start using some technological services which were available for a long time ago. In the second part, you will be asked about how often do you use corresponding services offered by your institution's Office 365. In the third part, you will be asked to indicate how much do you use those Office 365 services in international communication (in percentage). In the fourth part, you will be asked about when you start using those Office 365 services.

Please indicate when did you use the following services for the first time in your life (whatever the provider was; Microsoft, Google, Yahoo, Amazon,...)

Email

Not selected

Online documents (e.g. Word Online via web browser NOT desktop application)

Not selected

Calendar

Not selected

Web-based conferencing (e.g. Skype, Hangout,...)

Not selected

Instant messages (e.g. Windows live instant messages, Yahoo instant messages,...)

Not selected

Storage space (Google Drive, Microsoft SkyDrive, Dropbox,...)

Not selected

Sites (e.g. Google Sites,...)

Not selected

Tasks
Manager

Not selected

Contacts Manager

Not selected

Please indicate how often do you use the following services according to the scale below:

1=Never
2= Once or several times a month
3= Once or several times a week
4= Once or several times a day
5= Once or several times an hour
6=All the time

Office 365 Outlook email

Office 365 online documents (e.g. Word Online via web browser NOT desktop application)

Office 365 Calendar

Office 365 Skype (web-based conferencing)

Office 365 Lync(instant messages)

Office 365 OneDrive (storage space)

Office 365 Sites

Office 365 Tasks Manager

Office 365 People (contacts manager)

Please indicate how much percentage do you use the following institutional services in international communication:

	0 - 10 %	11 - 20 %	21 - 30 %	31 - 40 %	41 - 50 %	51 - 60 %	61 - 70 %	71 - 80 %	81 - 90 %	91 - 100 %
Office 365 Outlook email										
Office 365 OnlineDocs										
Office 365 Calendar										
Office 365 Skype										
Office 365 Lync										
Office 365 OneDrive										
Office 365 Sites										
Office 365 Tasks Manager										
Office 365 People										

When did you start using the following institution Office 365 services:

	I don't know about this service	Not yet	2017	2016	2015	2014
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○
	○	○	○	○	○	○

PUBLICATIONS

PUBLICATION I

How Does an Organisation's Culture Relate to Professional Growth? A Study of Finnish Higher Education Institutions

Tahani Aldahdouh, Vesa Korhonen, and Petri Nokelainen

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How Does an Organisation's Culture Relate to Professional Growth?

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Refereed article

Onko organisaatiokulttuurilla yhteyksiä ammatilliseen kasvuun?

Tutkimus kolmesta suomalaisesta korkeakoulusta

Abstrakti

Tässä tutkimuksessa on tarkasteltu organisaatiokulttuuria ja kasvuorientoitunutta ilmapiiriä kolmessa Tamperelaisessa korkeakouluorganisaatiossa (Tampere3 korkeakoulut) ja pyritty tunnistamaan kulttuurin ja ilmapiirin välisiä yhteyksiä. Organisaatiokulttuurin arviointimittaria (OCAI) ja kasvuorientoituneen ilmapiirin kyselyä (GOAQ) soveltaen koottiin aineistoa yhteensä 322 henkilöstön jäseneltä. Tulokset osoittivat, että kaikkia neljää teorian mukaista organisaatiokulttuuria (hierarkkinen, markkinaorientoitunut, klaani ja adhokratia) esiintyi Tamperelaisissa korkeakouluissa, joskin

vallitsevana kulttuurina oli tunnistettavissa klaani. Kasvuorientoituneen ilmapiirin tulos oli yli keskiarvon, mikä osoitti ilmapiirin olevan yleisesti henkilöstön ammatilliselle kasvulle suotuisa. Kulttuurin ja kasvuorientoituneen ilmapiirin välisten yhteyksien tarkempi tarkastelu kuitenkin osoitti, että vain klaani ja adhokratia vallitsevina kulttuureina koetaan ammatillista kasvua tukevina. Toisin sanoen, kun tarjotaan henkilöstölle joustavuutta, vaikutusmahdollisuuksia ja itsenäisyyttä, tuetaan samalla ammatillista kasvua ja kehittymistä. Aineisto osoitti myös oppi- ja tieteenalojen välisiä eroja organisaatiokulttuureissa sekä vastaajien sukupuolten ja koulutustason välisiä eroja kulttuurien arvioinnissa. Korkeakoulujen päättävät tahot voivat ottaa tuloksia huomioon tehdessään strategisia suunnitelmia ja ratkaisuja em. korkeakoulujen yhteistyön tiivistämisessä.

Avainsanat: *korkeakoulutus, organisaatiokulttuuri, ammatillinen kasvu, Tampere3*

Abstract

This study seeks to explore organizational culture and growth-oriented atmosphere as experienced at higher education institutions in Tampere together with the relationship between culture and atmosphere. The Organisational Culture Assessment Instrument (OCAI) and the Growth-Oriented Atmosphere Questionnaire (GOAQ) were administered to a sample of 322 staff members. The results revealed that all four culture types (Hierarchy, Market, Clan and Adhocracy) were experienced in moderation inTampere higher education institutions, while the dominant culture was found to be Clan. The score for a growth-oriented atmosphere was above the average, which means that the atmosphere encourages professional growth. The relationship between culture and growth-oriented atmosphere indicated that only the Clan and Adhocracy culture types support professional growth. That is to say, allowing the staff flexibility, discretion and autonomy implicitly guarantees their professional growth. The study also reported differences in organisational culture based on discipline, job type, gender and educational level. Administrators at higher education institutions could benefit by taking the study findings into account when developing strategic plans and initiatives.

Keywords: *higher education, organisational culture, OCAI, professional growth, Tampere3, Finland*

Introduction

Higher Education Institutions (HEIs) generally seek to unite their efforts and build coalitions to enhance their competitive capability, and Finnish HEIs are no exception (Crawford & Bethell, 2012). Recently, the University of Tampere (UTA), the Tampere University of Technology (TUT), and the Tampere University of Applied Sciences (TAMK) joined forces to develop a new form of cooperation. A new institution, to be called Tampere3, is planned to allow students and staff from the three HEIs to collaborate in creating an inspiring and globally attractive environment for their research and learning (Tampere3, 2017). The idea is to bring together the three distinct HEIs in such way that they will complement each other in one multidisciplinary university. 'The areas of cooperation will include, among others, joint study modules, IT services and international HR services, new research openings

and environments, the Open University and a joint Tampere Summer School concept' (UTA, 2015, pp. 6–7). Tampere3, if implemented, will have about 35,000 students, 4,600 employees, and will produce about 4,000 publications per year. The strategic leadership of Tampere3 is the responsibility of the boards of all three universities (UTA, 2015).

This study comes at a time when Tampere3 negotiations are still in progress. Caution, however, should be observed when institutions are working together in such a 'reengineering' change initiative. According to Cameron and Quinn (2006), 'The failure rate of most planned organisational change initiatives is dramatic' (p. 1). This is not to say that the Tampere3 initiative is going to fail, but we do need to understand how such difficulties frequently arise. Cameron and Quinn (2006) argue that the main cause of failure appears to be a neglect of the organisational culture as part of the change initiative.

In the higher education context, organisational culture is defined as the collective memories, beliefs, assumptions and thinking styles of the HEI stakeholders (academics, administrators, students, etc.), which implicitly guide their behaviour (Cai, 2008; Cameron & Quinn, 2006; Kuh & Whitt, 1988; Maassen, 1996; Smart & John, 1996). A culture represents something hidden, deep and implicit; it is the unwritten rules that govern the staff's behaviour. The culture may be implicit and hidden, but its effect on the institution's performance is widely recognized (Yu & Wu, 2009). Researchers have paid considerable attention to organisational culture because it has been proven to be a determining factor in institutional effectiveness (Cameron & Ettington, 1988; Cameron & Quinn, 2006; Quinn & Rohrbaugh, 1981, 1983; Smart & John, 1996). Cultural rules interact with the organisation's staff and affect their growth motivation, attitude towards their jobs, team spirit, managerial decisions and evaluation of their jobs. Together, these dimensions create the organisational climate or atmosphere. Denison (1996) contends that the atmosphere's dimensions are rooted in the culture, are relatively temporary and are subject to direct control. Atmosphere is therefore more overt and refers to observable attributes of organisations (Cameron & Quinn, 2006; Peterson & White, 1992). It is argued that if culture refers to an organisation's personality, the climate then refers to the organisation's mood (Thomas, 2010). A growth-oriented atmosphere is comprised of all those factors that have a significant and positive effect on staff's willingness to accept challenges, to learn new things, to acquire new skills and to be up-to-date (Nokelainen, 2008). In other words, a growth-oriented atmosphere is the type of organisational climate that will support life-long learning for its staff.

Smith (2004) and Ruohotie (1999) both argue that not all HEI cultures are equal in supporting their staff's professional development and growth. This study examines how the culture of an organisation relates to its growth-oriented atmosphere. In particular, this paper seeks to examine which HEI cultures support growth and to what extent the current cultures in the Tampere3 institutions foster it. Accordingly, the following five research questions are formulated to address the aims of this study:

1. How do the staff members of the Tampere HEIs perceive their school or department's culture?
2. Are there significant differences in

perception of a school's culture when staff member's institution, job type, discipline, gender, educational level, age or job experience are considered?
3. How do staff members perceive the growth atmosphere of their school or department?
4. Are there significant differences in perception of growth atmosphere when staff member's institution, job type, discipline, gender, educational level, age or job experience are considered?
5. How does the culture of the Tampere3 institutions relate to a growth atmosphere?

Theoretical Framework

Organisational culture in higher education

Organisational culture is considered one of the main research areas in the higher education context. Maassen (1996) argues that 'the study of higher education can be divided into two aspects: the substantive activities of academics … and the organisation of the work of academics, including the attitudes and values of academics towards their work and their profession' (pp.157–158). The value of studying the culture of institutions has been repeatedly highlighted in the literature. Austin (1990) and Beytekin, Yalçinkaya, Doğan and Karakoç (2010) contend that analysing the culture of an HEI leads to a deeper understanding of its staff's behaviours, concerns, problems and perspectives.

Kuh and Whitt (1988) define the HEI culture as 'the collective, mutually shaping patterns of norms, values, practices, beliefs, and assumptions that guide the behaviour of individuals and groups in an institute of higher education' (pp. 12–13). Therefore, a culture here represents the shared identity or personality and the qualities that distinguish one institution from all other institutions. Maassen (1996) argues that the study of culture in HE can be divided into two parts: the first part consists of studies on the cultures of universities or colleges, and the second part focuses on disciplinary cultures. Previous work done on the culture of universities and colleges includes that by Clark (1972, 1989), Bergquist (1992), Tierney (1988), Dill (1982) and Masland (1985); whereas prominent amongst the work done on disciplinary cultures is that of Becher (1981, 1994).

Measuring organizational culture is not an easy task; the many different approaches, models and frameworks reflect the different conceptualisations of culture. For example, Jung et al. (2009) identified 70 instruments and approaches used for assessing organizational culture. The HEI theorists have also been inspired by studies on organizational culture in the Business and Management fields such as the work of Schein (1985, 1996) as well as the work of Cameron and Quinn (2006). For example, Bergquist (1992) proposed that four cultures exist in academies of higher education: the collegial, the managerial, the developmental and a culture of advocacy. Later, Bergquist and Pawlak (2008) added two additional cultural types (the virtual and the tangible) to the four culture model to make it a model that engages with six cultures of the academy.

Cai (2008) says that the majority of studies dealing with organizational culture follow a qualitative approach and can be categorized into two tracks. The first track uses a dimensional approach to institutional culture, as in the work of Tierney (1988). The second track uses a typologi-

cal approach and identifies different types of institutional culture as in the work of Bergquist (1992) and Bergquist & Pawlak (2008). One of the most widely used typological frameworks in higher education is the Competing Values Framework (Cai, 2008; Yu & Wu, 2009).

Competing Values Framework (CVF) was developed as the result of efforts to identify organisational effectiveness (Quinn & Rohrbaugh, 1981, 1983). Originally, Campbell (1977) identified a list of 30 effectiveness criteria. Quinn and Rohrbaugh (1983) submitted that effectiveness list to a multidimensional scaling analysis and their results showed three competing value dimensions. The first dimension represents organisational focus (internal versus external orientation). The second dimension represents organisational structure (stability versus flexibility). The third dimension represents organisational means and ends (procedures versus outcomes). Yu and Wu (2009) state that the third dimension is integrated into the other two dimensions. Thus, Figure 1 shows the first two dimensions which are producing four quadrants representing four organisational culture types (Cameron & Quinn, 1999, 2006): Hierarchy, Market, Clan and Adhocracy.

The *Hierarchy* culture focuses on internal control. It emphasizes that all resources are to be utilized as planned. It outlines procedures and guidelines that all staff members and students should follow. The rules are the governor. Rectors and deans are seen as directors and coordinators. A hierarchy culture aims to achieve stability, continuity, predictability and efficiency. The priority is to keep the institution alive; the status of the institution is of greater significance than the needs and interests of its stakeholders.

The *Market* culture focuses on external control. Running a well-functioning business is its prominent feature. It keeps an eye open for its share of the 'market.' These terms may seem strange and unrelated to the educational field. However, for-profit universities, colleges and schools are fundamentally business organisations. The institution's existence is contingent on its ability to keep and increase its share of students and research funds. The mar-

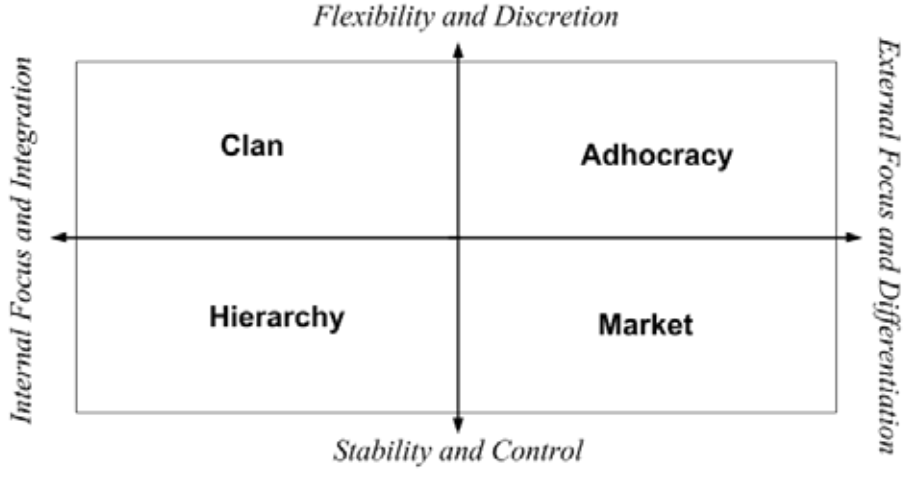

Figure 1. Competing Values Framework adopted from Cameron and Quinn (2006)

ket culture emphasises achieving goals and introduces rules to increase productivity and efficiency. Rectors and deans are tough and demanding. The market culture seeks to acquire profit from different sources, such as selling research, winning funds and minimizing expenses.

An Adhocracy culture focuses on external flexibility.

The *Clan* culture focuses on internal flexibility, individuality and spontaneity. It emphasizes close, coherent and moral relationships among staff members. It pays great attention to teamwork; all members work together for the sake of their institution. A clan culture allows staff members to be involved in decision-making at the highest levels. It supports the creation of a warm atmosphere where staff members feel as though they are in a big family. Rectors and deans are mentors and facilitators. A clan culture aims to foster staff members' professional development, satisfaction and participation.

An *Adhocracy* culture focuses on external flexibility. It supports openness, innovation, risk-taking and readiness for change. It focuses on innovative ideas and opportunities that could make the institution a pioneer in the higher education field. It encourages the staff's flexibility and freedom to produce cutting-edge research and study programs that attract attention. It adopts a flattened and dynamic structure, which can be subject to change within a few days (Cameron & Quinn, 2006). Rectors and deans are innovators and entrepreneurs. An institution holding to an adhocracy culture aims to be distinguished, to create something that does not exist elsewhere, and to stand out as one of the top HEIs.

An organisation's culture is not a homogeneous phenomenon. A single culture may have many subcultures (Cameron & Quinn, 2006). Each subculture has its own unique characteristics, which are different from those of other subcultures. Subcultures still have some characteristics in common, which represent the culture of the entire organisation. Kuh and Whitt (1988) and Maassen (1996) identify four primary cultural levels in HEIs: (1) academic profession; (2) discipline; (3) HEIs as an organisational type versus other organisational types such as companies and governments; and (4) a single HEI versus other HEIs. For example, the academic profession's subculture distinguishes between those who work as instructors and others who work as administrators, librarians, gatekeepers and IT members (Peterson & White, 1992). The academic profession subculture can be divided into different subcultures based on the qualities of the discipline, such as soft or hard (Becher, 1994; Clark, 1989). In addition, each institution (for example, UTA, TUT or TAMK) will have its own culture. In this study, we have assumed that universities of applied sciences – such as TAMK – have a culture that is different from that of other universities, such as UTA and TUT. This is mainly because Applied Universities in Finland have distinct structures and regulations (Ministry of Education and Culture of Finland, 2016c).

Professional growth

Professional growth refers to the continuous learning that keeps individuals updated ahead of workplace environment

changes (Nokelainen, 2008). Professional growth is usually the result of professional development practices. Professional development has been defined as those processes, procedures, strategies, plans and programs that the institution offers its employees, which aim at their professional growth (Nokelainen & Ruohotie, 2009). Not all professional development practices result in professional growth, but all professional growth requires professional development practices (Nokelainen, 2008). The atmosphere of an HEI has been shown to be a determining factor in the professional growth of its staff (Nokelainen, 2008; Nokelainen & Ruohotie, 2009; Ruohotie, 1996a, 1996b, 1999; Ruohotie & Nokelainen, 2000).

It is suggested that an HEI should create an atmosphere that encourages staff members' lifelong learning (London & Smither, 1999; O'Meara, Terosky, & Neumann, 2008). In the words of Ruohotie (1996a), 'In order to be successful, educational organisations must provide effective professional development programs for employees over the entire course of their career' (p. 419). Rowley (1996) says that 'higher education is by culture a developmental environment' (p.14). Rowley therefore assumes that the culture of an HEI fosters its staff's growth by default.

Professional growth has been studied in the Management field under the term learning organization. A learning organization, as defined by Senge (1990), is a place where 'people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together' (p. 3). As a learning organization, the HEI enables its staff members to identify with its aims and strategies, it responds rapidly to change, it questions its mode of operation, it is willing to take risks, it accepts correction and learns from errors (Brancato, 2002; Nokelainen, 2008). Many strategies for creating a learning organization have been suggested in the literature (Bui & Baruch, 2010; Marsick & Watkins, 2003; Ruohotie, 1996b, 1999; Senge, 1990). For example, Brancato (2002) contended that the HEI should offer its staff members activities which employ the five components of a learning organization: personal mastery, team learning, mental models, shared vision and systems thinking (see Senge, 1990). In a learning organization, it is not only the responsibility of the staff to learn continuously, it is also the responsibility of the institution to create and maintain a culture of learning (Nokelainen, 2008). The institution should support, invest in and reward staff members' learning. Marsick & Watkins (2003) contend that:

> "When individuals increase their capacity to learn, they can (collectively) enhance the overall capacity of the organization to learn as long as the organization is receptive to their efforts to use their learning and puts in place appropriate mechanisms to enable, support, and reward the use of what is learned." (p.136)

In research conducted as part of the Growth Needs Project in Finland, Ruohotie (1996a, 1996b, 1999) studied the atmosphere factors contributing to professional growth. Ruohotie and Nokelainen (2000) proposed a 14 dimensional theoretical model for a growth-oriented atmosphere. Later, Nokelainen and Ruohotie (2009) reduced the model to four major factors, divided into 13 sub-factors, as shown in Figure 2.

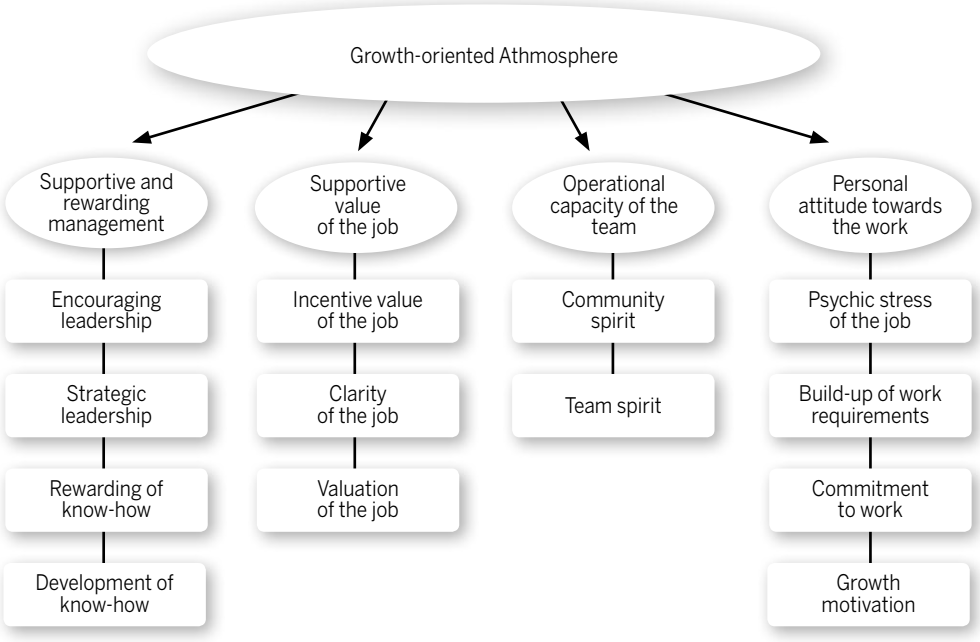

Figure 2. Growth-oriented Atmosphere model adopted from Nokelainen and Ruohotie (2009)

Relationship between organizational culture and professional growth

An organization's culture has a critical effect on professional growth. Bui and Baruch (2010) argue that an organization's culture is the antecedent for professional growth factors such as a shared vision and team learning. Mulford and Silins (2005) found that the promotion of a culture of caring and trust is one of the leadership requirements for encouraging continuous learning. The results of a study by Raj and Srivastava (2013) reveal that organizational learning mediates the relationship between the clan, adhocracy and market cultures, human resources management practices and innovativeness. In other words, they suggest that in order to 'increase learning and innovativeness, organizations have to focus on building a culture that incorporates a sense of competitiveness and market leadership and at the same time, provide employees flexibility, autonomy, opportunities for growth and rewards them for their contributions' (Raj & Srivastava, 2013, p. 201). In short, the literature consistently indicates that the clan and adhocracy cultures are positively related to an organization's effectiveness, innovativeness and learning (Ashraf, Kadir, Pihie, & Rashid, 2013; Cameron & Ettington, 1988; Smart & John, 1996; Sokol, Gozdek, Figurska, & Blaskova, 2015).

Method

Sample and procedures

The study included a non-probability sample of Finnish staff members working at Tampere3 institutions during the 2015/2016 academic year. The target population included three HEIs in Tampere: two universities (UTA and TUT) and one university of applied sciences (TAMK). Table 1 outlines the three HEIs in relation to the Finnish higher education system.

Table 1. Brief description of the three HEIs in Tampere

	Finish Higher Education System		
	Universities		Universities of Applied Sciences
Mission	To conduct scientific research and provide instruction and postgraduate education based on it.		To train professionals in response to labour market needs.
Institution	University of Tampere	Tampere University of Technology	Tampere University of Applied Sciences
Category	Public corporation	Foundation	Applied university
Discipline	Multi-discipline	Concentrates on technology and architecture	Multi-discipline
Number of Students	21,503	8,895	10,000

Source: Ministry of Education and Culture of Finland (2016a, 2016b, 2016c), UTA (2015), TUT (2015a), TAMK (2016a, 2016b).

As shown in Table 1, the Finnish higher education system consists of two complementary sectors: universities of applied sciences (UAS) and universities. Since 2009, Finnish universities can either be independent corporations under public law or foundations under private law (the Foundations Act) (Ministry of Education and Culture of Finland, 2016b). TAMK is an independent limited company owned by the City of Tampere and others (TAMK, 2016b). UTA is an independent corporation under public law (Ministry of Education and Culture of Finland, 2016b), while TUT has been operating as a foundation since 2010 (TUT, 2014).

A total of 342 staff members responded to the online questionnaire, with 322 responses being valid for data analysis. Table 2 shows the distribution of the sample between the Tampere3 institutions together with the method used to publish the questionnaire.

Different methods were utilized to collect data from the population. In UTA, an email was sent to 1014 staff members inviting them to respond on the online questionnaire which was built on a UTA survey management system called 'elomake'. In TUT and TAMK the same online questionnaire was published on the

Table 2. Sample distribution and the method used in publishing the questionnaire

	N		Response rate	Method of publishing the questionnaire
	Collected	Valid		
UTA	124	119 (37%)	12%	Email
TUT	130	122 (38%)	9%	TUT's intranet
TAMK	88	81 (25%)	11%	TAMK's intranet
Total	342	322 (100%)		

institutions' intranets. Publishing and follow up procedures took place between June and November 2016. Valid responses were received from 151 (47%) males and 171 (53%) females. The average age of the participants was 46 years (*SD* = 11.187, range 20-67). The average higher education job experience of the participants was 178 months (about 15 years) (*SD* = 116.349, range 2–480 months). The majority of participants were from the academic staff (71%, *n* = 229). The educational level was distributed as follows: Bachelor (7%, *n* = 24), Master (41%, *n* = 131), Doctorate/Post Doc (15%, *n* = 47), Professor/Docent (17%, *n* = 56), and others (20%, *n* = 64). The sample was distributed according to Becher's (1981, 1994) classification into two academic disciplines, Soft (39%, *n* = 126) and Hard (36%, *n* = 115). Participants who didn't report their school were classified as Other (25%, *n* = 81). It is worth mentioning that Becher's classification included another dimension: pure/applied. This study used only the soft/hard dimension because the number of valid responses was insufficient for conducting a comparison based on two dimensions.

Instruments

Two instruments were adopted to serve the aims of this study: the Organisational Culture Assessment Instrument (OCAI) and the Growth-Oriented Atmosphere Questionnaire (GOAQ). An online questionnaire was developed on UTA's elomake. The questionnaire consisted of two sections: the first section collected personal information (demographic variables) and the second section was dedicated to OCAI and GOAQ items.

Organisational culture: The OCAI was adopted, translated into the Finnish language and piloted in order to measure staff members' perceptions of their schools' culture. The OCAI was devised by Cameron and Quinn (1999, 2006) and is based on the Competing Values Framework (CVF). CVF is the framework most used in the higher education context (Cai, 2008; Kleijnen, Dolmans, Muijtjens, Willems, & Van Hout, 2009). The OCAI's validity and reliability in measuring an organisation's culture have been confirmed in other studies (Cameron & Quinn, 2006; Heritage, Pollock, & Roberts, 2014; Jung et al., 2009). The OCAI consists of 24 questions: six for each of the four cultures. The Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree).

In the current study, the OCAI demonstrated sufficient reliability in three cultures (Cronbach's α coefficients for Market = 0.87, Clan = 0.81, Adhocracy = 0.82) and questionable reliability in the Hierarchy culture (α = 0.63). This might be congruent with the findings of another study which suggested that the Hierarchy factor should be adjusted (Heritage et al., 2014).

Professional Growth: The Growth-oriented Atmosphere Questionnaire (GOAQ) was used to measure staff members' perceptions of their schools' growth climate. The questionnaire was developed in the Finnish higher education context (Nokelainen & Ruohotie, 2009; Nokelainen, Ruohotie, Silander, & Tirri, 2003; Nokelainen, Silander, Ruohotie, & Tirri, 2007; Ruohotie, 1996a, 1996b, 1999; Ruohotie & Nokelainen, 2000). The latest version of the GOAQ consists of 26 items representing 13 sub-factors. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used. Reliability was measured for the

four main factors of GOAQ, and three factors showed sufficient reliability (Cronbach's α coefficients of SRM = 0.84, SVJ = 0.79, OCT= 0.85), whereas the PAW factor showed questionable reliability (α= 0.61).

Statistical Procedures

Data analysis utilized Means for answering RQ1 and RQ3; Two-Independent Samples t-test and One-way ANOVA were used for answering RQ2 and RQ4; and the Pearson Product-Moment Correlation for answering RQ5.

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Results

Staff members were asked to indicate their perceptions about their school's culture. Therefore, the unit of analysis was the school. As mentioned previously, the study examined the perceived culture at four levels:

1. Tampere3 institution as a whole,
2. academic profession (academics and administrators),
3. discipline (hard or soft), and
4. each HEI (UTA, TUT, and TAMK).

In addition, the study examined if differences in the schools' cultures depended on demographic variables such as gender, age, and job experience.

RQ1. How do Tampere HEI staff members perceive their school's culture?

The mean was computed for each culture type at the Tampere3 level. The results showed that all means were relatively close to the neutral value (3 on a range of 1–5): Hierarchy (M = 2.95, SD = 0.561), Market (M = 2.46, SD = 0.764), Clan (M = 3.05, SD = 0.668) and Adhocracy (M = 2.89, SD = 0.686). These results indicated that the four cultures were moderately experienced throughout Tampere3. However, there was a slight tendency towards the Clan and Hierarchy cultures. That is to say, the culture of Tampere3 concentrates more on internal integration, harmony and unity. The Adhocracy culture score, which emphasizes innovation and rapid change, was not far below the Clan and Hierarchy scores. Therefore, Tampere3 might experience a paradox (Cameron, 1986). The Market culture scored lower than the other three cultures. In other words, staff members did not see their school's culture as tending towards competitiveness and goal achievement.

RQ2. Are there significant differences in the perception of a school's culture when staff member's institution, job type, discipline, gender, educational level, age or job experience are considered?

One-way ANOVA was conducted to analyse the differences between the Tampere3 institutions (UTA, TUT and TAMK). The results indicated that there were no significant differences between the mean scores of the three HEIs in either the Clan or Adhocracy cultures. More specifically, staff members from the three institutions tended to agree on the degree of flexibility, dynamism and self-regulation

in their institutions. There were, however, significant differences in the Market [F (2,318) = 5.85, p = .003] and Hierarchy [F (2,319) = 7.69, p = .001] cultures. Post hoc comparisons using the Tukey HSD test showed that TUT staff members perceived their school as tending towards a Market culture (M = 2.64, SD = 0.711) to a greater extent than their counterparts at UTA (M = 2.38, SD = 0.791) and TAMK (M = 2.30, SD = 0.757). TUT staff members also perceived their school as tending less towards a Hierarchy culture (M = 2.80, SD = 0.511) than their counterparts at UTA (M = 3.07, SD = 0.531) and TAMK (M = 3.01, SD = 0.629). Therefore, the main differences between the three institutions referred to differences between TUT and the other two universities.

Table 3. Sample score in OCAI divided by institution

	UTA		TUT		TAMK	
	M	SD	M	SD	M	SD
Hierarchy	3.07	0.531	2.80	0.511	3.01	0.629
Market	2.38	0.791	2.64	0.711	2.30	0.757
Clan	3.05	0.637	2.95	0.721	3.17	0.616
Adhocracy	2.80	0.699	2.95	0.632	2.95	0.737

The study then examined whether there were differences between the academics and the administrators (based on a 'Job Type' variable). The results of the Two-Independent Samples t-test showed that the academics perceived their school's culture as externally oriented (Adhocracy and Market cultures) more than the administrators, who perceived their schools as tending more towards a Hierarchy culture, as shown in Table 4.

The study went on to identify more deeply the differences between the academics themselves based on their disciplines (either hard or soft). Two-Independent Samples t-test showed that, regardless of which discipline the academics were working in, they perceived their school's culture as almost the same, except in relation to Market culture. Those working in the hard disciplines (M = 2.69, SD = 0.726) perceived their schools as heading more towards a Market culture than those working in the soft disciplines (M = 2.48, SD = 0.689); t (218) = 2.21, p = .028.

Furthermore, Two-Independent Samples t-test showed that males perceived their school's culture as externally oriented (Adhocracy and Market) more than females did, as shown in Table 5.

Table 4. Comparing the cultures of academics and administrators using the t-test

	Academics		Administrators		t(df)	Sig (2-tailed)
	M	SD	M	SD		
Adhocracy	2.99	0.652	2.63	0.704	4.43(319)	<.001
Market	2.56	0.733	2.21	0.787	3.77(319)	<.001
Hierarchy	2.85	0.548	3.22	0.502	-5.73(320)	<.001

Table 5. Comparing males' and females' cultures using the t-test

	Males		Females		t(df)	Sig (2-tailed)
	M	SD	M	SD		
Adhocracy	3.04	0.648	2.76	0.694	3.78(319)	<.001
Market	2.64	0.749	2.29	0.741	4.19(319)	<.001

The study sought also to identify whether there were differences in cultural perceptions between staff members who had attained different educational levels (bachelor, master, doctorate/post doc, professor/docent, or other). A one-way ANOVA test showed a significant effect of the educational level variable on the Hierarchy culture mean score [$F(4,317) = 4.187$, $p = .003$)]. Post hoc comparisons using the Tukey HSD test indicated that the mean score of bachelors ($M = 3.07$, $SD = 0.637$), masters ($M = 2.99$, $SD = 0.532$), and others ($M = 3.06$, $SD = 0.594$) were significantly different from the mean score of professors or docents ($M = 2.69$, $SD = 0.467$) in perceiving the school as having a Hierarchy culture. Generally, staff members with lower educational levels (bachelors, masters and others) perceived their school's culture as tending more towards a Hierarchy culture than the professors or docents.

Finally, no significant differences were detected between staff members' perceptions based on their category of age or job experience.

One may notice that the differences reported between HEIs (UTA, TUT and TAMK) in terms of gender (males and females), job types (academics and administrators) and disciplines (hard and soft) all referred to perceptions of Market culture. In addition, the TUT sample had more males than females, more academics than administrators, and most of its schools are classified as hard disciplines. These factors prompted us to run an extra analysis to see if the differences reported were in fact due to one factor and not the others. It is important to note that the job type variable (academics and administrators) implicitly included the discipline variable because discipline divides only the academics into soft and hard. Therefore, the discipline variable was excluded from the subsequent analysis. To examine the differences, a two-way ANOVA test was conducted using 'university', 'gender' and 'job type' as the independent variables with Market mean score as the dependent variable. The results showed no significant interactions between the variables, and therefore each variable had its own effect on the Market mean score independently of the other variables. The effects were found to be significant only for the gender variable [$F(1,309) = 4.87$, $p = .028$], while both university [$F(2,309) = 3.01$, $p = .051$] and job type [$F(1,309) = 3.21$, $p = .074$] approached the significant value with a level $p < .05$.

RQ3. How do staff members perceive the growth atmosphere of their school or department?

This study examined the growth atmosphere at the Tampere3 level. Interestingly, the results showed that the Tampere3 school atmosphere encouraged professional growth since the mean score in the

GOAQ was above the average (M = 3.50, SD = 0.503) on a range of 1–5. Details of the responses on the GOAQ factors also supported the conclusion that the Tampere3 school atmosphere motivates professional growth. SRM (M = 3.22, SD = 0.707), SVJ (M = 3.67, SD = 0.641), OCT (M = 4.02, SD = 0.747), and PAW (M = 3.40, SD = 0.555) were all above the average. It was evident that staff members strongly perceived their school as having a supportive team and community spirit.

RQ4. Are there significant differences in perception of growth atmosphere when staff member's institution, job type, discipline, gender, educational level, age or job experience are considered?

No significant differences in the GOAQ mean score were found based on these demographic variables except for educational level. The one-way ANOVA test showed a significant difference between educational level categories [F(4,317) = 2.809, p = .026)]. Post hoc comparisons using the Tukey HSD test indicated that the professors' mean score for GOAQ (M = 3.66, SD = 0.47) was higher than the mean score of staff with educational qualification less than a bachelor's degree (M = 3.37, SD = 0.53).

RQ5. How does the culture of the Tampere3 institutions relate to a growth atmosphere?

A Pearson Product-Moment Correlation coefficient was computed to assess the relationship between cultures and growth atmosphere. There were moderate positive correlations between both Clan and Adhocracy scores and the growth-oriented atmosphere score (r = .67, p <.001; r = .56, p <.001, respectively). Scatter plots summarize these results (Figure 3 and Figure 4). In other words, the more staff members perceived their school as tending towards the Clan and Adhocracy cultures, the more they perceived the atmosphere as supportive of their professional growth.

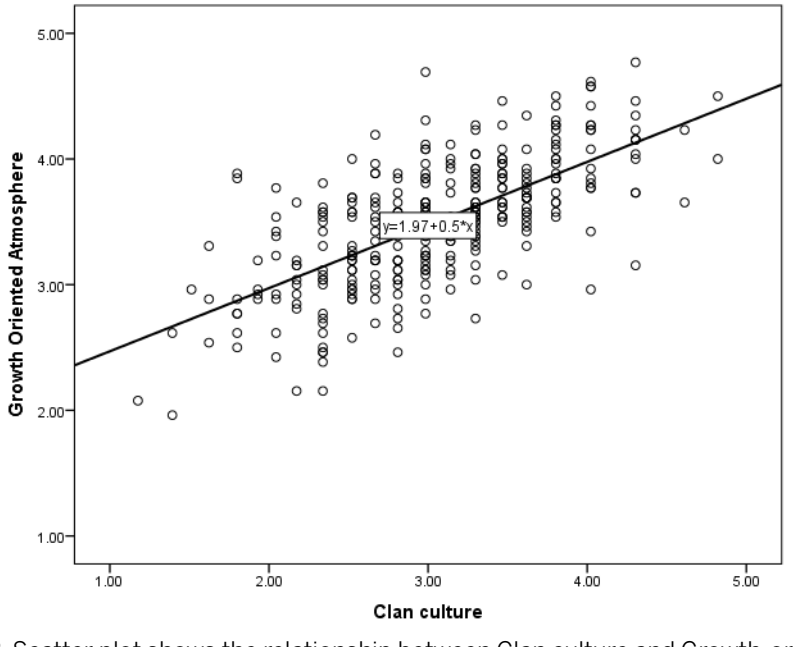

Figure 3. Scatter plot shows the relationship between Clan culture and Growth-oriented Atmosphere

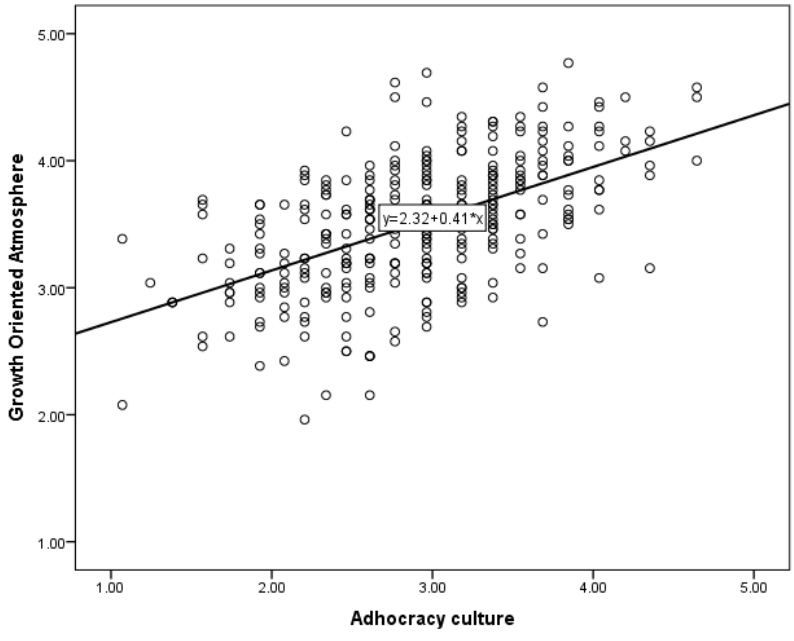

Figure 4. Scatter plot shows the relationship between Adhocracy culture and Growth-oriented Atmosphere

Details of the relationships between culture types and the four main factors of GOAQ provide insights into how different culture types encourage or discourage professional growth:

Table 6. Pearson Product-Moment Correlations of culture types with GOAG's four factors

	SRM	SVJ	OCT	PAW
Hierarchy	.17**	.09	.03	-.04
Market	.02	-.13*	-.03	-.17**
Clan	.66**	.60**	.46**	.30**
Adhocracy	.57**	.50**	.37**	.24**

*p<.05, **p<.01

The general observation, as demonstrated in Table 6, is that both Clan and Adhocracy scores were significantly and positively correlated with all sub-factors of GOAQ at level $p < .01$. However, the Clan culture correlation was slightly stronger than that of the Adhocracy culture in all sub-factors. Both the Clan and Adhocracy cultures were correlated moderately with SRM, and SVJ; whereas they had lower correlations with OCT, and PAW. On the other hand, there was little if any positive correlation between the Hierarchy culture and the SRM sub-factor. One also should notice that Market culture was negatively correlated with the two sub-factors (SVJ and PAW), although the correlations were small if any.

Discussion

This study aimed to explore the culture and growth atmosphere at Tampere3 institutions together with the relationship between culture and atmosphere. The aim was to see if the Tampere3 culture and atmosphere support the acceptance and adoption of new initiatives. The results revealed that both the Clan and Adhocracy cultures are moderately experienced in Tampere3 and that they both support a growth-oriented atmosphere. Since the common dimension between the Clan and Adhocracy cultures refers to flexibility, individuality and spontaneity, it is safe to say that this dimension is one that will encourage professional growth. In other words, giving staff members the space and freedom to manage themselves will implicitly encourage their professional growth. A study by Smart and John (1996) tracked cultural effectiveness in American HEIs and found that those with Clan and Adhocracy cultures were more effective in eight and six out of nine dimensions, respectively. Among those nine dimensions, three are similar to the GOAQ sub-factors: Professional Development and Quality of the Faculty, Faculty and Administrator Employment Satisfaction, and Organisational Health. Their findings that Clan and Adhocracy cultures have higher means on those three dimensions are congruent with our results. Similar findings were also reported by Cameron and Ettington (1988) who found that institutions with a dominant Adhocracy culture are more effective in promoting academic development, and that institutions with a dominant Clan culture are more effective in maintaining organisational health and faculty satisfaction. Our results confirm these earlier findings and emphasise their applicability in the Finnish higher education context.

Giving staff members the space and freedom to manage themselves will implicitly encourage their professional growth.

No institution has been characterized as having a pure culture type (Cameron & Ettington, 1988; Smart & John, 1996). Tampere3 institutions experience almost all culture types in their schools even though the dominant culture can be seen to be Clan. Berrio (2003, p. 8) indicated that almost two-thirds of colleges and universities in the USA have a dominant Clan culture. It seems that working in academia by its nature supports academics' autonomy and discretion (Cameron & Ettington, 1988; Rowley, 1996), and this may explain why most HEIs are dominated by a Clan culture (Smart & John, 1996). HEIs' administrators should therefore be aware of the pros and cons of the Clan culture. On the one hand, a Clan culture usually scores high in the morale domain of an institution's effectiveness: staff members are highly committed and loyal to their institution, the institution's image concerns them and they seek to maintain it, and therefore their skills may be developed as part of their commitment to their institution. On the other hand, a Clan culture pays little attention to international competition and this may discourage openness to global changes and challenges. A Clan culture also imposes little control over resource usage, which means that resources may not be optimally utilised.

Dividing the sample on the basis of demographic variables, this study revealed that there are sub-cultures in Tampere3 and that these are different from the dominant culture, Clan. Based on their job types, staff members who work as academics see their school's culture as heading externally, towards Adhocracy and Market cultures, as opposed to the administrators, who see their schools as heading towards the Hierarchy culture. The results also showed that staff members who are working in the hard disciplines perceive their schools as heading towards a Market culture more than those who work in the soft disciplines. In addition, males experience their schools' culture as externally oriented towards Market and Adhocracy more than females do. Finally and interestingly, staff members with lower educational levels (namely bachelor, master and other) see their schools as heading towards a Hierarchy culture more than the professors and docents. This is interesting because we asked staff members who are working in the same school to report what their school's culture really is: those with lower educational levels still see their school's culture as a Hierarchy. In other words, they see that the glue that holds their school together is the rules, laws and regulations.

The existence of sub-cultures in an institution is a normal phenomenon. That is because different departments normally require different types of culture. As described by Cameron and Quinn (2006), it is common to see that the HR department has developed a Clan culture, whereas the financial department has developed a Hierarchy culture. The major thing that should be taken into consideration, however, is the difference in culture perception between the academics and the administrators (Peterson & White, 1992), or between the professors and the other staff members. Tampere3's administration needs to make an effort to arrive at an understanding of why staff members working in one school or department see the glue between members, the leadership style, the departmental criteria of success, and the departmental strategic goals differently.

TUT, TAMK and UTA have much in common. They all share similar scores for Clan and Adhocracy cultures. Their mean scores for Clan are around the average (3 on a scale ranging from 1 to 5), while their mean scores for Adhocracy are below average. Since an Adhocracy culture supports innovation, change and creativity, one may infer that acceptance of new initiatives in Tampere3 institutions may not be rapid: staff members may resist changes affecting their regular work styles. Although all Tampere3 institutions agree on Clan and Adhocracy, TUT seems to have a unique orientation towards a Market culture and a tendency to move away from the Hierarchy culture. This is somewhat unexpected since our initial assumption was that TAMK might have developed a different culture because it is a university of applied sciences in comparison to UTA and TUT which are universities (Ministry of Education and Culture of Finland, 2016a). In an attempt to understand why TUT appears to be different, the study referred to two sources of organisation-based information: (1) the vision, mission and strategic plans, and (2) the structural and financial system of all three institutions.

The strategic plans for the Tampere3 HEIs for 2016-2020 show different trends and visions, even if they all three agree on their external orientation. The UTA strategic plan consists of three Adhocracy ori-

ented goals and only one Clan oriented goal (UTA, 2016). Multidisciplinary research, the latest research-based knowledge and learning, and internationality are all oriented towards an Adhocracy culture, while university community, which emphasises the well-being of all staff members, is oriented towards the Clan culture. In their own words, 'In order to advance multidisciplinarity in its operations, the University will remove administrative barriers. It will support innovative research through strategic allocation of funding, creation of new infrastructures and multidisciplinary research hubs' (UTA, 2016, p. 12). Similarly, the TAMK strategic plan has two Adhocracy, one Clan and one Market oriented goals (TAMK, 2016c). TAMK aims to be 'The best professional higher education that Finland offers to the world' (TAMK, 2016c). At the same time, it wants to maintain 'a sense of community' and a 'respect for the individual and individual differences' (TAMK, 2016c). In contrast, it is evident that TUT has a stronger orientation towards the Market and Adhocracy cultures. Its strategic plan consists of four Market, four Adhocracy, and only one Clan oriented goals, while its indictors are clearly dominated by Market statements (TUT, 2015b). It aims to 'contribute to the creation of new business opportunities, companies and jobs arising from "our" research' and to 'strengthen the industrial competitiveness and export industry of Finland' (TUT, 2015b, p. 2). TUT states that they 'support the commercialization of research results and the establishment of new companies' (TUT, 2015b, p. 2). TUT aims to support professional growth by offering challenging tasks, high-quality facilities and performance-based pay (TUT, 2015b, p. 2). Clearly, the orientation towards a Market culture in TUT is different. Regarding the structural and financial system, Table 1, with its description and information, may elucidate something of the differences between TUT and both UTA and TAMK.

One may notice that there is incongruence between the Tampere3 HEI's strategic plans and their current cultures: while all the plans tend externally towards internationalisation and competitiveness, staff members see their school cultures as currently tending internally towards integration and unity. A justification for this incongruence may be the fact that their strategic plans are actually for the period 2016 to 2020. Therefore, they may still be in the early stages of a culture change process. However, it would seem that TUT, in contrast to UTA and TAMK, has partially succeeded in dragging its staff members towards internationalisation and competitiveness.

The tendency toward internationalisation seems to be in response to a report from the Ministry of Education and Culture of Finland (2009) – Internationalisation Strategy, 2009–2015. Internationalisation has also been discussed in many Finnish studies (Cai, Hölttä, & Kivistö, 2012; Crawford & Bethell, 2012; Saarinen, 2012) in which they indicate that 'Internationalizing higher education systems is one means to address globalization challenges' (Crawford & Bethell, 2012, p. 189). HEIs that plan to change in the direction of innovation and creativity (an Adhocracy culture) may not be affected in relation to the professional growth atmosphere since both the Clan and Adhocracy cultures are found to be in support of professional growth, as suggested by the findings of both the current and other studies (Cameron & Ettington, 1988; Smart & John, 1996). This change, if it happens, will foster the possibilities of adopting new initiatives. HEIs that plan

to change towards competitiveness and goal achievement (the Market culture) need to understand the consequences of this choice for their professional growth: the current study finds a lack of correlation between the Market culture and professional growth. Furthermore, the study finds a small negative correlation between Market culture and staff commitment and satisfaction. This is in agreement with the findings of Smart and John (1996) and Heritage et al. (2014), both of which found that Market culture has a negative effect on employee satisfaction. A change in culture from flexibility to control may make staff members feel as though the institution has lost its warm and friendly atmosphere. This, in turn, decreases their commitment and satisfaction (Cameron & Quinn, 2006). Culture change needs to be well planned and directed. When planning for culture change, an institution should consider two points: (1) the desired culture should respond to the environmental demands, (2) there should be a matching between the institution's long-term goals and its actual practices (Cameron & Quinn, 2006).

A general limitation of this study is that the number of participants was not sufficient for the results to be generalised. It proved challenging to collect responses from busy staff members. Future studies could target a large-scale sample from Tampere3 but under administrative custody. The Tampere3 institutions seem to be in the middle of a culture change process and plan to merge into one HEI. Further studies could track culture changes over the years together with the final post-merger culture.

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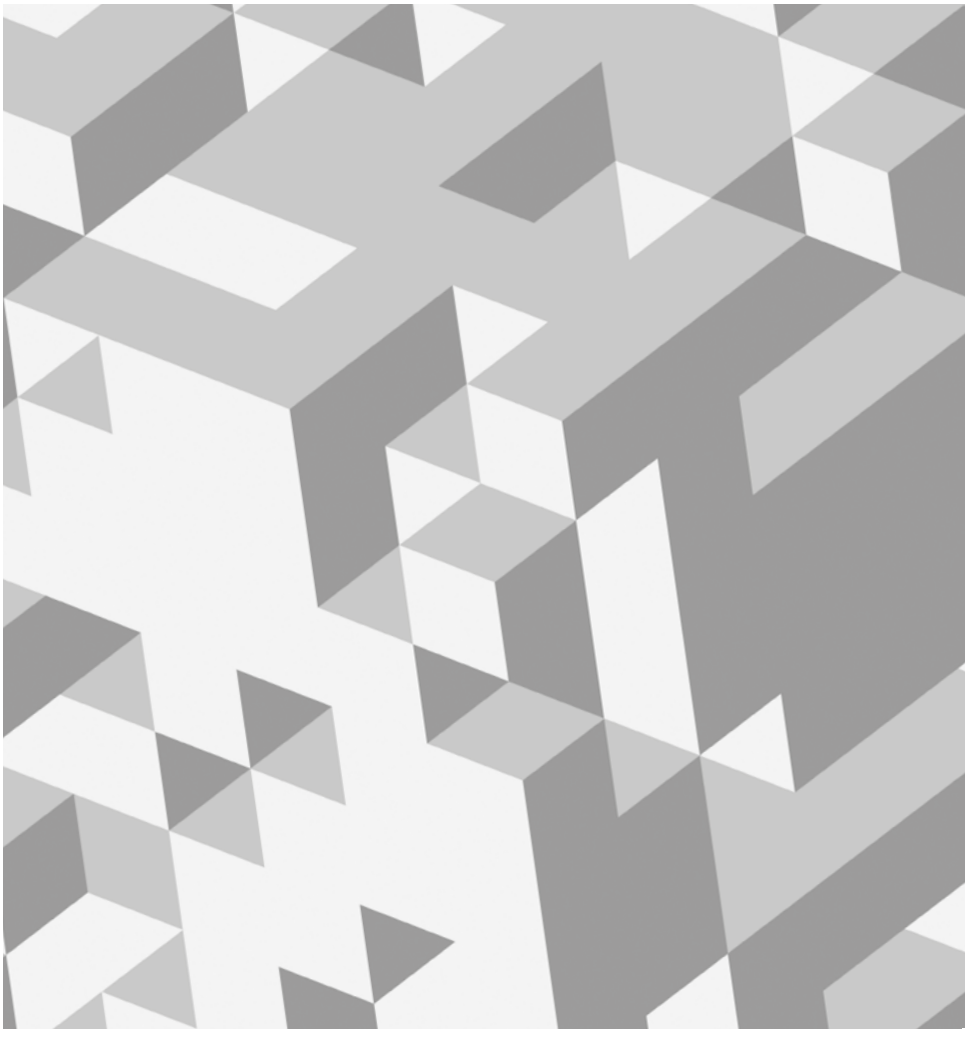

PUBLICATION II

Innovativeness of Staff in Higher Education - Do Implicit Theories and Goal Orientations Matter?

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Innovativeness of Staff in Higher Education

Do Implicit Theories and Goal Orientations Matter?

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Abstract

Innovativeness has been believed to be a significant psychological construct underlying individual differences in adopting novel ideas, experiences or approaches. Although few recent studies have contributed to identifying the factors that predict innovativeness, there is a lack of research showing the impacts of implicit theories and goal orientations on innovativeness. This study aimed to investigate this matter. A sample comprising 315 staff members working in three Finnish higher educational institutions completed self-reported questionnaires. The results showed that the mastery goal orientation fully mediated the effect of both the entity theory of ability and personality on innovativeness. However, both entity theories failed to predict the performance-avoidance goal orientation, while the performance-avoidance goal orientation showed to be a significant, negative predictor of innovativeness. This study presents a promising framework for examining innovativeness in the higher educational context where further research is suggested.

Keywords: innovativeness, implicit theories, mindset, goal orientation, higher education, staff, structural equation modelling.

1. Introduction

A growing body of literature recognises the need to understand why individuals vary a great deal in their willingness to accept changes (Goldsmith & Foxall, 2003; Kirton, 1976; Loogma, Kruusvall, & Ümarik, 2012; Parzefall, Seeck, & Leppänen, 2008; Rogers, 2003). Recent endeavours of scholars in the educational field have shown the relevance of individual innovativeness in explaining these variances. Empirical evidence reveals that individual innovativeness predicts the usage of technology (Gökçearslan, Karademir, & Korucu, 2017; Jin, 2013), is associated with the awareness of Web 2.0 tools (Mutlu Bayraktar, 2012), influences the implementation of information and communication technology (ICT; Drent & Meelissen, 2008) and is related to perceived competencies in e-learning (Loogma et al., 2012) and techno-pedagogical skills (Çuhadar, Bülbül, & Ilgaz, 2013).

In the higher educational context, one may further argue that staff members should be responsive to change; it is not expected that administrations are interested in offering projects, initiatives, policies and new technologies for their staff which then face resistance and reluctance from the employees. The fact of the matter is that administrators at Higher Education Institutions (HEIs) are keen to provide an environment where employees' work is appreciated and respected; their opinion is involved in the decisions at higher levels; and where an optimal level of autonomy and discretion are offered (Heslin, 2010). Yet these efforts have not resulted in comprehensive understanding of the individual differences in the willingness to adopt changes (Hasanefendic, Birkholz, Horta, & Sijde, 2017). What is not clear in specific is to know what contributes to the individual innovativeness (Batra & Vohra, 2016). Midgley and Dowling (1978, p. 235) recognized that conceptualising innovativeness as a psychological construct is useful but they argued that it would be even better to see innovativeness as a function of other 'dimensions of the human personality'. This proposal opened up a research framework in which the researchers' way to understand innovativeness go through the other psychological characteristics. Several studies have identified a set of innovativeness' antecedents including cognitive style (Batra & Vohra, 2016), big five personality factors (Yesil & Sozbilir, 2013), positive relational experience, self-efficacy, psychological availability (Vinarski-Peretz, Binyamin, & Carmeli, 2011) and problem-solving style (Scott & Bruce, 1994). Among these efforts, only one study by Keong

& Hirst (2010) has attempted to establish a link between innovativeness and goal orientations. Even though, the goal orientations (Elliot and Murayama 2008; Midgley et al. 1998) and implicit theory (Dweck, 2006; Dweck & Leggett, 1988) were repeatedly reported in literature review studies (Anderson, Potočnik, & Zhou, 2014; Hero, Lindfors, & Taatila, 2017; Parzefall et al., 2008; Patterson, Kerrin, & Gatto-Roissard, 2009) as possible contributors to individual innovativeness. The present study meets this challenge and investigates the role of the implicit theory and goal orientation as predictors of innovativeness.

1.1 Innovativeness

Historically, individual innovativeness was addressed by tracking the observable behaviour of individuals to see, for example, if they have adopted or generated specific set of innovations (Goldsmith & Foxall, 2003). Such approach was mainly referred in the literature to as innovative work behaviour (Janssen, 2000), innovative job performance (Janssen & Van Yperen, 2004) or time-based innovativeness (Rogers, 2003). Considering some critical limitations of this approach (Goldsmith & Foxall, 2003), researchers adopted a deeper and more abstract definition of innovativeness, perceiving it as latent construct (Midgley and Dowling 1978) or underlying personality trait (Hurt, Joseph, & Cook, 1977) which shapes an individual disposition towards the newness regardless of the kind of innovation. It is worth noting that the literature, in the latter approach, has referred to innovativeness in different terms such as *life innovativeness* (Roehrich, 2004), *general innovativeness* (Menold, Jablokow, Purzer, Ferguson, & Ohland, 2014), *global trait innovativeness* (Goldsmith & Foxall, 2003) and *innate innovativeness* (Midgley and Dowling 1978). This conceptualisation is embedded in a well-respected research paradigm focusing on the personality trait which was meant to predict the persistent and enduring patterns of reacting positively towards innovations across all domains (Roehrich 2004; Goldsmith and Foxall 2003; Midgley and Dowling 1978).

Several theorists have studied general innovativeness from different perspectives (Hurt et al., 1977; Kirton, 1976; Leavitt & Walton, 1975). For example, Kirton (1976) distinguishes between adaptors and innovators in decision making and problem solving context. While adaptors seek to develop upon an existing structure, innovators seek to change the structure itself. Innovativeness is perceived here as a personal cognitive style which promotes changes and disruptions of the existing framework. Hurt, Joseph, and Cook (1977) define innovativeness as underlying personality trait which determines the individual willingness to change. Obviously, theorists present similar concepts of innovativeness and the convergent validity of their instruments revealed that they are measuring related but not identical constructs (Goldsmith, 1986). The current study adopts the conceptualisation and measurement of innovativeness as in the work of Hurt, Joseph, and Cook (1977).

1.2 Implicit Theories and Innovativeness

The implicit theory (Dweck, Chiu, & Hong, 1995) refers to an individual's beliefs about the nature of human attributes, including ability, personality and morality. Recent developments have heightened the need for revising the theory so that it refers to an individual's beliefs about the nature of one's own attributes rather than human attributes in general (De Castella & Byrne, 2015). People may hold two different theories (Dweck, 2006) – the incremental or the entity theory. Incremental theorists believe that human attributes are malleable, dynamic and improvable through effort and persistence. In contrast, entity theorists believe that human attributes are innate, fixed and unchangeable. A great deal of previous research has focused on implicit beliefs about ability, such as intelligence (Blackwell, Trzesniewski, & Dweck, 2007) and talent (Chełkowska-Zacharewicz & Kałmuk, 2016), while others have studied implicit beliefs about personality (Chiu, Hong, & Dweck, 1997). The findings on both attributes (ability and personality) support the assumption that the two are different yet related constructs (Dweck et al., 1995; Hughes, 2015; Spinath, Spinath, Riemann, & Angleitner, 2003).

A considerable amount of literature has demonstrated the role of implicit theories in predicting individual differences in a variety of human behaviours. Some examples are an interest in professional learning and development (Thadani, Breland, & Dewar, 2010, 2015), workplace learning (Meyer, 2012), work engagement (Heslin, 2010), managerial styles (Heslin, Latham, & VandeWalle, 2005), academic achievement (Komarraju & Nadler, 2013), self-handicapping in physical education (Ommundsen, 2001) and many others (Dweck, 2006).

While the implicit theory was initially developed in school, little has been done to investigate its impact in the higher educational context (Yorke & Knight, 2004). Among the limited number of studies on higher education, some target undergraduate students (Chen & Wong, 2015; Komarraju & Nadler, 2013; Robins & Pals, 2002), while others concentrate on the academic staff (Rissanen, Kuusisto, Hanhimäki, & Tirri, 2016; Thadani et al., 2015). However, the research to date has tended to focus on academics' implicit beliefs about their students' learning (Yorke & Knight, 2004) or about their teaching capabilities (Thadani et al., 2010) rather than their own abilities and personalities.

Several theoretical contributions suggest that it might be logical to link implicit theories to innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009). Molden and Dweck (2006) contend that entity theories are associated with maladaptive psychological processes, while incremental theories are related to adaptive psychological processes such as self-regulation, social perception and social development. Based on this argument, we expect implicit theories to predict individual innovativeness, as follows:

Hypothesis 1. Entity theories are negatively related to individual innovativeness.

1.3 Goal Orientations and Innovativeness

Goal orientations refer to the purposes that individuals pursue while engaging in a task (Dweck & Leggett, 1988; Linnenbrink & Pintrich, 2002). In their early investigations of goal orientations, researchers have distinguished between two dimensions of goals: (1) mastery, learning or task goals and (2) performance or ego goals (Linnenbrink & Pintrich, 2002). Mastery goals orient individuals to engage in a task in order to learn, master new skills and improve their competencies, whereas performance goals orient individuals to engage in a task in order to surpass others, receive recognition for their performance and prove their competence (Dweck & Grant, 2008). Recent developments in the theory have led to partitioning performance goals into performance-approach and performance-avoidance goals (Middleton & Midgley, 1997; Midgley et al., 1998). Individuals pursuing performance-approach goals tend to focus on showing their competence to others, whereas individuals pursuing performance-avoidance goals tend to avoid appearing incompetent in comparison to others (Elliot & Church, 1997).

Over decades, researchers have considered goal orientation an important factor in interpreting individual differences in achievement settings (Grant & Dweck, 2003; Linnenbrink & Pintrich, 2002). Evidence has decidedly shown that mastery goals are associated with adaptive behaviours (Dweck & Leggett, 1988; Pintrich, 2000), whereas performance-avoidance goals are related to maladaptive behaviours (Elliot & Church, 1997). In comparison, research on performance-approach goals has not yielded such consistent results; while some studies show positive consequences (De Castella & Byrne, 2015; Elliot & Church, 1997; Midgley, Kaplan, & Middleton, 2001), others report the opposite outcomes (Ames, 1992; Dweck & Grant, 2008; Dweck & Leggett, 1988).

The goal orientation theory has also been developed in school (Ames, 1992; Pintrich, 2000) and then extended to the higher educational context (Daumiller, Grassinger, Dickhäuser, & Dresel, 2016; Mattern, 2005). The major line of research on goals has focused on students' (Midgley et al., 1998, 2001) or teachers' goal orientations (Butler, 2007; Mascret, Elliot, & Cury, 2015), while other studies have concentrated on the classroom goal structure which investigating the effect of the school or classroom environment on students' goals (Ames, 1992; Shim, Cho, & Cassady, 2013). More recently, goal orientations have been extended to examine the staff's goals in the higher educational context (Daumiller et al., 2016; Han, Yin, & Wang, 2015; Kunst, van Woerkom, & Poell, 2017; Van Yperen & Janssen, 2002; Wosnitza, Helker, & Lohbeck, 2014; Yin, Han, & Lu, 2017). Specifically, some studies have investigated the influence of instructors' goal orientations on their participation in professional development activities (Kunst et al., 2017), teaching quality (Daumiller et al., 2016), teaching approaches (Han et al., 2015; Yin et al., 2017) and job satisfaction (Van Yperen & Janssen, 2002). The previous research findings agree that mastery goals are associated with desirable consequences, while performance-avoidance goals are linked to unfavourable outcomes.

A number of review studies have emphasised the role of goal orientation in individual innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009). Surprisingly, an in-depth empirical examination of the relationship has scarcely been conducted. One exception is the study by Keong and Hirst (2010), who report that mastery and performance-approach goals are positively associated with attitudes towards innovation adoption, while performance-avoidance goals are negatively related to such attitudes. Therefore, we expect goal orientation to predict individual innovativeness, as follows:

Hypothesis 2. The mastery goal orientation is positively related to individual innovativeness.

Hypothesis 3. The performance-approach goal orientation is positively related to individual innovativeness.

Hypothesis 4. The performance-avoidance goal orientation is negatively related to individual innovativeness.

1.4 The Mediating Role of Goal Orientation

Dweck and Leggett propose a model in which 'implicit theories predict social goals and social goals provide the framework for social behavior' (1988, p. 265). The relationship between implicit theory of ability and goal orientations has been thoroughly examined (De Castella & Byrne, 2015; Komarraju & Nadler, 2013). The previous research findings present consistent evidence that the incremental theory of ability predicts mastery goals, while

the entity theory of ability predicts performance-approach and performance-avoidance goals (Blackwell et al., 2007; Chen & Pajares, 2010; Dweck & Leggett, 1988; Robins & Pals, 2002). As far as we know, the relationship between implicit theory of personality and goal orientations has not been examined in previous studies but we assume based on previous contributions (Chiu et al., 1997; Plaks, Levy, & Dweck, 2009) that entity theory of personality may influence goal orientations in much similar manner as the entity theory of ability does. Accordingly, we assume the following hypotheses:

Hypothesis 5. Entity theories are negatively related to the mastery goal orientation.

Hypothesis 6. Entity theories are positively related to the performance-approach goal orientation.

Hypothesis 7. Entity theories are positively related to the performance-avoidance goal orientation.

The mediating role of goal orientations has also been confirmed between implicit theories and for example, attributions, affect, self-esteem (Robins & Pals, 2002), academic motivation, academic achievement (Chen & Pajares, 2010; Chen & Wong, 2015; Dupeyrat & Mariné, 2005) and self-handicapping (Ommundsen, 2001).

As outlined, implicit theories may predict innovativeness directly (Hypothesis 1), goal orientations may predict innovativeness (Hypotheses 2, 3 and 4), and implicit theories may predict goal orientations (Hypotheses 5, 6 and 7). In view of all that has been mentioned so far, we propose that goal orientation mediates the relationship between an implicit theory and innovativeness (Hypothesis 8).

Hypothesis 8. Goal orientation mediates the relationship between the entity theories and individual innovativeness.

2. Method

2.1 Participants

Complete data were collected from 315 (170 female and 145 male) staff members working in three higher educational institutions in Tampere, Finland. The age range was 20 – 67 years old (M = 46, SD = 11.259) and the average job experience in higher education was 176 months (about 14.5 years) (SD = 116.772). The majority of the participants were academic staff members (70%, n = 222), while the rest (30%, n = 93) were administrative personnel. Their educational levels were distributed as follows: bachelor's degree (8%, n = 26), master's degree (41%, n = 129), doctorate/post-doctoral degree (14%, n = 45), professor/docent (18%, n = 55) and others (19%, n = 60).

2.2 Measures and Procedures

Research permits were approved by the concerned universities prior conducting the study. An online questionnaire was distributed among the staff members during the 2015–2016 academic year, using email invitations and the universities' intranet. Unless otherwise indicated, a 5-point Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach's α was calculated as an estimate of the internal consistency of the scales. The questionnaire was revised for applicability to the staff in the higher educational context, translated to the Finnish language and piloted before being published. The questionnaire consisted of demographic questions (seven items) and the following measures:

2.2.1 Innovativeness

A shortened version (13 items) of Hurt and colleagues' (1977) Innovativeness Scale was adopted to measure the staff members' orientations towards change (e.g., 'I enjoy trying new ideas'). Cronbach's α was .849.

2.2.2 Goal Orientations

A shortened version (10 items) of Midgley and colleagues' (2000) Achievement Goal Orientation (AGO) Scale was adapted to measure the staff members' goal orientations. The adaptation included replacing 'school' with 'work', for example. The AGO Scale consisted of three subscales: Mastery Orientation (three items, e.g., 'One of my goals in work is to learn as much as I can'), Performance-Approach Orientation (three items, e.g., 'One of my goals is to show others that work is easy for me') and Performance-Avoidance Orientation (four items, e.g., 'It's important to me that I don't look incapable of doing my work'). Cronbach's α values for Mastery Orientation, Performance-Approach Orientation and Performance-Avoidance Orientation were .758, .783 and .818, respectively.

2.2.3 Implicit Theories

Two domains of implicit theories were measured: ability and personality. The eight-item person measure developed by Levy et al. (1998) was used, and another eight-item ability measure was adapted in a similar manner. The items were re-worded to reflect the first-person belief about the nature of his or her own attributes rather than human

attributes in general (e.g., for incremental theories, 'I can significantly change my basic characteristics'; for entity theories, 'I can do things differently, but the important parts of who I am can't really be changed'). The items were measured on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The incremental items were reverse-scored such that larger scores reflected a relatively strong entity theory. The eight-items corresponding to each domain were summed and averaged to create personality and ability entity theory scales. The high reliabilities of the reverse-scored scales (α = .889 and α = .873 respectively) provide a support for a unipolar measurement instrument. It is worth noting that there are two basic assumptions regarding the dimensionality of the implicit theory. For one, the implicit theory is measured using bipolar measurement in which the incremental and entity theories are two independent dimensions (Dupeyrat & Mariné, 2005; Hong, Chiu, Dweck, Lin, & Wan, 1999; Lou, Masuda, & Li, 2017). For the other, the implicit theory is measured using unipolar measurement in which the incremental and entity theories are two extreme points on one continuous dimension (Blackwell et al., 2007; De Castella & Byrne, 2015; Hughes, 2015; Robins & Pals, 2002) .The present study adopts the latter approach to avoid the loss of prediction power associated with typologising variables (Cohen, 1983).

2.3 Analysis

Data screening, missing values analysis and differences tests were conducted using SPSS 22.0 statistical package. Structural equation modelling (SEM) was conducted to test the hypotheses using R Lavaan package (Rosseel, 2012). What makes R Lavaan suitable to our data analysis is that it supports some statistical tests for non-normal data such as robust Maximum Likelihood (MLM), which does not exist in other software such as AMOS (Arbuckle, 2013; Rosseel, 2012). Since the data violated the assumption of multivariate normality, MLM estimation with robust standard error and mean adjusted chi-square (Satorra & Bentler, 1994) were used.

To assess the model fit, we used well-established indices, such as CFI, TLI, RMSEA and SRMR, as well as the chi-square test statistics. According to Hu and Bentler (1999), values greater than .90 for the CFI and TLI indices, and values less than .06 for RMSEA and less than .08 for SRMR are typically considered acceptable. For the ratio of X^2 to *df*, values less than 3 represent adequate fit (Schreiber et al., 2006).

We followed Baron and Kenny's (1986) four steps for establishing mediation as indicated in the results section. Bootstrapping analysis (Preacher & Hayes, 2008) was used to assess the mediating effect of the goal orientation.

3. Results

3.1 Preliminary Analyses

Prior to analysis, missing values analysis was conducted. Case screening of a total of 342 collected responses were resulted in removing 27 cases. The case screening identified the participants who (1) left all the items of one or more dimensions blank, (2) were unengaged while responding (using standard deviation per case per dimension), and (3) provided outlier responses. The resulted sample consisted of 315 responses which still had very limited number of missing values per variable. The missing data was analysed by means of data imputation, replacing them by the mean for the continuous variables (e.g. age and experience) and by the median for the categorical variables (e.g. items of Likert scale). To ensure the sample homogeneity regarding innovativeness, a series of differences tests were conducted. An independent sample t-test showed that there is no significant difference in innovativeness regarding the gender (male and female) and the job type (academic and administrative). The results of a one-way ANOVA also indicated no significant difference in innovativeness regarding the educational levels of the staff (all $p > .05$).

The means, standard deviations and zero order correlations among the variables are presented in Table 1. Notably, innovativeness is positively related to the mastery goal but negatively related to the performance-avoidance goal and the entity theory of ability. The two dimensions of performance orientation (approach and avoidance) were positively and strongly correlated; the same held true for the correlation between the two dimensions of the implicit theory (ability and personality).

Table 1. Means, standard deviations and zero order correlations among the variables

Study variables	1	2	3	4	5	6
1. Innovativeness	1	.324**	-.028	-.189**	-.171**	-.209**
2. Mastery goal		1	.054	.086	-.148**	-.197**
3. Performance-approach goal			1	.667**	.066	.095
4. Performance-avoidance goal				1	.059	.052
5. Entity theory of ability					1	.663**
6. Entity theory of personality						1
M	3.74	3.95	2.21	2.65	3.74	3.64
SD	0.562	0.696	0.826	0.957	0.872	0.916
Scale	1 – 5	1 – 5	1 – 5	1 – 5	1 – 6	1 – 6
Number of items	13	3	3	4	8	8

$*p < .05$; $**p < .01$.

3.2 Direct Effect

3.2.1 Implicit Theories Predicting Innovativeness (Hypothesis 1)

First, we examined whether variations in the entity theory significantly accounted for variations in innovativeness. Because the implicit theories of ability and personality were significantly correlated ($r = .663$, $p < .01$), we built two separate models to isolate the variance explained by each dimension of the implicit theories (see Figure 1 and Figure 2). The results showed that the entity theory of ability ($\beta = -.219$, $p < .01$) and personality ($\beta = -.202$, $p < .01$) predicted innovativeness significantly and the models fit the data well; for entity theory of ability ($X^2 = 336.483$, $df = 184$, $p < .001$, $X^2/df = 1.828$, CFI = .922, TLI = .911, RMSEA = .056, SRMR = .057), and for entity theory of personality ($X^2 = 358.037$, $df = 183$, $p < .001$, $X^2/df = 1.956$, CFI = .921, TLI = .909, RMSEA = .059, SRMR = .059). According to Baron and Kenny (1986), the goal orientation may play a *fully* or *partially mediating role* between innovativeness and both the entity theory of ability and personality.

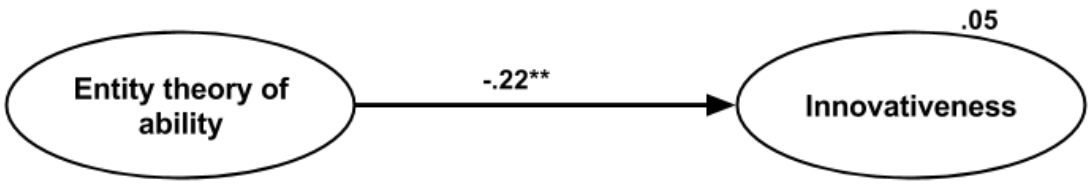

Figure 1. Entity theory of ability predicts innovativeness. Standardised regression coefficients reported. $**p < .01$.

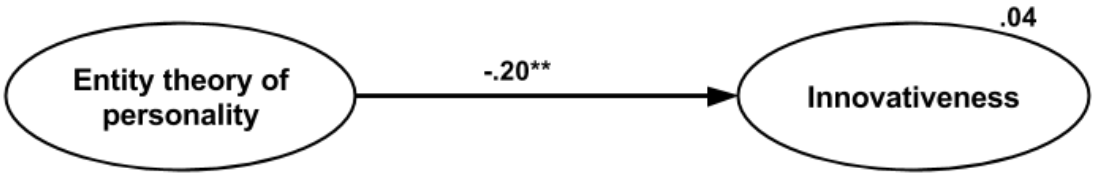

Figure 2. Entity theory of personality predicts innovativeness. Standardised regression coefficients reported. $**p < .01$.

3.2.2 Goal Orientations Predicting Innovativeness (Hypotheses 2, 3 and 4)

From the correlation matrix in Table 1, the performance-approach goal showed no significant correlation to any of the other variables. Therefore, it was excluded from the analysis. We examined whether variations in goal

orientations (mastery and performance-avoidance) significantly accounted for variations in innovativeness (see Figure 3). The model showed that both the mastery goal (β = .400, p < .001) and the performance-avoidance goal (β = -.233, p < .01) predicted innovativeness. The model acceptably fit the data (X^2 = 353.254, df = 204, p < .001, X^2/df = 1.732, CFI = .922, TLI = .911, RMSEA = .052, SRMR = .076).

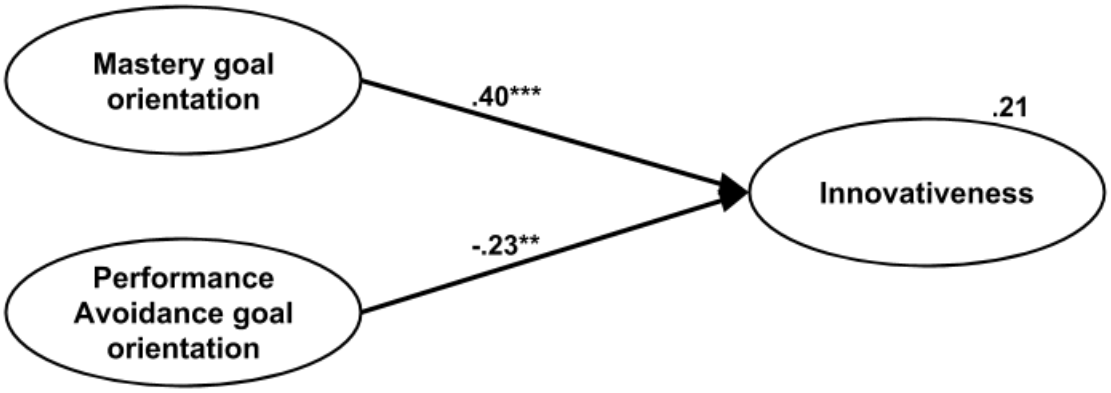

Figure 3. Goal orientations predict innovativeness. Standardised regression coefficients reported. **p < .01; ***p < .001.

3.2.3 Implicit Theories Predicting Goal Orientations (Hypotheses 5, 6 and 7)

Excluding the performance-avoidance goal because it failed to show a significant correlation to any of the implicit theories (see Table 1), we then examined whether variations in the entity theory significantly accounted for variations in only the mastery goal orientation (see Figure 4 and Figure 5). The results showed that the entity theory of ability predicted the mastery goal (β = -.207, p < .01) in the absence of the entity theory of personality, with a sufficient model fit (X^2 = 105.763, df = 41, p < .001, X^2/df = 2.579, CFI = .939, TLI = .918, RMSEA = .079, SRMR = .056), and the entity theory of personality predicted the mastery goal (β = -.231, p < .01) in the absence of the entity theory of ability, with a sufficient model fit as well (X^2 = 100.873, df = 42, p < .001, X^2/df = 1.714, CFI = .953, TLI = .939, RMSEA = .072, SRMR = .045).

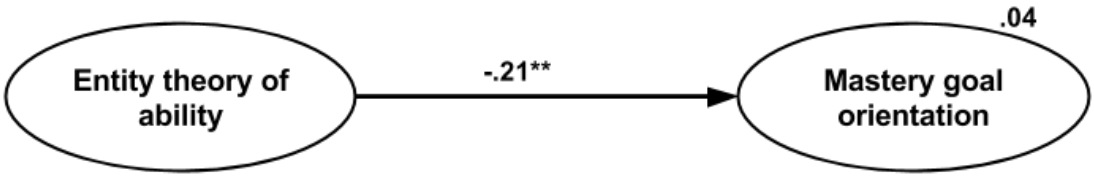

Figure 4. Entity theory of ability predicts mastery goal orientation. Standardised regression coefficients reported. **p < .01.

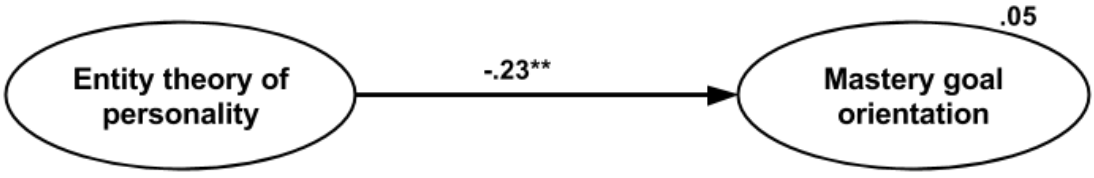

Figure 5. Entity theory of personality predicts mastery goal orientation. Standardised regression coefficients reported. **p < .01.

3.3 The Mediation Model (Hypothesis 8)

Following the fourth step of Baron and Kenny's (1986) mediation analysis, we tested the mediating role of goal orientations between implicit theories and innovativeness (Figure 6). Given the high correlation between the two dimensions of the entity theory, two models (M1 and M2) were analysed. M1 was dedicated to examining the mediating role of goal orientations between the entity theory of *ability* and innovativeness. The results revealed a non-significant direct effect of the entity theory of ability on innovativeness, thus indicating the full mediation effect of the mastery goal orientation. This mediation model showed a good data fit (X^2 = 420.136, df = 243, $p < .001$, X^2/df = 1.729, CFI = .921, TLI = .910, RMSEA = .052, SRMR = .061) and accounted for 16% of the variance in innovativeness.

M2 was dedicated to examining the mediating role of goal orientations between the entity theory of *personality* and innovativeness. Similar to the entity theory of ability, the effect of the entity theory of personality on innovativeness was shown to be full mediated by the mastery goal orientation. This model also provided an adequate data fit (X^2 = 438.170, df = 244, $p < .001$, X^2/df = 1.796, CFI = .921, TLI = .963, RMSEA = .054, SRMR = .061) and accounted for 16% of the variance in innovativeness.

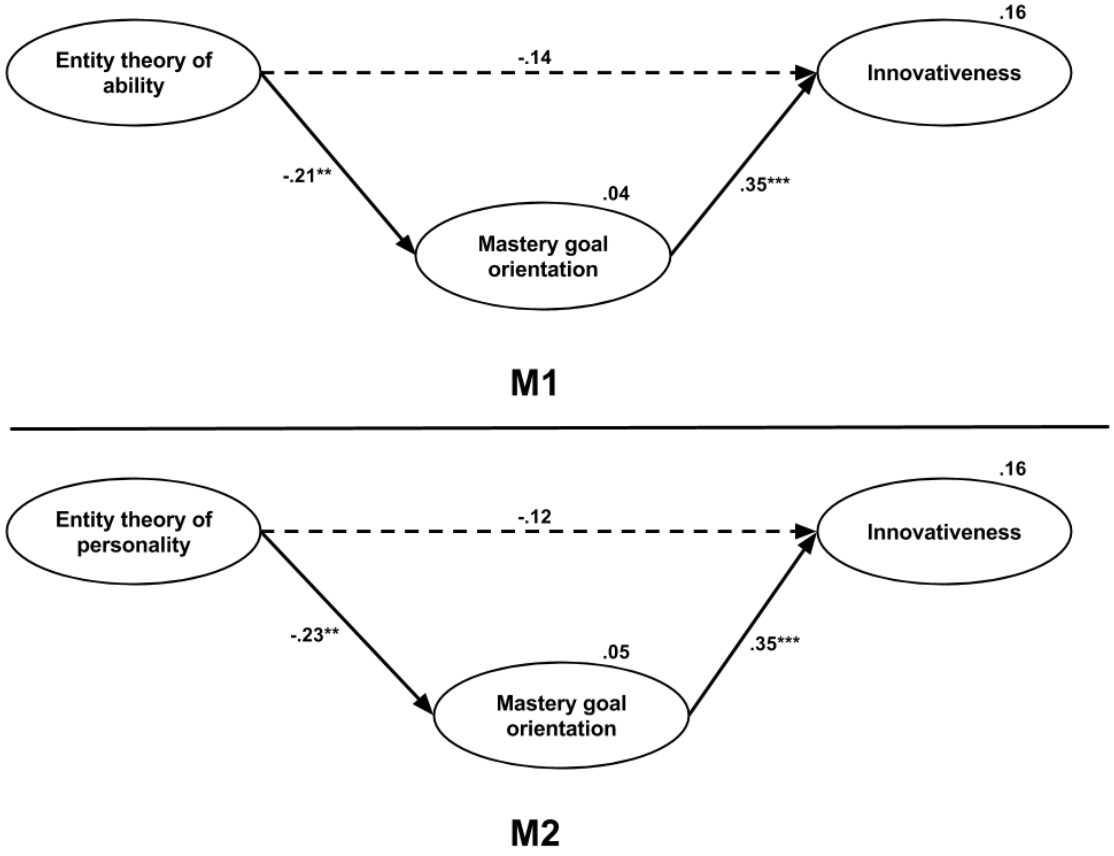

Figure 6. Mediation models – the mediating role of goal orientation between the entity theory of ability and innovativeness (M1) and the mediating role of goal orientation between the entity theory of personality and innovativeness (M2). Standardised regression coefficients reported. Punctured lines are non-significant. **$p < .01$; ***$p < .001$.

To assess the significance of mediation, we used a bootstrapping method with 5,000 bootstrap samples and 95% bias-corrected confidence intervals (CIs) (Preacher & Hayes, 2008). The results showed a significant full mediation in M1 (β = -.074, 95% CI [-.099, -.011], $p < .05$) and a significant full mediation in M2 as well (β = -.082, 95% CI [-.112, -.017], $p < .05$).

3.4 The Summary Model Predicting Innovativeness

Since this paper investigates the psychological factors predicting innovativeness, this subsection presents a summary model that includes all factors predicting innovativeness directly or indirectly. As reported in the previous subsections, the entity theories of ability and personality predicted innovativeness indirectly through the mastery goal. Additionally, the performance-avoidance goal predicted innovativeness directly. Controlling for the entity theory of personality, the summary model (M3 in Figure 7) included the entity theory of ability, the mastery goal and the performance-avoidance goal as predictors. The results showed that M3 fit the data well (X^2 = 549.231, df = 341, p < .001, X^2/df = 1.611, CFI = .922, TLI = .914, RMSEA = .047, SRMR = .065) and showed a *significant* full mediation (β = -.094, 95% CI [-.111, -.015], p < .05). The predictors in M3 accounted for 22% of the variance in innovativeness.

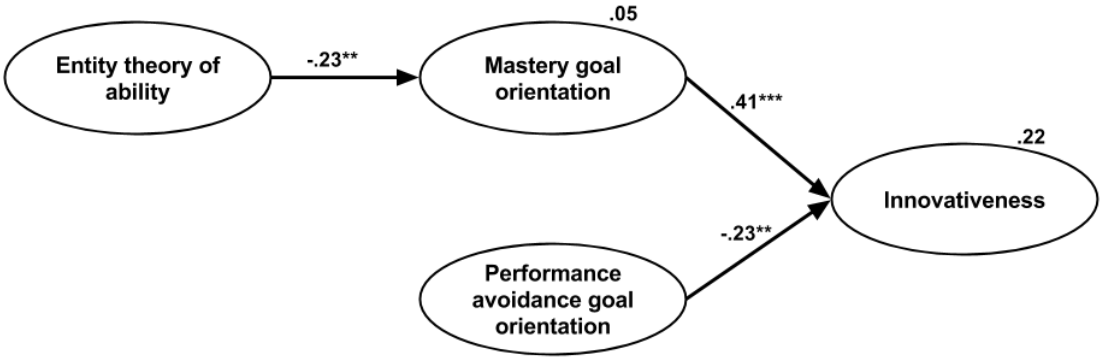

Figure 7. Summary model – the entity theory of ability and goal orientations as predictors of innovativeness (M3). Standardised regression coefficients reported. **p < .01; ***p < .001.

In contrast and controlling for the entity theory of ability, the summary model (M4 in Figure 8) included the entity theory of personality, the mastery goal and the performance-avoidance goal as predictors. The results showed that M4 fit the data well (X^2 = 559.280, df = 342, p < .001, X^2/df = 1.635, CFI = .925, TLI = .917, RMSEA = .048, SRMR = .066) and indicated a *significant* full mediation (β = -.100, 95% CI [-.130, -.021], p < .05). The predictors in M4 accounted for 22% of the variance in innovativeness.

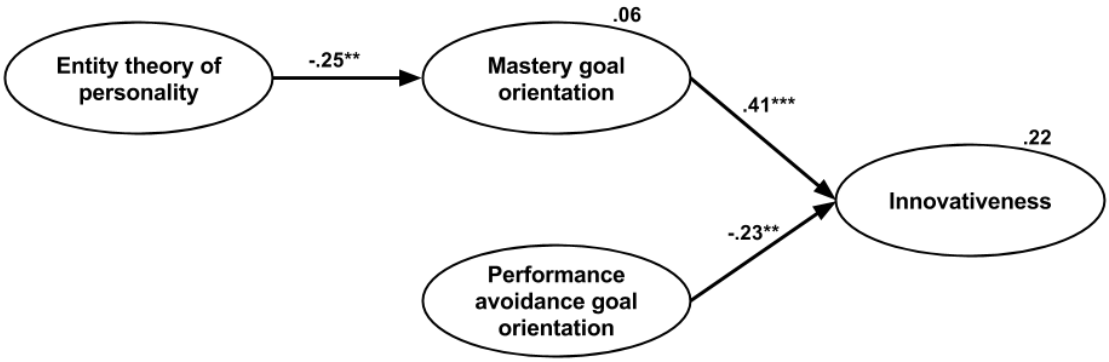

Figure 8. Summary model – the entity theory of personality and goal orientations as predictors of innovativeness (M4). Standardised regression coefficients reported. **p < .01; ***p < .001.

Thus, the current models M3 and M4 indicate that the influence of both implicit theories of ability and personality on innovativeness is fully mediated by mastery goal orientation and both models explain 22% of the variance.

4. Discussion and Conclusions

The current study expands the previous models and research on innovativeness by incorporating implicit theories and goal orientations as predictors of individual innovativeness. Moreover, it contributes to the literature about achievement settings (Grant & Dweck, 2003) by confirming its applicability to staff members in the higher educational context.

This study's results show a high correlation between the two dimensions of implicit theories: ability and personality. The results provide support to the findings of Dweck and colleagues (Dweck et al., 1995; Dweck & Grant, 2008), who argue that an individual's beliefs in one's ability and personality are correlated, but still distinct psychological constructs.

The analysis shows that both entity theories predict the mastery goal orientation but fail to predict the two performance orientations. These findings are in accord with the previous research indicating that the more individuals endorse the entity theory of their ability, the less likely they are to strive for the mastery goal (Blackwell et al., 2007; Chen & Wong, 2015; De Castella & Byrne, 2015; Dupeyrat & Mariné, 2005; Ommundsen, 2001; Robins & Pals, 2002). Contrary to our expectations, no significant correlation between the entity theories and the two performance orientations is found, which also challenges previous studies suggesting the entity theories' correlation with performance-avoidance (Chen & Pajares, 2010; De Castella & Byrne, 2015; Elliot & McGregor, 2001) and performance-approach goal orientations (Blackwell et al., 2007; Chen & Pajares, 2010; De Castella & Byrne, 2015). Nonetheless, the amount of the mastery goal's variances that is accounted for by the entity theory of ability and personality are fairly weak (R^2 less than .06). The findings confirm those obtained by Dupeyrat and Mariné (2005), who reported that the entity theory of ability explains only 10% of the mastery goal's variance. One explanation might be that the mastery goal orientation would be best predicted by other factors, such as organisational culture (Aldahdouh, Korhonen, & Nokelainen, 2017; Cameron & Quinn, 2006), growth-oriented atmosphere (Nokelainen & Ruohotie, 2009) and other epistemological beliefs (Schommer, Crouse, & Rhodes, 1992). Future research should take some of these factors into account to gain a better understanding of the staff members' differences in goal orientations.

The results confirm the association reported earlier between goal orientations and innovativeness (Keong & Hirst, 2010). As hypothesised, mastery and performance-avoidance goals are significant predictors of innovativeness, positively and negatively, respectively. In other words, mastery-oriented staff members who strive to explore new ideas and satisfy their learning curiosity tend to be innovators by trying new experiences, enjoying challenges and accepting risks. In contrast, performance-avoiding staff members who are driven by their fear of appearing incompetent or incapable of keeping pace with others are inclined to be late innovation adopters by avoiding the risk of uncertainty and resisting any changes to their regular work.

The present study does not support Keong and Hirst's (2010) findings that the performance-approach goal is positively correlated with attitudes towards innovation adoption. Thus, the present study's results can contribute to the long-standing debate about the consequences of the performance-approach goal (Butler, 2007; Mascret et al., 2015; Retelsdorf, Butler, Streblow, & Schiefele, 2010). The study, therefore, supports the line of research indicating that the performance-approach goal may lack the power to predict individual differences in different contexts (Butler, 2007; Chen & Pajares, 2010; Middleton & Midgley, 1997; Retelsdorf et al., 2010). The current findings may reveal the need for a decisive investigation of whether the performance approach should be considered or abandoned as a differentiating factor among staff members in higher education.

Our main findings support the hypothesis that the staff members' implicit theories of their ability and personality predict their innovativeness, and this association is fully mediated by the mastery goal orientation. The results suggest that staff members who view their ability and personality as a fixed quality tend to avert the mastery goal and are thus less oriented towards innovativeness. This result may corroborate the theoretical matching between the characteristics of entity theorists, as described by Dweck (2006), and late adopters, as described by Rogers (2003). Dweck (2006) argues that entity theorists who avoid challenges and focus on performance rather than learning are less likely to engage in achievement tasks, especially those that may expose their deficiency. Avoiding risks, averting uncertainty and thinking twice before accepting innovations are actually the core characteristics of late adopters (Rogers, 2003).

This study has significant and practical implications for understanding the important determinants of how staff members in higher education differ in their orientations towards change. The study provides strong evidence that implicit theories and associated goals have substantial effects on staff innovativeness. Signs of increasing adherence to the entity theories and performance-avoidance goal orientation should be taken as dangerous signals if present in innovative higher educational institutions. Fortunately, recent endeavours in the field have shown that implicit theories and associated goals can be altered in different ways (Blackwell et al., 2007; Heslin, 2010; Heslin et al., 2005; Keating & Heslin, 2015; Kunst et al., 2017; Meyer, 2012; Shim et al., 2013). The workplace culture has proven to be effective in modifying the espoused beliefs and goals of teachers, employees and managers (Murphy & Dweck, 2010). Cameron and Quinn (2006) argue that although an organisational culture is relatively stable, it can

still be changed with a well-thought-out plan. Alternatively, a relatively modest, quick and less expensive intervention involves introducing professional development programmes for staff members. Such programmes that present the concepts of implicit theories and goal orientations together with their consequences could result in appreciable changes in staff motivation and innovativeness (Dweck & Grant, 2008; Heslin, 2010; Heslin et al., 2005).

This study notes some limitations and considerations for future research. Its cross-sectional design limits the ability to confirm the causality relationships. Future research with a longitudinal design would prove our claims about the causality relationships. A second drawback of this study is that all constructs are measured by means of a self-reported questionnaire. Thus, the results are subject to the common-method bias. Future research may add other methods to the self-reported questionnaire. The study's third shortcoming is its adoption of the AGO questionnaire, which includes only three goal orientations. Recent developments in the field have revealed some additional goal orientations for teachers, such as mastery-avoidance (Elliot & McGregor, 2001), work-avoidance (Butler, 2007), task-approach, task-avoidance, self-approach and self-avoidance, other-approach and other-avoidance types (Mascret et al., 2015). It would be interesting to investigate the applicability to and the consequences of these recent dimensions for innovativeness. Finally, the study sample only includes staff members of higher educational institutions, which may limit the results' generalisability to other institutions. It is recommended that further research be undertaken in other institutions, such as schools, companies and governmental organisations. Notwithstanding these limitations, the present study provides a noteworthy model to understand staff innovativeness in higher education.

In summary, this study set out to examine the role of implicit theories and goal orientations in explaining staff's differences in innovativeness. The most obvious finding to emerge from this study was that the mastery goal orientation fully mediated the effect of both the entity theory of ability and personality on innovativeness. However, the performance-avoidance goal orientation had no precedents out of the implicit theories and had a direct negative effect on innovativeness. Moving forward, the field may be advanced by extending the current model to include the organisational factors along with other psychological factors. Our ultimate aim is to bring the holistic picture of the contributing factors of individual innovativeness.

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What Contributes to Individual Innovativeness? A Multilevel Perspective

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Mindset
Staff

ABSTRACT

It is well-established that individual innovativeness is an indispensable quality for employees working in a variety of workplace environments. However, the interaction between the psychological and organizational factors influencing innovativeness remains unclear. This study seeks to address that research gap by examining a model comprising a mix of psychological factors (implicit theory and goal orientation) and organizational culture. Data were collected from 315 staff members working in 34 different departments/schools at Tampere University, Finland. The study employed a Bayesian multilevel path analysis that matched the hierarchical structure of the data to test the hypotheses. The results suggest that psychological factors reflecting goal orientation are the most important for interpreting individual innovativeness. Specifically, mastery goal orientation was shown to be a positive predictor and performance-approach goal orientation a negative predictor of innovativeness. Unexpectedly, departmental culture had neither a direct effect on innovativeness nor a moderation effect on the relationships between the psychological variables and innovativeness. Plausible explanations for these results and implications for future research are discussed.

1. Introduction

Prosperity and advancement rely on the capacity of societies, organizations, and individuals to innovate, and research has consistently shown that individual innovativeness is a key factor in initiative success (Gökçearslan, Karademir, & Korucu, 2017; Hong, Hwang, Ting, Tai, & Lee, 2013; Jin, 2013; Park & Kim, 2010; Si & Wei, 2012). Rogers (2003) describes innovators as change agents, while Kirton (1976) argues that innovators are pioneers of radical change. Innovativeness is of the utmost importance for knowledge workers (Benson & Brown, 2007) because they are expected to expand their expertise, deal with ambiguity, take risks, embrace novel ideas, and respond quickly to knowledge changes (Aldahdouh, Korhonen, & Nokelainen, 2017). In other words, knowledge workers are asked to be innovators (Drucker, 1999).

Many studies show remarkably consistent findings regarding the relevance of innovativeness in predicting adaptive outcomes. For instance, the empirical evidence shows that innovativeness predicts technology usage (Gökçearslan et al., 2017; Hong et al., 2013; Jin, 2013; Park & Kim, 2010), influences the implementation of information and communication

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technology (ICT; Drent & Meelissen, 2008), and is related to perceived competencies in e-learning (Loogma, Kruusvall, & Ümarik, 2012) and techno-pedagogical skills (Çuhadar, Bülbül, & Ilgaz, 2013).

Although several studies have sought to identify the antecedents of innovativeness, the results may be described as scattered. Some studies, for instance, have focused on organizational factors (Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2016; Shanker, Bhanugopan, van der Heijden, & Farrell, 2017; Si & Wei, 2012), while others have focused on psychological factors (Aldahdouh, Nokelainen, & Korhonen, 2018; Batra & Vohra, 2016; Lu, Lin, & Leung, 2012; Vinarski-Peretz, Binyamin, & Carmeli, 2011). In a review study summarizing the antecedents of innovativeness, Parzefall, Seeck, and Leppänen (2008) pointed out that "most studies have focused on isolated factors, and a holistic perspective is lacking" (p. 166). Among the few studies that have investigated psychological and organizational factors together, Scott and Bruce (1994) found that both psychological and organizational factors interacted and cooperated in shaping innovative behavior. Beyond those few studies (Miron, Erez, & Naveh, 2004; Montani, Odoardi, & Battistelli, 2014; Scott & Bruce, 1994), however, evidence of an interactive effect remains inconclusive.

Cai (2017) argued that the study of innovation in higher educational institutions (HEIs) does not enjoy the same momentum as studies in the management field. This conclusion adds more uncertainty about whether models identified in prior studies are applicable to the context of HEIs and calls for research to fill this void. This study responds to this need by exploring some of the most often-cited psychological and organizational factors influencing individual innovativeness in HEIs. We are fundamentally motivated by a curiosity about whether individual innovativeness results from employees' psychological attributes or is shaped by their workplace environment. Alternatively, it may be a function of both psychological and organizational aspects. This study addresses two of the most salient psychological factors—implicit theories (Dweck, Chiu, & Hong, 1995) and goal orientations (Midgley et al., 1998)—while the organizational aspect is represented by the organizational culture (Cameron & Quinn, 2006).

In what follows, we review the literature on innovativeness along with its antecedents and develop the study's hypotheses. Next, we describe the study's methodology, including the sample, the measures, and the analysis. Next, the study's most important findings are outlined. Finally, we discuss the study's results, establish connections to the literature, and draw conclusions and implications for researchers and practitioners.

2. Innovativeness

Below, we delineate several relevant concepts in the literature and try to demarcate each one. However, the boundaries are by no means clear. The more confusing concepts in the literature include "creativity"' (Amabile, 1988), "innovation" (West & Farr, 1990), "innovative behavior" (Scott & Bruce, 1994) and "innovativeness" (Goldsmith & Foxall, 2003). Thus, we will begin by locating this study's concept of innovativeness within a sea of foggy conceptualizations.

Some scholars have advocated a conceptual differentiation between creativity and innovation (Miron et al., 2004; Rank, Pace, & Frese, 2004), while others argue that innovation implicitly or explicitly encompasses creativity (West & Farr, 1990). The first approach considers creativity as idea generation while conceiving innovation as idea implementation (Rank et al., 2004). The second approach combines the two concepts and considers creativity to be the first phase of the innovation process, thus viewing creativity as "the ideation component of innovation and innovation as encompassing both the proposal and applications of the new ideas" (West & Farr, 1990, p. 10). This study employs the latter approach because our concern is not just about whether employees will implement the ideas generated by others; we also examine their tendency to generate innovative ideas.

Regarding measurement, individual innovation has been operationalized through two main methods. The first measurement level relies on Rogers (2003), who defines innovativeness as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 242). This definition corresponds to a low level of abstraction because it concerns the tracking of individual differences in *observed behavior*. The literature also uses various terms to describe innovativeness from a behavioral perspective, including *actualized innovativeness* (Midgley & Dowling, 1978), *innovative work behavior*, or *innovative job performance* (Janssen & Van Yperen, 2004; Jong & Hartog, 2007). A second and more abstract measurement level for innovativeness conceptualizes it as a persistent individual characteristic (Yi, Fiedler, & Park, 2006), a latent construct (Goldsmith & Foxall, 2003; Midgley & Dowling, 1978), or an underlying personality trait (Hurt, Joseph, & Cook, 1977) that determines the tendency to generate and accept changes and novel ideas. Innovativeness as a personality trait has been referred to as *general innovativeness* (Marcati, Guido, & Peluso, 2008), *life innovativeness* (Roehrich, 2004), *innate innovativeness* (Midgley & Dowling, 1978), and *global trait innovativeness* (Goldsmith & Foxall, 2003). The measurement of innovativeness as a personality trait has outweighed the use of behavioral measurement because the latter has been identified as a post-facto technique lacking the predictive power of innovations in other domains (Goldsmith & Foxall, 2003). Accordingly, this study adopts the personality trait approach.

2.1. Factors predicting innovativeness

Researchers have made several theoretical attempts to identify the factors predicting individual innovativeness (Anderson, Potočnik, & Zhou, 2014; Frambach & Schillewaert, 2002; Parzefall et al., 2008; Patterson, Kerrin, & Gatto-Roissard, 2009; Wisdom, Chor, Hoagwood, & Horwitz, 2014). These efforts have revealed the key determinants which can be

categorized into psychological and organizational types. The sections below review these factors, along with the relationships between them.

2.1.1. Psychological factors

Several psychological factors have been identified as contributors to individual innovativeness. The long list includes Big Five personality dimensions, self-efficacy, thinking styles, intrinsic motivation, and attitudes (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). Among those factors, the implicit theory (Dweck, 2006) and achievement goal orientation (Midgley et al., 1998) represent the most promising models.

Implicit theory (Dweck & Leggett, 1988) concerns an individual's beliefs about the nature of human attributes, including ability, personality, and morality (Dweck et al., 1995). A person may believe in one of two theories about human attributes (Dweck, 2006). For entity theorists, human attributes are fixed, innate, and physical; one cannot surpass these physical limitations. For incremental theorists, human attributes are elastic, stretchable, and malleable; there are no limitations on how far one can go through practice and effort. Scholars have examined implicit theories extensively, with a focus on human abilities such as intelligence (Blackwell, Trzesniewski, & Dweck, 2007). The results of research conducted in several contexts have consistently shown that entity theories are associated with maladaptive outcomes, while incremental theories are related to adaptive outcomes (De Castella & Byrne, 2015; Dweck, 2006; Murphy & Dweck, 2010).

Achievement goal orientations is the other psychological factor important to this study. Goal orientations are often described as the reasons why one is striving to achieve a task (Dweck & Leggett, 1988; Midgley et al., 1998). Three main goal orientations have been identified: (1) mastery, (2) performance-approach, and (3) performance-avoidance (Linnenbrink & Pintrich, 2002; Midgley et al., 1998). Individuals adopting mastery goal orientation tend to engage in tasks in order to improve their capacities and sharpen their skills. By contrast, individuals adopting performance-approach goal orientation tend to engage in a task in order to show others how well they can do or to surpass their peers (Linnenbrink & Pintrich, 2002). Finally, individuals adopting performance-avoidance goal orientation tend to engage in a task in order to avoid appearing incompetent (Elliot & Church, 1997). Mastery goal orientation is often reported to be associated with adaptive behaviors (De Castella & Byrne, 2015; Dweck & Leggett, 1988), whereas performance-avoidance goal orientation is related to maladaptive behaviors (Elliot & Church, 1997). The research findings on performance-approach goal orientation have been inconsistent and contradictory (Elliot & Moller, 2003); while some findings indicate positive effects (De Castella & Byrne, 2015; Elliot & Church, 1997), others indicate negative consequences (Ames, 1992; Dweck & Leggett, 1988).

What we know about the relationship between implicit theories and goal orientations relies largely upon empirical studies that repeatedly confirm that incremental theory predicts mastery goal orientation. Meanwhile, the entity theory predicts performance-approach and performance-avoidance goal orientations (Chen & Pajares, 2010; De Castella & Byrne, 2015; Dweck & Leggett, 1988; Robins & Pals, 2002).

In 1988, Dweck and Leggett proposed a theoretical framework for future research wherein they identified implicit theories as predictors of goal orientations and goal orientations as predictors of social behaviors. While several theoretical studies have mentioned that implicit theory and goal orientations can be strong predictors of innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009), empirical findings have partially supported this theoretical framework (Keong & Hirst, 2010; Lu et al., 2012). For instance, Lu et al. (2012) found that mastery goal orientation was an indirect positive predictor of innovative performance. On the other hand, Aldahdouh et al. (2018) found that the entity theory of ability predicted the mastery goal orientation but failed to predict the performance-avoidance goal orientation. Even though performance-avoidance goal orientation appeared to be a negative predictor of innovativeness, mastery goal orientation seemed to be a positive predictor.

2.1.2. Organizational factors

Previous studies have listed a number of organizational factors that help hinder or foster innovativeness, such as organizational leadership, structure, strategy, resources, size, and climate (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). This study examines the role of organizational culture, the most often-mentioned factor amongst those listed. An organizational culture comprises employees' hidden and collective beliefs, assumptions, and thoughts about their institution, all of which implicitly guide their behavior (Cai, 2008). The term “culture” here refers to the shared identity that distinguishes one working unit from all others.

The competing values framework (CVF) is one of the most widely used typological frameworks for organizational culture (Cai, 2008; Cameron & Quinn, 2006). The CVF comprises two crossing dimensions with two opposite poles: (1) internal *vs.* external; and (2) stability *vs.* flexibility. The crossing dimensions produce four quadrants representing four organizational culture types (Cameron & Quinn, 2006): Clan (focuses on internal flexibility), Hierarchy (focuses on internal stability), Market (focuses on external stability), and Adhocracy (focuses on external flexibility).

Several review studies have made a strong case for the role of organizational culture in influencing innovativeness (Ahmed, 1998; Anderson et al., 2014; Frambach & Schillewaert, 2002; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014). For example, Patterson et al. (2009) noted that an organizational culture that supports innovation is one that “encourages risk taking and the exchange of ideas, promotes participation in decision making and management, has goals and rewards for innovation, and provides psychological safety in relation to making suggestions” (p. 25). In support of these claims, Raj and Srivastava (2013) revealed that the Clan, Adhocracy, and Market cultures contribute positively to predicting organizational innovativeness through organizational learning. In another study reported by Amabile (1988), interviews with

R&D scientists identified nine work environment characteristics that foster the generation of novel ideas: giving employees a sense of control over their work (freedom); offering supportive managerial practices, such as showing enthusiasm for new ideas and paying attention to employees' needs and expectations (encouragement); and providing constructive feedback and rewards for employees' professional skills and knowledge (recognition).

2.1.3. Psychological and organizational factors

Implicit theory and goal orientations were originally studied in academic contexts, where researchers focused on identifying their antecedents and consequences (Dweck & Leggett, 1988; Midgley et al., 1998). Their efforts have pointed to the importance of identifying the school's or classroom's goal structure as a strong predictor of students' goal orientations (Ames, 1992; Midgley et al., 1998). Students who tend to endorse a statement like "in this classroom, only talented students are rewarded" also tend to endorse statements like "my talent is what it is, and there is not much I can do to improve it." Therefore, they also tend to endorse statements like "One of my goals is to avoid looking not smart in this class."

Like those of their students, teachers' implicit-theories and goal orientations are shaped by their working environments, as several studies have emphasized (Hamstra, Van Yperen, Wisse, & Sassenberg, 2014; Kunst, van Woerkom, van Kollenburg, & Poell, 2018). Murphy and Dweck (2010), for example, showed that two cultural mindsets contribute to employees' cognition, affection, and behavior: a culture of genius and a culture of growth. In a culture of genius, organizations tend to recruit only "intelligent" people and praise employees on their "innate" attributes. They invest little in employee training, which talented people do not need. Contrariwise, in a culture of growth, organizations tend to recruit growth-minded people, praise employees on their efforts, and invest a great deal in employee training. Keating and Heslin (2015) proposed a model in which they identified organizational culture and its climate as antecedents of employees' implicit theories and their job commitment and satisfaction.

Several studies have examined organizational culture as a moderator of the relationship among the psychological variables. For instance, Hon and Leung (2011) found that organizational culture moderated the effect of employees' intrinsic motivations on their creative performance. Miron et al. (2004) examined whether cultures serve as moderators between individual creativity and innovation performance, finding that, in a high-innovative culture, individuals' creative ideas are often transformed into innovation, while individuals' creative ideas remain stagnant in a low-innovative culture.

3. Study variables and hypotheses

Table 1 summarizes the study variables, along with the corresponding abbreviations and definitions.

We posited that the psychological variables (entity theory of ability and goal orientations) and organizational variables (cultures) predict innovativeness while the organizational variables serve as moderators of the relationships among the psychological variables. Specifically, we propose the following:

Hypothesis 1. The entity theory of ability and performance-avoidance goal orientation contribute negatively in predicting innovativeness, while mastery goal orientation contributes positively in predicting innovativeness.

Hypothesis 2. The entity theory of ability is negatively associated with mastery goal orientation and positively associated with performance-avoidance goal orientation.

Hypothesis 3. The Clan and Adhocracy cultures contribute positively in predicting innovativeness, while the Hierarchy culture contribute negatively in predicting innovativeness.

Hypothesis 4. Culture moderates the relationship among the implicit theory of ability, goal orientation, and innovativeness such that:

Table 1
Study variables, abbreviations, and definitions.

Variable	Abbreviation	Definition
Innovativeness	INNOV	refers to an individual's willingness to change
Entity theory of ability	ETA	refers to an individual's beliefs that the human attributes are fixed, innate and stable
Mastery goal orientation	MAS	refers to an individuals' tendency to engage in a task in order to improve their own capacities and to sharpen skills
Performance-approach goal orientation	PAP	refers to an individuals' tendency to engage in a task in order to show others how well they can do or to overtake their peers
Performance-avoidance goal orientation	PAV	refers to an individuals' tendency to engage in a task in order to avoid appearing incompetent in comparison to their peers
Clan culture	CLN	refers to a culture that focuses on internal flexibility
Hierarchy culture	HRC	refers to a culture that focuses on internal stability
Market culture	MRK	refers to a culture that focuses on external stability
Adhocracy culture	ADH	refers to a culture that focuses on external flexibility

Hypothesis 4.1. Cultures supporting flexibility and discretion (Clan and Adhocracy) mitigate the negative effect of the implicit theory of ability and performance-avoidance goal orientation on innovativeness, but they strengthen the positive effect of mastery goal orientation on innovativeness.

Hypothesis 4.2. Cultures emphasizing control and stability (Hierarchy) worsen the negative effect of the entity theory of ability and performance-avoidance goal orientation on innovativeness, but they reduce the positive effect of mastery goal orientation on innovativeness.

Hypothesis 4.3. Cultures that support flexibility and discretion (Clan and Adhocracy) mitigate the negative effect of implicit theory of ability on mastery goal orientation, but they weaken the positive effect of the implicit theory of ability on performance-avoidance goal orientation.

Hypothesis 4.4. Cultures emphasizing control and stability (Hierarchy) reduce the positive effect of the entity theory of ability on mastery goal orientation, but they worsen the negative effect of the entity theory of ability on performance-avoidance goal orientation.

The literature has not presented clear evidence about the relationship between the Market culture and innovativeness (Naranjo-Valencia et al., 2016; Raj & Srivastava, 2013). On one hand, the Market culture is defined by stability and control, which may contribute negatively to mastery goal orientation while contributing positively to performance-avoidance goal orientation. On the other hand, it has an external orientation that supports openness and competitiveness, so it may contribute positively to innovativeness. Therefore, we do not hypothesize regarding the effect of the Market culture on innovativeness and its moderation role. Driven by the data, we allowed the Market variable to be associated with innovativeness and to moderate the relationship among the psychological variables and innovativeness.

Similar to findings on the Market culture, findings on the effect (adaptive or maladaptive) of performance-approach goal orientation have been inconsistent (Elliot & Moller, 2003). Thus, we allowed performance-approach goal orientation to be associated with innovativeness while remaining neutral regarding its effect.

4. Method

4.1. Participants

All the staff members working in 34 different schools/departments at Tampere University, Finland, were invited to participate in the study. Of these, 315 (167 female and 148 male) respondents left valid responses to an online questionnaire. Therefore, the sample was selected using a non-probability sampling method. The age of the participants varied from 20 to 67, with a mean of 46 years ($SD = 11.187$). Seventy percent ($n = 221$) of the participants were academic staff, while the rest ($n = 94$) were administrative workers. Participants had job experience of an average of 177 months in higher education (about 14.75 years; $SD = 116.475$). In terms of educational qualifications, 8% ($n = 25$) had completed a bachelor's degree, 40% ($n = 128$) had completed a master's degree, 15% ($n = 46$) had completed a doctoral or post-doctoral degree, 17% ($n = 54$) were professors or docents, and 20% ($n = 62$) were "others."

4.2. Measures and procedures

We distributed an online questionnaire to all staff members from August 2016 to November 2016, using email invitations and the university's intranet. Unless otherwise indicated, a 5-point Likert scale was used, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Cronbach's α provided an estimate of the internal consistency of the scales. We translated the questionnaire into Finnish and piloted it before use. The questionnaire consisted of demographic questions (seven items) and the following measures: innovativeness, organizational culture, goal orientations, and implicit theories of ability.

4.2.1. Innovativeness

A shortened version (13 items) of Hurt et al. (1977) Innovativeness Scale was adopted to measure the staff members' orientations towards change (e.g., "I enjoy trying new ideas"). The scale has shown strong psychometric characteristics and has repeatedly demonstrated its usefulness as a valid measure of general innovativeness (Goldsmith, 1990; Pallister & Foxall, 1998). Cronbach's α was 0.848.

4.2.2. Organizational culture

We adopted the Organizational Culture Assessment Instrument (OCAI) to assess staff's perceptions of their departments' culture. The OCAI was devised by Cameron and Quinn (2006) and is based on the CVF, the framework most often used to assess culture in the higher education context (Cai, 2008; Kleijnen, Dolmans, Muijtjens, Willems, & Van Hout, 2009). Previous studies have validated the OCAI's validity and reliability in measuring an organization's culture (Cameron & Quinn, 2006; Heritage, Pollock, & Roberts, 2014). The OCAI consists of 24 questions: six for each of the four cultures. Cronbach's α coefficients were as follows: Clan = 0.805, Hierarchy = 0.624, Market = 0.868, and Adhocracy = 0.822. The reliability of the

Hierarchy culture is under the acceptable level of 0.70 and is consistent with prior findings that revealed that the Hierarchy factor should be adjusted (Heritage et al., 2014).

4.2.3. Goal orientations

We adapted a shortened version (10 items) of Midgley and colleagues' (2000) Achievement Goal Orientation (AGO) Scale to measure staff members' goal orientations. The adaptations included replacing "school" with "work." The resulting AGO Scale consisted of three subscales: MAS (three items; e.g., "One of my goals in work is to learn as much as I can"), PAP (three items; e.g., "One of my goals is to show others that work is easy for me"), and PAV (four items; e.g., "It's important to me that I don't look incapable of doing my work"). Cronbach's α values for MAS, PAP, and PAV were 0.759, 0.787, and 0.815, respectively.

4.2.4. Implicit theories of ability

The eight-item person measure developed by Levy, Stroessner, and Dweck (1998) was adapted to capture the implicit theory of ability. The items were re-worded to reflect first-person beliefs about the nature of participants' personal attributes rather than human attributes in general (e.g., for incremental beliefs, "I can significantly change my basic level of talent"; for entity beliefs, "My talent is something very basic about me that I can't change very much"). The items were measured on a 6-point Likert scale, ranging from 1 ("strongly disagree") to 6 ("strongly agree"). The incremental items were reverse-scored such that larger scores reflected a relatively strong entity theory. The eight items were added up and averaged to create the Entity Theory of Ability scale ($\alpha = 0.870$).

4.3. Analysis

4.3.1. Approach

We conducted Bayesian multilevel path analysis using Mplus version 8.0 (Muthén & Muthén, 2017) to test the hypotheses. A multilevel approach was warranted since our data had a nested structure, whereby we collected 315 responses of individuals working in 34 schools/departments. We opted to use path analysis because the study variables were assumed to have structural dependencies among the predictor variables beside their effects on the outcome variable. We followed the within-and-between approach to multilevel path analysis, wherein estimates for the within-covariance matrix (individual-level) and between-covariance matrix (group-level) are determined separately (Hox, 2010). This makes it possible to partial out the group-level variance from individual-level variables. Multilevel path analyses of both levels were conducted separately but simultaneously. Due to the small number of groups in this study, it was not feasible to conduct the analysis on latent variables. Thus, summary scores of the variables were used in the analysis. The Bayesian approach was chosen because of its superior performance for small samples (Stegmueller, 2013). Unlike inferential techniques, the Bayesian approach does not rely on any distributional assumptions about the data, such as normality (Finch & Bolin, 2017, p. 286).

4.3.2. Settings

The Markov Chain Monte Carlo (MCMC) methodology was used to obtain the parameter estimates in Bayesian analysis. The convergence of parameter estimates was assessed by the Potential Scale Reduction (PSR) convergence criterion. A PSR <1.05 for each parameter indicates that convergence of the MCMC sequence has been reached (Finch & Bolin, 2017). The convergence was also monitored using the trace plots. Quick oscillations in the trace plot indicate convergence. Autocorrelation plots were used to check for the correlation between two adjacent MCMC draws and to set the thinning value. Data was thinned every fourth MCMC draw to minimize the correlation to near zero.

Model fit was assessed using the Posterior Predictive P-value (PPP) and Credibility Interval (CI). A PPP value close to 0.50 indicates optimal fit (Finch & Bolin, 2017). A 95% CI that contains zero indicates good fit to the data. In addition, we used the Deviance Information Criterion (DIC) to compare between models, where the model with the lowest DIC value is preferable. The analysis was conducted using non-informative or diffuse priors. Two MCMC chains of a minimum of 45,000 iterations were used (Muthén & Muthén, 2017).

4.3.3. Statistical procedures

We tested three models while analyzing the data: random intercept, random slopes, and cross-level interaction models. First, we tested the random intercept model (Fig. 1) and assessed the fitness of the model by computing the PPP. Then, we tested the random slopes model (Fig. 2) by allowing the slopes to vary across departments. Finally, we tested the cross-level interaction model (Fig. 3), in which the cultures served as moderators of the relationships between the psychological variables and the outcome (innovativeness).

The logic behind this process had two objectives. One was to ensure simplicity by testing the models from simple to more complex structures. The other was to check the PPP model fit value, which was not available except for the random intercept model. We then compared the DIC value of the random intercept model with the DIC values of both the random slopes and the cross-level interaction models. Lower DIC values would indicate a better model fit.

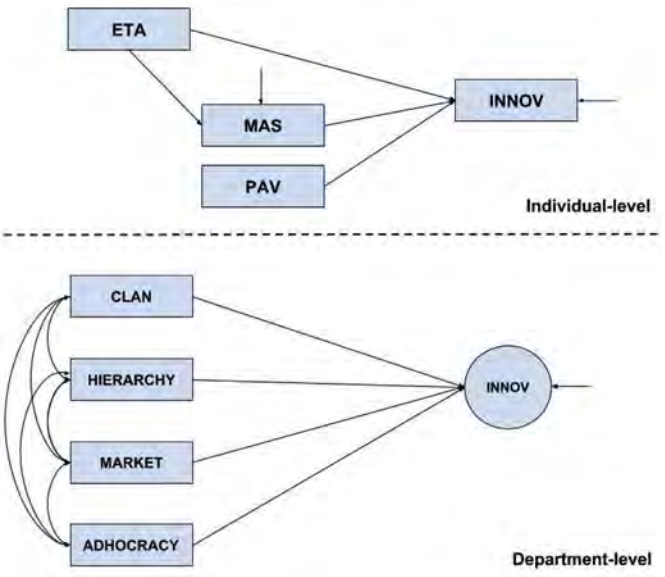

Fig. 1. Random intercept model. INNOV = Innovativeness; ETA = Entity Theory of Ability; MAS = Mastery goal orientation; PAV = Performance-Avoidance goal orientation. Performance-Approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

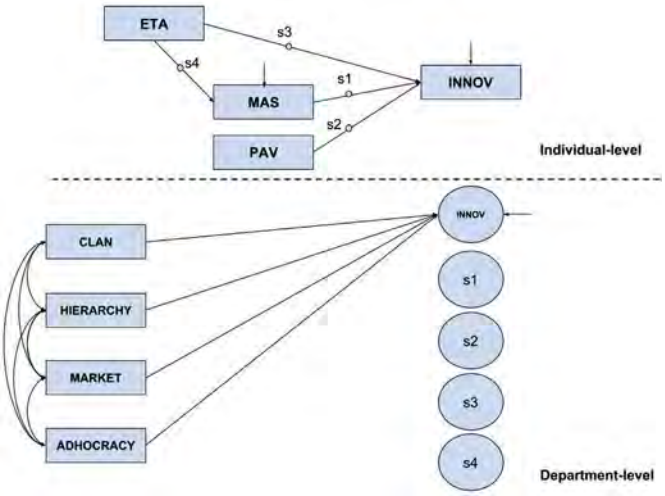

Fig. 2. Random slopes model. INNOV = Innovativeness; ETA = Entity Theory of Ability; MAS = Mastery goal orientation; PAV = Performance-Avoidance goal orientation. Performance-Approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

4.3.4. Preliminary analyses

4.3.4.1. Missing data analysis. First, we conducted a missing values analysis. A case screening of 342 collected responses resulted in the removal of 27 cases. The missing values per variable were analyzed using the data imputation technique; they were replaced by the mean (for continuous variables) and the median (for the categorical variables).

4.3.4.2. Sample homogeneity. We conducted a series of differences tests to ensure sample homogeneity with respect to the outcome variable, innovativeness. An independent sample *t*-test showed that there was no significant difference in innovativeness based on gender (male or female) or job type (academic or administrative). The results of a one-way ANOVA also revealed no significant difference in innovativeness related to staff educational levels ($p > 0.05$).

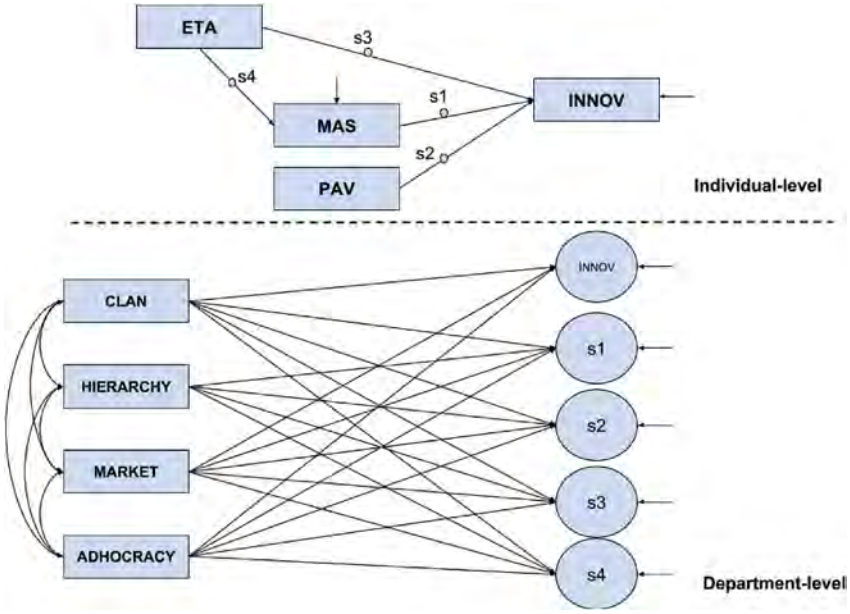

Fig. 3. Cross-level interaction model. INNOV = Innovativeness; ETA = Entity Theory of Ability; MAS = Mastery goal orientation; PAV = Performance-Avoidance goal orientation. Performance-Approach goal orientation as well as the path from ETA to PAV were omitted based on the correlation findings.

4.3.4.3. Common method variance. Our data could have suffered from a common method bias since the responses for all study variables were collected from the same individuals. We used Harman's one-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). All items of our nine variables were entered into an unrotated exploratory factor analysis using SPSS and forcing a one-factor solution. The results indicated that the single factor accounted for only 12.7% of the variance. These results suggested that the common method variance was not a major concern in this study.

4.3.4.4. Data aggregation. The intra-class correlation coefficient (ICC1; Bliese, 2000) was calculated to examine whether there were department-level variances in the study variables that necessitated their inclusion in the between-level model. ICC1 represents the proportion of group-level variance in respect to the total variance of the variable. Variables showing ICC1 > 0.05 were included in the between-level model (LeBreton & Senter, 2008). Though we consider the entity theory of ability and goal orientations as individual characteristics, we computed ICC1 for their respective variables because they may differ significantly across departments due to the study's sampling method. As hypothesized, however, the ICCs for those individual variables showed almost no variance according to department membership (All ICC1s < 0.03). Thus, they were included only in the within-level model. Furthermore, we calculated ICC1 for the outcome variable (innovativeness) to see whether individual innovativeness was affected by department membership (Bliese, 2000). The results revealed that 10% of the variance in innovativeness was due to department membership.

Our intention for the cultural variables was to measure the common perceptions of culture in each department. We were interested in the mean of each department, and not individual perspectives on what the departmental culture was. However, the cultural variables were measured through the ratings given by individuals in the department. To justify the aggregation of those cultural variables to their departments' means, we used a calculator developed by Biemann, Cole, and Voelpel (2012) to compute median Rwg values using the null uniform distribution (Bliese, 2000). The Rwg value indicates the degree of agreement among staff members within a department. Values greater than 0.70 indicate generally accepted agreement among the raters (LeBreton & Senter, 2008). Using the same tool, we determined ICC1 in addition to the reliability of the group means (ICC2). The results were as follows: for Clan culture, 0.88 (Rwg), 0.08 (ICC1), and 0.44 (ICC2); for Hierarchy culture, 0.88 (Rwg), 0.08 (ICC1), and 0.45 (ICC2); for Market culture, 0.89 (Rwg), 0.16 (ICC1), and 0.64 (ICC2); for Adhocracy culture, 0.88 (Rwg), 0.09 (ICC1), and 0.47 (ICC2). The F-ratios associated with the ICC values were all statistically significant at the 0.05 level. The ICC1 and Rwg values of all cultural variables were above the cut-off values. The ICC2 values ranged between 0.44 and 0.64, classified by Fleiss (1986, p. 7) as fair to good reliability estimates (ICC2 values < 0.40 are poor, those between 0.40 and 0.75 are fair to good, and those > 0.75 are excellent). Based on the results, we decided to aggregate the cultural variables.

We followed the recommendation of Enders and Tofighi (2007), who suggested centering the individual-level variables on their group mean when the focus is on inspecting the moderation effect of the group-level variables on individual-level relationships. Department-level variables were centered on their grand mean (Hox, 2010).

4.3.4.5. Descriptive statistics. Table 2 displays the means, standard deviations, and correlations among the variables on the individual and department levels. An inspection of the correlations revealed that the relationships between innovativeness and the psychological variables were significant except for PAP. Therefore, PAP was excluded from further analysis. Similarly, ETA showed a non-significant relationship with PAV. Thus, the regression coefficient between ETA and PAV was canceled out in the examined models.

5. Results

5.1. Random intercept model

We were guided by the hypotheses and the correlation matrix in specifying the paths between the variables. At the individual level, we examined the model in which ETA, MAS, and PAV were predictors of innovativeness, while ETA was a predictor of MAS. At the department level, we examined the extent to which Clan, Hierarchy, Market, and Adhocracy cultures explain the variance in the random intercept of innovativeness. Equations (1)–(3) below represent the model:

$$INNOV_{ij} = \beta_{0j} + \beta_{10}\, MAS_{ij} + \beta_{20}\, PAV_{ij} + \beta_{30}\, ETA_{ij} + e_{ij} \quad (1)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\, CLN_j + \gamma_{02}\, HRC_j + \gamma_{03}\, MRK_j + \gamma_{04}\, ADH_j + u_{0j} \quad (2)$$

$$MAS_{ij} = \alpha_{00} + \alpha_{10}\ \ ETA_{ij} + \varepsilon_{ij} \quad (3)$$

In equation (1), the intercept β_{0j} is a random effect that varies across departments, while the slopes β_{10}, β_{20}, and β_{30} are fixed. The cultures on the department level predict the intercept of innovativeness β_{0j}. Equation (3) allows ETA to predict MAS where the intercept α_{00} and the slope α_{10} are fixed. ETA was not allowed to predict PAV because ETA had no correlation with PAV, as shown in the correlation matrix (see Table 2).

The parameter estimates all converged adequately, as the PSR values decreased smoothly over the iterations, reaching a value of 1.010, which is below the cut-off value of 1.05. The trace plot (Fig. 4) displays quick oscillations, while the autocorrelation plot (Fig. 5) displays low autocorrelation near zero, which together indicating good convergence of the MAS estimate. The posterior parameter trace and autocorrelation plots for the other parameters (not reported) were also indicative of good convergence.

The model showed a good fit to the data, as the PPP was 0.278, and the 95% CI for the difference between the observed and the replicated χ^2 values covered zero, with a lower bound of −16.494 and an upper bound of 32.025. The DIC value was 1143.358.

As shown in Table 3, ETA is negatively associated with MAS ($\alpha_{10} = -0.149$) and INNOV ($\beta_{30} = -0.083$), while MAS is positively associated with INNOV ($\beta_{10} = 0.261$). As expected, PAV is negatively associated with INNOV ($\beta_{20} = -0.097$). Although the individual-level variables maintained a significant association with INNOV, a significant value of e_{ij} may suggest that there remains a variance in INNOV that has not yet been explained.

Contrary to our expectations, none of the cultures explained the variance of the innovativeness's random intercept, even though a random effect of the intercept (δ^2_{u0j}) pointed to a significant variation in the intercept (γ_{00}) between departments. A significant overall fixed intercept γ_{00}, which is the expected value of INNOV when all predictors are on their means, suggested that the intercept was significantly different from zero.

Table 2
Means, standard deviations, and correlations among the variables on the individual and department levels.

	1	2	3	4	5	6	7	8	9
1. INNOV	1					−0.01	0.02	−0.04	−0.02
2. ETA	−0.09*	1							
3. MAS	0.13*	−0.09*	1						
4. PAP	0.00	0.05	0.04	1					
5. PAV	−0.08*	0.05	0.07	0.54*	1				
6. Clan						1	0.00	−0.10*	0.07*
7. Hierarchy							1	0.00	−0.03
8. Market								1	0.03
9. Adhocracy									1
M	3.75	3.73	3.95	2.22	2.67	3.02	2.87	2.49	2.94
SD	0.057	0.049	0.040	0.048	0.054	0.069	0.052	0.092	0.063

Notes: INNOV = Innovativeness; ETA = Entity Theory of Ability; MAS = Mastery goal orientation; PAP = Performance-Approach goal orientation; PAV = Performance-Avoidance goal orientation. Values below the diagonal are correlations at the individual level (n = 315); values above the diagonal are correlations at the department level (n = 34). *$P < 0.05$.

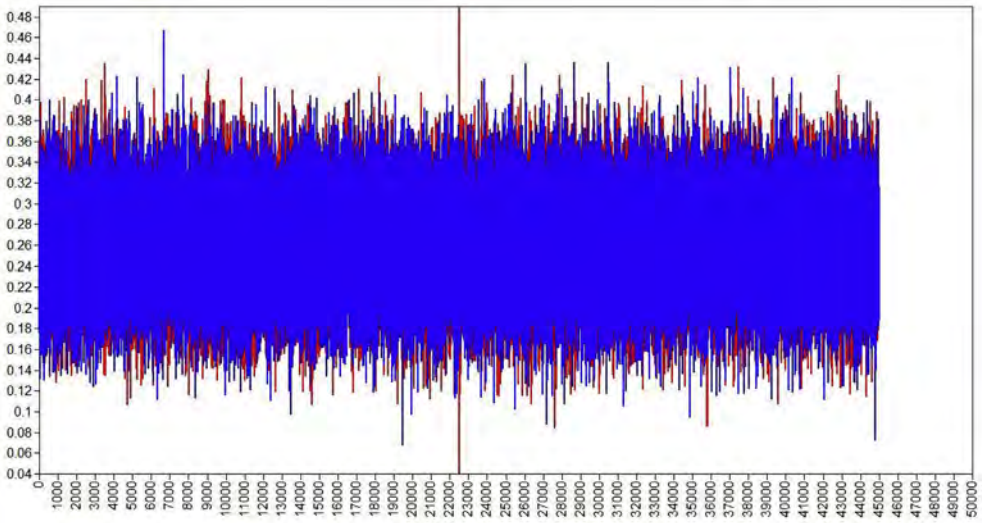

Fig. 4. Trace plot for the slope of MAS.

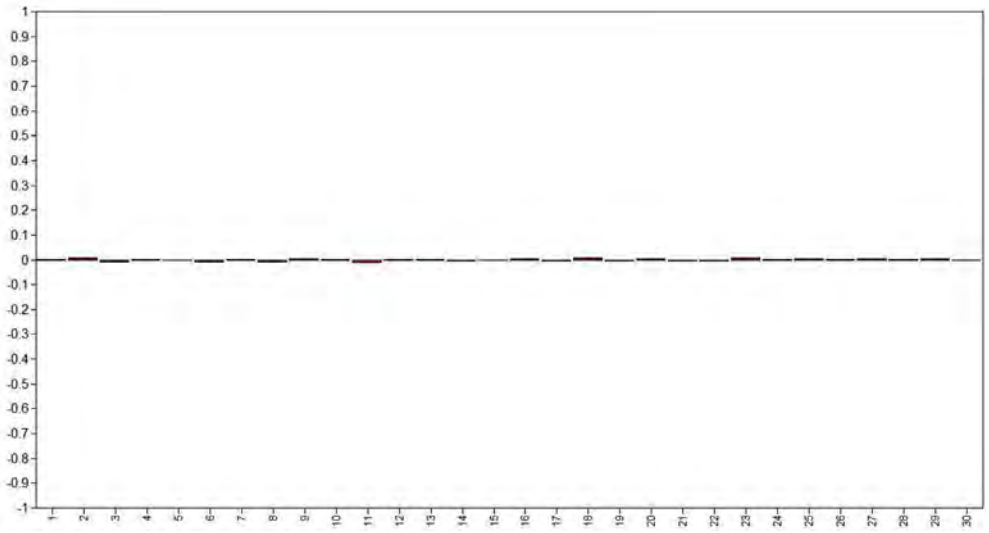

Fig. 5. Autocorrelation plot for the slope of MAS.

Table 3
Bayesian parameter estimates and credibility intervals of random intercept model.

Path	Estimate (*SD*)	95% Credibility Interval		Significance
		Lower	Upper	
Within-level				
MAS → INNOV (β_{10})	0.261 (0.044)	0.175	0.347	*
PAV → INNOV (β_{20})	−0.097 (0.032)	−0.159	−0.034	*
ETA → INNOV (β_{30})	−0.083 (0.035)	−0.153	−0.014	*
ETA → MAS (α_{10})	−0.149 (0.045)	−0.237	−0.062	*
Residual Variances				
INNOV ($\delta^2_{\varepsilon ij}$)	0.244 (0.021)	0.208	0.289	*
MAS ($\delta^2_{\varepsilon ij}$)	0.418 (0.034)	0.359	0.492	*
Between-level				
CLN → INNOV (γ_{01})	−0.380 (0.266)	−0.900	0.147	
HRC → INNOV (γ_{02})	0.308 (0.231)	−0.139	0.773	
MRK → INNOV (γ_{03})	−0.290 (0.173)	−0.625	0.056	
ADH → INNOV (γ_{04})	0.244 (0.259)	−0.263	0.759	
Intercepts				
INNOV (γ_{00})	3.758 (0.048)	3.662	3.853	*
Residual Variances				
INNOV (δ^2_{u0j})	0.040 (0.021)	0.014	0.095	*

5.2. Random slopes model

We allowed the slopes of the relationships between the psychological variables and innovativeness to vary across departments in a random slopes model. The slope of ETA on MAS was permitted to vary as well. The rest of the model remained as it was in the random intercept model to allow a comparison of the two models using DIC value.

$$INNOV_{ij} = \beta_{0j} + \beta_{1j} MAS_{ij} + \beta_{2j} PAV_{ij} + \beta_{3j} ETA_{ij} + e_{ij} \quad (4)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01} CLN_j + \gamma_{02} HRC_j + \gamma_{03} MRK_j + \gamma_{04} ADH_j + u_{0j} \quad (5)$$

$$\beta_{1j} = \gamma_{10} + u_{1j} \quad (6)$$

$$\beta_{2j} = \gamma_{20} + u_{2j} \quad (7)$$

$$\beta_{3j} = \gamma_{30} + u_{3j} \quad (8)$$

$$MAS_{ij} = \alpha_{00} + \alpha_{1j} ETA_{ij} + \varepsilon_{ij} \quad (9)$$

$$\alpha_{1j} = \lambda_{10} + \varepsilon_{1j} \quad (10)$$

The slopes β_{1j}, β_{2j}, and β_{3j} were random effects that vary across departments in this model (see equation (4)). The slopes β_{1j}, β_{2j}, and β_{3j} were functions of fixed intercepts (γ_{10}, γ_{20}, and γ_{30}) and random variances (u_{1j}, u_{2j}, and u_{3j}), while no variables were assigned to predict for those slopes, as shown in equations (6)–(8). Similarly, the slope α_{1j} was a function of fixed intercept λ_{10} and a random part ε_{1j}, as shown in equation (10).

Good MCMC convergence was manifested by (1) a steady decrement in the PSR values to values close to 1 for the last few tens of thousands of iterations, (2) tight horizontal bands for the parameter estimation in the trace plots, and (3) low dependence in the chain in the autocorrelation plots. The DIC value was 1122.479, which is lower than in the previous model; thus, allowing the slopes to vary across department led to a better fit to the data.

In this model, only MAS and PAV appeared to have significant positive ($\gamma_{10} = 0.266$) and negative effects ($\gamma_{20} = -0.089$) on INNOV, respectively (see Table 4). The variances of the slopes (u_{1j}, u_{2j}, u_{3j}) were significant, which indicates significant variations between departments in the relationships between the psychological variables and innovativeness, thus justifying the running of the cross-level interaction model.

5.3. Cross-level interaction model

The cross-level interaction model incorporated the previous random slopes model plus two additional constraints: (1) the cultures acted as moderators for the relationships between the psychological variables and innovativeness, as shown in

Table 4
Bayesian parameter estimates and credibility intervals of random slopes model.

Path	Estimate (*SD*)	95% Credibility Interval		Significance
		Lower	Upper	
Within-level				
Residual Variances				
INNOV (δ^2_{eij})	0.218 (0.020)	0.183	0.262	*
MAS ($\delta^2_{\varepsilon ij}$)	0.388 (0.033)	0.331	0.459	*
Between-level				
CLN → INNOV (γ_{01})	−0.375 (0.263)	−0.887	0.146	
HRC → INNOV (γ_{02})	0.314 (0.229)	−0.130	0.773	
MRK → INNOV (γ_{03})	−0.284 (0.171)	−0.615	0.056	
ADH → INNOV (γ_{04})	0.247 (0.256)	−0.263	0.746	
Intercepts				
INNOV (γ_{00})	3.772 (0.050)	3.675	3.872	*
Means				
MAS→INNOV slope (γ_{10})	0.266 (0.062)	0.143	0.390	*
PAV→INNOV slope (γ_{20})	−0.089 (0.044)	−0.177	−0.002	*
ETA→INNOV slope (γ_{30})	−0.072 (0.043)	−0.158	0.013	
ETA→MAS slope (λ_{10})	−0.124 (0.068)	−0.256	0.010	
Variances				
MAS→INNOV slope (u_{1j})	0.044 (0.035)	0.006	0.138	*
PAV→INNOV slope (u_{2j})	0.023 (0.016)	0.005	0.065	*
ETA→INNOV slope (u_{3j})	0.012 (0.014)	0.001	0.051	*
ETA→MAS slope (ε_{1j})	0.059 (0.037)	0.014	0.158	*
Residual Variances				
INNOV (δ^2_{u0j})	0.042 (0.021)	0.016	0.098	*

equations (13)–(15); and (2) the cultures were allowed to be moderators for the relationship between ETA and MAS as well (equation (17)).

$$INNOV_{ij} = \beta_{0j} + \beta_{1j}\ MAS_{ij} + \beta_{2j}\, PAV_{ij} + \beta_{3j}\, ETA_{ij} + e_{ij} \tag{11}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\, CLN_j + \gamma_{02}\, HRC_j + \gamma_{03}\, MRK_j + \gamma_{04}\, ADH_j + u_{0j} \tag{12}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}\, CLN_j + \gamma_{12}\, HRC_j + \gamma_{13}\, MRK_j + \gamma_{14}\, ADH_j + u_{1j} \tag{13}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}\, CLN_j + \gamma_{22}\, HRC_j + \gamma_{23}\, MRK_j + \gamma_{24}\, ADH_j + u_{2j} \tag{14}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}\, CLN_j + \gamma_{32}\, HRC_j + \gamma_{33}\, MRK_j + \gamma_{34}\, ADH_j + u_{3j} \tag{15}$$

$$MAS_{ij} = \alpha_{00} + \alpha_{1j}\, ETA_{ij} + \varepsilon_{ij} \tag{16}$$

$$\alpha_{1j} = \lambda_{10} + \lambda_{11}\, CLN_j + \lambda_{12}\, HRC_j + \lambda_{13}\, MRK_j + \lambda_{14}\, ADH_j + \varepsilon_{1j} \tag{17}$$

The PSR value, in addition to the trace and autocorrelation plots for the parameters, indicated that the parameter estimation converged properly. The DIC value was 1015.440, which is smaller than that of the random intercept model. This means that the cross-level interaction model showed a better fit to the data.

Table 5 shows that the interaction between the psychological variables and cultures was not significant. The culture variables appeared to have neither direct effects on INNOV nor a moderation effect on the relationships between the psychological variables and innovativeness. Only the positive effect of MAS on INNOV ($\gamma_{10=}0.223$) and the negative effect of PAV on INNOV ($\gamma_{20=}-0.092$) were found to be significant. The variances of the random intercept (δ^2_{u0j}) and the random slopes (δ^2_{u1j}, δ^2_{u2j}, δ^2_{u3j}) were significant. In other words, the intercept varied significantly between departments, and so did the

Table 5
Bayesian parameter estimates and credibility intervals of cross-level interaction model.

Path	Estimate (*SD*)	95% Credibility Interval		Significance
		Lower	Upper	
Within-level				
Residual Variances				
INNOV ($\delta^2_{\varepsilon ij}$)	0.208 (0.020)	0.173	0.252	*
MAS ($\delta^2_{\varepsilon ij}$)	0.388 (0.033)	0.331	0.459	*
Between-level				
CLN → INNOV (γ_{01})	−0.374 (0.262)	−0.884	0.149	
HRC → INNOV (γ_{02})	0.312 (0.229)	−0.128	0.776	
MRK → INNOV (γ_{03})	−0.280 (0.171)	−0.613	0.062	
ADH → INNOV (γ_{04})	0.243 (0.255)	−0.257	0.746	
CLN × MAS→ INNOV slope (γ_{11})	0.453 (0.383)	−0.289	1.228	
HRC × MAS→ INNOV slope (γ_{12})	−0.299 (0.316)	−0.942	0.309	
MRK × MAS→ INNOV slope (γ_{13})	−0.289 (0.247)	−0.783	0.191	
ADH × MAS→ INNOV slope (γ_{14})	−0.438 (0.354)	−1.145	0.249	
CLN × PAV→ INNOV slope (γ_{21})	−0.099 (0.269)	−0.606	0.452	
HRC × PAV → INNOV slope (γ_{22})	0.199 (0.210)	−0.211	0.622	
MRK × PAV → INNOV slope (γ_{23})	−0.084 (0.179)	−0.423	0.284	
ADH × PAV → INNOV slope (γ_{24})	0.034 (0.241)	−0.449	0.503	
CLN × ETA → INNOV slope (γ_{41})	0.214 (0.268)	−0.298	0.758	
HRC × ETA → INNOV slope (γ_{42})	−0.015 (0.237)	−0.476	0.459	
MRK × ETA → INNOV slope (γ_{43})	0.234 (0.178)	−0.108	0.596	
ADH × ETA → INNOV slope (γ_{44})	−0.344 (0.252)	−0.841	0.149	
CLN × ETA→MAS slope (λ_{11})	−0.175 (0.371)	−0.881	0.582	
HRC × ETA→MAS slope (λ_{12})	−0.300 (0.324)	−0.922	0.358	
MRK × ETA→MAS slope (λ_{13})	−0.054 (0.240)	−0.525	0.416	
ADH × ETA→MAS slope (λ_{14})	−0.382 (0.354)	−1.097	0.295	
Intercepts				
INNOV (γ_{00})	3.759 (0.048)	3.664	3.852	*
MAS→ INNOV slope (γ_{10})	0.223 (0.064)	0.099	0.355	*
PAV→ INNOV slope (γ_{20})	−0.092 (0.046)	−0.182	−0.001	*
ETA→ INNOV slope (γ_{30})	−0.083 (0.048)	−0.181	0.007	
ETA→ MAS slope (α_{1j})	−0.105 (0.067)	−0.240	0.027	
Residual Variances				
INNOV (δ^2_{u0j})	0.043 (0.021)	0.017	0.099	*
MAS→ INNOV slope (δ^2_{u1j})	0.033 (0.035)	0.002	0.133	*
PAV→ INNOV slope (δ^2_{u2j})	0.022 (0.018)	0.002	0.070	*
ETA→ INNOV slope (δ^2_{u3j})	0.016 (0.019)	0.001	0.070	*
ETA→ MAS slope ($\delta^2\varepsilon_{1j}$)	0.051 (0.038)	0.008	0.155	*

relationships between the psychological variables and innovativeness. The variance of the random slope of ETA on MAS ($\delta^2\varepsilon_{1j}$) was significant as well.

6. Discussion

This study sought to identify the factors influencing individual innovativeness and to determine how these factors interact to produce their influencing power. The literature has identified two major factor types: psychological factors, represented in this study by implicit theory and goal orientation; and organizational factors, represented by organizational culture.

This study supports the previous finding that the performance-approach goal orientation may lack the power to predict individual differences in different contexts. These results can contribute to the long-standing debate about the consequences of performance-approach goal orientation (Butler, 2007; Chen & Pajares, 2010; Mascret, Elliot, & Cury, 2015; Papaioannou & Christodoulidis, 2007).

The study used a series of models to examine the influence of the entity theory of ability, mastery goal, and performance-avoidance goal orientations on innovativeness. In the random intercept model, we assumed that the psychological factors (ETA, MAS, PAV, and INNOV) influenced each other with fixed relationships, which were not allowed to vary across departments. In this model, ETA showed a significantly negative effect on MAS and INNOV. MAS and PAV showed positive and negative effects on INNOV, respectively. In the random slopes and cross-level interaction models, when we allowed the relationships among the psychological factors to vary across departments, all relationships retained their significance, except the influence of ETA on other factors (MAS and INNOV). Thus, the results partially supported Hypothesis 1 but failed to support Hypothesis 2. Our findings challenge the results reported in many previous studies that confirmed the relationship between ETA and MAS (Aldahdouh et al., 2018; Chen & Pajares, 2010; Cho, Toste, Lee, & Ju, 2019; De Castella & Byrne, 2015). It is worth mentioning that those studies did not consider the hierarchical structure of the data and thus reported results that were similar to our results in the random intercept model. De Castella (2015), for example, reported a significant relationship between the entity theory of intelligence and MAS by sampling 680 Australian students from five different high schools while overlooking the fact that the sample had a hierarchical structure (students nested within classes, and classes nested within schools). Neglecting the hierarchal structure of data might produce misleading results (Hox, 2010). This study sheds light on the importance of accounting for the group level while analyzing the effect of the individual factors. Not all previous studies failed to take the data structure into account. However, our findings challenge the results of the few studies that controlled for group variation (Chen & Wong, 2015; Leondari & Gialamas, 2002). One interpretation of this deviation might be that our sample differs from previous studies' samples in that it was comprised of staff members in a workplace while most of the samples used by previous studies were comprised of students in schools or universities. To the best of our knowledge, we are the first to examine the relationship between ETA and MAS for staff members in the higher educational context.

Individual innovativeness is by definition an individual characteristic. We identified two clues that suggest that it is a psychological construct and can be predicted by other psychological constructs. The first clue was established by the proportion of the variation accounted for by departmental membership relative to the total variance in innovativeness (ICC1 = 0.10). In other words, 90% of the innovativeness variance can be attributed to the individual willingness to change. The second clue was the fact that MAS and PAV retained their significant influences on INNOV throughout the three models. These results indicated that the psychological factors, namely goal orientations, are most important for interpreting individual innovativeness, in line with previous studies (Aldahdouh et al., 2018; Keong & Hirst, 2010; Lu et al., 2012).

One unanticipated finding, which was contrary to hypotheses 3 and 4 (and sub-hypotheses 4.1, 4.2, 4.3, and 4.4), was that none of the cultures contributed to innovativeness, nor did they moderate the relationships among the psychological variables. Although many literature reviews have pointed to the influence of organizational culture on innovativeness (Ahmed, 1998; Anderson et al., 2014; Frambach & Schillewaert, 2002; Parzefall et al., 2008; Patterson et al., 2009; Wisdom et al., 2014), this study failed to provide any evidence of such a relationship. It may be worth mentioning that most of the empirical findings that supported the influence of organizational cultures on innovativeness in fact used the concept of *organizational* innovativeness rather than that of *individual* innovativeness (Naranjo-Valencia et al., 2016; Prakash & Gupta, 2008; Raj & Srivastava, 2013). It is also difficult to compare our results with those generated through the use of the concept of individual innovativeness (Miron et al., 2004) due to the different views among researchers on what the definition of "innovativeness" is, how it may be measured, and whether innovativeness should target behavioral, general, or domain-specific aspects (Goldsmith & Foxall, 2003).

6.1. Implications

Several patterns of theoretical and practical implications can be delineated across the findings. In line with prior research (Janssen & Van Yperen, 2004; Keong & Hirst, 2010; Lu et al., 2012), the results revealed that adopting innovation is primarily an individual decision, attributable to the individual's tendencies and goal orientations. Thus, to support staff innovativeness, one could work to enhance their awareness of the positive impacts of mastery goal orientation while decreasing the negative effects of performance-avoidance goal orientation. For example, human resource management at HEIs should introduce professional development courses for staff members based on scientific evidence. These sessions should discuss goal orientations and their consequences on performance. Such courses might have significant impacts for institutions, inducing employees towards mastery goal orientation in the same way in which interventions have altered deeper traits such as

implicit beliefs (Blackwell et al., 2007; Heslin, Latham, & VandeWalle, 2005; Keating & Heslin, 2015; Kunst et al., 2018). This study adds to both Lu et al. (2012) and Janssen and Van Yperen (2004) in finding that institutions aspiring to embrace innovative employees should find ways to orient them towards mastery goals. This could be done by, for instance, promoting "self-referenced rather than other-referenced feedback and compensation systems that focus on effort, personal improvement, skill development, experimentation and cooperation" (Janssen & Van Yperen, 2004, p. 382).

The individual decision to adopt or reject innovations does not occur in a vacuum, yet there are variations in innovativeness due to the workplace environment (department level). In seeking the source of department-level variations, one may conceive of two equally likely hypotheses. One is to assume that individuals who have certain characteristics tend to prefer working in certain schools/departments; the main source of variation in this case is at the individual level. Alternatively, one may assume that the source of the departmental variation is due to certain characteristics of each department that encourage or discourage the staff to adopt or reject innovations. We adopted the second approach and sought to explain the departmental variation by examining the effect of the departmental culture. However, the results countered our expectations, as the cultures showed no significant effect.

Another implication for researchers is that they should take the nested structure of the data into account when analyzing the individual variables. The general concept is that groups and their individuals are engaging in a bidirectional interaction: the individuals are influenced by their group, and the group is in turn influenced by its members (Hox, 2010). When the study design involves nested structure data, this implicitly means that the observations are not independent. Studies that fail to account for this assumption and violate the independency of the observations will generate results of doubtful validity. Ignoring the hierarchal structure of the data leads to an inappropriate estimation of the standard errors, producing erroneous statistical inferences (Finch & Bolin, 2017). It seems that the difference we observed between an accounting of the group level and ignoring it reflects what Hox (2010) found. Hox (2010) conducted a meta-analysis on data that had originally been analyzed without having their multilevel nature taken into account, and the analysis reached different conclusions.

6.2. Strengths, limitations, and future research

This study is one of the very few to examine group effects in explanation of the relationships among the entity theory of ability, goal orientation, and individual innovativeness. Using a multilevel path analysis enabled us to examine if environmental or contextual factors (e.g., departmental culture) moderate the relationships among the psychological variables. Thus, the development of an integrative framework examining individual, group, and cross-level effects on innovativeness would be a potential avenue for future research.

This study also raises several intriguing questions the exploration of which could further our understanding of individual innovativeness. First, our cross-sectional design limits our ability to confirm causal relationships, but future research using an experimental or longitudinal design could prove our claims. A second limitation of the study is the use of a self-reporting questionnaire to measure the variables. Although Harman's one factor test found no major common method bias, collecting data from different sources would strengthen the study's design and results (Podsakoff et al., 2003). For example, departmental culture could be described *via* consensus among representatives from management, employees, and the union rather than by relying on the aggregative value of individual perceptions (Cameron & Quinn, 2006).

As our examination of departmental culture in the HEI context found no evidence of its influence on individual innovativeness, considerably more work will need to be done to examine the predictive power of other departmental factors, such as department size and structure (Frambach & Schillewaert, 2002); department learning (Senge, 1990); department innovativeness (Frambach & Schillewaert, 2002); department proactivity (Lantz Friedrich, Sjöberg, & Friedrich, 2016); and department cohesiveness (Patterson et al., 2009).

Finally, we focused on addressing the antecedents of individual innovativeness. Future research could investigate its consequences, as well as its antecedents. Needless to say, the value of innovativeness remains questionable until its consequences have been examined thoroughly. Previous studies have identified a set of consequences, including domain-specific innovativeness (Marcati et al., 2008) and technology usage (Gökçearslan et al., 2017; Jin, 2013). More efforts in this direction would be welcome.

Notwithstanding these limitations, the model presented in this study should prove useful in expanding our understanding of the factors influencing individual innovativeness. The clearest result of this study is its corroboration of previous studies' consistent finding that psychological factors are the most important factors influencing individual innovativeness (Batra & Vohra, 2016; Lu et al., 2012; Vinarski-Peretz et al., 2011). Another interesting finding is that organizational culture had neither a direct effect on innovativeness nor a moderation effect on the relationships between the psychological factors and innovativeness, which contradicted many previous findings (Miron et al., 2004; Montani et al., 2014; Scott & Bruce, 1994). Further research is needed to clarify the role of culture by considering differences among organization types in the analysis.

Conflicts of interest

The authors declare no conflict of interest.

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PUBLICATION IV

Technology and Social Media Usage in Higher Education: The Influence of Individual Innovativeness

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Technology and Social Media Usage in Higher Education: The Influence of Individual Innovativeness

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Abstract

This article presents a two-phase study exploring the usage of technology in higher education as well as the role of the general innovativeness in predicting the actual use of technology. During the first phase of the study, which involved 502 staff members, a descriptive analysis of their usage of social media, technological devices, and Microsoft Office 365 cloud services was performed, with various demographic variables being considered. During the second phase, which involved a subsample of 106 staff members, structural equation modeling (SEM) was used to examine a model in which the general innovativeness and the demographic variables acted as predictors of the actualized innovativeness. The results showed that the staff used social media, devices, and cloud services quite satisfactorily. The examination of their user profiles revealed that there were significant differences among the staff members on the basis of their demographic variables, especially their gender, job type, and discipline. The results of the SEM showed that the general innovativeness contributed positively, as was expected, to predicting the adoption of devices, non-academic social networking sites and Office 365 cloud services. The results further suggested that males were early adopters of devices, while academics were early adopters of commercial services and academic social networking sites. However, the academics appeared to lag behind the administrators in terms of adopting Office 365 cloud services. The implications of the study and directions for future research are also presented.

Keywords

innovativeness, social media, social networking sites, higher education, staff, cloud computing, structural equation modeling, technology adoption, Microsoft Office 365

Introduction

Many studies have sought to illustrate how new technologies could assist with the educational process (Brown, 2012; Dermentzi et al., 2016; Hung & Yuen, 2010; Lim et al., 2015). For instance, technologies have been promoted as supporting students' learning (Dyson et al., 2015), assisting with teaching (S. Manca & Ranieri, 2017b), facilitating research collaboration among researchers from different parts of the world (Al-Daihani et al., 2018; Gu & Widén-Wulff, 2011), and enhancing staff's professional development and growth (Donelan, 2016). Due to the numerous possibilities afforded by technologies, universities and colleges have sought to purchase and provide both their staff and their students with new technologies. However, simply putting those technologies into service does not imply that staff and/or students are actually going to use them. According to a recent EDUCAUSE report (Alexander et al., 2019)—which was build upon the 98-expert global panel to forecast technology trends at higher education institutions (HEIs)—addressed the issue of involving staff in implementing educational technologies as one of the upcoming challenges in higher education. Indeed, in recent years, researchers have increasingly suggested that technologies have been oversold but underused (S. Manca & Ranieri, 2016b). It is no longer debatable whether technologies can assist with the educational process, since it has been proved that they can. Rather, the question has become, "who is using the offered technologies?" For instance, Veletsianos and Kimmons (2013) suggested the need to investigate the profiles of technology users so as to determine the relationship between the usage of technology and staff members' educational level, age, discipline, gender, and other personal characteristics.

Aside from the actual use of technology, researchers in the domains of marketing and business have advanced the

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research by proposing a different and arguably deeper concept of innovation adoption: general innovativeness (Goldsmith & Foxall, 2003). General innovativeness here refers to an individual's tendency to accept changes and to try new things. Two major contributions can be attributed to this line of research. First, it removes the constraints of a given innovation. An innovation can be any new object or experience, including recent technologies such as social media, artificial intelligent tools, the Internet of Things, robots, and digital badging, or it could be a change in career path or an alteration in the structures of the work environment, such as a university merger (Aldahdouh et al., 2017). The second major contribution concerns the predictive characteristic of the concept of general innovativeness, which allows us to anticipate the possibility of adopting innovations prior to offering such expensive innovations. Tracking the actual use has often been criticized as being a form of post hoc analysis, since it can only be measured after an event has occurred. The concept of general innovativeness serves to overcome this evident drawback (Goldsmith & Foxall, 2003; Hurt et al., 1977).

Although it certainly sounds valuable, the use of the concept of general innovativeness in research has not yet become established. More specifically, the literature concerning general innovativeness is inconsistent with regard to its potential to predict innovation adoption behavior. Some studies have confirmed its predictive power (Arts et al., 2011; Bartels & Reinders, 2011; Jin, 2013; van Rijnsoever & Donders, 2009), others have rejected (Roehrich, 2004), or contested that innovativeness at the abstract and general level is a poor predictor of innovation adoption behavior (Goldsmith et al., 1995; Im et al., 2003). For example, in a study by Im et al. (2003), less than 5% of the variance in new-product adoption behavior is explained by the general innovativeness. Another example is a systematic review of the literature by Bartels and Reinders (2011), which tracked 79 relevant empirical articles, stated that the relationship between general innovativeness and innovative behavior is ambiguous. Although 10 studies supported the existence of a positive relationship, four reported only partial support, and six indicated no support for such a relationship. In addition to this inconsistency, we—in the higher educational context—are unable to make a judgment regarding the potential benefits of the general innovativeness concept simply because most studies to date have been conducted in the marketing domain. There is little, if any, logical reason to suggest that the models proposed in the marketing domain to predict *customers' purchasing behavior* would inform us about how staff working in higher education respond to the technologies offered by their institutions.

The current research has two key aims. The first phase of the study is devoted to exploring staff members' usage of the social media, technological devices and cloud services offered by Tampere University, Finland. More specifically, the study reports *what* kinds of technologies the staff members use, *how* frequently they use them, and *how* the distribution of technology usage relates to the investigated demographic variables. The second phase of the study examines the general innovativeness and the demographic variables as predictors of the actual use of technology.

Technology Usage in Higher Education

It could prove difficult to delineate the borders of the technologies in use at contemporary universities. The wide spectrum of such technologies includes learning management systems, blogging tools, discussion forums, bookmarking sites, wikis, social networking sites (SNSs), devices, cloud computing services, augmented reality, virtual reality, and robot technology, to name but a few. In the present study, social media, technological devices, and cloud computing services were included as representative of these recently developed technologies.

Social Media

Broadly speaking, social media sites represent a recent innovation intended to foster communication and collaboration on a large scale. Since their invention, such sites have diffused so rapidly that the number of users is growing daily, and they have become an integral part of people's personal and professional lives (Chugh & Ruhi, 2018). Social media can be defined as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (Kaplan & Haenlein, 2010, p. 61). The term "social media" refers to a set of tools that includes blogging services, discussion forums, bookmarking services, and wikis. Thus, the overarching concept of social media implicitly includes SNSs, which are defined by Chugh and Ruhi (2018, p. 606) as "an online service allowing users to construct a public or private profile to connect and interact with their social connections." In the interests of both clarity and consistency, the term "social media" will hereafter be used to exclusively refer to SNSs.

Numerous studies have reported on the positive impacts of integrating social media sites into the technological resources of HEIs. Many such studies have targeted students (Al-Rahmi et al., 2015; Dumpit & Fernandez, 2017; Dyson et al., 2015; Hamid et al., 2015; Hung & Yuen, 2010; Uusiautti & Määttä, 2014; Valenzuela et al., 2009), while others have targeted staff members as employees (Al-Daihani et al., 2018; Arshad & Akram, 2018; Dermentzi et al., 2016; Donelan, 2016; Gruzd et al., 2012; Gu & Widén-Wulff, 2011; S. Manca & Ranieri, 2016a, 2016b; Moran et al., 2011; Nández & Borrego, 2013; Veletsianos, 2012; Veletsianos & Kimmons, 2013). There may be a certain degree of consensus among staff members as to the perceived benefits of using social media. These benefits include establishing new, maintaining existing, and widening connections (Donelan, 2016; S. Manca & Ranieri, 2017a). In addition, staff

members have acknowledged the value of social media in terms of facilitating collaboration and communication (Rowlands et al., 2011), developing oneself (Donelan, 2016; S. Manca & Ranieri, 2017a), and increasing visibility through the dissemination of one's work (S. Manca & Ranieri, 2017a). Surprisingly, some studies have shown that staff members believe social media to be less beneficial when it comes to teaching purposes than in relation to personal and professional purposes (S. Manca & Ranieri, 2016b).

Studies involving staff members have distinguished between academics and other staff (Moran et al., 2011). Working as an academic at a HEI implicitly involves being a researcher in addition to being an employee of an institution. Tracking technology adoption has resulted in the coining of the term "Research 2.0," which is along the lines of Web 2.0 technologies (Koltay et al., 2015). Conducting research is no longer a solo activity performed with limited access to resources; it is now more likely to involve navigating across a complex and professional network. The benefits of utilizing social networking when carrying out research are quite clear. Consistent results across studies have revealed that social media sites provide a convenient environment for scholarly communication and research dissemination (Al-Daihani et al., 2018; Gu & Widén-Wulff, 2011; S. Manca & Ranieri, 2017a). For example, publishing research results on Twitter was found to be of significant value in terms of obtaining instant and rigorous informal peer review (Gruzd et al., 2011), having one's research more quickly cited (Priem & Costello, 2010) and establishing a professional personae (Veletsianos, 2012). Mendeley, as a reference management system and academic social network (Gunn, 2013), has helped scholars to explore the metrics and impact of their research. LinkedIn offers the option to build a professional profile, and it has been frequently reported to be used during job searches. Both ResearchGate and Academia.edu were reported to make sharing teaching material with students easier (S. Manca & Ranieri, 2016a). A study by Gruzd et al. (2012) showed that scholars found social media sites to be useful for keeping themselves up to date in their field, promoting their work online, and maintaining their professional image. For junior researchers, in particular, social media sites may prove to be of great importance with regard to situating them within the scientific community (Gruzd et al., 2012).

Still, there are some barriers hindering the adoption of social media in HEIs. Staff members, for instance, have reported privacy concerns when using social media, such as the blurring of boundaries and endangering one's career (Gruzd et al., 2012). Other reported concerns pertain to copyright issues such as plagiarism and the commercialization of content (Lupton, 2014). Moreover, staff members have cast doubt on the credibility and quality of the material posted on social media (S. Manca & Ranieri, 2017a). Other academics have perceived that social media usage might shift their attention from knowledge creation to knowledge production. For instance, the sample of academics included in the study by Menzies and Newson (2007) believed that being connected to social media on a 24/7 basis would limit their ability to think deeply about their work and, therefore, decrease their creativity. In addition, researchers who are convinced of the benefits of social media usage have complained that they lack sufficient time to do so (Rowlands et al., 2011).

Cloud Computing Services

A recent report focusing on technology adoption within HEIs highlighted cloud computing services as one of the most influential technologies, with the majority of institutions being found to have started to learn about the possibility of moving some of their on-premises services to the cloud (Reinitz, 2017). The National Institute of Standards and Technology (NIST) defines cloud computing as a recent paradigm for providing real-time and on-demand computing resources, such as networks, servers, storage, applications, and services (Mell & Grance, 2011). Many providers are competing to deliver cloud services, and the IT staff of HEIs have the responsibility for matching their institutions' needs to the affordances of the available technologies.

Cloud computing technology can offer immense benefits to HEIs (Alharthi et al., 2015; Behrend et al., 2011; Klug & Bai, 2015; Pardeshi, 2014; Sultan, 2010). *Economically*, cloud computing is based on a pay-as-you-go cost structure and, therefore, represents a lower-cost option for acquiring and maintaining up-to-date and efficient services. *Technically*, the most important benefits are manifested in the scalability and flexible deployment of cloud computing. *Pedagogically*, cloud services have shown positive effects in terms of facilitating teaching and learning, since both teachers and students can access elegant applications and academic materials anytime and anywhere. Cloud services allow them to communicate in a vivid, flexible, easy-to-use and social-media-like environment. *Scholarly*, cloud services offer a bunch of tools designed to support joint research activities and to facilitate communication among researchers. Due to these advantages, researchers have devoted significant efforts to proposing models for how cloud computing could be adopted in the higher education field (Low et al., 2011; Okai et al., 2014; Sabi et al., 2016). Other studies have discussed the experiences of their universities in relation to adopting cloud services (Klug & Bai, 2015; Sultan, 2010).

However, some HEIs still have concerns about the security and confidentiality of data stored in the cloud (Okai et al., 2014). In addition, universities have exhibited concerns that cloud services could hijack their control over data, while fears have been reported that they might be locked in to using a specific cloud service provider (Alharthi et al., 2015). In the current study, we will not delve into the issue of the *institution* as a unit of adoption. Rather, the focus is on the *individual* as a unit of adoption. By that, we mean the individual factors that hinder or foster the adoption of technology. Among those

factors are an individual's tendency to accept the newness (Alharthi et al., 2015), social influence (Talukder, 2012), trustworthiness (Shakeabubakor et al., 2015), and perceived ease-of-use and usefulness of the cloud (Bhatiasevi & Naglis, 2016). For instance, Shakeabubakor et al. (2015) conducted in-depth interviews with 30 researchers and postgraduate students, and they found that 71% of the interviewees reported distrusting cloud services.

Innovativeness

Innovativeness has been intensively researched as a determinant of the adoption of innovations (Bartels & Reinders, 2011; Kaushik & Rahman, 2014). During the early 1970s, innovativeness was theorized and studied in the field of marketing and business in order to understand consumer behavior with regard to the adoption of new products. Later, the research on innovativeness was extended to include higher education (Aldahdouh et al., 2019; Gökçearslan et al., 2017) and other contexts such as management (Jong & Hartog, 2007) and the health sector (Park & Kim, 2010).

Throughout the process of developing the conceptualization of innovativeness, different approaches have been proposed: behavioral, general, and domain-specific innovativeness (for a review, see: Bartels & Reinders, 2011; Kaushik & Rahman, 2014). The behavioral approach defines innovativeness as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 242). In other words, the behavioral approach focuses on the real act of innovation adoption, which is why it has sometimes been referred to in the literature as *actualized innovativeness* (Midgley & Dowling, 1978) or *innovative behavior* (Jong & Hartog, 2007). The general approach conceives innovativeness as a psychological construct or individual characteristic that shapes an individual's disposition toward newness regardless of the kind of innovation (Aldahdouh et al., 2018). General innovativeness has been referred to in the literature by several names, including *life innovativeness* (Roehrich, 2004), *personality-trait innovativeness* (Hurt et al., 1977), *global trait innovativeness* (Goldsmith & Foxall, 2003), and *innate innovativeness* (Midgley & Dowling, 1978). The third approach—domain-specific innovativeness—lies somewhere between the two aforementioned approaches. The notion that informs it is that individuals show varied tendencies and interests toward different kinds of innovations and, thus, the domain-specific innovativeness approach seeks to understand the individual's tendency to adopt innovation within a specific domain (Roehrich, 2004, p. 672). For example, a staff member may be inclined to embrace innovations within the teaching and learning domain, but not within the technological domain.

The relations that exist among the three approaches have been discussed in several studies (Arts et al., 2011; Bartels & Reinders, 2011; Kaushik & Rahman, 2014; Marcati et al., 2008), the results of which consistently showed that general innovativeness positively correlates with domain-specific innovativeness, while domain-specific innovativeness in turn positively correlates with actualized innovativeness. In other words, domain-specific innovativeness mediates the relationship between general and actualized behavior.

Various studies have assessed the relationship between the general innovativeness and actualized innovative behavior (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003; Jin, 2013; van Rijnsoever & Donders, 2009). For instance, the study by Arts et al. (2011) involved the meta-analysis of 77 studies concerning consumer innovativeness and its correlates. Their study confirmed that general innovativeness is a positive predictor of innovative behavior. In the educational context, several studies have showed the positive impact of general innovativeness in terms of predicting technology usage (Gökçearslan et al., 2017; Hong et al., 2013).

Previous studies have also examined the linkage between innovation adoption behavior and demographic variables such as age, gender, education, and discipline (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003; Park & Kim, 2010; Talukder, 2012; van Rijnsoever & Donders, 2009). In the technology domain, males have been found to show more of an inclination toward the adoption of innovations than females. Furthermore, younger individuals have been reported to show higher rates of innovation usage than their older counterparts (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003). Individuals who work in soft disciplines are considered to be more prone to embracing new innovations than their counterparts who work in hard disciplines (S. Manca & Ranieri, 2016a; Nández & Borrego, 2013; Wang & Meiselwitz, 2015). The findings regarding the educational level indicated null relationships (Arts et al., 2011; Im et al., 2003), while employment experience and job type were seldom examined and, thus, no pre-assumptions were hypothesized.

The Context

In 2014, Tampere University, Finland, joined the cloud computing revolution and embraced the use of Microsoft Office 365 (O365) cloud services. The adoption was stimulated by a number of factors, including the deficiency of the old system in terms of coping with work-related demands and the high cost of upgrading it. The choice of O365 was driven by the recommendation of the European Commission as well as by positive feedback from other Finnish universities that had already adopted O365. Therefore, investigating how staff members perceive and use the O365 services is one of the aims of the present study.

The current study measured innovativeness at two levels: general and actualized behavior. The reason that we opted to measure general innovativeness rather than domain-specific innovativeness—although the latter approach was appealing—is that Tampere University, as most of the universities today, is a vivid and full-of-changes environment, and not only when

Table 1. Study Hypotheses.

Independent variable	Relation to actualized innovativeness
General innovativeness	+
Age	–
Gender (1 = *male*, 2 = *female*)	–
Educational level (0 = *lower than bachelor*, 1 = *bachelor*, 2 = *master*, 3 = *doctorate*, 4 = *post-doctorate*, 4 = *docent/professor*)	+
Discipline (1 = *hard*, 2 = *soft*)	–
Job type (1 = *academic*, 2 = *administrator*)	Null
Employment experience	Null

considered from the technological perspective (Aldahdouh et al., 2017). Hence, it was simply more logical and valuable in this context to trace the staff members' willingness to change in general, rather than to assess their willingness to adopt specific technological innovations.

The Present Research

The present research project represents part of our ongoing efforts to study the factors that influence innovation adoption in the field of higher education. It is based on a two-phase study. First, we aimed to explore the staff members' usage of social media, technological devices, and cloud computing services. More specifically, during the first phase of study, we reported on the wide spectrum of technologies used by staff members, the frequency of their usage and the distribution of the usage in relation to certain demographic variables. Second, we examined a model in which general innovativeness and demographic variables serve as predictors of actualized innovativeness. Based on the literature review aforementioned in *innovativeness* section, the hypotheses regarding the relationship between the predictors and the outcome variable were developed as shown in Table 1.

Methodology

Participants

The main study sample consisted of 502 members of staff of Tampere University, Finland. There were 270 males and 232 females, and they had a mean age of 45.45 years (SD = 11.297, range: 21–67 years). They averaged 173.26 months of employment experience in higher education (approximately 14.44 years) (SD = 118.776). In terms of their educational qualifications, 93 (18.5%) had degrees lower than a bachelor's degree, 35 (7%) had completed a bachelor's degree, 229 (45.6%) had completed a master's degree, 77 (15.4%) had completed a doctoral or post-doctoral degree, and 68 (13.5%) were docents or professors. The participants included 368 (73.3%) academic staff members and 134 (26.7%) administrative staff members.

A subsample (n = 106) from among the initial 502 staff members participated in the second phase of the study. The subsample included 43 males and 63 females. The participants were, on average, 45.19 years of age (SD = 11.726, range: 23–67 years), and they reported an average of 176.84 months spent working in higher-education-related jobs (approximately 14.74 years) (SD = 126.386, range: 7–480 months). The majority of participants were academic staff (71.7%, n = 76), while the remainder were administrators. The distribution of their educational levels was as follows: 18 (17%) had degrees lower than a bachelor's degree, 9 (8.5%) had completed a bachelor's degree, 53 (50%) had completed a master's degree, 10 (9.4%) had completed a doctoral or post-doctoral degree, and 16 (15.1%) were docents or professors.

Measures and Procedures

During the academic year 2015 to 2016, staff members of Tampere University were invited to complete a questionnaire designed to measure their general innovativeness. The questionnaire was distributed using the "elomake" institutional survey management system. The staff were also invited to supply their email addresses if they wanted to be contacted regarding the next phase of the study. During the 2016 to 2017 academic year, an online Technology Usage Questionnaire (TUQ) was administered to the staff. The questionnaire was developed by the authors with the aim of measuring actualized innovativeness.

General innovativeness. A shortened version (13 items) of Hurt and colleagues' (1977) Individual Innovativeness Scale was adopted to measure the staff members' orientations toward change (e.g., "I enjoy trying new ideas"). The scale has previously shown strong psychometric characteristics, and its use as a valid measure of general innovativeness has been repeatedly demonstrated (Goldsmith, 1990; Pallister & Foxall, 1998). The Cronbach's α of the scale was .820.

Structure of the TUQ. The TUQ consisted of four sections: demographic data, social media, technological devices and technological services. The social media section included

questions about Facebook, Twitter, Mendeley, LinkedIn, ResearchGate, Academia.edu and institutional Office 365 Yammer SNSs. The devices section included questions about smart phones, tablets, laptops, and desktop computers. The services section included questions about *institutional* Office 365 services (as provided by the institution to its staff members) and *commercial* services (services other than those provided by the institution). The considered services included email, online documents, calendar, web-based conferencing services, storage space, and instant messaging. The idea behind distinguishing between commercial and institutional services is that staff members could have used commercial services long before the services offered by the institution were available. In such cases, measuring actualized innovativeness based on the institutional services alone would generate misleading results. The frequency of usage was assessed using a six-point Likert-type scale (1 = *never*, 2 = *once or several times a month*, 3 = *once or several times a week*, 4 = *once or several times a day*, 5 = *once or several times an hour*, 6 = *all the time*). The full questionnaire is available in the supplementary material accompanying this article.

Actualized innovativeness. The prior literature has identified two main methods for measuring actualized innovativeness, namely the time-of-adoption and cross-sectional methods. When using the time-of-adoption method, individuals are typically asked to recall when they started to use a certain innovation. The answer as to how early in time the individual adopted the innovation in question is then used to decide how innovative that individual is. In contrast, when using the cross-sectional method, individuals are asked to select which innovations they have embraced from among a comprehensive list of innovations within a certain category (e.g., a list of new Web 2.0 tools). The level of innovativeness is then measured based on the number of innovations adopted by a given individual, such that the more innovations adopted, the more innovative the individual is. The cross-sectional method was devised to overcome the recall problem associated with the time-of-adoption method. An additional advantage of the cross-sectional method concerns its aggregated nature (i.e., it involves a wide spectrum of innovations). This aggregated nature is of particular merit in studies examining the relationships between personality and actualized behavior (Reinhardt & Gurtner, 2015). However, despite these advantages, the cross-sectional method does give rise to the common method bias issue (Bartels & Reinders, 2011; Podsakoff et al., 2003). In addition, when applying the cross-sectional method, a certain amount of variation between participants is lost because it is not possible to distinguish between a participant who started using the technology only recently (a late adaptor) and a participant who was among the first to acquire it (an innovator).

To avoid such a loss of data, we followed the suggestion of Reinhardt and Gurtner (2015) and combined the time-of-adoption approach with the cross-sectional approach. Instead of providing the participants with a check-list of technologies, they were asked to indicate the year in which they started using each technology from among a pre-defined list of years (the drop-down list of years was ordered from the year the questionnaire was distributed to the year the technology was launched). Moreover, at the top of each list, two additional items were added: (a) "I don't know about this technology," which indicated that the participant was the least innovative and (b) "I have never used this technology," which indicated that the participant was a little bit more innovative (since he or she at least knew about the technology). Therefore, the coding was built so that lower values represented lower innovativeness scores, while higher values represented higher innovativeness scores (see the TUQ in the supplementary material for more information).

Analysis

Statistical Package for the Social Sciences (SPSS 22.0) was used to conduct the descriptive analysis. We first calculated the percentage of technology users from among the total sample. Then we employed the chi-square test and Cramer's *V* to examine the association between technology usage and demographic variables. To test how heavily the technology is used, we summed up the values of the usage frequency field for each technology and then divided the total by the maximum value of the scale for the entire sample to create a single variable, sum/(6*502). This new variable represents the percentage of heavy usage.

Next, participant's answers to when they started using each technology were subjected to a categorical principal components analysis (CATPCA, aka non-linear principal components analysis [NLPCA]) in SPSS to objectively reduce the list of technologies to a smaller number of components (Linting & Van Der Kooij, 2012). The CATPCA is preferred over the standard principal components analysis when the variables are ordinal, as in our case. Following the guidelines of Linting and Van Der Kooij (2012), we used the ordinal analysis level, while only those variables with a total variance accounted for (VAF) of .25 or higher were maintained for the analysis.

The Spearman's *r* correlation matrix was then calculated among the components generated from the CATPCA and the other study variables. The Spearman's *r* approach was selected based on the recommendation by Bishara and Hittner (2012, p. 402), who indicated that Spearman's *r* is "often more powerful than Pearson's r in the context of nonnormality."

We applied structural equation modeling (SEM) to test the hypothesized model using the R lavaan package (Rosseel, 2012). R lavaan demonstrates advanced qualities comparable to those of the most widely used commercial packages, such as LISREL and EQS (Green, 2016). R lavaan is particularly suitable for our data analysis, since it features on-board statistical tests for non-normal data, a feature that is absent

from other software, such as AMOS (Arbuckle, 2013; Rosseel, 2012). We used maximum likelihood (MLM) estimation with a robust standard error and a Satorra-Bentler scaled test statistic (Rosseel, 2012; Satorra & Bentler, 1994) to manage any violations in the data's multivariate normality. To assess the model fit, we used well-established indices, such as the confirmatory fit index (CFI), the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA), as well as the chi-square test statistics. According to Hu and Bentler (1999), the generally acceptable values include those greater than .90 for the CFI, those less than .06 for the RMSEA, and those less than .08 for the SRMR. For the ratio of χ^2 to *df*, values of less than three indicate an adequate fit (Schreiber et al., 2006).

Results

First-Phase Study Results

RQ1. What kinds of technologies are used by staff members and who are the users? The first column (Users) in Table 2 represents the percentage of technology users from among the total sample. The subsequent columns represent the percentage of each kind of technology user in the corresponding category. For example, in the table, 14% of the male participants ($n = 270$) and 13% of the female participants ($n = 232$) used Academia.edu.

An inspection of the table reveals that the most popular SNS among the staff members was Facebook (76%), followed by LinkedIn (69%) and by then Twitter and Yammer (both 45%). As for the devices, the staff showed similar usage percentages for smart phones, laptops and desktop computers, while they all showed a lower usage percentage for tablet devices. A similar distinction can be seen between the usage percentages for the email, online documents, calendar, e-conferencing tools and storage space services on the one hand and the tasks service on the other. This distinction remained consistent across both the commercial and the O365 services.

The results revealed a gender difference in terms of the use of social media, with the female participants exhibiting a stronger preference for Facebook, $\chi^2(1) = 7.802$, $p < .01$, *Cramer's V* = 0.125, and Twitter, $\chi^2(1) = 3.980$, $p < .05$, *Cramer's V* = 0.089, whereas the male participants were more inclined to use ResearchGate, $\chi^2(1) = 7.013$, $p < .01$, *Cramer's V* = 0.118. Despite the fact that the male participants surpassed the female participants in using certain commercial services, such as online documents, $\chi^2(1) = 8.108$, $p < .01$, *Cramer's V* = 0.127, and storage space, $\chi^2(1) = 5.095$, $p < .05$, *Cramer's V* = 0.101, they showed a lower preference for using the services offered by the university, including the O365 services of email, $\chi^2(1) = 5.917$, $p < .05$, *Cramer's V* = 0.109; calendar, $\chi^2(1) = 5.972$, $p < .05$, *Cramer's V* = 0.109; Skype, $\chi^2(1) = 4.711$, $p < .05$, *Cramer's V* = 0.097; and Lync, $\chi^2(1) = 15.789$, $p < .001$, *Cramer's V* = 0.177. With regard to the usage of devices, no significant differences were found between the male and female participants in relation to any devices except for tablets, with the female participants showing a greater tendency to use tablets than the male participants, $\chi^2(1) = 9.210$, $p < .01$, *Cramer's V* = 0.135. For a general overview of the differences between the male and female participants, see Figure 1.

In terms of the job type, it was only logical that the number of academic staff who used Academia.edu, $\chi^2(1) = 19.501$, $p < .001$, *Cramer's V* = 0.197; ResearchGate, $\chi^2(1) = 64.075$, $p < .001$, *Cramer's V* = 0.357; and Mendeley, $\chi^2(1) = 10.428$, $p < .01$, *Cramer's V* = 0.144, was higher than the number of administrators, who instead showed a greater inclination to use Twitter, $\chi^2(1) = 6.325$, $p < .05$, *Cramer's V* = 0.112, and Yammer, $\chi^2(1) = 7.386$, $p < .01$, *Cramer's V* = 0.121. As depicted in Figure 2, the difference between the numbers of academic and administrator users was clear and in favor of the administrators. A case in point could be the higher difference observed in relation to the usage of O365 services.

Regarding the discipline (see Figure 3), the staff who worked in soft disciplines outperformed their counterparts working in hard disciplines in relation to the usage of almost all technologies: Academia.edu, $\chi^2(1) = 7.139$, $p < .01$, *Cramer's V* = 0.137; Facebook, $\chi^2(1) = 6.816$, $p < .01$, *Cramer's V* = 0.134; Twitter, $\chi^2(1) = 13.559$, $p < .001$, *Cramer's V* = 0.188; Yammer, $\chi^2(1) = 10.385$, $p < .01$, *Cramer's V* = 0.165; tablets, $\chi^2(1) = 4.032$, $p < .05$, *Cramer's V* = 0.103; desktop computer devices, $\chi^2(1) = 6.369$, $p < .05$, *Cramer's V* = 0.129; O365 Outlook, $\chi^2(1) = 4.344$, $p < .05$, *Cramer's V* = 0.107; and Skype services, $\chi^2(1) = 5.234$, $p < .05$, *Cramer's V* = 0.117. Exceptions to this can be seen in the cases of ResearchGate and the O365 Tasks service, in which the staff who worked in hard discipline accounted for the most users.

RQ2. How heavily is social media used? In the previous section, the research question concerned whether the staff members were using the investigated technologies or not. In this section, we move forward with those who used each technology to test how frequently they used it.

The results showed that the degree (or heaviness) of usage of academic social networks ranged between 25% for ResearchGate and 19% for Academia.edu and Mendeley. The staff members were asked to provide more details regarding the general social networks so that a distinction could be made between use for personal and for work purposes. Figure 4 shows that the heaviness of SNS use for both work and personal purposes ranged between 19% and 30%, except for the heaviness of using Facebook for personal purposes, which reached 50%. An interesting result presented in Figure 4 concerns the fact that for both Twitter and Facebook, the heaviness of usage for personal purposes exceeded that for work purposes, while the opposite was true for LinkedIn and the institution's O365 Yammer.

Table 2. Percentage of Technology Users From Among the Total Sample and Their Distribution by Gender, Job Type and Discipline.

			Gender		Job type		Discipline	
		Users[a] (502) (%)	M.[a] (270) (%)	F.[a] (232) (%)	Ac.[a] (368) (%)	Ad.[a] (134) (%)	H.[a] (181) (%)	S.[a] (201) (%)
Social Media	Academia.edu	13	14	13	**17**	**2**	**12**	**22**
	ResearchGate	36	**41**	**30**	**46**	**7**	**54**	**35**
	Mendeley	13	16	11	**16**	**5**	17	12
	Twitter	45	**41**	**50**	**42**	**54**	**33**	**51**
	Facebook	76	**71**	**81**	74	79	**70**	**81**
	LinkedIn	69	72	66	71	64	72	74
	Institution's Yammer	45	43	48	**42**	**55**	**32**	**48**
Devices	Smart phone	96	95	98	96	97	97	96
	Tablet	76	**71**	**82**	**73**	**85**	**68**	**77**
	Laptop	97	97	97	**99**	**94**	99	98
	Desktop computer	97	98	97	98	96	**96**	**100**
Commercial services	Email	100	100	100	100	100	100	100
	Online documents	85	**89**	**80**	85	86	85	84
	Calendar	90	90	91	**88**	**97**	88	88
	e-conferencing tools	91	91	91	91	90	91	94
	Storage space	91	**94**	**88**	92	89	91	94
	Instant messaging	68	69	67	**65**	**76**	66	66
	Site	57	56	59	**52**	**73**	**48**	**58**
	Tasks	34	36	31	33	37	**38**	**27**
	Contacts	38	41	34	**35**	**47**	37	35
Institution's O365 services	O365 Outlook	93	**90**	**96**	**91**	**98**	**87**	**94**
	O365 OnlineDocs	70	68	72	**67**	**79**	62	71
	O365 Calendar	79	**75**	**84**	**73**	**96**	71	77
	O365 Skype	58	**53**	**63**	**51**	**77**	**48**	**59**
	O365 OneDrive	68	68	67	65	73	63	68
	O365 Lync	45	**37**	**55**	**35**	**74**	37	40
	O365 SharePoint	30	27	33	**23**	**50**	20	26
	O365 Tasks	16	13	18	**10**	**30**	9	10
	O365 People	31	27	35	**24**	**51**	23	25

Note. Percentages in bold represent significant differences between the paired categories according to the chi-square test. M. = male; F. = female; Ac. = academic; Ad. = administrator; H. = hard discipline; S. = soft discipline.

[a] Numbers in parentheses represent the number of participants in the named category

RQ3. How heavily are technological devices used? Figure 5 compares the heaviness of the usage of devices for work and personal purposes. Generally speaking, all the devices were used more than 33% and up to 73% of the time. Both smart phones and tablets were used more heavily for personal purposes, while laptops and desktop computers were used more heavily for work purposes.

Smart phones were said to mainly be used for calling, text messaging, and instant messaging (e.g., texting through WhatsApp and Facebook Messenger). The results showed quite similar percentages of usage for all three purposes: instant messaging (60%), calling (61%), and text messaging (55%).

RQ4. How heavily are O365 services used? The staff reported the highest usage of O365 Outlook (76%), followed by O365 Calendar (58%), O365 OnlineDocs (41%), and O365 OneDrive (40%). The other services were used to a somewhat similar degree and around 30% of the time (see Figure 6)

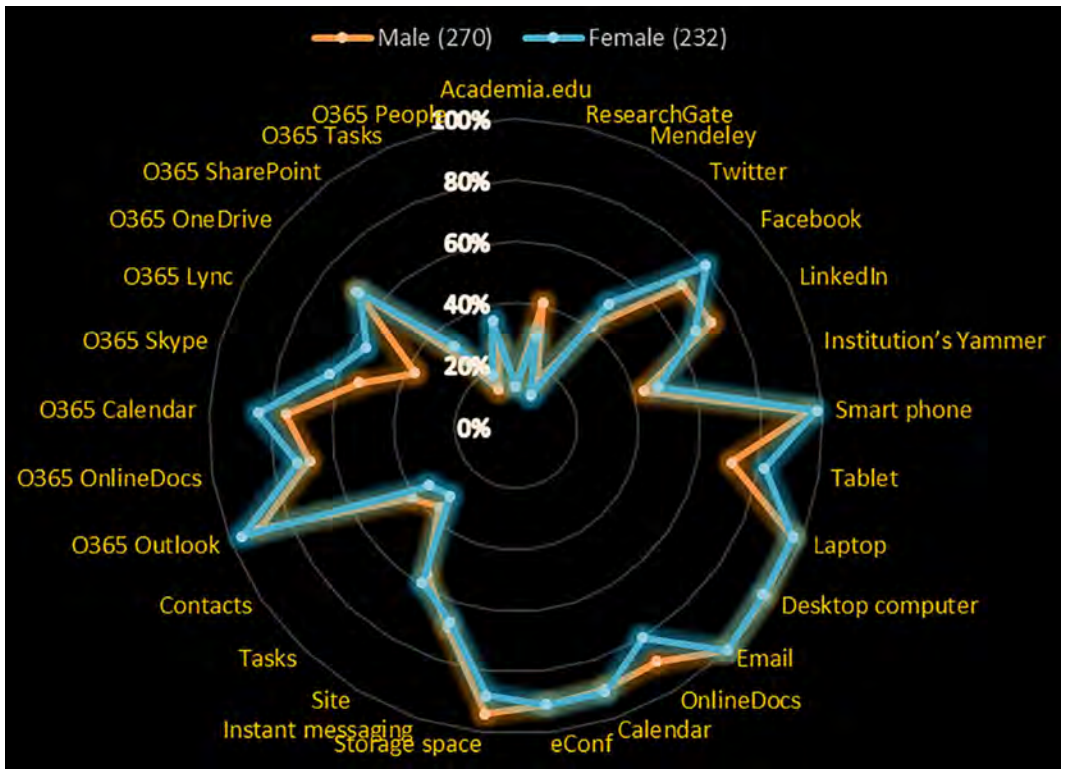

Figure 1. Technology usage profiles by gender.

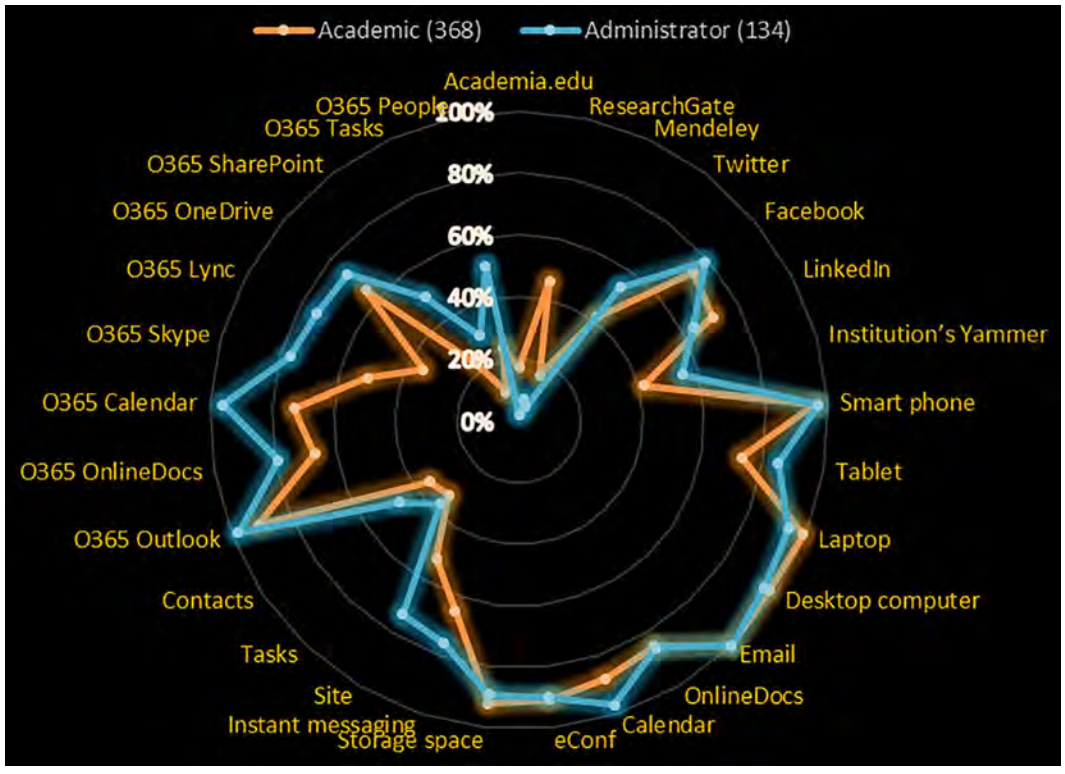

Figure 2. Technology usage profiles by job type.

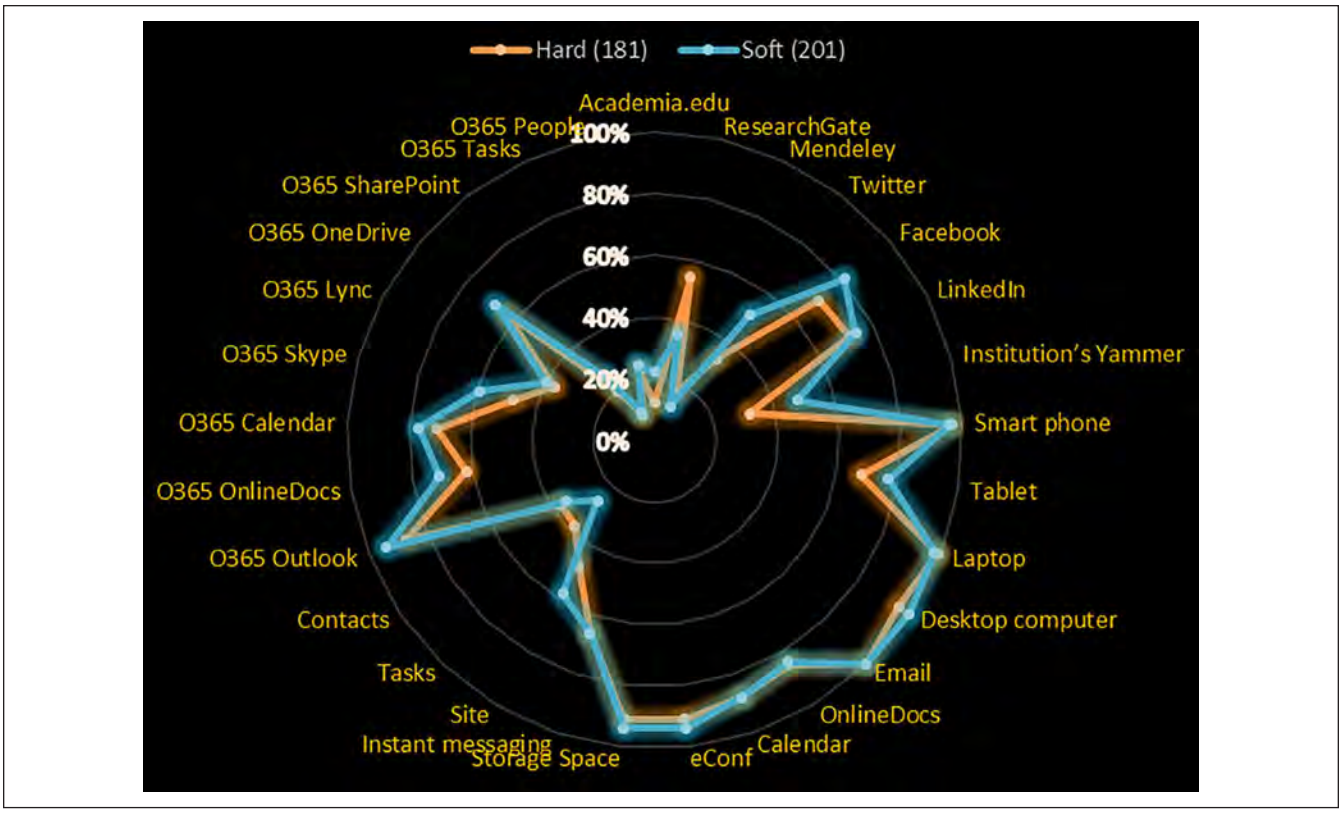

Figure 3. Technology usage profiles by discipline.

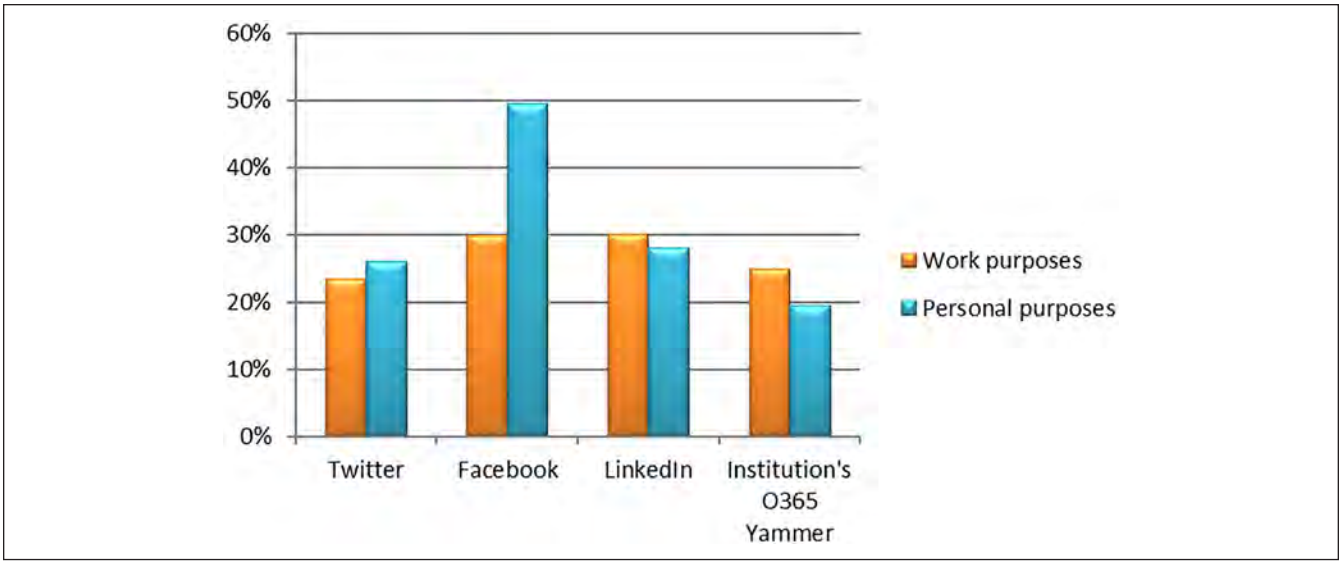

Figure 4. Heaviness of usage of SNSs for personal versus work purposes.
Note. SNS = social networking sites.

When the participants were asked to indicate how much (as a percentage) they used the O365 services for international communication, O365 Outlook was found to be used the most (33%), followed by Skype (18%). The usage of the other services for international communication purposes showed a somewhat similar percentage, ranging from 11% to 14%.

Second-Phase Study Results

Categorical principal components analysis. First, we assumed that the social-media-related variables (Academia.edu, ResearchGate, Mendeley, LinkedIn, Facebook, Twitter and the Institution's O365 yammer) could be represented by two

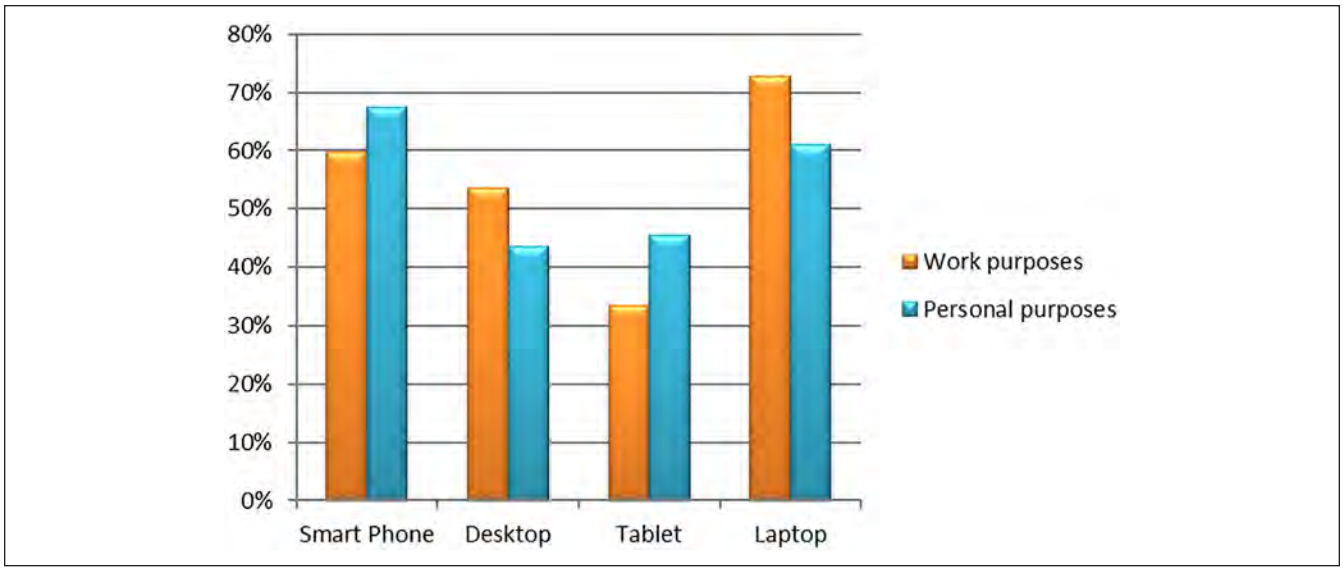

Figure 5. Heaviness of usage of devices for personal versus work purposes.

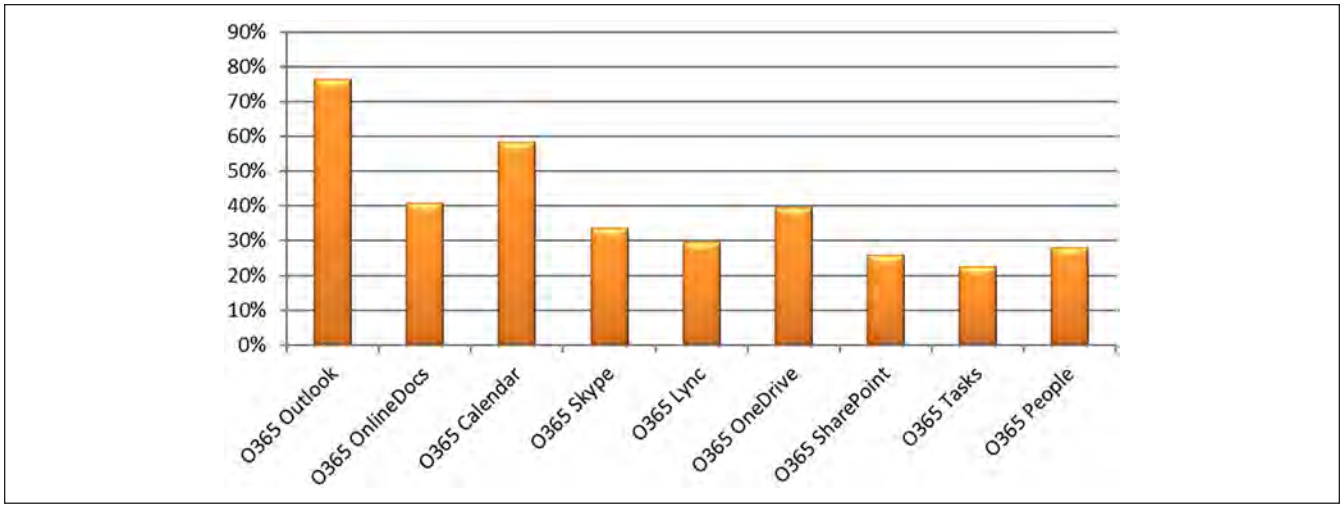

Figure 6. Heaviness of usage of O365 cloud services.

dimensions, namely academic and non-academic social media. Therefore, we entered those seven variables into the CATPCA and forced a two-dimension solution. O365 Yammer was removed from the analysis because it showed a total VAF of .115 (i.e., less than the cut-off value of .25). The results confirmed that the two dimensions accounted for 63.4% of the variance. Next, we assumed that the device-related variables (smart phone, tablet, laptop and desktop computer) represented one dimension, and the results of the CATPCA showed that exactly one dimension accounted for 52% of the variance. Finally, we assumed that the 18 cloud services could be represented by two dimensions, namely commercial and institutional services. We excluded the email, online documents, instant messaging, and site services from the analysis because they all showed a total VAF of less than .25. The results of the CATPCA confirmed that a two-dimension solution accounted for 66.7% of the variance. Table 3 shows each item loading into its corresponding dimension.

Means, standard deviations and Spearman correlations. The means, standard deviations, and correlations among the general innovativeness, the components of actualized innovativeness, and the demographic variables are summarized in Table 4.

Path analysis. The five components generated during the previous step represent the actualized innovativeness. We ran a

Table 3. Results of the Categorical Components Analysis.

		Dimension name	Dimension name		
	Technology	Devices	N/A	Cronbach's alpha	VAF
Devices	Phone	**0.76**		.69	52.02%
	Tablet	**0.69**			
	Laptop	**0.77**			
	Desktop	**0.65**			
		Non-academic SNSs	Academic SNSs		
Social networking sites	Academia.edu	0.17	**0.84**	.60	33.55%
	ResearchGate	0.16	**0.80**		
	Mendeley	0.10	**0.62**		
	Twitter	**0.83**	–0.14	.53	29.83%
	Facebook	**0.68**	–0.16		
	LinkedIn	**0.90**	–0.11		
		Institutional services	Commercial services		
Cloud Services	Calendar	0.45	**0.76**	.76	24.20%
	e-conferencing tools	0.33	**0.62**		
	Storage space	0.43	**0.79**		
	Tasks	0.40	**0.78**		
	Contacts	0.49	**0.80**		
	O365 Outlook	**0.72**	–0.26	.90	42.47%
	O365 OnlineDocs	**0.74**	–0.36		
	O365 Calendar	**0.80**	–0.24		
	O365 Skype	**0.71**	–0.28		
	O365 Lync	**0.79**	–0.17		
	O365 OneDrive	**0.79**	–0.17		
	O365 SharePoint	**0.67**	–0.26		
	O365 Tasks	**0.73**	–0.28		
	O365 People	**0.79**	–0.12		

Note. SNS = social networking sites.
The coefficients in bold represent factor loadings that are the largest for each factor indicator.

path analysis to examine whether the general innovativeness and the demographic variables predicted the actualized innovativeness. Figure 7 depicts the final path analysis model. The fit indices showed an adequate model-to-data fit: (χ^2 = 3.85, df = 8, p = .87, χ^2/df = .48, CFI = 1.0, RMSEA = .00, SRMR = .03). The percentage of variance explained (R^2) by the model of each technology component was as follows: academic SNSs (3%), non-academic SNSs (1%), devices (15%), institutional O365 services (16%), and commercial services (8%).

The results revealed that the general innovativeness contributed positively to predicting the adoption of devices (β = .29, $p < .001$), non-academic SNSs (β = .10, $p < .05$), and institution O365 services (β = .22, $p < .001$), as expected. However, the general innovativeness showed a non-significant effect on the adoption of academic SNSs and commercial services. In other words, the staff who showed a higher willingness to change were found to be earlier adopters of technological devices, non-academic SNSs, and institutional O365 services.

In accordance with our hypothesis, gender negatively predicted the adoption of devices. Based on the coding of the gender (1 = *male*, 2 = *female*), this means that the male participants tended to use devices earlier than the female participants. In terms of the job type, the academics seemed to adopt academic SNSs and commercial services earlier than the administrators. However, they seemed to lag behind the administrators in terms of using O365 services. A moderate negative correlation was detected between the use of O365 services and the commercial services.

Discussion

The findings of the current study show that, in general, technology is reasonably well used by the staff members of HEIs. Consistent with the literature (Al-Daihani et al., 2018; S. Manca & Ranieri, 2016b; Rowlands et al., 2011), this study found that Facebook is the most popular SNS among the staff members, followed by LinkedIn. For the academic staff in particular, Facebook is the most popular SNS, with LinkedIn,

Table 4. Spearman's *r* Correlations Among the Study Variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. General innovativeness	1											
2. Academic SNSs	–.02	1										
3. Non-academic SNSs	.29**	.16	1									
4. Devices	.30**	.06	.51**	1								
5. Institution O365 services	.24*	–.30**	.16	.15	1							
6. Commercial services	.07	.25*	.08	.28**	–.52**	1						
7. Age	.17	–.01	–.11	.15	.21*	–.18	1					
8. Gender	–.05	–.15	–.24*	–.32**	.14	–.29**	.05	1				
9. Job type	.05	–.43**	–.17	–.16	.41**	–.37**	.10	**.23****	1			
10. Educational level	.26**	.33**	.24*	.24*	.05	.07	.14	–.14	–.25*	1		
11. Total job experience	.09	–.03	–.11	.24*	.19*	–.19	.75**	–.06	.09	.23*	1	
12. Discipline	.05	–.42**	–.10	.04	.10	–.19	.14	**.26****	**.13***	–.12	.02	1

Note. Bold coefficients refer to Cramer's *V* (based on Chi-square statistic). For Gender: 1 = male; 2 = Female. For job type: 1 = academic; 2 = administrator. For educational level: 0 = lower than a bachelor's degree; 1 = bachelor's degree; 2 = master's degree; 3 = doctoral degree; 4 = post-doctoral degree; 5 = docent/ professor. For discipline: 1 = hard, 2 = soft; SNS = social networking sites.
*$p < .05$. **$p < .01$.

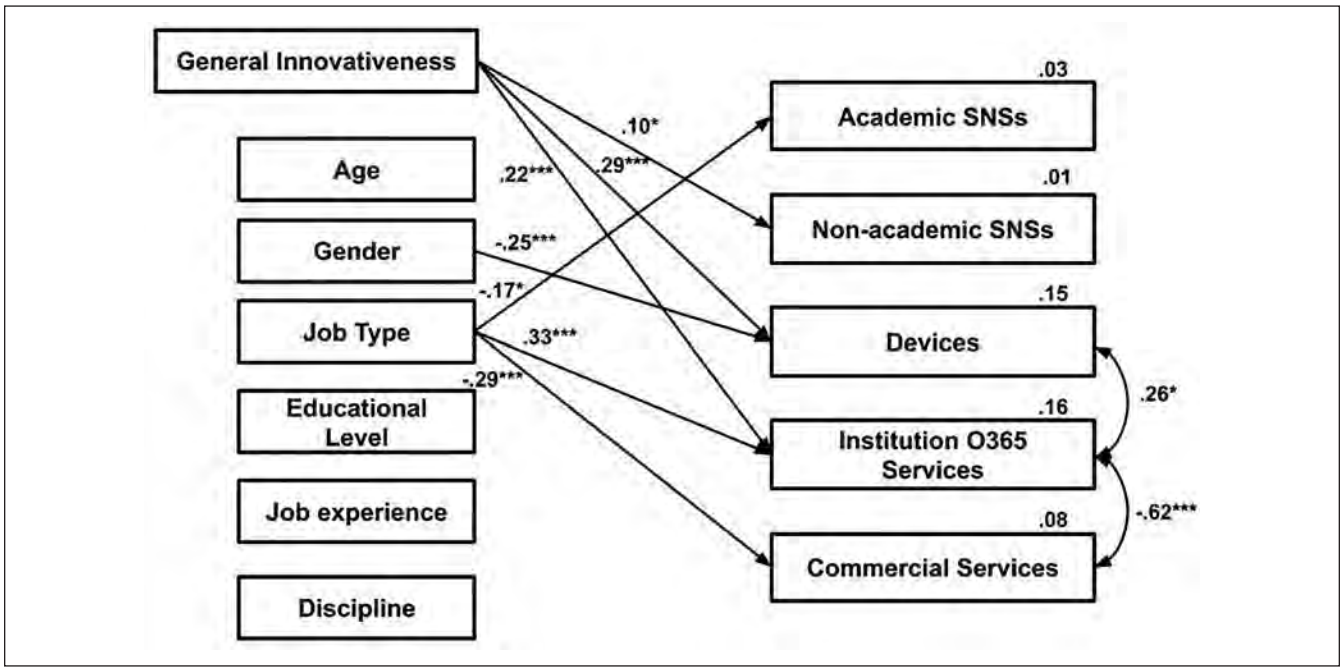

Figure 7. Path model of the general innovativeness and the demographic variables as predictors of the actualized innovativeness.
Note. Standardized regression coefficients reported. Non-significant paths were omitted for clarity.
*$p < .05$. *** $p < .001$.

ResearchGate, Twitter, and Yammer being the next most popular SNSs, sequentially. These results are mirrored by those of Rowlands et al. (2011), who collected non-probabilistic convenience sample ($N = 2,414$) consisted of researchers across wide geographic range (Latin America and Caribbean, Northern America, Asia, Europe Oceania Middle East), and noted that even researchers tend to prefer generic and popular SNSs. Even though, the current findings highlighted the recent and increasing orientation of academics toward the use of professional academic SNSs. Almost the same trends were addressed by S. Manca and Ranieri (2017a), who further explained this orientation as to respond to managerial pressure on the staff to increase their performance and avoid wasting time. Another explanation could be that the growing awareness of the benefits of academic SNSs—represented by, for example, the dissemination of research findings, increased visibility and research impact, and the establishment of an academic profile for career

progression—encouraged academics to direct their attention toward professional SNSs. Nonetheless, the present results also revealed that the usage of SNSs for personal purposes outweighed their usage for work purposes, which was not surprising, since it matches the findings of prior studies conducted with various samples, including the United States, Italy, and the Middle East (Al-Daihani et al., 2018; S. Manca & Ranieri, 2016a; Moran et al., 2011).

The results concerning the usage of devices indicated a similar rate for most of the devices (smart phone, tablet, laptop and desktop computers), with the tablet being the least popular option. This result matched the findings of Davison and Argyriou (2016), who identified the tablet to be the least frequently used device. In terms of services, generally speaking, the commercial services were more popular than the O365 services offered by the institution. As expected, the most popular service was email, followed by calendar, online documents, e-conferencing services, and storage space. The instant messaging, site, tasks, and contacts services were the least popular services. It is worth mentioning here that technological services are updated at a rapid pace; as some services emerge, others diminish quickly. For example, at the time the questionnaire was distributed, Lync was one of the services offered, although at the time of writing the present paper, it is no longer supported. The current findings highlighted the dominance of traditional email services despite the continuous emergence of new technologies. It seems that once individuals are familiar with a certain technology, it becomes harder for them to leave it in favor of an alternative technology, even if the alternative offers more features. In support of these results, the study by Roblyer et al. (2010) compared the use of email and Facebook by staff members. Their results revealed that the staff were significantly more likely to check their email than to check Facebook, and they did not use Facebook for daily communication in the same way they did with email.

Our findings suggest that female participants leaned more toward using generic social media such as Facebook and Twitter, while male participants were more disposed toward using ResearchGate. This could be partially explained by the results of Davison and Argyriou's (2016) study, wherein the female participants were reported to be more likely to use the Internet as a communication tool in relation to social activities, whereas the male participants were more likely to use the Internet for information, entertainment, and commerce purposes. Otherwise, females might exhibit a greater tendency toward socialization, while males might have a greater preference for updating their academic profiles and focusing on their professional career. This could be supported by the results obtained by Rowlands et al. (2011), who found the male participants to report a stronger preference for the use of LinkedIn.

The difference in technology usage between academics and administrators is one of the most interesting findings of the present study. It seems logical and justifiable due to the nature of their work that academics have a tendency to use academic social media such as ResearchGate and Mendeley. Less convincing is the fact that academics appear to lag behind administrators in terms of harnessing the O365 services and Yammer supported by the university. This could be explained by a recent qualitative study conducted by Corcoran and Duane (2018) on 30 academic and administrative staff working in a public multi-campus HEI in Ireland. Their findings revealed a divide in social media usage between academic and administrative staff, where the latter feel detached and thus, needed the participation in Yammer to develop their sense of belonging to the organization, especially for the new staff.

Furthermore, the results suggested that Academia.edu, Facebook, Twitter, Skype and Outlook services were the most used technologies by those working in soft disciplines. In contrast, ResearchGate, Site and Tasks services were most used technologies by those working in hard disciplines. The tendency of soft scientists toward the use of Acdemia.edu and the tendency of hard scientists toward the use of ResearchGate seem to be international trends, since similar findings were documented in the recent study by Greifeneder and colleagues (2018), who investigated researchers' attitudes toward the use of SNSs in four countries (Germany, Singapore, the United Kingdom, and the United States). In 2011, Rowlands et al. found that the hard scientists had taken the lead in terms of using recent technologies, namely social media, while the soft scientists felt that they failed to keep pace with technology, although they wished to catch up. It seems, from both our results and from those of many other studies conducted in Italy (S. Manca & Ranieri, 2016a), Spain (Nández & Borrego, 2013), and the United States (Wang & Meiselwitz, 2015) that the soft scientists have taken the lead nowadays. The reason for this discrepancy could be attributed to the importance of the content posted on social media from the staff's perspective. Moran et al. (2012) indicated that staff in the mathematics, computing, and natural sciences fields complained about the lack of relevant content on social media sites for their particular discipline. S. Manca and Ranieri (2016a, p. 227) noted that soft scientists tended to underemphasize the importance of relevant content on social media when compared to other affordances, such as facilitating communication, sharing, and content creation.

Similar to the findings of studies conducted in the business and marketing fields (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003; Jin, 2013; van Rijnsoever & Donders, 2009), the results of the current study, which took place in the higher educational context, confirmed the positive role played by general innovativeness in predicting actualized innovativeness. Thus, the present findings extended previous efforts to examine the predictive power of general innovativeness (Arts et al., 2011; Bartels & Reinders, 2011; Im et al., 2003; Jin, 2013; van Rijnsoever & Donders, 2009). However, the predictive power was not the same for all the five aspects of actualized innovativeness. While the general

innovativeness had a significant effect on the adoption of non-academic SNSs, technological devices and institutional O365 services, it failed to exert a significant effect on the other dimensions.

Among the investigated demographic variables, only gender and job type succeeded in predicting the actualized innovativeness. Males tended to adopt devices earlier than females. This could be interpreted in light of previous findings in the higher education context, which concluded that males exhibit more positive attitudes toward technology (John, 2015) and demonstrate less anxiety in relation to using technology than females (Venkatesh & Morris, 2000). Other studies have shown that females exhibited lower confidence (Zhou & Xu, 2007) and perceived less ease-of-use in relation to technology (John, 2015; Venkatesh & Morris, 2000). In other words, females are likely to be suspicious of the use of technology, and they may need more time to learn about it and to be sure of its functionality prior to using it. Enlightened by the predictive power of the job type, we concluded that academics were earlier adaptors of academic SNSs and commercial services, while they were later adopters of institutional O365 services. This might be interpreted in the way suggested by van Rijnsoever and Donders (2009, p. 985): "When the relationship between innovations is very close in terms of functionality, the chances of adopting both technologies simultaneously can decrease because it is not very useful to buy two different items with exactly the same function." Staff may consider the O365 services offered by their institution to be simply another version of the commercial services that they were already using. Thus, the value of using such services may seem questionable.

Even though the model presented in the current study succeeded in explaining some of the variance in the actualized innovativeness, it seemed that both the general innovativeness and the demographic variables were only weak predictors. This conclusion was driven by the fact that the regression weights and the R^2 values were rather small. The empirical finding of weak, albeit still significant, relationships substantially supports the line of research claiming that innovativeness at the abstract and general level is a poor predictor of innovation adoption behavior (Goldsmith et al., 1995; Im et al., 2003; Roehrich, 2004).

Implications

The implications of the current study are twofold. For staff members who seek to build up a reputation as scientists in their respective field, the findings re-emphasize the important role of technology in achieving their goals. Technology should serve academics in their professional development and growth in three key regards: teaching, learning, and research. The results of our study showed that the staff members were using technology, although their professional usage remained weak. Staff need to be aware of the possibilities that technology can offer to them. Research evidence on technology affordances to staff's professional development are quite prevalent (Anderson, 2019; Donelan, 2016; Lupton, 2014; S. Manca & Ranieri, 2017b) and that failing to keep pace with technology leads to professional death (Gillard et al., 2008). For instance, Donelan (2016) investigated the professional usage of social media among UK academics and their results showed that as the level of activity on social media increase, the perceptions of positive outcomes such as career progression increase. In a recent review study of 111 papers, A. Manca and Whitworth (2018) concluded four main practices of social media in HEIs: (1) social media as an education research tool or generator of data, (2) social media as professional practice, (3) social media as an administrative intervention, and (4) social media as a new knowledge-formation and/or literacy practice. While some studies (Holland et al., 2016) showed that the personal use of social media during work time has positive consequences on morale, retention, job performance, and satisfaction, there are also studies referred to a cyber loafing, where the use of Internet for personal or non-related purposes, has negative consequences such as perceived injustice, disengagement and stress (Holland et al., 2016; McDonald & Thompson, 2016). Thus, here we are not arguing to decrease the personal usage of technology, rather to increase the professional usage to gain the optimal benefits. Moreover, it is well known that conducting scientific research in all disciplines requires tremendous effort and, of course, the aim is to constantly build on current knowledge. A vivid example can be seen in the fact that just 11 journals together published 366,000 research articles and 13,000 review articles in the 1-year period from 2013 to 2014 (Bohannon, 2016). What would cause readers to seek out a specific researcher's work from among this huge heap of knowledge? One could argue that the quality of the work should draw in readers, but the question remains: how would they reach the work in the first? Academics may conceive that publishing their works in well-indexed journals and with respectable publishers would assist them in this regard. They may be right to hold such a belief, but respectable publishers still appeal authors to create web-friendly materials (i.e., video abstract, infographics, short blog, vlog) and to help in sharing and re-sharing their work. Recent findings by Thoma and colleagues (2018) revealed that promoting articles using podcasts and infographics positively impacted both research dissemination and readability in terms of the Altmetric scores and abstract views. Furthermore, it is not only in relation to research dissemination and visibility that the use of technology has proven to be influential, it is also in terms of fostering creativity; employees with a diverse Twitter network tend to generate better ideas (Parise et al., 2015).

The second main implication of this study is directed toward academic institutions as incubators of their staff. A large-scale study conducted in the higher education context (S. Manca & Ranieri, 2016a) cited the lack of time, the lack of administrative support, and the increase in workload as

being some of the barriers that hinder the usage of social media. This situated HEIs as inhibitors rather than facilitators of technology adoption (Hasanefendic et al., 2017). For example, the findings by Corcoran and Duane (2018) found that knowledge sharing on social media platforms are limited due to the prevalent organization structure and culture in higher education. HEIs should recognize that a higher level of technology usage by staff implicitly suggests a significant increase in an institution's scientific indicators, prestige, and ranking (Al-Daihani et al., 2018). In this study, we add our voice to S. Manca and Ranieri's (2017a) call for the re-calculation of the workload of academics to include new tasks—enhancing their technological capacities, disseminating their work through social media, and participating in scientific dialogues on the Internet—in order to significantly improve the performance and satisfaction of staff members.

Early technology adoption has indeed advantages. In their paper, Gillard et al. (2008) articulated 10 reasons as to why educators should be early adopters of technological innovations. Among the most important reasons are setting example to students and promoting the concept of lifelong learning. Furthermore, keeping up with the latest innovations fulfill the leadership role of higher education since "the use of IT within academia has quickly become a benchmark by which academic institutions define their competitiveness, effectiveness, and leadership" (Gillard et al., 2008, p. 29). HEIs should be at the forefront, or on an equal footing with the speed of adoption of technology in the workplace, not less.

We wish to end our discussion of the implications of the present study by whispering in the ear of HEI administrations: being late to adopt technologies has consequences. We have provided evidence that staff members resorted to the use of commercial alternatives to the technological services that the university was still studying with regard to the adoption decision. We do not call for the rushed adoption of whatever technology emerges, but rather for wise and fast decision making. As the proverb goes, "the early bird gets the worm, but the second mouse gets the cheese."

Limitations and Future Research

The findings of the present study raise several intriguing questions that could serve to develop our understanding of actualized innovativeness. However, it is important to recognize that the study did have a number of limitations. Our cross-sectional design limits our ability to confirm the causal relationships, although future studies with a longitudinal design could validate our claims. A second drawback of this study is that all the constructs were measured by means of a self-reported questionnaire. Thus, the results may be subject to the common method bias (Podsakoff et al., 2003). We allowed for a 1-year gap between the distribution of the two questionnaires used in the two phases of the study as a procedural remedy for common variance issues (Podsakoff et al., 2003). This should handle most—but not all—of the common rater effects, item characteristic effects and item context effects. Further studies need to be conducted that take a variety of measurement methods into account. For example, a study that retrieves the technology usage data from the log data, after taking into account any ethical considerations, may overcome a lot of issues related to recalling past events and common method bias. Another issue concerns the generalizability of the results from the second phase of the study, which were limited due to the small sample size and the higher education context. Future studies should examine the applicability of the model using larger samples in different contexts. At this stage, we know that general innovativeness is a function of other psychological factors, such as goal orientations (Aldahdouh et al., 2019), and that it contributes positively to predicting actualized innovativeness. However, our knowledge is limited in terms of interpreting how these factors interact with each other to influence innovation adoption. Hence, there exists a need for qualitative studies that delve into individual thoughts to explore *how* and *why* these factors interact in such a way.

Notwithstanding these limitations, the findings from this study make several contributions to the current literature. First, the present study has a methodological contribution in that it developed the TUQ (see supplementary material) and it has been one of the first attempts to measure the actualized innovativeness in a novel way gathering the time of adoption and the number of technologies adopted, and then submitting the results to CATPCA in order to generate representative factors objectively. Further, this study offers a general description of technology usage at Finnish HEIs in comparison to other universities worldwide; by and large the results confirmed that the technology usage at Finnish HEIs is no exception. Finally, the study contributes to the debate on the relationship between the general and actualized innovativeness but in higher education context, and hence it expands the scope and generalizability of theories. The insights gained from this study may be of assistance to researchers and decision makers at HEIs.

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Supplemental Material

Supplemental material for this article is available online.

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