THE BEHAVIOURAL INNOVATION PROCESS MODEL: A CRITICAL, CONSTRUCTIVE EVALUATION OF THE INNOVATIVE WORK BEHAVIOUR LITERATURE AND A WAY FORWARD.

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Abstract

The present thesis examined the individual level innovative work behaviours that facilitate the development, promotion, and implementation of innovative ideas.

The thesis entails a systematic literature review of the innovative work behaviour literature, which critically evaluated the empirically tested models of innovative work behaviour. This review identified that existing models of innovative work behaviour sub-optimally describe the theoretical content of the construct of innovative work behaviour, due to including construct irrelevant content (Creativity, Innovative performance), and under-representing the construct's theoretical domain. Furthermore, the corresponding psychometric measures have also been negatively impacted by the sub-optimal conceptualisation, whereas scale development studies have used only a sub-section of the available scale development methodologies.

To address the theoretical limitations of the existing models of innovative work behaviour, the present thesis developed the Behavioural Innovation Process model (M-BIP). The M-BIP adopts an explicit behavioural orientation, and presents a comprehensive synthesis of the empirical literature, enriched by relevant inter-disciplinary knowledge. The M-BIP adopts the widely accepted three stage conceptualisation of innovative work behaviour, but further extends the construct by introducing seven behaviourally focused activities, describing the behaviours involved in the facilitation of the objectives of the three stages (The development, promotion, and implementation of the innovative idea).

Two empirical studies were designed to empirically test the M-BIP. Study 1 (n = 294) detailed the development of the psychometric measure, the assessment of its psychometric properties, and a qualitative assessment of items' ability to elicit construct relevant participants' responses. Results indicated that the a priori hypothesised factorial structure of the M-BIP was supported, the M-BIP converged as hypothesised to Holman et al. (2012) measure of innovative work behaviour, and was a positive predictor of self-report innovative outcomes. Moreover, the qualitative evaluation of the M-BIP items indicated that they successfully captured the construct's content.

Study 2 findings (n = 861) provided further support on the M-BIP's hypothesised factorial structure, supported the M-BIP's measurement invariance, and discriminance against the construct of Personal Initiative, and used multi-source data to support the convergence of the measure in relation to the De Jong and Den Hartog (2010) measure of innovative work behaviour. Furthermore, the M-BIP's was shown to be a positive predictor of supervisor rated innovative outcomes. Finally, Study 2 assessed how the M-BIP is positioned within the established nomological network of innovative work behaviour, by examining its relationships with three variables; supervisor support, job control, and openness to experience. Results confirmed 10 out of 12 hypotheses, indicating that the M-BIP largely complies with the empirical literature.

DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

COPYRIGHT STATEMENT

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Chapter 1

Introduction

Innovative work behaviour is the main construct of interest within this thesis. The main objective of the present research project was to develop and empirically test a new, updated model of innovative work behaviour to address the relevant literature's limitations. Innovative work behaviour has been defined as all the individual behaviours and activities aimed at "the intentional creation, introduction and application of new ideas within a work role, group, or organisation, in order to benefit role performance, the group, or the organisation" (Janssen, 2000, p. 288).

The importance of innovation cannot be overstated, not only because innovation is considered one of the key drivers of organisational competitiveness, sustainability, growth, and survival (Baer, 2012; Blok, 2018; Coad, Segarra, & Teruel, 2016; Potočnik & Anderson, 2012), but also because innovation promotes a wide range of societal and scientific advancements (i.e., Public health and education; West & Altink, 1996). Furthermore, the globalised economy and the rapid pace of technological advancement, which has made the self-life of technological products decrease (Blok, 2018), has made innovation an essential adaptation tool in order to capitalise on opportunities that arise, and generate added value (Ciabuschi, Dellestrand, & Martín Martín, 2015). Hence, developing innovative products, services, and time and cost-efficient procedures is imperative in order to grow and remain competitive (Anderson, Potočnik, & Zhou, 2014; Ciabuschi et al., 2015).

1.1. Research philosophy positioning

In this section, the ontological and epistemological foundations of the present thesis are discussed. Ontology and epistemology are two distinct philosophical fields.

Ontology is a philosophical field focused on understanding the form and the nature of reality, whereas, epistemology is a philosophical field concerned with the ways through which reality can be studied and understood (Guba & Lincoln, 1994). Pragmatism and methodological individualism are the adopted ontological and epistemological foundations of this thesis.

1.1.1. Pragmatism

The philosophical movement of pragmatism emerged to counter the metaphysical debate with respect to the concepts of reality and truth, as postulated by the positivism – constructivism dualism (Maxcy, 2003). Pragmatist philosophers have been sceptical with respect to whether the true nature of reality could be discovered once and for all (Pansiri, 2005), because the meaning of reality could never be disentangled from human experiences, needs, and the social context (Morgan, 2014). Hence, pragmatism is not grounded in the metaphysical concepts of reality and truth, but rather focuses on the nature of human experience (Morgan, 2014), and approaches "reality as a normative concept and maintains that reality is what works" (Kaushik & Walsh, 2019, p. 3).

Pragmatist philosophers have postulated that neither positivism nor constructivism represent sufficient research paradigms because they are both characterised by lack of flexibility and practicality (Kaushik & Walsh, 2019). Positivists have embraced the assumption that there is an objective reality that exists independently of human perceptions (Hudson & Ozanne, 1988). Constructivists have embraced the assumption that there is not a single objective reality, but social phenomena are dependent on individual beliefs, perceptions, and interpretations (Creswell & Clark 2011). Pragmatist philosophers have suggested that the positivism – constructivism dichotomy could be better understood as a continuum, and not as mutually exclusive poles of objectivity and subjectivity (Goles & Hirschheim, 2000). As such, although pragmatist philosophers have proposed that there is an objective reality, what really matters, is how reality is experienced by individuals. According to pragmatist philosophers, individual perceptions of reality are shaped through socially constructed beliefs, and therefore, pragmatist philosophers have postulated that multiple realities can co-exist (Creswell & Clark, 2011). Pragmatists are therefore, focused on empiricism rather than idealistic or rationalistic approaches (Frega, 2011). Thus, pragmatists emphasise practicality and are mostly concerned with how researchers can best answer research questions (Biesta, 2010).

Therefore, it follows that pragmatism, as a research paradigm, is not bound by rigid methodological assumptions, but is open to the use of diverse methodologies, provided that the selected methodologies can be of assistance in answering a research question (Morgan, 2014). For pragmatists, the ultimate criterion guiding the choice of methodologies, is not the underlying philosophical and metaphysical assumptions, but whether the adopted methodologies can best serve researchers' attempts to satisfactorily answer research questions (Tashakkori & Teddlie, 2008). Hence, pragmatists embrace both deductive and inductive reasoning, and quantitative and qualitative methodologies, by virtue of appropriateness to any given research question (Goldkuhl, 2012; Morgan 2007).

1.1.2. Methodological individualism

Innovation studies have been categorised in two streams of research (De Jong, 2007). The first stream of research examines innovation as a produced outcome, whereas the second stream focuses on actors' behaviours, activities, and processes that precede innovative outcomes. Within the latter stream actors might be individuals, teams, or organisations (West & Altink, 1996). The present thesis examined innovation from an actor's perspective, and at the individual level, because it adopted the foundational premises of methodological individualism, and assumed that without individual behaviours and actions, organisational level innovation could not exist (Miller, 1978).

Methodological individualism considers individuals and their behaviours the main unit of analysis of social phenomena (Hodgson, 2007). Philosophy scholars have engaged in a decades old debate with respect to the meaning of methodological individualism. Hodgson (2007) has pointed out that this ongoing debate could be summarised by enquiring whether social phenomena could be better understood by examining only individuals' actions or by examining individuals' actions plus their social interactions. Miller (1978), in a highly technical paper, presented and critically discussed versions of methodological individualism, labelling them as extreme and moderate versions. Extreme methodological individualists, such as Popper and Watkins (Miller, 1978), have advocated that individual behaviour is the sole explanatory source of social phenomena. Hayek (1967) and Arrow (1994) have rebutted this claim, and argued that social interactions, structures, and entities should be considered alongside individual behaviours, when explaining social phenomena. Indeed, individuals are the fundamental units of teams, organisations, and societies, and all social constructs could not exist without the individual (Felin & Foss, 2005). In short, innovation occurs through the efforts of motivated individuals (Amabile & Pratt, 2016) who utilise their knowledge and skills to generate innovative products (D'Amore, Iorio, & Lubrano Lavadera, 2017; Rothaermel & Hess, 2007). Thus, by definition, micro-level individual activities are central and critical for the evolution of innovative products (Salvato, 2009).

Nevertheless, whereas the main point that this section aims to make is that individuals' behaviours are core to the innovation phenomenon (Bos-Nehles, Renkema,

& Janssen, 2017), the argument advocated by extreme methodological individualists that individual behaviour is the sole explanatory source of social phenomena (Miller, 1978) was not adopted. Hayek’s (1967) and Arrow’s (1994) arguments, that social interactions, structures, and entities should be considered alongside individual behaviours when explaining social phenomena, have been in fact supported by an abundance of empirical evidence. Empirical evidence has shown that the interpersonal interactions forming the various properties of social networks (i.e., Network size, strength, diversity; Baer, Evans, Oldham, & Boasso, 2015; Donati, Zappala, Gonzalez-Roma, 2016) or relational variables such as Leader Member Exchange (Hughes, Lee, Tian, Newman, & Legood, 2018; Sanders, Moorkamp, Torka, Groeneveld, & Groeneveld, 2010; Wang, Fang, Qureshi, & Janssen, 2015) and interpersonal trust (Li & Hsu, 2018; Muethel, Siebdrat, & Hoegl, 2012), have an impact on innovation. Moreover, organisational climate (Sethibe & Steyn, 2016; Shanker, Bhanugopan, van der Heijden, & Farrell, 2017) and culture variables (Büschgens, Bausch, & Balkin, 2013; Hogan & Coote, 2014) have also been found to be positive conductors of innovation.

These empirical findings indicated that it would be reductionist to focus exclusively on individuals’ behaviours, to explain the whole process of innovation. However, it is argued that most extra-individual social structures influence innovation through influencing, to some degree, individuals’ expressed behaviours. For example, an extended social network would enable the prospective innovator to get access to diverse information, a condition which could be a valuable asset in developing innovative ideas (Baer et al., 2015). Likewise, the existence of a social network characterised by strong ties, which is associated with social support (Perry-Smith & Mannucci, 2017), promotes the development of innovative ideas (Donati et al., 2016; Wang et al., 2015). Interpersonal trust has also been shown to have a positive influence on innovative behaviour via increasing knowledge sharing (Seo, Kim, & Chang, 2016), because trust makes individuals to be less hesitant to communicate thoughts and pitch ideas (Perry-Smith & Mannucci, 2017). Furthermore, pro-innovation organisational climates, which among other attributes are characterised by the provision of increased employee autonomy (Hunter, Bedell, & Mumford, 2005), enable the manifestation of innovative behaviours through granting procedural freedom, thus providing employees with the necessary time and discretion to identify and pursue innovations (Hammond, Neff, Farr, & Schwall, 2011; Holman et al., 2012). Finally, organisational culture, conceptualised as the shared beliefs and values of organisations' members, influences organisational outcomes through shaping employees' attitudes and behaviours (Gregory, Harris, Armenakis, & Shook, 2009; Schein, 1992; Hogan & Coote, 2014; O'Reilly, Chatman, & Caldwell, 1991).

Concluding, external factors do shape the social phenomenon of innovation, but as argued, they do so through their effects on individual behavioural manifestations. Hence, understanding individual innovative work behaviour, while acknowledging that it is a product of internal and external shaping factors, is essential in order to understand team and organisational level innovation. Thus, individual innovative work behaviour should be considered the fundamental entry-level unit of analysis of innovation studies, and the building block of higher level conceptualisations of innovation, such as team- and organisational level innovation.

1.2. Overview of the literature on innovative work behaviour

The field of innovative work behaviour is dynamic, and there is an extensive amount of highly informative research concerning innovative work behaviour. Much of the work in the existing literature was intended to address these following questions:

1. Which behaviours and activities constitute innovative work behaviour, and can these behaviours and activities be grouped into discrete stages?
2. Which individual differences and contextual variables facilitate or block innovative work behaviour?

The first question is concerned with the theoretical conceptualisation and empirical operationalisation of the construct of innovative work behaviour. Naturally, conceptualisation and operationalisation are intertwined as the former guides the latter, and the latter puts the former to the test (Hughes, 2018). The second question concerns the utilisation of the construct in order to advance scientific knowledge regarding the facilitators of innovative work behaviour, and subsequently to provide evidence-based information and practical recommendations to industry. Reasonably, the way we answer the first question has a direct impact on the quality of the answers we obtain when examining the second.

Despite the large amount of theoretical and empirical work conducted during the last four decades, there is a difficulty in providing parsimonious and conclusive answers to these questions, and the research field is characterised by conceptual confusion and fragmentation of the literature (Hughes et al., 2018; Potočnik & Anderson, 2016; Walker & Batey, 2014). Some confusion and fragmentation are to be expected in such an active field, but some of it stemmed from the lack of unifying theoretical frameworks and properly developed psychometric instruments (Hughes et al., 2018). Broadly, the two main limitations of the literature on innovative work behaviour are the sub-optimal conceptualisation and operationalisation of the construct.

1.2.1. Conceptualisation of innovative work behaviour

There are three areas of controversy with respect to the conceptualisation of the construct of innovative work behaviour. The most rudimentary conceptual controversy regarding innovative work behaviour is whether it is identical or distinct from creativity. If the answer is that they are identical, then further questioning the existence of the construct of innovative work behaviour is meaningless, because that would imply construct proliferation. However, despite their commonly accepted close relationship, that they are different has been repeatedly acknowledged (Anderson et al., 2014; Carmeli, Meitar, & Weisberg, 2006; Hughes et al., 2018). Creativity can occur independently and does not necessarily have to be followed by innovative behaviours, whereas an individual can proceed to the implementation of an innovative idea by picking up an already existing idea, and thus not engage in creative behaviours (Hughes et al., 2018). Nevertheless, this conceptual distinction has not been transferred into the literature, as it is quite common that the terms creativity and innovation have been used interchangeably by researchers, and the two literatures have been synonymous to a significant extent (Baer, 2012; Hughes et al., 2018). Hughes and colleagues' (2018) review paper pointed out that the conceptual confusion is exasperated by the fact that psychometric operationalisations assessing creativity include items measuring innovative work behaviour and vice versa, whereas studies examining creativity used innovation measures and vice versa. Potočnik and Anderson's (2016) review study on change and innovation related constructs attests to Hughes et al's (2018) observation, explicitly criticising this widespread practice.

Second, moving from the creativity versus innovative work behaviour controversy, and assuming these two constructs to be related but distinct, the literature examining the dimensionality of innovative work behaviour is a research domain that has been sub-optimally addressed. Innovative work behaviour has been most commonly described as a multistage process (King & Anderson, 2002). The use of a multistage approach to model innovative work behaviour, by definition implies that the construct has been conceptualised as a multi-dimensional one. Reviewing the theoretical conceptualisations of innovative work behaviour indicated that there has been an evident lack of consensus regarding the number of dimensions, how they should be grouped, and the order in which they should be presented. The dimensionality of existing theoretical models of innovative work behaviour varies from a minimum of two stages (e.g., Generation and testing of ideas – Implementation; Krause, 2004) to a maximum of five[1] (e.g., Opportunity exploration – Idea generation – Idea promotion – Idea realisation – Reflection; Messmann & Mulder, 2012), with several variations existing in-between (e.g., Idea generation – Idea promotion – Idea realisation; Janssen, 2000). The lack of consensus with respect to the construct's dimensionality is not necessarily problematic because diverse views can enrich the research field and provide the building blocks for further theoretical advancement. What is problematic, though, is that the many different conceptualisations have largely been introduced into the literature as stand-alone models, rather than incremental integrations. Therefore, the domain of innovative work behaviour has remained fragmented but, as discussed in Chapter 2, these diverse approaches could have been collated and integrated, so as to provide a much more holistic representation of the construct of innovative work behaviour.

Third, the content of the stages of innovative work behaviour has remained unclear. Whereas the construct's label itself implies a behavioural orientation, Hughes

[1] Note: Lukes and Stephan (2017) published a study presenting a new six stage measure of innovative work behaviour after the present research project had completed the critical evaluation of the literature, the formulation of the proposed Behavioural Process Model of Innovation, the data collection, and the statistical analysis. For this reason, Lukes and Stephan's model was not integrated post hoc in the present thesis write up. An explanatory endnote is available in Chapter 2.

and colleagues (2018) reported that the models of innovative work behaviour lack an explicit and concise focal orientation, meaning that instead of describing the behaviours and activities leading to the development of innovative outcomes, several models have been composed of a mixture of process descriptors and process outcomes, thus confusing innovative behaviour with innovative performance. As discussed in Chapter 2, Hughes et al.'s (2018) observation has been supported and extended by the current author's review of a wider range of models of innovative work behaviour. Moreover, the level of abstraction for the specification of the actual behaviours and activities underlying the construct of innovative work behaviour varies across models. For example, Messmann and Mulder (2012) explicitly sought to identify the types of behaviours individuals deploy when attempting to develop an innovative outcome. However, this has not been the case for the majority of existing models of innovative work behaviour that include very broad behavioural descriptors of the process of innovation that do not explain how individuals behave during the process of innovation. As discussed in the previous section, innovative work behaviour is treated as the fundamental entry-level unit of analysis of innovation studies. Concurring with Messmann and Mulder's (2012) point of view, and embracing Hughes and colleagues' (2018) call for behavioural innovation models, whose focus is on the matter of how individuals innovate rather than just assessing innovative outcomes, it is argued that at this level of analysis, theories should describe with as much precision as possible the behaviours that enable and facilitate the production of innovative outcomes. Generating an inclusive model of the behaviours associated with innovation (that excludes for example behaviours associated with creativity or generic citizenship behaviour) could provide an initial unifying model that clarifies definitional confusion and serves as a basis for rigorous measure development. Accordingly, in Chapter 3, I aim to begin to address this issue by combining insights from seminal work conducted on innovative work behaviour, as well as relevant but underutilised interdisciplinary knowledge (Adams, Bessant, & Phelps, 2006), to produce the Behavioural Innovation Process model.

1.2.2. Operationalisation of innovative work behaviour

Considering that the theoretical underpinnings of any given construct guide scale development (Hughes, 2018), it is unsurprising that the measurement of innovative work behaviour has suffered from the issues described in the section above. As such, it is difficult to distinguish whether a measure assesses creativity or innovative work behaviour. Additionally, measures lack a concise behavioural focus because they include items tapping both innovative behaviours and innovative products, and assess the construct at various levels of abstraction, which are usually broadly capturing innovative behaviours (Hughes et al., 2018). Furthermore, the empirical testing of the models of innovative work behaviour has received little attention within the extant literature. Based on the current review of the literature, there are only two studies dedicated to testing a model of innovative work behaviour using, to some degree, a proper validation procedure (i.e., De Jong & Den Hartog, 2010; Messmann & Mulder 2012). The majority of the measures of innovative work behaviour were developed as part of a single study whereby innovative work behaviour was only one of the variables of interest. Furthermore, the dimensionality of several of the models of innovative work behaviour has not been supported by empirical evidence (e.g., Janssen, 2000; De Jong & Den Hartog, 2010), resulting in a mismatch between theory and measures. For example, Janssen (2000) conceptualised innovative work behaviour as a three-stage process, but empirical evidence suggested that the measure is best operationalised uni-dimensionally.

The current status of measurement of innovative work behaviour is problematic , and its negative impact on the examination of the antecedents of innovative work behaviour has been supported by several studies, including influential meta-analyses, review papers, and stand-alone studies (Baer et al., 2015; Bos-Nehles et al., 2017; Hammond et al., 2011; Hughes et al., 2018; Kang, Matusik, Kim, & Phillips, 2016; Skerlavaj, Cerne, & Dysvik, 2014). Hammond and colleagues (2011), in their meta-analysis of the antecedents of individual level innovation, pointed out that a limitation of the literature has been the reliance on measures focusing on outcomes, and global innovation scales, which has impeded the evaluation of the differential drivers of the various stages of the process of innovation, and they, therefore, have endorsed the development of multi-dimensional measures of the construct. Likewise, in a meta-analysis examining the influence of social networks on individual innovation, the exactly same limitation was identified and the authors called for more refined measures (Baer et al., 2015). Bos-Nehles and colleagues' (2017) review paper, which examined how human resource management practices influence innovative work behaviour, once more noted that the relevant literature, with the exception of few studies, has failed to make the differentiation between early and late stages of the process of innovation, and called for future research to make such a distinction. Concluding, a commonality across these papers is the concern that current measures of innovative work behaviour do not allow for a detailed examination of the individual and contextual drivers of innovation, and that sub-optimal measurement should no longer remain a neglected issue. A detailed discussion with respect to the existing measures of innovative work behaviour is presented in Chapter 2.

1.3. Thesis outline

The present thesis is structured in six chapters, this one being the first. Chapter 2 presents a detailed review of the literature on innovative work behaviour, focussed on an examination of existing models of innovative work behaviour, to produce recommendations regarding how best to build an inclusive model that capitalises on the strengths of existing work, and also addresses some of the most important limitations of models of innovative work behaviour. Moreover, an in-depth evaluation of the psychometric properties of the corresponding measures of innovative work behaviour is conducted, in order to illustrate why rigorous and systematic scale development studies are imperative for the advancement of this research field. Chapter 3 presents the Behavioural Innovation Process model which is a model constructively addressing the limitations of the literature on innovative work behaviour. The Behavioural Innovation Process model integrates the unique contributions of the existing models of innovative work behaviour, but also capitalises on relevant interdisciplinary knowledge in order to propose a comprehensive behavioural representation of the individual level process of innovation. The next two chapters present the two empirical studies conducted to test the Behavioural Innovation Process model. For the purpose of consistency and fairness, both empirical studies complied with the same set of criteria applied to the critical evaluation of the existing measures of innovative work behaviour. Chapter 4's main focus was on the development and refinement of the new measure and the preliminary assessment of its psychometric properties. Chapter 5 sought to cross-validate the first study's findings on a larger dataset, and provide a more rigorous assessment of the psychometric properties of the Behavioural Innovation Process model, implementing a wider range of methodologies and statistical analyses, and capitalising on a more robust research design, which did not solely rely on self-report data but used pairs of self-report and supervisory ratings. Finally, Chapter 6 provides a general discussion on the findings of the present research project, describes its practical implications, limitations, and provides suggestions for future research.

1.4. Potential Contributions

Overall, the aim of this thesis was to make two main contributions to the field of innovative work behaviour. First, I aimed to address the confusion regarding the theoretical conceptualisation of innovative work behaviour, by developing an integrative model grounded in theory and empirical evidence. In doing so, the present study presents an initial attempt to unify the fragmented literature, by addressing important omissions and limitations inherent within existing theoretical conceptualisations, and by capitalising on interdisciplinary knowledge. Second, using the theoretical model, I developed a new measure of innovative work behaviour using rigorous psychometric procedures. Specifically, the Accuracy and Appropriateness model (Hughes, 2018) of psychometric instrument development, which was the guiding framework for the critical evaluation of the empirical literature and the empirical work, has also been implemented so as to assess and provide all the necessary information regarding the psychometric properties of the developed measure. Thus, the consistent application of the Accuracy and Appropriateness model (Hughes, 2018) also enabled the direct comparison of the psychometric properties of the developed measure with the current measures of innovative work behaviour, and presented all the necessary information required for its evaluation.

These two contributions, if realised, could have several additional implications. For example, the Behavioural Innovation Process model could potentially be used as a practical guideline assisting organisations to conduct a job analysis for positions where being innovative is necessary or desirable. Specifically, it could be used to describe the tasks, skills, and behaviours necessary for an individual to be successful in an innovation-demanding job. Furthermore, the developed model could potentially be used for recruitment purposes by providing the backbone of a structured interview so as to evaluate the applicants' innovativeness. Finally, it could be used as an assessment tool for existing employees in order to evaluate their innovation related strengths and weaknesses, and subsequently boost their innovativeness through focused training programmes.

Chapter 2

Literature Review

The present literature review provides a critical evaluation of the literature on innovative work behaviour. Chapter 2 first explores the broad literature on creativity and innovation, because these topics are directly related to the construct of innovative work behaviour. Next, the exploration of the literature on innovative work behaviour is structured around two broad axes; the conceptual models of the construct and the corresponding psychometric instruments. Finally, this chapter provides a general discussion of the literature on innovative work behaviour, accompanied by propositions with respect to how the identified limitations and omissions of the literature should be addressed.

2.1. Creativity and Innovation

This section reviews the literatures on creativity and innovation because they jointly present an important and influential piece of background information, closely related to the construct of innovative work behaviour. In doing so, two major creativity and innovation related issues that hamper definitional clarity and promote confusion, are discussed (Hughes et al., 2018; Potočnik & Anderson, 2016). Briefly stated, the first and foremost conceptual and empirical controversy of the field concerns the distinctiveness of creativity and innovation. The second conceptual controversy concerns the dependence of the definitions of the two constructs on the outcomes of the creativity and innovation processes.

2.1.1. Disentangling creativity and innovation

The literatures on creativity and innovation present a highly informative, but confusing body of work characterised by definitional ambiguity and measurement imprecision (Hoelscher & Schubert, 2015; Hughes et al., 2018; Potočnik & Anderson, 2016; Rosing, Bledow, Frese, Baytalskaya, Lascano, & Farr, 2018). Potočnik and Anderson (2016), in their review study of change and innovation related constructs, observed that the absence of definitional clarity, the terminological vagueness, and the lack of clearly stated construct conceptualisations has led to construct proliferation and an often dysfunctional state of the science. This is problematic because the provision of clear and concise definitions is crucial in order to develop unambiguous arguments and promote accurate communication within the research community (Inch & Tudor, 2015; Potočnik & Anderson, 2016).

Some scholars clearly associate creativity with the underlying processes leading to the generation of a creative novel idea (Axtell, Holman, Unsworth, Wall, & Waterson, 2000; Hughes et al., 2018; Mumford, 2003), whereas others go far beyond that and extend the conceptualisation of the creativity process to include the development of novel products, and procedures (Madjar, Oldham, & Pratt, 2002; Woodman, Sawyer, & Griffin, 1993; Oldham & Cummings, 1996). This definitional confusion has promoted ambiguity regarding the constructs' distinctiveness, and as a result, creativity and innovation have often been treated as synonymous constructs (Sears & Baba, 2011) capturing the same concept (Hughes et al., 2018; Baer, 2012). This conceptual confusion has been further manifested by the tendency of organisational researchers to view innovation as a broad construct (Hammond et al., 2011; Hughes et al., 2018; Potočnik & Anderson, 2016) that subsumes both the creativity (Hülsheger, Anderson, & Salgado, 2009) and subsequent innovation processes (Patterson, 2002).

Two characteristic examples of treating creativity and innovation as parts of a broader construct are Amabile and Pratt's (2016) Dynamic Componential Model of Creativity and Innovation, and Mumford, Mobley, Reiter-Palmon, Uhlman, and Doares's (1991) Creative Process Model. Amabile and Pratt (2016) argued that creativity and innovation should be treated as two "inextricably linked" components of the same process. Mumford and colleagues (1991; 2012; 2015) also proposed that innovation is based on creativity, and thus, innovation is an extension of the creativity process. These two models have two things in common. First, they have both presented a detailed account of the creativity sub-processes that lead to the generation of creative ideas but did not place the same emphasis on the processes that facilitate the implementation of ideas. Specifically, Amabile and Pratt (2016) have embedded within the Dynamic Componential Model of Creativity and Innovation, a five-stage process model of creativity that described the individual level processes, which result in the production of creative ideas. However, the implementation component of the process was abstractly presented and described, using a stage labelled "Testing and Implementing the ideas" under which, the organisational facilitators of implementation were primarily discussed rather than a detailed process stage model. Likewise, Mumford and colleagues (1991) dedicated six out of the eight stages, presented in the Creative Process Model, to the detailed description of the sub-processes that result into the generation of creative ideas, but specified only one stage for implementation, which was particularly surprising when taking into account Mumford and colleagues' (1988; 2015) argument that innovation is a much more complex activity than creativity. Second, both models have treated innovation as an organisational phenomenon. Studying innovation as an organisational phenomenon, as opposed to creativity which was approached from the individual level, might be the reason why both models did not provide a more in-depth discussion of the sub-processes individuals need to carry out to facilitate implementation. Nevertheless, the disproportionate focus in detail both models placed in favour of creativity, as opposed to the innovation component of the creativity/innovation process, provides further support to Magadley and Birdi's (2012) observation that the literature on creativity and innovation treats implementation as a routine stage, taken for granted. The tendency to treat creativity and innovation as two "inextricably linked" components of the same process has had pervasive implications for the models of innovative work behaviour, but for now, I do not discuss this any further, because I return to this issue in the section where the literature on innovative work behaviour is reviewed.

Another example of conceptual imprecision is to be found in Rosing and colleagues' (2018), otherwise exemplary, work. Specifically, in the Rosing et al.'s paper, creativity does not only refer to the process of developing an idea that is intended to be implemented but has also the broader meaning of creative thinking. As such, according to Rosing et al. (2018), individuals can think creatively in the late stages of the innovation process about non idea generation related aspects of the innovation process, such as how the idea could be best implemented, or how problems and obstacles that emerge during implementation could be overcome (Rosing et al., 2018). Therefore, in that instance creativity conceptually overlaps with behaviours that elsewhere in the literature on innovation have been labelled as reflective (e.g., MacCurtain, Flood, Ramamoorthy, West, & Dawson, 2010; Messmann & Mulder, 2012; Messmann & Mulder, 2015; West, 1996; West, 2002a). Considering that the contradictory and often overlapping conceptualisations of creativity and innovation promote confusion, it is imperative to clearly define the content of each construct (Potočnik & Anderson, 2016). Thus, it is argued that the constructs of creativity and innovation, albeit closely related, as shown by the positive meta-analytic correlation of .46 (Sarooghi, Libaers, & Burkemper, 2015), are by no means identical and should not be treated as such. The interchangeable use of the terms creativity and innovation only perpetuates confusion and hinders the scholarly investigation of these two important research fields.

The first reason for such an explicit assertion is grounded in two seminal review studies which have set clear boundaries of creativity and innovation (Anderson et al., 2014; Hughes et al., 2018). Both studies have explicitly stated that creativity refers to the generation of ideas, whereas innovation refers to the implementation of ideas. Additionally, another differentiating factor is that creativity can be, but is not always a precursor of innovation. Not all creative ideas translate into innovations or are intended to become innovations (Amabile, Conti, Coon, Lazenby, & Herron, 1996), and not all innovations are rooted in creative ideas (Hughes et al., 2018). Undoubtedly, innovation requires the existence of an idea but not always of a strictly speaking creative idea (Holman et al., 2012; Hughes et al., 2018). Creativity refers to the generation of novel and original ideas (Mumford, 2003; Mumford & Gustafson, 2012), whereas in the context of innovation, innovative ideas encapsulate both absolute and relative novelty (Anderson, De Dreu, & Nijstad, 2004). Hence, improvements and incremental modifications of existing ideas are grouped into the label of innovative ideas but may not necessarily meet the criteria necessary to be considered creative. For instance, if we apply the above definitions provided by Mumford (2003), Mumford and Gustafson (2012), and Anderson and colleagues (2004), the act of introducing an existing idea into a new context is considered an innovative behaviour, but would not be considered creative per se (West & Farr, 1990; Anderson et al., 2014). For example, an employee's proposal to the organisation's management to adopt an existing technology, widely used in other organisations, is considered an innovative behaviour within the context of the given organisation, but not a creative one. Therefore, creativity might feed the innovation process, but innovation can also occur without strictly novel creative ideas.

2.1.2. Defining creativity and innovation

Disentangling creativity and innovation is a necessary but not sufficient condition in order to offer concise definitions. The second area of controversy is the dependency of creativity and innovation on their produced outcomes. Specifically, definitions of these two constructs often, do not disentangle the constructs from their effects (De Spiegelaere, Van Gyes, Van Thillo, & Van Hootegem, 2012; De Spiegelaere, Van Gyes, & Van Hootegem, 2014; Hughes et al., 2018). For example, Anderson et al.'s (2014, p. 1298) definition has stated that "Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things". In another example, Janssen (2000, p. 288) has defined innovation "as the intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization".

Thus, according to this logic, whether certain behaviours can be considered creative and innovative or not, depends on whether an idea was created, introduced, and applied. It is argued that this logic is inherently flawed because the outcomes of the processes of creativity and innovation are not guaranteed from the onset of the process, and thus, future and unknown outcomes cannot define the nature of presently expressed behaviours. An everyday analogy for this logic, would be to judge whether someone was cooking or not based on whether they produced an edible dish.

The present author concurred with the view of authors (e.g., De Spiegelaere et al., 2012; 2014b; Hughes et al., 2018; Messmann & Mulder, 2012) who disentangle creativity and innovation from their outcomes, at least in terms of construct definition, and adopted Hughes and colleagues' (2018, p. 551) definition of creativity and innovation:

“Workplace creativity concerns the cognitive and behavioural processes applied when attempting to generate novel ideas. Workplace innovation concerns the processes applied when attempting to implement new ideas. Specifically, innovation involves some combination of problem/opportunity identification, the introduction, adoption or modification of new ideas germane to organizational needs, the promotion of these ideas, and the practical implementation of these ideas”.

Hughes et al.’s definition disentangles creativity from innovation, and also explicitly focuses on the underlying processes of the constructs, rather than their outcomes. It is suggested that this clear-cut distinction between the two constructs is the optimal way forward, because it promotes definitional clarity and minimises conceptual confusion.

2.2. Innovative Work Behaviour

Having disentangled and defined the constructs of creativity and innovation, the following evaluation of the literature on innovative work behaviour intended to make even clearer why future research should follow Hughes’ and colleagues’ (2018) paradigm. In fact, creativity and innovation have been so strongly entwined in the empirical literature (see Hughes et al., 2018 review paper for a detailed presentation of the conceptualisation and measurement of creativity and innovation) that it is difficult to review the literature on innovative work behaviour without stumbling on creativity related content, that as explicitly stated earlier should not be considered part of innovation. Infusing models of innovative work behaviour with creativity related content not only perpetuates confusion, but also underrepresents the content of the construct of innovative work behaviour. Although innovative work behaviour is reasonably dependent on the existence of an innovative idea (Hughes et al., 2018), the source of innovative ideas is not necessarily creativity, but ideas can be sourced through a multitude of ways (De Jong & Den Hartog, 2010; Holman et al., 2012; Hughes et al., 2018). Following Hughes' definition, the idea related content of innovative work behaviour should describe how an idea is managed to fit into an identified organisational need or problem, rather than how the idea was generated in the first place. Idea generation should be the focal point of creativity and not innovation. Nevertheless, given that it is necessary for the purpose of the present thesis to evaluate the existing literature as is, I present the existing terminology, even though I explicitly state that I deem it to be inaccurate.

Innovative work behaviour can be understood as the behavioural component of individual innovation. As such, models of innovative work behaviour have described the activities and behaviours applied in order to generate, promote, and implement an innovative idea (Patterson, Kerrin, & Gatto-Roissard, 2009). The remainder of this section first discusses the "linear" and "complexity" perspectives of models of innovative work behaviour. Next, the explanatory properties of models of innovative work behaviour are presented. Subsequently, the existing models of innovative work behaviour are examined. Finally, the existing psychometric measures of innovative work behaviour are reviewed and discussed.

2.2.1. "Linear" and "Complexity" perspectives of models of innovative work behaviour

This section discusses the overarching principles of modelling innovative work behaviour. As it is later illustrated in detail, models of innovative work behaviour adhere to the "linear" perspective and conceptualise the construct by applying a stage-like framework (King & Anderson, 2002; Rosing et al., 2018). Linear stage models delineate the tasks that need to be successfully accomplished prior to proceeding to the next task, and assume a broadly linear transition from one stage to the next (Rosing et al., 2018). For example, an idea has first to be promoted and then implemented (Holman et al., 2012). However, despite their prevalence, linear stage models are not without limitations, because they make some compromises in terms of realism, particularly when they do not account for the iterative nature of the innovation process (Messmann & Mulder, 2012; Pérez-Bustamante, 1999; Rosing et al., 2018; Scott & Bruce, 1994). Rosing and colleagues (2018), in a longitudinal study, examined the temporal dynamics of the innovation process, and demonstrated that the innovation process is not linear but an iterative process often requiring backward steps in order to move forward (Anderson et al., 2014; Rosing et al., 2018). For example, unforeseen difficulties during implementation might require the re-evaluation of the innovative idea, or the identification of an alternative method to overcome the difficulty. Therefore, the adoption of the "linear perspective" is inherently limited.

Despite this widely acknowledged limitation, linear stage models have been the preferred framework for conceptualising innovative work behaviour, as the competing "complexity perspective" has also important limitations (Rosing et al., 2018). The "complexity perspective" states that it is difficult to categorise and differentiate the innovative work behaviours under discreet stages because they are indistinguishable and simultaneously occurring, and the innovation process does not evolve in a linear fashion (Anderson et al., 2014; Paulus, 2002; Scott & Bruce, 1994; Shalley, Hitt, & Zhou, 2015). Although, there is some element of truth in this claim, as indeed, innovative behaviours, which belong to different stages according to the stage-like models, can occur simultaneously and without adhering to a pre-defined temporal order, empirical evidence has shown that some separation among stages is desirable (Rosing et al., 2018). For example, implementation behaviours are not needed during the early time frames of the innovation process (Rosing et al., 2018). Hence, although innovative behaviours primarily belonging to the early (e.g., Opportunity exploration and idea adaptation behaviours) and late (e.g., Implementation behaviours) time frames of the innovation process are heavily intertwined, simply viewing them as a single construct is reductionist, and hinders the detailed examination of the factors that promote or suppress innovative endeavours (Rosing et al., 2018). Further, the utility of the "complexity perspective" for applied research has been heavily criticised by researchers because it disallows the assessment of the differential impact of the individual and contextual antecedents on the different stages of the innovation process (Baer et al., 2015; Bos-Nehles et al., 2017; Hammond et al., 2011; Hughes et al., 2018). After all, empirical studies have demonstrated that the antecedents of innovative work behaviour are differentially related to different stages of the innovation process (e.g., Axtell et al., 2000; Hammond et al., 2011; Holman et al., 2012; Magadley & Birdi, 2012).

Concluding, I concur with Rosing and colleagues' (2018) suggestion that a combination of the two perspectives is preferable. As such, some form of stage categorisation of innovative work behaviours is desirable, for it allows a more detailed understanding of the innovation process, and is particularly useful for didactical and research purposes (Kanter, 1988). Nevertheless, the iterative nature of the innovation process, as described by the "complexity perspective" and several scholars, should not be disregarded, and should be integrated into stage models of innovative work behaviour.

2.2.2. Activity stage models of innovative work behaviour

Activity stage models of innovative work behaviour aspire to present both the stages and the underlying individual behaviours facilitating the implementation of innovative ideas (King & Anderson, 2002). In principle, activity-stage models of innovative work behaviour should constitute a systematic explanatory framework mapping the innovation process and describing the activities and behaviours individuals need to perform under each stage in order to implement an innovative idea (Patterson et al., 2009). As shown in Figure 2.1, the explanatory properties of models of innovative work behaviour can be broken down into three layers, each operating at a different level of abstraction.

The first layer concerns the stages. Each stage can be understood as a task that needs to be accomplished in order to produce an innovative outcome (Scott & Bruce, 1994; Janssen, 2000; Messmann & Mulder, 2011). Depending on the adopted theoretical model, these tasks may vary in terms of their specificity. For example, Axtell and colleagues (2000) described two tasks; idea suggestion and idea implementation, whereas Janssen (2000) broke down the latter stage into two narrower tasks; promotion and implementation, and De Jong and Den Hartog (2010) broke down the idea generation stage into two discreet stages; idea exploration and idea generation. Each broad task can be further broken down into the broad activities that enable its successful completion. For example, Holman and colleagues (2012) suggested that in order to accomplish the task of promotion an employee needs to obtain support from organisational members for the proposed idea and try to get organisational approval. Subsequently, each activity can be further broken down into more specific behaviours, explaining how each activity can be performed (Messmann & Mulder, 2011). This last layer is the one that provides an in-depth understanding of the behaviours facilitating innovation. In other words, the stages' labels of models of innovative work behaviour point to the "*what"* needs to be done in order to facilitate the innovation process, and the activities and behaviours grouped into each stage elaborate "*how*" this facilitation is to be pursued. However, the following review of the existing models of innovative work behaviour reveals that both the "*what*" and the "*how*" of the innovation process are not satisfactorily addressed.

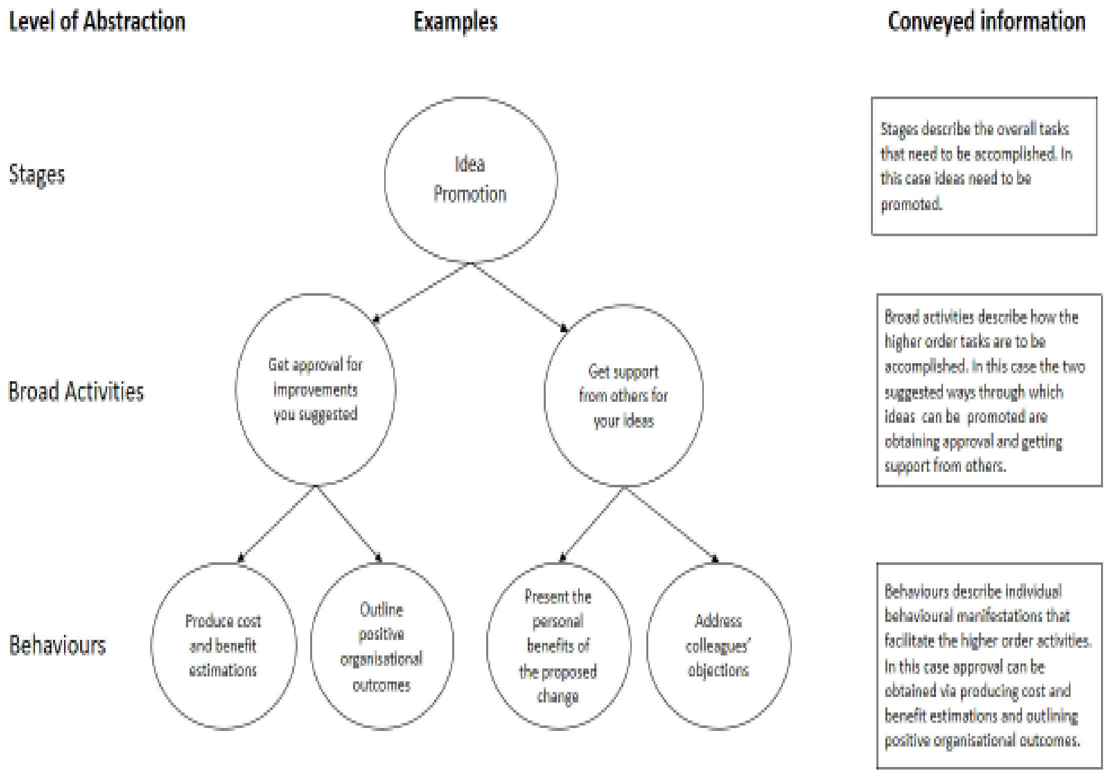

Figure 2.1. Layers of conveyed information by the models of innovative work behaviour

2.2.3. Review of models of innovative work behaviour

In an early review of activity stage models, Wolfe (1994) has noted that the most consistent conclusion drawn from the literature on innovation has been its inconsistency (p. 405). One particular problem identified by Wolfe was the ambiguity regarding the stages of the innovation process. This ambiguity was attributed to the inconsistent and often partially overlapping activity stage models of the innovation process, the lack of explicit clarification of the proposed stages, and the lack of empirical verification (Wolfe, 1994). Following the millennium, a surge of empirical examinations of activity stage models of innovative work behaviour appeared in the literature (see Table 2.1). However, the present day status of the literature on innovative work behaviour is not far from Wolfe's characterisation, because, as illustrated in the following sections, existing theoretical conceptualisations of innovative work behaviour are incomplete, failing to capture important parts of the innovation process. Further, the existing models of innovative work behaviour tend not to precisely present the behaviours that occur during the proposed stages. In addition, current evidence is limited because current research relies upon measures that are unable to effectively assess the most important stages.

2.2.3.1. Stages of the models of innovative work behaviour

The stages of the models of innovative work behaviour describe what needs to be done in order to successfully complete the innovation process (see Figure 2.1). Therefore, this section focuses on the tasks that existing models of innovative work behaviour specify to be part of the innovation process and not on the activities and behaviours that facilitate these tasks. Table 2.1 presents the activity stage models of innovative work behaviour that have undergone some form of empirical examination. The models are categorised in an ascending order by the number of stages theorised to describe the innovation process, and the authors' definitions for each stage are presented.

Table 2.1

Activity stage models of innovative work behaviour

Authors	Theoretical models' dimensionality		Authors' definitions of dimensions
	Number of dimensions	Dimensions' labels	
Axtel, Holman, Unsworth, Wall & Waterson (2000)	2	a. Suggestions b. Implementations	An overall definition is provided: "Innovation may be defined as a process that involves the generation, adoption, implementation and incorporation of new ideas, practices or artifacts within organizations" (p. 266)
Krause (2004)	2	a. Generation and testing of ideas b. Implementation	a. "The generation and testing of ideas encompasses processes of defining their focus (formulating and analyzing the problem), finding ideas (developing and recombining ideas and mentally trying them out), and proposing the resulting ideas" (p. 82) b. "The implementation encompassed the introduction of a new procedure and its use by the department or project group, so that it could subsequently be made into a daily routine" (p. 83)
Dorenbosch, van Engen & Verhagen (2005)	2	a. Creativity oriented work behaviour b. Implementation oriented work behaviour	a. "starts with the recognition and understanding of work related problems, followed by the production of novel and useful ideas within the work context" (p. 130) b. "including the promotion of a novel idea to potential allies (e.g., colleagues and managers) and realizing actual ideas that ultimately can be applied within the work-role, group or total organization" (p. 130)
Janssen (2000)	3	a. Idea generation b. Idea promotion c. Idea realisation	a. "the production of novel and useful ideas in any domain" (p. 288) b. "engage in social activities to find friends, backers, and sponsors surrounding an idea, or to build a coalition of supporters who provide the necessary power behind it" (p. 288) c. "producing a prototype or model of the innovation that can be experienced and ultimately applied within a work role, a group or the total organization" (p. 288)

Holman et al. (2012)	3	a. Idea generation b. Idea promotion c. Idea implementation	a. "the creation of new ideas by employees that are intended to be useful" (p. 179) b. "suggesting ideas to others, persuading others to adopt new ideas and gaining support for ideas" (p. 179) c. "introducing a new idea in a systematic way and obtaining resources to aid implementation" (p. 179)
De Jong & Den Hartog (2010)	4	a. Idea exploration b. Idea generation c. Idea Championing d. Idea Implementation	a. "looking for ways to improve current products, services or processes or trying to think about them in alternative ways" (p. 24) b. "The generation of ideas may relate to new products, services or processes, the entry into new markets, improvements in current work processes, or in general terms, solutions to identified" (p. 24) c. "Championing includes finding support and building coalitions by expressing enthusiasm and confidence about the success of the innovation, being persistent, and getting the right people involved" (p. 24) d. "Idea implementation also includes making innovations part of regular work processes and behaviours like developing new products or work processes, and testing and modifying them" (pp. 24 - 25)
Kleysen & Street (2001)	5	a. Opportunity exploration b. Generativity c. Formative investigation d. Championing e. Application	a. "travelling extensively through innovation opportunities in order to learn or discover more about them" (p. 285) b. "generativity deals with behaviors directed at generating beneficial change for the purpose of "growing" organizations, their people, products, processes, and services" (p. 286) c. "giving form to and fleshing out ideas, solutions, and opinions and trying them out through investigation" (p. 286) d. "Championing consists of the socio-political behaviors involved in processes of innovation which are essential to realizing the potential of ideas, solutions, and innovations" (p. 287) e. "working at making innovations a regular part of business as usual" (p. 287)
Messmann & Mulder (2012)	5	a. Opportunity exploration b. Idea generation	a. "Opportunity exploration refers to the recognition and comprehension of problems and needs in one's work context that create an opportunity for change and improvement" (p. 44) b. "Idea generation contains the activation of innovation development by creating and suggesting ideas for products or processes that are new, applicable, and potentially useful for approaching the identified opportunities" (p. 44)

	c. Idea promotion d. Idea realisation e. Reflection	c. “Idea promotion encompasses championing the ideas by convincing the social environment of the envisioned innovation and building a coalition of allies that take over responsibility and provide necessary information, resources, and support.” (pp. 44 - 45) d. “Idea realization involves experimenting with one’s ideas, creating a physical or intellectual prototype of the innovation, examining and improving its adequacy, and planning its strategic integration into organizational practice.” (p. 45) e. “Reflection encompasses assessing the progress of innovation development, evaluating activities and outcomes based on criteria for success, examining one’s personal advancement during innovation development, and improving action strategies for future situations” (p. 46)

All models of innovative work behaviour have been useful and have incrementally contributed to the advancement of the field. Nevertheless, it is argued that no single model on its own adequately describes the entirety of the innovation process. It is proposed that the best way forward is to combine the unique contributions of each model, since all models taken together present a more accurate depiction of the broad tasks of the innovation process. There are three main elements to this argument, and each is discussed in turn.

First, some of the models are deemed overly simplistic and have been surpassed by more accurate and comprehensive theoretical models. This is evidenced by a series of studies that have theorised (e.g., De Jong & Den Hartog, 2010; Janssen, 2000; Messmann & Mulder, 2012) and supported with empirical evidence more elaborate models of innovative work behaviour (e.g., De Jong & Den Hartog, 2012; Holman et al., 2012; Messmann & Mulder, 2012) compared to the simplest two-stage form of activity-stage models of innovative work behaviour. The two-stage models are grounded in Van de Ven's (1986) conceptualisation of the innovation process, namely the generation of ideas and the subsequent implementation. Axtell et al., (2000), Krause (2004) and Dorenbosch et al., (2005) adopted Van de Ven's paradigm, but with some variations on the labels used to describe the stages (see Table 2.1). All three studies reported that the empirical examination of the models supported the distinctiveness between the stages of idea generation and idea implementation. However, the following theoretical considerations and empirical evidence indicate that such a conceptualisation is insufficient.

Innovation is by definition about implementing innovative ideas (Anderson et al., 2014; Hughes et al., 2018). It has been stressed that the real problem organisations face is how the ideas get implemented (Van de Ven, 1986; West, 2002b; Baer, 2012). An innovative idea is more likely to be implemented, and thus provide some benefit to the organisation, when others have been persuaded of its potential, its usefulness, its feasibility, and its compatibility with individual and organisational objectives (Choi & Chang, 2009; Litchfield, Ford, & Gentry, 2015). Empirical studies (Da Silva & Oldham, 2012; Mueller, Melwani & Goncalo 2012; Rietzschel, Nijstad, & Stroebe, 2006; 2010) have emphasised that the difficulty ideas face in order to proceed to the implementation stage, and thus be successfully promoted, can be better understood when taking into account the recipients of these ideas. For example, Mueller and colleagues (2012) found that people are often biased against ideas, which are new in a given context, because new ideas can be associated with change and uncertainty (Amabile, 1996). Therefore, considering that innovation is a process that by definition implies change (King & Anderson, 2002), it is often the case that change is associated with feelings of insecurity, fear of the unknown (Bruckman, 2008), uncertainty and skepticism (Janssen, Van de Vliert, & West, 2004), and can be perceived as potentially disruptive of organisational norms and practices (Mueller et al., 2012). Uncertainty though, is not a desirable state, and people often lack motivation to commit themselves to a process with an unknown outcome (Whitson & Galinsky, 2008).

Furthermore, the more radical a proposed innovation is the more likely it is for organisational members to resist its adoption (Mueller et al., 2012). Da Silva and Oldham (2012) also provided empirical evidence demonstrating that ideas suggesting minor incremental changes are more likely to be implemented than the ones who involve radical changes. Propositions of radical changes in the workplace are often associated with a risky period of turbulence during the transition from an existing status quo to another (Shane, 1994; Janssen et al., 2004), with larger margins for failure (Hennessey & Amabile, 2010), and threats to established routines (Hon, Bloom, & Crant, 2014), and potential conflict of interests (Baer, 2012). Thus, radical innovative ideas typically face high resistance for reasons that are often beyond the idea itself but are founded in the natural inclination of people to avoid potentially disruptive situations (Oreg, 2003). Overcoming resistance and dissolving potential conflicts of interest and priorities, hence, persuading the members of the organisation to commit to the proposed change, is a critical factor for the success of the innovation process (Kelley & Lee, 2010). As such, an important task, innovators need to perform, is to successfully promote the merits of their ideas and overcome resistance, and such a task is not embedded in the aforementioned two-stage models.

Considering that theoretical models of innovative work behaviour should describe the individual activities and behaviours facilitating innovation (Patterson et al., 2009), the acknowledgment of the importance of idea promotion, and its incorporation into more elaborate and empirically supported models of innovative work behaviour (Janssen, 2000; Holman et al., 2012; De Jong & Den Hartog, 2010; Kleysen & Street, 2001; Messmann & Mulder, 2012), should be considered an important contribution to theory. Specifically, Holman et al.'s (2012) and Messmann and Mulder's (2012) studies presented factor analytic results indicating that the stage of idea promotion is indeed a discreet stage of the innovation process. Thus, recent advancements in the modelling of innovative work behaviour have supplemented the two-stage models of innovative work behaviour to the extent that idea promotion is now considered a fundamental component of the construct.

Second, although there is a significant overlap between activity-stage models of innovative work behaviour, to varying degrees each model presents a piecemeal reflection of the entirety of the innovation process. For example, one model has empirically demonstrated and presented the existence of a stage of the innovation process that was missing from another model (e.g., Reflection, Messmann & Mulder, 2012; Idea implementation, Holman et al., 2012), but at the same time the first model has omitted the stage that was presented by the second. Thus, it is suggested that existing models should cross-pollinate, which would lead to the development of comprehensive models.. One could argue that cross-pollination is not necessary as differences in conceptualisations could simply be a conscious scholarly disagreement rather than a theoretical omission. However, it is argued that this is not generally the case, particularly when empirical evidence provides support for widely consensual theoretical arguments. For example, Messmann and Mulder's (2012) factor analysis of their developed psychometric instrument of innovative work behaviour showed that the stage of opportunity exploration is indeed a separate stage of the innovation process. This evidence-based progression is theoretically meaningful because, as already discussed, identifying opportunities in the context of a given organisation is qualitatively and conceptually different from generating new and novel ideas (Hughes et al., 2018). Further, Messmann and Mulder's (2012) empirical study has also identified "reflection" to be a unique stage of the innovation process. Reflection is a stage that describes the reflective behaviours facilitating the iterative nature of the innovation. Reflection concerns the monitoring and the evaluation of expressed behaviours, based on criteria of success, and the subsequent modification of future comparable behaviours, as a means of continuous improvement (Messmann & Mulder, 2012). The usefulness of this most recent addition to the activity-stage models of innovative work behaviour (i.e., the introduction of reflection as part of the innovation process; Messmann & Mulder, 2012) is quite difficult to dispute. That is because reflection is a topic that has been widely discussed by innovation scholars and is almost considered an axiom (Anderson et al., 2014; Bledow, Frese, Anderson, Erez, Farr, 2009; West, 2002a; Hammond et al., 2011), whereas Rosing et al.'s (2018) longitudinal study has also empirically shown that reflective behaviours are indeed a core part of the innovation process. As such, from a theoretical perspective, Messmann and Mulder (2012) significantly contributed to a more realistic understanding of the innovation process, by providing the first empirical integration of reflective behaviours into a model of innovative work behaviour.

Third, some of the activity-stage models of innovative work behaviour have not been empirically supported, as their multi-dimensional theoretical conceptualisations were not confirmed by the data and the authors concluded that the construct is best operationalised uni-dimensionally (i.e., Janssen, 2000; Kleysen & Street, 2001; De Jong & Den Hartog, 2010). For example, De Jong and Den Hartog theorised that the process of innovation consists of 4 discrete stages, but their empirical findings led them to the conclusion that the construct was best operationalised as a single, global innovative work behaviour dimension. Moreover, Messmann and Mulder's (2012) model has received only partial support. Specifically, factor analytic results indicated that the hypothesised idea realisation stage does not form a distinct factor as the corresponding items loaded on other factors, whereas the other four hypothesised factors were retained (Messmann & Mulder, 2012). Thus, Messmann and Mulder's empirical findings provided support for a four-stage model of innovative work behaviour, and not for the a priori hypothesised five-stage model of innovative work behaviour.

In conclusion, the examination of the stages of the models of innovative work behaviour can be summarised with two concluding remarks. First, the baseline distinction between idea generation and implementation is inadequately describing the innovation process, considering that empirical studies have supported more complex and elaborate theoretical models. Specifically, the literature has now empirically shown that apart from the two basic stages (i.e., Idea generation and Idea implementation), opportunity exploration (Messmann & Mulder, 2012), idea promotion (Holman et al., 2012; Messmann & Mulder, 2012), and reflection (Messmann & Mulder, 2012) are constituent components of the construct of innovative work behaviour. Second, our understanding of the innovation process can be further promoted by the integration of each model's contribution into a more comprehensive theoretical model and the empirical examination of such a model. For example, Holman and colleagues' (2012) model omitted the important aspects of reflection, and opportunity exploration. Considering that there is compelling empirical evidence concurring with a strong theoretical logic that indicates reflection and opportunity exploration to be essential constituents of the innovation process (e.g., Anderson et al., 2014; Hughes et al., 2018; Messmann & Mulder, 2012; Rosing et al., 2018), it is highly likely that the combination of research findings that examine overlapping conceptualisations of the same construct could produce a more elaborate model of innovative work behaviour.

2.2.3.2. Focus of the stages of the models of innovative work behaviour

The focus of the stages of the models of innovative work behaviour refers to the focal orientation (i.e., Process or Product focused) of the stages' underlying content. A process focus refers to behaviours and cognitions with the explicit intention to develop and realise innovative ideas (Batey, 2012). A product focus refers to the outcomes of the innovation process and its sub-processes (i.e., innovative outcomes/ identification of opportunities) (Batey, 2012). This section is going to explore the focus of the models of innovative work behaviour presented in Table 2.1, by examining their definitions (see Table 2.1) and the descriptive narratives provided by the authors in their published papers. A detailed investigation of the associated psychometric instruments and how they were influenced by the focus of their respective theoretical models is provided in the next section, which is dedicated to the measurement of innovative work behaviour.

A summary of the evaluation of the focus of the models of innovative work behaviour is presented in Table 2.2. Because the definitions of the stages have already been presented in Table 2.1, here, I present only in-text quotations that justify the assigned characterisation. The in-text quotations were obtained from the papers presented in Table 2.1. Axtell et al. (2000) did not provide any further descriptive text that would indicate the focus of their model. An example quotation of the type of information discussed by Axtell et al. (2000), following the provided definition of innovative work behaviour, is "several different perspectives on innovation exist…. most approaches identify two key elements. The first is an "awareness" of the innovation, or suggestion, phase; and the second is an implementation phase" (p. 266). As such the evaluation of the construct's nature is based on the overall definition provided in the paper, which identifies innovation as a process, albeit clearly dependent on its products.

Table 2.2

Focal orientation of the stages of the models of innovative work behaviour

Authors	Stages	Assessment of focus
Axtell et al., 2000	a. Suggestions b. Implementations	a. Combination of process and product b. Combination of process and product
Krause, 2004	a. Generation and testing of ideas b. Implementation	a. Process b. Product
Dorenbosch et al., 2005	a. Creativity oriented work behaviour b. Implementation oriented work behaviour	a. Combination of process and product b. Combination of process and product
Janssen, 2000	a. Idea generation b. Idea promotion c. Idea realisation	a. Product b. Process c. Product
Holman et al., 2012	a. Idea generation b. Idea promotion c. Idea implementation	a. Product b. Process c. Product

De Jong & Den Hartog, 2010	a. Idea exploration b. Idea generation c. Idea championing d. Idea Implementation	a. Process b. Combination of process and product c. Process d. Combination of process and product
Kleysen & Steet, 2001	a. Opportunity exploration b. Generativity c. Formative investigation d. Championing e. Application	a. Process b. Product c. Process d. Process e. Product
Messmann & Mulder, 2012	a. Opportunity exploration b. Idea generation c. Idea promotion d. Idea realization e. Reflection	a. Process b. Combination of process and product c. Process d. Process e. Process

Krause’s (2004) descriptive text for the stage of generation and testing ideas, briefly extended the provided definition of the stage of generation and testing ideas (see Table 2.1), and again focused on the process of developing an idea, as shown in the following quotation. “For the generation of ideas, it is crucial that information is combined in a new way, as is often the case by forming analogies to what is familiar …. these processes are manifested in the middle manager’s eagerness to experiment and take risks, discuss the problem with others, or invest time and energy in finding a better variant.” (Krause, 2004, p. 82). Both the definition and the descriptive text provided, show that Krause’s focus was on the process rather than the outcomes. Concerning the stage of implementation, Krause focused on the products of the stage of implementation rather than on how the implementation could be facilitated. This assessment was based on both the provided definition of the stage of implementation (see Table 2.1) and the following quotation. “The scope of implementation is determined by the degree to which the process innovation is used as intended and to which the innovation spreads” (Krause, 2004, p. 83).

Regarding Dorenbosch et al.'s (2005) conceptualisation, the authors did not provide any further text to describe the nature of the hypothesised stages, apart from the definitions presented in Table 2.1. The only other available descriptor of the innovation process was to be found in the following quotations and concerned West and Farr's (1990) definition of the innovation process as a whole, and a brief sentence that succinctly defined the adopted focal orientation. "IWB as the intentional introduction and application of ideas, processes, products or procedures, within a role, group or organization, new to the relevant unit of adoption designed to significantly benefit the individual, group, organization or wider society" (p. 130); "we focus on the employees' innovative performance" (p. 130). Whereas, these quotations clearly indicate the adoption of a product focus, the provided definitions include process descriptors, and as such both stages combine a process and product focus.

The evaluation of the focus of Janssen's (2000) model was solely based on the definitions presented in Table 2.1, as the author did not discuss any further the theoretical content of their model. As shown in the following quotation the additional information provided was generic and concerned the sources of ideas and the implementation actors (i.e., Individuals or teams). "Perceived work-related problems, incongruities, discontinuities, and emerging trends are often instigators of the generation of novel ideas….. Simple innovations are often completed by individual workers involved, while the accomplishment of more complex innovations usually requires teamwork" (Janssen, 2000, p. 288). Therefore, based on the available definitions, the stages of idea generation and realisation are product focused, whereas the stage of idea promotion is process focused.

The focal orientation of Holman and colleagues' (2012) model was also identified through the definitions provided (see Table 2.1), as the additional information provided concerned the nature of the ideas, rather than the process. “We define an idea as being new if it is new to a particular context, and such ideas can differ in terms of scale and originality. New ideas can therefore be copied from elsewhere and concern small changes or they can be highly novel ideas concerned with large-scale change” (Holman et al., 2012, p. 179). Thus, according to the available definitions (see Table 2.1) the stages of idea generation and implementation are product focused, whereas the stage of idea promotion is process focused.

De Jong and Den Hartog (2010) apart from the provided definitions (see Table 2.1) of the stages, conducted a somewhat more extended discussion of the construct of innovative work behaviour, compared to the aforementioned authors. Example quotations were “idea generation appears to be the combination and reorganization of information and existing concepts to solve problems or to improve performance” (p. 24), “the champions of innovation…..push creative ideas beyond roadblocks in their organizations and help realizing innovative ideas” (p.24), and “considerable effort and a result-oriented attitude are needed to make ideas happen” (p.24). Thus, taking account of the available definitions (see Table 2.1) and the descriptive text, the stages of idea exploration and idea championing display a process focus, whereas the stages of idea generation and implementation combine a process and product focus.

Kleysen and Street (2001) on top of the definitions provided (see Table 2.1), presented a clear list of the underlying content for each of the proposed dimensions. Example quotations concerning each of the five stages discussed include “Paying attention to opportunity sources” (p. 285), “Generating ideas and solutions to opportunities” (p. 286), “Experimenting with ideas and solutions” (p.286), “Pushing and negotiating” (p. 287), and “Implementing ….Modifying …Routinizing” (p. 287). The assessment of the focus of thestages indicated that the stages of opportunity exploration, formative investigation, and championing adopted a process focus, whereas the stages of generativity and application adopted a product focus.

Finally, Messmann and Mulder's (2012) text provided a clear indication of the nature of the proposed stages. Example quotes were "being attentive to one's work environment and keeping up with recent developments and events" (p. 45), "expressing and discussing ideas for necessary changes regarding these problems" (p. 46), "negotiating with key actors about permissions and resources" (p.46), "developing a hands-on model or example of the innovation ….. planning its practical application in the work context" (p.46), and "evaluating activities and outcomes based on criteria for success" (p.46). Summarising, all stages but idea generation, which combines a process and product focus, display a process orientation.

This evaluation has revealed that several models of innovative work behaviour did not disentangle the constructs from their effects (De Spiegelaere et al., 2012; 2014b; Hughes et al., 2018). Specifically, all but Messmann and Mulder's (2012) model, which combines a process and product focus only for the idea generation stage, are to varying degrees focused on the products of the stages rather than the underlying processes. An overall observation is that the most commonly process focused stages are those of idea promotion/championing and opportunity exploration, with all 5 models that include idea promotion and 3 that include opportunity exploration being process focused. On the contrary, idea generation is heavily focused on products with 4 models out of 8 being evaluated as product focused, whereas 3 out of 8 being evaluated as combining a process and product focus. The only model that had a process focus concerning the stage of idea generation was Krause's (2004). Likewise, the stage of idea implementation is heavily focused on products with 5 models out of 8 being evaluated as product focused, whereas 2 out of 8 being evaluated as displaying a combination of process and product focus. The only model that had a process focus on idea implementation was Messmann and Mulder’s (2012).

This evaluation suggested that research efforts have mainly concentrated on the identification of the stages, and that due to the lack of a consensual focal orientation, it was up to each researcher to determine the focus of their proposed models. Identifying the stages of the innovation process is an important first step, because stages define the structure of the construct, but innovative work behaviour, by definition, should be focused on processes, thus behaviours. The innovation process is a complex endeavour and knowing that individuals need to initiate an innovative idea, promote it, and implement it (Janssen, 2000; Holman et al., 2012) is indeed useful as a starting point, and tells us what needs to be done. Nevertheless, that knowledge brings us no closer to understanding how it is to be done. The “*how*” can be answered only by identifying the behaviours that facilitate the “*what*”. Concurring with Messmann and Mulder’s point of view, and Hughes et al.’s (2018) call for behaviourally focused models of innovative work behaviour, it is suggested that our understanding of individual innovation would be best served if models of innovative work behaviour focused on the actual behaviours which constitute the basis of organisational innovation. Unless the behaviours that enable employees to overcome the various obstacles presented during the innovation process are identified, it is difficult to develop an in depth understanding of innovative work behaviour.

One further observation that emerged during this evaluation concerned the level of specificity of the models that adopted a process focus. The issue of the specificity of the models of innovative work behaviour has rarely been explicitly addressed in the literature on innovative work behaviour, with the exception of Messmann and Mulder (2011; 2012). The term specificity, herein, refers to the level of abstraction of the innovative activities and behaviours found under each stage of any given model of innovative work behaviour. As discussed in section 2.2.2 and illustrated in Figure 2.1, models of innovative work behaviour operate at three levels of abstraction. Apart from the broad tasks (i.e., stages), their underlying processes can be distinguished with respect to activities and behaviours. It was observed that with the exception of Messmann and Mulder's (2012) model, all other authors provided succinct descriptions of the processes that facilitate the more abstract tasks, usually residing in broad activities, thus conveying little or no insight regarding the actual behaviours needed to realise these tasks. Considering though that the descriptive texts provided by the authors were extremely brief, this observation cannot be satisfactorily supported with evidence just by reviewing their theoretical descriptive narratives. For this reason, the examination of the level of specificity of the existing models of innovative work behaviour is further investigated by the examination of the corresponding psychometric instruments, which evaluated the status of measurement of innovative work behaviour.

2.2.4. Measurement of Innovative Work Behaviour

This section first presents an item level review of the existing measures of innovative work behaviour, conducted by the current author. The item level review was a prerequisite for the evaluation of the psychometric properties of the measures to be implemented by the use of the Accuracy and Appropriateness model (Hughes, 2018), which was used as a guiding framework for the critical evaluation of the empirical literature and the empirical work conducted for the present thesis. An explanation for the assertion that an item level review is a necessary prerequisite, is provided in section 2.2.4.2.1 (p. 69), because that section discusses the Accuracy component of Hughes model, and clarifies that an item level review of psychometric instruments is necessary so as to evaluate the accuracy related psychometric properties of measures.

2.2.4.1. Item level review of measures of Innovative Work Behaviour

In the previous section the focal orientation of the existing models of innovative work behaviour was evaluated. Considering that psychometric instruments should ensure the content representativeness of the operationalized theoretical domain (Hughes, 2018), it is important to examine how the previously discussed focal orientation of the models of innovative work behaviour has influenced the measurement of innovative work behaviour. Hughes and colleagues' review study (2018) evaluated two of the most widely used measures of innovative work behaviour (i.e., Janssen, 2000; De Jong & Den Hartog, 2010). Their findings indicated that these measures (i.e., Janssen, 2000; De Jong & Den Hartog, 2010) are a mixture of process and product items, thus, lacking a concise and explicit focal orientation. Apart from the evaluation of measures' focal orientation, another issue I aim to explore is the specificity of the items, namely, whether the process items capture broad activities or more specific behaviours.

The following item level review was conducted using Batey's (2012) 4P measurement framework.

- Process: Behaviours and cognitions with the explicit intention to develop and realise ideas.
- Product: The outcomes of the innovation process and its sub-processes; innovative outcomes/ identification of opportunities.
- Person/Trait: Individual differences fostering creativity/innovation.
- Press/Environment: Environmental context within which the innovation process occurs.

During the item-level review process, each item was screened, evaluated, and assigned a value based on Batey's (2012) 4P measurement framework. Moreover, considering that Batey's measurement framework does not differentiate between broad activities and more specific behaviours, the items that were identified as having a process focus were assigned a value based on whether they describe broad activities or more specific behaviours. Thus, items identified to be tapping broad activities were assigned the value of 1. Items identified to be measuring specific behaviours were assigned the value of 2. Items identified as assessing products were assigned the value of 3. Because no items were found to measure Person or Press, no values were assigned for these two descriptors. Table 2.3 presents all the items evaluated and their assigned value. Table 2.4 presents a descriptive summary of the item level review. The outcome of this review was also cross-examined and validated by two subject matter experts. There were no disagreements concerning the assigned values.

As already reported above, an overall observation derived from the item-level review, was that the examined measures of innovative work behaviour contained no items tapping Person (i.e., traits) or Press (i.e., environment). However, this item level review revealed two issues. First, 7 out of the 8 innovative work behaviour measures contained a low percentage of specific behaviours ranging from 0% (Axtell et al., 2000) to 37.5% (Dorenbosch et al., 2005). The only exception was Messmann and Mulder's measure in which 75% of their items tapped specific behaviours. Thus, we can conclude that most of the existing measures either operate at a broad level (Percentage range 18.8% to 50 %), meaning broad activities were assessed, or instead of presenting individual activities and behaviours even at a broad level, describe and assess products (Percentage range 28.6% to 100%).

Table 2.3

Item level review of existing models of innovative work behaviour

Authors	Dimensions	Items
Axtell et al., 2000	Suggestions	1. Proposed new targets or objectives **(3)** 2. Proposed new working methods or techniques **(3)** 3. Proposed new methods to achieve work targets **(3)** 4. Proposed new information or recording systems **(3)** 5. Proposed new products or product improvements **(3)** 6. Proposed other aspects of their work. **(3)**
	Implementations	All items remained the same but instead of proposed the introductory word was implemented.
Janssen, 2000	Overall IWB	1. Creating new ideas for difficult issues **(3)** 2. Searching out new working methods, techniques, or instruments **(2)** 3. Generating original solutions for problems **(3)** 4. Mobilizing support for innovative ideas **(1)** 5. Acquiring approval for innovative ideas **(1)** 6. Making important organizational members enthusiastic for innovative ideas **(1)** 7. Transforming innovative ideas into useful applications **(3)** 8. Introducing innovative ideas into the work environment in a systematic way **(3)** 9. Evaluating the utility of innovative ideas **(1)**
Kleysen & Street, 2001	Overall IWB	1. Look for opportunities to improve an existing process, technology, product, service or work relationship **(1)** 2. Recognise opportunities to make a positive difference in your work, department organisation or with customers **(3)** 3. Pay attention to non-routine issues in your work, department, organisation or the market place **(2)** 4. Generate ideas or solutions to address problems **(3)** 5. Define problems more broadly in order to gain greater insight into them **(2)** 6. Experiment with new ideas and solutions **(1)** 7. Test out ideas or solutions to address unmet needs **(1)** 8. Evaluate the strengths and weaknesses of new ideas **(2)** 9. Try to persuade others of the importance of a new idea or solution **(1)** 10. Push ideas forward so that they have a chance to become implemented **(1)** 11. Take risk to support new ideas **(1)** 12. Implement changes that seem to be beneficial **(3)** 13. Work the bugs out of new approaches when applying them to an existing process, technology, product or service **(2)** 14. Incorporate new ideas for improving an existing process, technology, product or service into daily routines **(3)**

Krause, 2004	Idea generation and testing	1. I invested time and energy to find better variants **(1)** 2. I was also willing to take a risk **(1)** 3. I talked about the problem with others (e.g., experts) to develop something new **(2)** 4. I spared no effort to approach my boss to find solutions **(1)** 5. I liked to experiment **(1)**
	Implementation	6. I used the innovation myself **(3)** 7. I implemented the project idea in my area of work **(3)** 8. I completely carried out the decisions that had been made **(3)**
Dorenbosch et al., 2005	Creativity-oriented work behaviour	1. Actively think along concerning improvements in the work of direct colleagues **(2)** 2. Generate ideas to improve or renew services your department provides **(3)** 3. Generate ideas on how to optimise knowledge and skills within your department **(3)** 4. Generate new solutions to old problems **(3)** 5. Discuss matters with direct colleagues concerning your/their work **(2)** 6. Suggest new ways of communicating within your department **(2)** 7. Generate ideas concerning the distribution of tasks and work activities within your department **(3)** 8. Actively engage in the thinking on which knowledge and skills are required within your department **(2)** 9. Try to detect impediments to collaboration and coordination **(2)** 10. Actively engage in gathering information to identify deviations within your department **(2)**
	Implementation-oriented work behaviour	11. In collaboration with colleagues, get to transform new ideas in a way that they become applicable in practice **(3)** 12. Realize ideas within your department/organization with an amount of persistence **(3)** 13. Get to transform new ideas in a way that they become applicable in practice **(3)** 14. Mobilize support from colleagues for your ideas and solutions **(1)** 15. Eliminate obstacles in the process of idea implementation **(1)** 16. Make your supervisor enthusiastic for your ideas (**1**)
De Jong & Den Hartog, 2010	Overall IWB	1. Pay attention to issues that are not part of his daily work **(2)** 2. Wonder how things can be improved **(2)** 3. Search out new working methods, techniques or instruments **(2)** 4. Generate original solutions for problems **(3)** 5. Find new approaches to execute tasks **(3)** 6. Make important organizational members enthusiastic for innovative ideas **(1)**

		7. Attempt to convince people to support an innovative idea **(1)** 8. Systematically introduce innovative ideas into work practices **(3)** 9. Contribute to the implementation of new ideas **(1)** 10. Put effort in the development of new things **(1)**
Holman et al., 2012	Idea generation	1. Thought of new ideas **(3)** 2. Had ideas about how things might be improved **(3)** 3. Found new ways of doing things **(3)**
	Idea promotion	4. Attempted to get support from others for your ideas **(1)** 5. Tried to get approval for improvements you suggested **(1)** 6. Got involved in persuading others to adopt your proposals for doing things differently **(1)**
	Idea implementation	7. Had your ideas implemented **(3)** 8. Had your suggestions for improvements adopted **(3)** 9. Had your proposals for doing things differently carried out **(3)**
Messmann & Mulder, 2012	Opportunity exploration	1. Keeping oneself informed about the organisation's structures and processes **(2)** 2. Keeping oneself informed about the latest developments within the company **(2)** 3. Keeping oneself informed about new concepts/insights within one's professional field **(2)** 4. Keeping oneself informed about new developments in other organisations outside the company **(2)**
	Idea generation	5. Examining predominant beliefs critically **(2)** 6. Addressing the things that have to change directly **(2)** 7. Asking critical questions **(2)** 8. Suggesting improvements on expressed ideas **(2)** 9. Testing evolving solutions for shortcomings when putting ideas into practice **(2)** 10. Analysing evolving solutions on unwanted effects when putting ideas into practice. **(2)**
	Idea promotion	11. Addressing key persons who provide necessary permissions and resource allocation **(1)** 12. Promoting new ideas to colleagues in order to gain their active support **(1)** 13. Promoting new ideas to the supervisor in order to gain her/his active support **(1)** 14. Promoting the application of the new solution within one's work context **(1)** 15. Reporting regularly on the progress of the realization of ideas **(2)** 16. Convincing others of the importance of a new idea or solution **(1)** 17. Introducing colleagues to the application of a developed solution **(2)**

Reflection	18. Assessing the progress while putting ideas into practice **(2)** 19. Defining criteria of success for the realization of the idea **(2)** 20. Systematically reflecting on recently made experiences **(2)**

Note: 1: Identified as an item describing broad activities, 2: Identified an item describing more specific behaviours 3: Identified as an item capturing products/output

Table 2.4

Item level review summary

Authors	Total No. of Items	Assigned Value No. of Items (%)				
		Process		Product	Person	Press
		Broad Activities	Specific Behaviours			
Axtell et al., 2000	12	0 (0%)	0 (0%)	12(100%)	0 (0%)	0 (0%)
Janssen, 2000	9	4 (44.4%)	1 (11.1%)	4(44.4%)	0 (0%)	0 (0%)
Kleysen & Streer, 2001	14	6 (42.9%)	4 (28.6%)	4(28.6%)	0 (0%)	0 (0%)
Krause, 2004	8	5 (50%)	1 (12.5%)	3 (37.5%)	0 (0%)	0 (0%)
Dorenbosch et al., 2005	16	3 (18.8%)	6 (37.5%)	7 (43.8%)	0 (0%)	0 (0%)
De Jong & Den Hartog, 2010	10	4 (40%)	3 (30%)	3 (30%)	0 (0%)	0 (0%)
Holman et al., 2012	9	3 (33.3%)	0 (0%)	6 (66.7%)	0 (0%)	0 (0%)
Messmann & Mulder, 2012	20	5 (25%)	15 (75%)	0 (0%)	0 (0%)	0 (0%)

Example items tapping broad activities are: “Attempted to get support from others for your ideas” (Holman et al., 2012), “Convincing others of the importance of a new idea or solution” (Messmann & Mulder, 2012), and “Acquiring approval for innovative ideas” (Janssen, 2000). This type of item provides some broad insight into the activities that facilitate the task of promotion. Nevertheless, they convey no information regarding how support is to be pursued, people are to be convinced, approval is to be obtained, and what are the critical parameters during these activities. The description of broad activities does not elaborate on the methods to achieve these broad objectives. Regarding items describing the products of the innovation process rather than presenting the innovative work behaviours that could generate those products, three sample items are: “Generating original solutions for problems” (Janssen, 2000), “Had your ideas implemented” (Holman et al., 2012), and “Systematically introduce innovative ideas into work practices” (De Jong & Den Hartog, 2010). Thus, this type of description informs us about what it is expected to be accomplished during the innovation process, rather than how it is accomplished. The innovation process has the objective to deliver products. It has already been argued that these products are not part of the innovation process but rather the outcomes of the process (Hughes et al., 2018). Assessing whether or not these outputs of the innovation process were delivered does not say anything about the way individuals went about delivering them, which is a problem when one wants to understand the innovation process that delivers innovative products. Concurring with Hughes and colleagues’ (2018) recommendation, process and product items should form distinct psychometric instruments, to avoid definitional confusion, imprecise measurement and biased empirical estimates. If process measures contain outcome assessments they will, speciously, predict outcome measures (Hughes et al., 2018).

This item level review also suggested that the observation of several researchers that the field has neglected the importance of implementation is particularly relevant for models of innovative work behaviour (West, 2002b; Da Silva & Oldham, 2012; Mueller et al., 2012; Baer, 2012; Hülsheger et al., 2009; Bjorklund, Bhatli, & Laakso, 2013). In order to assess the veracity of this observation, the items presented in Table 2.3 were clustered under three categories, which represent three broad stages of the innovation process. The first category comprised all items that were identified as idea related indicators, them being either related to opportunity exploration or the generation of ideas.

The second category comprised the items assessing idea promotion, and the third category included items assessing implementation. It should be noted that the 3 items tapping reflection (Messmann & Mulder, 2012) were excluded as no other measure specified an even remotely relevant stage. Table 2.5 presents the outcomes of this analysis.

Table 2.5

Item level review for the three broad stages of innovative work behaviour

Items' stage classification	Total	Assigned Value, No. of Items (%)		
		Broad Activities	Specific Behaviours	Product
Idea related items	50	7 (14%)	23 (46%)	20 (40%)
Idea promotion items	19	18 (94.7%)	1 (5.3%)	0
Idea implementation items	26	4 (15.4%)	2 (7.7%)	20 (76.9%)

Results were consistent with the aforementioned observation as 76.9% of the items assessing idea implementation were operationalised as products. The idea related items were most frequently operationalised (46%) in terms of specific behaviours, whereas items tapping idea promotion were exclusively operationalised as a process, however, without sufficient specificity, as 94.7% of the items tap broad activities. Overall, the item level review has indicated that the literature on innovative work behaviour has provided a much clearer understanding of the behaviours related to exploring opportunities and developing ideas, but has offered a broader perspective regarding the practical behaviours needed in order to gain support, obtain approval, and has provided a non-existent discussion on how to implement innovative ideas, as if implementation is a routine stage taken for granted (Magadley & Birdi, 2012). Here, it should be noted once more that the inclusion of idea generation content is problematic considering that the generation of ideas is the focal point of creativity (Anderson et al., 2014; Hughes et al., 2018), nevertheless I could not ignore the fact that these items are part of existing measures and not evaluate them.

2.2.4.2. Evaluation of the psychometric properties of existing scales

In this section the psychometric properties of the existing innovative work behaviour measures are evaluated, by the use of the Accuracy and Appropriateness model (Hughes, 2018). The accuracy and appropriateness model (Hughes, 2018) presents a conceptually simple, easily communicable, but systematic and powerful framework to guide the design and the evaluation of psychometric measures. Concurring with Hughes' view of science, a researcher's objective is to develop theory, design theoretically sound measures, use those measures for theory testing, and subsequently make theory-based decisions. The use of adequate psychometric measures is synonymous with good scientific practice. Psychometricians refer to the adequacy of psychometric measures by the term validity. However, the concept of validity is devoid of a consensual conceptualisation (Newton & Shaw, 2016), and there is a lack of agreement regarding what sort of empirical evidence is required in order to claim that a measure is valid (Borsboom, Mellenbergh, & van Heerden, 2004; Cizek, 2012; 2016; Hughes, 2018; Newton & Shaw, 2016). Indeed, the review of the papers, conducted by the current author, introducing psychometric measures of innovative work behaviour revealed an inconsistency regarding the terminologies used and the evidence presented supporting the validity of the developed measures. This disparity creates certain difficulties when assessing the quality of existing measures. Furthermore, the absence of a clearly defined framework makes the design of studies during the development phase of psychometric measures rather arbitrary, as researchers tend to select certain types of evidence and ignore others.

Hughes proposed that the ambiguous term of validity should be dropped and replaced with the terms accuracy and appropriateness. Broadly, accuracy refers to whether a psychometric instrument actually measures what it is supposed to measure, and appropriateness refers to whether a psychometric measure is useful for a specific purpose and in a specific situation. It is reasonable that if a psychometric instrument is inaccurate (i.e., measures citizenship behaviour not innovative behaviour), then, it cannot be deemed appropriate to use in theory testing or decision-making. However, an accurate psychometric instrument does not necessary imply that it is appropriate. A measure can accurately capture its intended target but do so in a biased way. For example, a measure might include items that comprehensively tap a construct's content, but items might function differentially across different populations, thus introducing measurement bias.

In the following subsections the criteria necessary to establish a measure's accuracy and appropriateness (Hughes, 2018) are presented, while at the same time the existing measures of innovative work behaviour are screened in order to assess whether they fulfil these criteria or not. Tables 2.6 and 2.7 present the existing measures of innovative work behaviour alongside the empirical evidence provided to establish their accuracy and appropriateness. Given that the accuracy – appropriateness model was not available at the time these measures were developed, it would be unreasonable to expect that all types of evidence should be provided. That said, the majority of the evidence required to establish accuracy and appropriateness is not especially novel and has been included in many previous guidelines regarding validation (e.g., AERA, APA, NCME, 2014; Cronbach & Meehl, 1955).

2.2.4.2.1. Establishing accuracy

The accuracy and appropriateness model can be seen as a two-step procedure. First, it is necessary to provide evidence that the psychometric measure accurately captures the theoretical content of the construct, and thus, achieves construct representativeness. A well-framed theoretical conceptualisation should guide item generation in order to ensure content accuracy. Furthermore, a psychometric instrument cannot be deemed accurate when it incorporates construct irrelevant content and when it under-represents the construct's content. For this reason, an item level examination of measures, similar to the one conducted in Section 2.2.4.1, is appropriate when evaluating whether a measure includes construct irrelevant content or under-represents a construct's content.

The evaluation of a measure's construct representativeness is not as straightforward as the evaluation of its structural accuracy (i.e., Examination of whether the factor analytic methods confirmed or rejected the proposed factorial structure) and merits a brief discussion. Content representativeness is dependent on the frame of reference. If a researcher is interested only in assessing the innovation process as a composite index of broad behaviours and innovative performance indicators, then a resultant measure that captures these elements is considered accurate in terms of content representativeness. Applying this criterion, all but one (i.e., Messmann & Mulder, 2012) measures of innovative work behaviour appearing in Table 2.6 have achieved construct representativeness. Messmann and Mulder's (2012) measure does not achieve content accuracy because the authors' theoretical conceptualisation stated idea realisation behaviours to be part of the construct, but the final psychometric instrument omitted this type of behaviours. If though the frame of reference extends to a different conceptualisation of the construct, based on the limitations of the existing models of innovative work behaviour discussed earlier, then the judgement passed on a measure's content representativeness naturally changes. For example, if Hughes and colleagues' (2018) proposal to distinguish behavioural and performance indicators is applied as the frame of reference, then, reasonably, measures that failed to make such a distinction should be considered content inaccurate due to containing construct irrelevant content and at the same time omitting the relevant behaviours. As previously shown, theoretical models of innovative work behaviour are far from being well framed. In fact, they represent a piecemeal representation of the construct and simultaneously focus on both innovative behaviours and innovative products. Thus, their corresponding measures' content accuracy is compromised, and constrained by each measure's theoretical limitations, which have also been transferred into their corresponding psychometric instruments. For example, Janssen's (2000) measure complied with the author's theoretical conceptualisation, but when applying the principle that items should display a consistent focal orientation (i.e., behavioural) it is rendered inaccurate in terms of content. Axtell and colleagues (2000) measure should be considered accurate in terms of content if we assume that it assesses innovative performance, as it consistently conceptualises and operationalises innovative products, but content inaccurate if it is supposed to be measuring innovative work behaviour. For this reason, Table 2.6 passes two different assessments on the existing measures' content accuracy. One which adopts the authors' provided conceptualisations as the frame of reference, and a second which assumes the frame of reference to be extended to Hughes et al.'s (2018) proposal to distinguish behavioural and performance indicators, and hence achieve focal consistency.

An accurate measure should also demonstrate structural equivalence to the theoretical construct it captures. Thus, a measure that operationalises innovative work behaviour as a uni-dimensional construct (i.e., a single scale score) despite it being based on a multi-dimensional theoretical conceptualisation is inherently inaccurate. As shown in Table 2.6, only four out of the eight measures' factorial structures matched the authors' theoretical conceptualisations, and thus, can be deemed structurally accurate. For example, De Jong and Den Hartog (2010) hypothesised a four-dimensional model but the statistical analysis produced a uni-dimensional scale, thus, the structural accuracy of the instrument was compromised. In contrast, Holman and colleagues' (2012) measure retained the hypothesised three-dimensional structure, and hence displayed structural accuracy.

One further criterion of accuracy is the demonstration that a psychometric measure performs similarly across groups, in order to prevent the development of biased theory, and the making of biased decisions. Therefore, evidence of invariance measurement is essential in order to establish that a psychometric instrument retains its structure in diverse settings, and populations. This piece of evidence is particularly important both for theory testing as well as for decision making, because it confirms the generalizability of a study's results or for example, it may prevent adversely impacting a certain group in a recruitment situation. No study provided this type of evidence.

Table 2.6

Accuracy of existing measures of innovative work behaviour

IWB measures			Accuracy Evidence		
Authors, Studies' Sample sizes	Content representativeness FoR1*	FoR2*	Structure	Invariance measurement	Response Processes
Axtell et al., 2000. (N=148)	Yes	No	Not provided. Measure's factorial structure matched authors' theoretical conceptualisation	Not provided	Not examined
Janssen, 2000. (N=170)	Yes	No	Not provided. Measure's factorial structure did not match author's	Not provided	Not examined

			theoretical conceptualisation		
Kleysen & Street, 2001. (N=225)	Yes	No	CFA. Measure's factorial structure did not match authors' theoretical conceptualisation.	Not provided	Not examined
Krause (2004) (N=399)	Yes	No	EFA. Measure's factorial structure matched author's theoretical conceptualisation	Not provided	Not examined
Dorenbosch et al., 2005. (N=132)	Yes	No	EFA. Measure's factorial structure matched authors' theoretical conceptualisation	Not provided	Not examined
De Jong & Den Hartog, 2010. (N=784)	Yes	No	EFA, CFA. Measure's factorial structure did not match authors' theoretical conceptualisation	Not provided	Not examined
Holman et al., 2012. (N=327)	Yes	No	CFA. Measure's factorial structure matched authors' theoretical conceptualisation	Not provided	Not examined
Messmann & Mulder, 2012. (N=628)	No	No	EFA, CFA. Measure's factorial structure did not match authors' theoretical conceptualisation	Not provided	Not examined

Note: * FoR : Frame of Reference. FoR 1 assesses the content accuracy of measures based on the authors' conceptualisations. FoR 2 assesses the content accuracy of measures based on the principle that measures should display a concise focal orientation so as not to under-represent nor misrepresent the construct of innovative work behaviour.

Last but not least, the examination of the underlying processes taking place when responding to the items of a psychometric measure is a fundamental piece of evidence in order to establish accuracy (Embretson, 2016; Borsboom et al., 2004). Unless we are confident that the variation in the responses to items represents a manifestation of true differences in the construct under examination, we cannot definitively claim that a measure is accurate. An illustrative example is the item “I paid attention to issues not part of my daily work”, which was one of the items used during the preparatory stages of the first study of this thesis. The item was intended to measure opportunity exploration but as the examination of the response processes indicated, this item, for some, represented a measure of procrastination or distraction (i.e., paid attention to issues that were neither part of daily work nor part of innovative work behaviour, such as sport, fashion, or politics). Thus, this item, although it would have correlated with other innovative work behaviour items, would have measured something else, and thus, would have been an inaccurate measure of the opportunity exploration element of innovative work behaviour. However, as shown in Table 2.6, this type of evidence was not provided in any paper presenting a measure of innovative work behaviour.

In sum, all examined measures, but one (Messmann & Mulder, 2012) are content accurate when assessed against the authors’ theoretical conceptualisations, but none is content accurate when applying the principle that innovative work behaviour should focus on behaviours. Four out of the eight measures achieved structural accuracy, and no study provided evidence regarding invariance measurement and response processes.

2.2.4.2.2. Establishing appropriateness

Having established that a psychometric measure accurately captures the construct of interest, one can then set about examining a measure’s appropriateness for use in theory testing and decision-making. Psychometric measures can be used in a multitude of ways and thus what makes a measure appropriate for use in any two given scenarios is likely to differ to some extent. Within the current thesis, the primary purpose for the newly developed measures is to provide prediction of innovative performance and generate more comprehensive theory surrounding workplace innovation. In terms of prediction, the primary source of appropriateness evidence lies in demonstrating a measure's ability to predict a criterion variable. Furthermore, Hughes (2018) recommended that a newly developed measure should outperform existing ones, demonstrated by the provision of evidence of incremental predictive validity. However, all but one study (i.e., De Jong & Den Hartog, 2010) failed to explicitly test whether their measure of innovative work behaviour actually predicts innovative outcomes. It should be noted once more that some of the measures (see Tables 2.3, 2.4, and 2.5), at the stage of implementation instead of capturing specific behaviours that lead to innovative products, assessed products (e.g., Janssen, 2000; Holman et al., 2012). Thus, this operationalisation might explain the lack of provision of evidence of predictive validity, but at the same time indicates that instead of innovative behaviours, innovative performance was assessed.

Furthermore, appropriateness is demonstrated by the provision of evidence of convergent and discriminant validity. Evidence of convergent validity evaluates the relationship of a psychometric measure by correlating the newly developed measure with existing measures tapping the same construct. Evidence of discriminant validity is best shown by demonstrating that the measure is unique and does not correlate strongly with a theoretically similar but distinct construct (Shaffer, DeGeest, & Li, 2016). As shown in Table 2.7, no study provided evidence of convergent and discriminant validity. Finally, one last indicator of appropriateness concerns the feasibility and practicality of a psychometric measure. Considering that all existing measures of innovative work behaviour are easy to administer, and no measure is excessively lengthy, they are all deemed feasible and practical to use in theory testing and decision making.

In sum, no psychometric measure was evaluated against the criteria stated by Hughes (2018), and only De Jong and Den Hartog (2010) assessed the predictive validity of their measure. Thus, the lack of provision of empirical evidence supporting or rejecting the existing measures level of appropriateness, disallows an evidence based evaluation of appropriateness, but strengthens the assertion that existing measures were poorly constructed and did not follow rigorous psychometric procedures (Hughes et al., 2018) in their development.

This review of the scales of innovative work behaviour indicated that the empirical literature has been reliant on measures of dubious quality, due to the insufficient use of the procedures implemented to test their psychometric properties, and the lack of clarity in the theoretical background upon which they were built. As stated earlier, the use of adequate psychometric measures is synonymous with good scientific practice (Hughes, 2018). Poorly constructed measurement instruments may shake our confidence in the reliability of the empirical findings and could misinform both theory and practice.

Table 2.7

Accuracy of existing measures of innovative work behaviour

IWB measures		Appropriateness evidence			
Authors, Studies' Sample sizes	Predictive	Incremental predictive	Convergent	Divergent	Feasibility/ Practicality
Axtell et al., 2000. (N=148)	Not applicable (Assessed outcomes)	Not applicable (Assessed outcomes)	Not provided	Not provided	Achieved
Janssen, 2000. (N=170)	Not applicable (Assessed outcomes)	Not applicable (Assessed outcomes)	Not provided	Not provided	Achieved
Kleysen & Street, 2001. (N=225)	Not provided	Not provided	Not provided	Not provided	Achieved

Krause (2004) (N=399)	Not applicable (Assessed outcomes)	Not applicable (Assessed outcomes)	Not provided	Not provided	Achieved
Dorenbosch et al., 2005. (N=132)	Not provided	Not provided	Not provided	Not provided	Achieved
De Jong & Den Hartog, 2010. (N=784)	Measure predicted innovative outputs	Not provided	Not provided	Not provided	Achieved
Holman et al., 2012. (N=327)	Not applicable (Assessed outcomes)	Not applicable (Assessed outcomes)	Not provided	Not provided	Achieved
Messmann & Mulder, 2012. (N=628)	Not provided	Not provided	Not provided	Not provided	Achieved

2.3. General discussion and proposing a way forward

The present evaluation of the literature on innovative work behaviour revealed that models of innovative work behaviour have been to a great extent contaminated by creativity and product related content, whereas their behavioural focus is predominantly broad, thus suboptimally describing the individual behavioural facilitators of the innovation process. In the following concluding section I discuss the impact of the identified limitations on each of the three broad stages of the models of innovative work behaviour; namely the idea related stage (i.e., opportunity exploration and idea generation), idea promotion and idea implementation, and propose a way forward.

2.3.1. Idea related content

As repeatedly stated, creativity and innovation are two related but distinct constructs and the present status of the models of innovative work behaviour perpetuates confusion. As illustrated in Tables 2.1 and 2.3, all but two models of innovative work behaviour (i.e., Krause, 2004; Messmann & Mulder, 2012) have incorporated creativity related and idea generation content into their models. Even the two models that did not include creativity and idea generation content in their models used the label idea generation which is equivalent to creativity (Anderson et al., 2014; Hughes et al., 2018). Thus, one of the important concerns of future models of innovative work behaviour should be to develop "creativity-free" conceptualisations and operationalisations. Likewise, future models should disentangle behaviours from products as by definition these two constructs are distinct.

2.3.2. Idea promotion

Regarding the stage of idea promotion, the conducted review illustrated that the construct has been exclusively conceptualised and operationalised as a process, albeit at a broad level of abstraction. This is problematic because models of innovative work behaviour should constitute a systematic explanatory framework and be the source of information on how individual behaviours can accomplish the objectives of the innovation process and overcome its obstacles (Patterson et al., 2009). One could rebut this assertion and question the importance of identifying the specific behaviours instead of being content with broadly defined activities. The answer to this question is based on the assumption made in the introductory chapter, whereby it was suggested that individual level innovative work behaviour is the fundamental entry-level unit of analysis of innovation studies, and the building block of higher level innovation. As such, it is the objective of models of innovative work behaviour to describe the micro-processes of innovation. Hence, it is proposed that models of innovative work behaviour should include behaviours that propose and explain the means by which individuals can address the diverse challenges and barriers of the innovation process. This issue is particularly important for the stage of idea promotion because an extensive amount of research has shown that there are several barriers posing diverse challenges for the prospective innovators during their promotion efforts (Hadjimanolis, 2003; Hueske & Guenther, 2015; Janssen et al., 2004; Bjorklund et al., 2013).

One of the many barriers individuals need to cope with concerns the other people in the organisation, whether they are co-workers or superiors (Hadjimanolis, 2003). Organisational members might have conflicting interests, objections based on genuine rational arguments or rooted in attitudinal dispositional resistance to change (Hadjimanolis, 2003; Hueske & Guenther, 2015; Mueller et al., 2012; Lansisalmi, Kivimaki, & Elovainio, 2004; Sandberg & Aarikka-Stenroos, 2014). It should be expected that theoretical models of innovative work behaviour should deal with such issues and attempt to describe what innovators actually do to overcome these barriers. Nevertheless, models of innovative work behaviour have not yet attempted to identify and describe these behaviours, and thus fail to provide a source of information regarding the behavioural manifestations that could be applied to overcome these barriers and facilitate idea promotion. Thus, it is proposed that future models of innovative work behaviour should concentrate their efforts in the identification of the behaviours that facilitate the stage of idea promotion.

2.3.3. Idea implementation

Regarding idea implementation, the current review of the literature demonstrated that it has been the less behaviourally oriented stage of the innovation process, and it has been mostly conceptualised and operationalised as a product (see Tables 2.2, 2.3, 2.5). Once more it is suggested that the stage of idea implementation should be disentangled from its products, and focus on behaviours. However, existing models of innovative work behaviour have failed to describe what innovators actually do so as to implement their ideas. In fact, not only has idea implementation been predominantly treated as a product but also some of the few idea implementation process descriptors found in the innovative work behavioural models have been so broad and generic, that they have essentially conveyed no information regarding how individuals implement their ideas (e.g., “Put effort in the development of new things” and “Contribute to the implementation of new ideas” De jong & Den Hartog, 2010). This is problematic because, similarly to the barriers associated with the idea promotion stage, research has shown that there are also challenges for the prospective innovators during their implementation efforts. For example, idea implementation is a complex process that requires the co-ordination of different people at different organisational levels and the combination of diverse skill-sets (Klein & Knight, 2005). Communication and cooperation deficiencies, limited resources and under-utilisation of skills and knowledge are conditions that can hinder innovation (Hadjimanolis, 2003; Hueske & Guenther, 2015; Lansisalmi et al., 2004; Sandberg & Aarikka-Stenroos, 2014). Again, it is suggested that future models of innovative work behaviour should attempt to describe what innovators actually do to address these challenges and facilitate the implementation process.

2.3.4. A way forward

This review of the models of innovative work behaviour has demonstrated that the models’ capacity to create an informative and comprehensive description of the behavioural manifestations that facilitate the broad tasks of the innovation process of innovation is limited. It is important to note that this criticism is not directed to the entirety of the literature on innovation, but it is a targeted critique pertinent on the models of innovative work behaviour. As discussed below, the broader literature on innovation contains extremely informative, and useful streams of literature. The suboptimal, behaviourally, descriptive capacity of the models of innovative work behaviour can be attributed to the fragmented nature of the literature on innovative work behaviour (Hughes et al., 2018; Walker & Batey, 2014) and the under-utilisation (Adams et al., 2006) of relevant streams of the literature, directly addressing the models' omissions and elaborating both the "what" and the "how" of the innovation process. Specifically, the fragmentation of the literature on innovative work behaviour can be countered by the integration of each model's contribution into a more comprehensive theoretical model. However, considering that existing models did not provide sufficient information regarding the specific behaviours facilitating innovation, a way forward is to draw knowledge from relevant and inter-disciplinary streams of the literature, such as the literatures on championing, on implementation, and on resistance to change.

The literature on championing (e.g., Chakrabarti, 1974; Bjorklund et al., 2013; Howell, 2005; Howell & Boies, 2004; Howell, & Higgins, 1990a,b; Howell & Shea, 2006; Jenssen & Jorgensen, 2004; Kelley & Lee, 2010; Markham, 2000; Markham & Aiman-Smith, 2001; Shane, 1994) is directly relevant to idea promotion. Howell and colleagues' work formed the basis of the empirical literature on championing and provided a useful body of theoretical and empirical work, which described how individuals can facilitate the successful promotion and implementation of ideas. These studies have focused both on the characteristics of the people who successfully achieve the implementation of ideas, and on the specific behaviours and tactics applied in order to address the challenges of the process of innovation. Models of innovative work behaviour could benefit greatly from the cross-pollination of these two relevant research streams. Such an integration would provide an in-depth understanding of the ways employees go about promoting innovative ideas.

Likewise, there is a relatively less well developed but highly informative stream of literature investigating implementation strategies, focusing on best practice models, steps, and conditions facilitating the implementation of ideas (e.g., Choi & Chang, 2009; Cormican & O'Sullivan, 2004; Klein & Knight, 2005; Klein & Sorra, 1996; Krause, Gebert, & Kearney, 2007). For example, during the implementation stage, piloting the innovation could assist bringing problems, and inter-personal conflicts to the surface early on, thus speeding up the implementation process and providing the opportunity to solve these issues (Cormican & O'Sullivan, 2004). Additionally, delegating responsibilities to key members of the implementation process and integrating different perspectives via encouraging participation can be a factor imperative to success (Cormican & O'Sullivan, 2004; Krause et al., 2007). Moreover, helping behaviours aimed at improving the skills and knowledge of colleagues participating in the implementation process can facilitate successful implementation (Klein & Knight, 2005). Nevertheless, despite the fact that these implementation focused studies have provided a more in-depth insight into the behavioural aspects of implementation, they have followed parallel paths to the theorisation of the models of innovative work behaviour. As stated for the literature on championing, models of innovative work behaviour would become much more comprehensive, informative, and useful if they provided such information and described how individuals should go about implementing their ideas, rather than just saying that ideas need to be implemented.

In a similar fashion, capitalising on inter-disciplinary knowledge which is highly relevant to innovative work behaviour knowledge, could provide new perspectives on how individuals go about persuading sceptic and resistant organisational members. The field of organisational change has provided a wealth of knowledge regarding the factors that instil resistance and proposes ways to overcome it (e.g., Bruckman, 2008; Ford,

Ford, & D'Amelio, 2008; Furst & Cable, 2008; Hon et al., 2014; Oreg, 2003; Palmer, 2004). Likewise though, models of innovative work behaviour have not integrated into their theoretical conceptualisations that knowledge, despite acknowledging that resistance to change is a critical issue threatening the survival of innovative ideas (Janssen et al., 2004). Thus, the capitalisation on existing knowledge found in relevant and inter-disciplinary research fields would promote a more accurate representation of the construct's richness, allowing a holistic and comprehensive representation of the engagement of individuals in the innovation process.

2.3.5. Conclusion

This critical evaluation of the literature on innovative work behaviour was by no means an attempt to discredit existing work. Nevertheless, this literature review highlighted the need for an update. Obviously, there is a wealth of knowledge upon which this thesis drew in order to make its own incremental contribution to the literature. The aspiration of the present author is to constructively capitalise on the diversity of knowledge in the literature and address its limitations, applying as an over-arching principle the constructive integration of relevant scientific knowledge as a means of constant improvement, as opposed to the development of convenience based research "traditions". Research "traditions" refer to the cases where researchers insist on using outdated and surpassed theoretical models or their correspondent psychometric operationalizations, despite the emergence of empirical evidence showing other models to be theoretically and psychometrically superior, or without updating their preferred model. An excellent counter-example of establishing a research tradition is found in the quotation below, which was taken from the exemplary work of Amabile and Pratt (2016; p. 158).

“*One of the most difficult things for organizations to do is to critically re-examine something that they have painstakingly built and that has served them well over time [...]. The same is true for individuals, and scholars are no exception. In 1988, the first author proposed a componential model of creativity and innovation in organizations (Amabile, 1988) that has now been cited nearly 4000 times. Given that measure of the theory's utility, it is tempting to leave well enough alone. Yet, in conversations about developments in the field with the second author and many other colleagues, it became clear that the theory required re-examination and, most likely, revision even in some of its core constructs*.”

Extending Amabile and Pratt's (2016) point of view to the theory of innovative work behaviour, I argue that existing models have served well and advanced the field up to this point, but their limitations require the refurbishment of the construct, and the development of an integrative model of innovative work behaviour[1]. In order to accomplish that, the present study aimed to integrate relevant intra- and interdisciplinary knowledge, to disengage the construct of innovative work behaviour from creativity and product indicators, and to create an informative model of innovative work behaviour, which operates at a lower level of abstraction, as opposed to vague descriptors.

Lukes and Stephan (2017) conducted a study in which their primary objective was the development of a psychometric measure of innovative work behaviour. This study was published after the current author had completed all empirical work for the present research project. Thus, the work conducted by the current author was not influenced by Lukes and Stephan's work to any extent. Nevertheless, it is important to acknowledge the existence of this new measure. It should be noted though, that Luke and Stephan stated that they conducted their empirical work prior to the publication of three influential studies that have been reviewed in the present research project (i.e., De Jong & Den Hartog, 2010; Holman et al., 2012; Messmann & Mulder, 2012).

A post hoc review of Lukes and Stephan's paper by the current author reveals that the present research project is by no means negatively affected by not taking into account Lukes and Stephan's study, for two reasons. First, Lukes and Stephan's two main observations are a subset of the observations that were already made by the current author in the present research project. Specifically, both research projects independently noted that existing measures of innovative work behaviour fail to distinguish between innovative behaviours and outcomes. Furthermore, both studies observed that existing models omitted essential aspects of innovative work behaviour, and suggested that this issue could be addressed by adopting an integrative approach. Thus, in principle both studies used a similar approach in developing a new model of innovative work behaviour. Second, whereas the fundamental approach in developing a new measure is quite similar, its implementation differs. The present research project has drawn information from a wider range of sources, and thus all novel aspects found in Lukes and Stephan's measure of innovative work behaviour were already included in the Behavioural Innovation Process model which is presented in Chapter 3. In contrast, the Behavioural Innovation Process model presents information that is not included in Lukes and Stephan's model (e.g., Opportunity exploration, Reflexivity), and thus the Behavioural Innovation Process model is argued to be more comprehensive and representative of the innovation process. This claim is bolstered by the fact that Lukes and Stephan drew exclusively from the literature presenting existing measures of innovative work behaviour and relevant constructs such as creativity, championing and entrepreneurship, while the current author capitalised on a wider range of literature (e.g., Organisational change, Championing, Implementation) and on a wider range of study types (e.g., Theoretical studies, measure development, literature reviews, qualitative, case studies). Thus, the literature used in Lukes and Stephan's study is a subset of the literature used in the present research project.

Chapter 3

The Behavioural Innovation Process Model

The purpose of Chapter 3 is to present the Behavioural Innovation Process model (M-BIP) which was developed in order to address the limitations of the existing models of innovative work behaviour discussed in Chapter 2. The present chapter first introduces some key descriptors of the proposed model stating its content and structure. Subsequently, the M-BIP is described drawing on the empirical intra- and inter-disciplinary literature.

3.1. The Behavioural Innovation Process model: assumptions and characteristics

The M-BIP conceptualises innovative work behaviour as a behavioural, multi-dimensional construct which adheres to a stage-like and recursive process. Each of these foci – behavioural focus, multi-dimensionality, recursive process – have either been neglected, sub-optimally addressed, or not explicitly stated in previous models. The labelling of the M-BIP aimed to explicitly address the two key characteristics that have been sub-optimally addressed in the literature on innovative work behaviour, namely the content and the structural properties (i.e., dimensionality, relationships between dimensions) of the models of innovative work behaviour, and each of the two characteristics of the proposed model – behavioural and process- makes a statement regarding the content and the structure of the construct.

Starting with the behavioural element, as presented in Chapter 2, there is a mismatch in the literature on innovative work behaviour between the construct's label and its actual content. Although it might seem obvious that the most important aspect of innovative work behaviour is behaviour, the majority of the existing models are behavioural in name only. As discussed in Chapter 2, the construct's content has often deviated from assessments of specific behaviours and has mostly addressed the outputs of the innovation process (e.g., Axtell et al., 2000; Janssen, 2000), or at best the broad activities (e.g., De Jong & Den Hartog, 2010) that facilitate the transformation of an innovative idea into an innovative outcome, with the exception of Messmann and Mulder's (2012) model. Thus, it is important to explicitly state that the M-BIP's focus is on employees' behaviours. Introducing a clear and explicit behavioural focal orientation to the construct aimed to advance definitional clarity, prevent confusion and construct proliferation.

The second characteristic of the M-BIP is the assumption that innovation is a process, with process defined as a "sequence of interdependent and linked procedures which, at every stage, consume one or more resources (e.g., employee time, money) to convert inputs (e.g., data, material,) into outputs. These outputs then serve as inputs for the next stage until a known goal or end result is reached" (The Business Dictionary). The introduction of the characteristic process into the proposed theoretical model explicitly states that the construct of innovative work behaviour consists of discrete, but interdependent and linked stages (Godin, 2015; Wolfe, 1994). Whereas, the existence of discrete stages directly implies that the proposed theoretical model adheres to a stage-like approach of modelling innovative work behaviour, this does not mean that the model adopted the "linear perspective" at the expense of the "complexity perspective" (Rosing et al., 2018). Rather, the M-BIP combined them. In the following paragraphs I briefly restate why the M-BIP adopted the stage-like approach, discuss how the stages and the underlying activities are linked to each other, and explain how the M-BIP combined the "linear" and the "complexity" perspectives.

A major limitation of the empirical literature on innovative work behaviour is that the theoretically assumed multi-dimensionality of the construct was not always supported by the empirical findings, resulting in a mismatch between theoretical conceptualisations and operationalisations of innovative work behaviour (see Chapter 2 for further discussion). Through the M-BIP, I propose that a stage-like conceptualisation of the innovation process is preferable for three reasons. First, the tasks and the necessary skill-sets for their accomplishment significantly differ across the broadly accepted stages of the innovation process (Hughes et al., 2018; West, 2002b). Whereas the identification of an opportunity and/or an innovative idea might occur as an isolated cognitive process (Messmann & Mulder, 2011) the subsequent promotion and implementation are more reliant on socio-political processes (Van de Ven, 1986; Rank, Pace, & Frese, 2004) with very different objectives and, as shown later, fundamentally different behavioural manifestations. Second, empirical evidence has already demonstrated that the drivers and facilitators of the innovation process could be better understood when the construct of innovative work behaviour is operationalised in a multi-dimensional manner (e.g., Axtell et al., 2000; Magadley & Birdy, 2012; Holman et al., 2012). Finally, recent empirical evidence has shown that innovative work behaviour is indeed a multi-dimensional construct (Messmann & Mulder, 2012; Holman et al., 2012; Lukes & Stephan, 2017).

Apart from the presentation of the innovation process as a multi-stage one, a description of any process is incomplete unless it is accompanied by an explanation of how the stages are connected to each other. As discussed in Chapter 2, the relationships between the proposed stages (i.e., linear or non linear transition among the activities) have not been explicitly addressed, and thus, existing models have been criticised as simplistic and unrealistic (Anderson et al., 2014). The M-BIP proposes that a characteristic of innovative work behaviour is its recursive nature, hence, it is an iterative process rather than a linear one (Anderson et al., 2014; Messmann & Mulder, 2012). Recursivity is proposed to be a manifestation of reflexivity, which is an issue addressed only in Messmann and Mulder's (2012) model of innovative work behaviour, despite being a widely acknowledged attribute of successful innovators (Messmann & Mulder, 2015; Müller, Herbig, & Petrovic, 2009) and a core component of change oriented behaviours (Grant & Ashford, 2008; Frese, 2007, 2009).

Individual reflexivity can be understood as the degree to which the object of reflection is monitored, evaluated, and adapted accordingly in order to enhance the likelihood of goal attainment (West, 1996; MacCurtain et al., 2010; Messmann & Mulder, 2015). For the purposes of the present thesis, the object of reflection is perceived as a dynamic variable which may encompass all the activities and behaviours manifested throughout the innovation process that can be evaluated and adapted in order to be improved or become more effective. For example, the object of reflection can be identified as the way an idea was communicated to another person, as the idea itself, or as a selling behaviour. Thus, the mechanism of reflection could lead to the modification of the selling approach, to the alteration of the preferred way to communicate with colleagues, or to the re-evaluation of the idea. Hence, reflexivity could be perceived as a regulatory mechanism of one's behaviour and a way to evaluate and improve goal directed actions that should transcend all aspects of the process of innovation (Van Woerkom, 2004; Messmann & Mulder, 2012; 2014). It should be noted though, that reflexivity is not perceived as a discrete stage, but as a behaviour that infuses the entirety of the innovation process. Thus, unlike Messmann and Mulder's (2012) model of innovative work behaviour, reflexivity, in the M-BIP, is embedded in all the activities of the innovation process as it was deemed to be an integrated mechanism facilitating the development, promotion and implementation of innovative ideas, providing the linking tissue between the activities.

The reflective element of the M-BIP is also the factor providing a link between the “linear” and “complexity” perspective. As such, reflective behaviours allow the manifestation of idea developing behaviours in late time frames of the innovation process. Furthermore, reflective behaviours, within the M-BIP, conceptually overlap with what Rosing and colleagues (2018) call creativity. As a reminder, in the Rosing et al.’s paper, creativity did not only refer to the process of developing an idea that is intended to be implemented but had also the broader meaning of creative thinking. As such, individuals might think creatively in the late stages of the innovation process about non idea related aspects of the innovation process, such as how the idea could be best implemented, or how problems and obstacles that emerge could be overcome (Rosing et al., 2018). As discussed in the previous paragraph though, these are also functions of reflective behaviours. Therefore, the M-BIP modelled the stages of the innovation process separately, but also accounted for the reasonable and evidence-based iterative nature of the innovation process (Rosing et al., 2018).

Apart from the aforementioned characteristics of the M-BIP, there is one further important characteristic that has been taken into account while developing the model. The proposed model paid particular attention to the interaction between the individual innovator and the social environment, as innovation is a process taking place within a social context (El Bassiti & Ajhoun, 2013; Perry-Smith & Mannucci, 2017). Although in this thesis innovation is studied from an individual perspective, it would be unrealistic to assume that there is strictly a sole actor throughout the innovation process. After all, the individual perspective does not imply that the innovator cannot engage in innovative behaviours as part of a team. The innovation process might be initiated by a single person who notices an area of potential improvement, but as described later in the presentation of the model, it might progressively be diffused to the organisation so as to build pro-innovation coalitions, and implementation teams. Thus, it is explicitly stated that the individual behaviours described below could be either rooted in intra-individual, or inter-individual processes. For example, an individual could prepare a cost-benefit evaluation that could be presented to the upper management singlehandedly, or by the help of his/her co-workers.

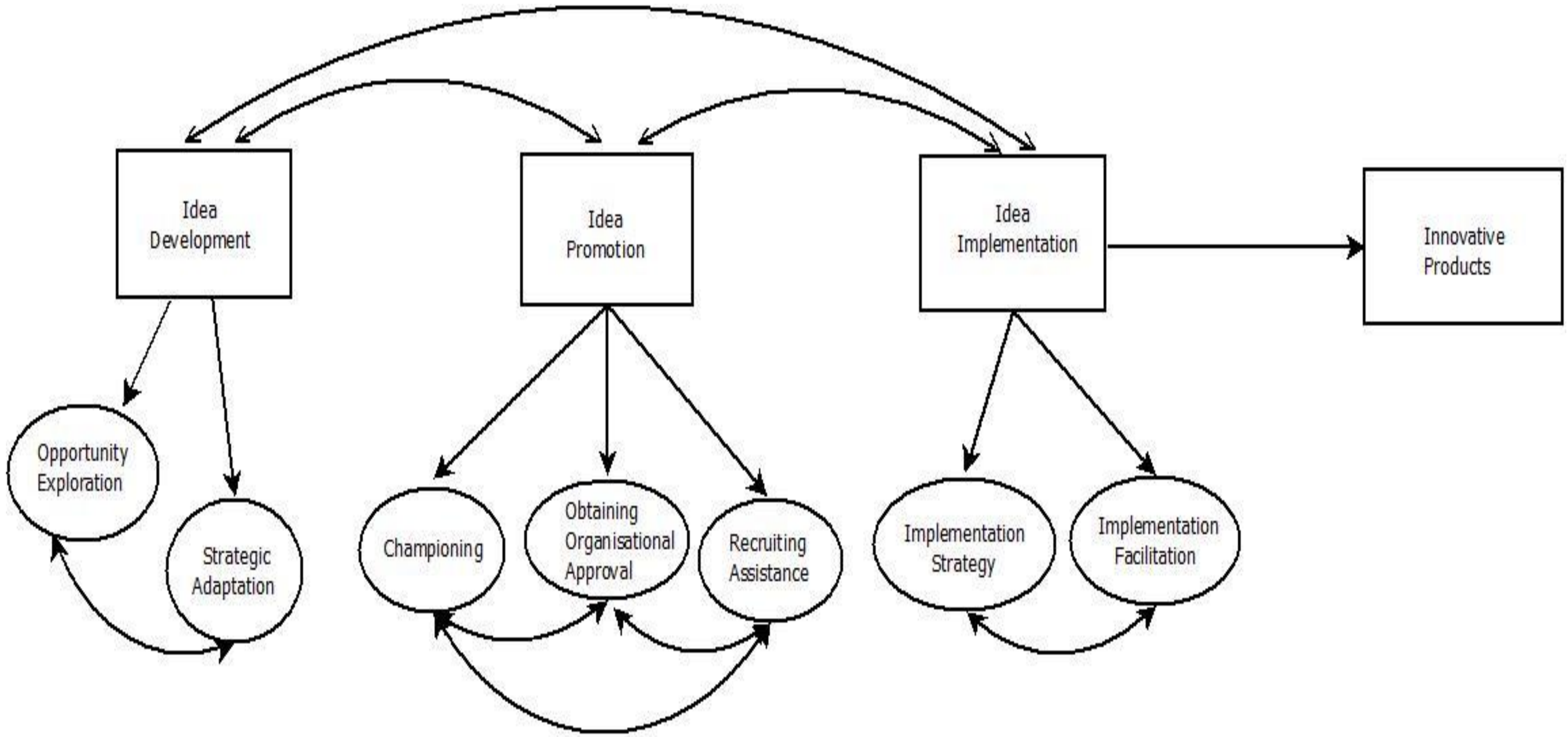

Figure 3.1. The Behavioural Innovation Process Model (M-BIP)

Note: This is not a structural model. Double arrows do not represent correlations. They represent the recursive temporal nature of the innovation process.

3.2. The presentation of the Behavioural Innovation Process model

Figure 3.1 illustrates the M-BIP. The model was built on the basis of explicit behavioural descriptors, which form behaviourally defined activities, leading to higher-order stages that capture three broad domains of innovative work behaviour following Janssen's (2000) and Holman and colleagues' (2012) conceptualisation; namely idea development, idea promotion and idea implementation. Here, it is important to clarify that the stage of idea development differentiates itself from the way it was conceptualised in existing models of innovative work behaviour, because I explicitly aimed to disentangle the construct from creativity related content, which as extensively discussed in the previous chapter has contaminated innovation and the models of innovative work behaviour. As such, idea development does not refer to the generation of ideas. I return to how I aimed to accomplish that in the section where the M-BIP content is presented. Figure 3.1 does not present the specific behaviours as it would be impractical to make extensive lists of specific behaviours applied to facilitate the objective of each activity in a figure. However, these specific behaviours are the building blocks of each activity and are presented in detail below. Furthermore, considering that the M-BIP operates at a lower level of abstraction than the existing models of innovative work behaviour, as clearly demonstrated by the fact that the three broad dimensions of the construct are further broken down into their constituent activities, it is a necessity to explicitly state the typology used in order to avoid unnecessary confusion. Henceforth, the higher order factors (i.e., idea development, idea promotion and idea implementation) are called stages, and the seven primary factors activities.

Hypothesis 1: The construct of innovative work behaviour has three second-order factors that correspond to Idea Development, Idea Promotion, and Idea Implementation.

The M-BIP aimed to provide both a theoretically derived and evidence-based taxonomy of innovative behaviours and describe how the behaviours interrelate to produce innovative outcomes. In order to explain how the model's components build on each other, the conceptualisation of the innovation process as a hierarchy of inter-related goals (Cropanzano, Citera, & Howes, 1995; Gutman, 1997) is first discussed. By definition, all individual innovative work behaviours contribute to achieving the ultimate goal of the process, which is the production of an innovative outcome. This conclusion of the innovation process could be perceived as the superordinate goal. Superordinate goals could be subdivided to sub-goals which enable the facilitation of the superordinate goal (Cropanzano et al., 1995; Gutman, 1997). For example, the sub-goal of the stage of idea development, as is later illustrated in the presentation of the M-BIP, is the development of innovative idea fit for a given organisational context. Without the achievement of this goal, it would be impossible to achieve the superordinate goal of producing an innovative outcome. In a similar manner, the sub-goal of developing an innovative idea could be further broken down in narrower sub-goals, thus creating a chain of sub-goals which are the means of accomplishing the superordinate goal (Cropanzano et al., 1995; Gutman, 1997). For instance, the M-BIP proposes that the development of an innovative idea is facilitated through the identification of an opportunity and the adaptation of an idea to fit the organisation's characteristics. Thus, the three stages presented in the model could be understood as the processes through which the superordinate goal of innovation is achieved, whereas the underlying activities present the sub-processes that could facilitate the attainment of the sub-goals.

The existence of goals leads to goal directed behaviours with the explicit aim of goal attainment (Gollwitzer & Schaal, 2001). In turn, behaviours generate outputs, namely, the full or partial fulfilment of the goal or the failure to attain the goal. These three possible outputs are discussed in relation to the inter-stage and intra-stage relationships of the M-BIP. These relationships are depicted in Figure 3.1 by the bi-directional arrows, which signify that the stages and the activities under each stage are built on each other and a certain sequence is in order, but they are also connected by iterative feedback loops as a manifestation of the recursive nature of the construct. In general, there are two directions through which the model's activities are connected. The forward direction exists when the output of a set of behaviours matches the stated goal. For example, when idea development behaviours result in the identification of an opportunity and the adaptation of an idea, then the individual can proceed to the next stage of idea promotion. Thus, the output of one stage becomes the input into the next stage.

The same forward direction principle can be applied to within stage processes (i.e., Activities). For example, the output of the activity of opportunity exploration (i.e., the identification of an opportunity/problem that needs to be fixed/ improved) is the input into the activity of strategic adaptation, because it would be an impossibility to adapt an idea to fit a given organisational need, thus an organisation specific problem, unless a specific problem that needs to be fixed has been identified. Furthermore, the forward direction of the innovation process can be maintained even if the intended goal is only partially fulfilled. For example, in the activity of obtaining organisational approval, the desired outputs are securing organisational consent and receiving the necessary resources. However, in this case, the output of the obtaining organisational approval directed behaviours is not in absolute terms a necessary condition to move forward, as innovators might attempt to implement an idea even with limited means (De Massis, Audretsch, Uhlaner, & Kammerlander, 2018). Thus, partial fulfilment of a goal does not necessarily impede the forward direction of the process. However, partial or total failure to attain a goal or a sub-goal could also initiate the return to previous activities of the process. This backwards direction is a manifestation of reflective behaviours, which as earlier discussed serve as a correctional mechanism, and provide a more realistic modelling assumption accounting for the non-linear iterative nature of the innovation process (Anderson et al., 2014; Bledow et al., 2009).

3.2.1. Idea development

A necessary prerequisite for the initiation of the innovation process is the existence of an innovative idea. An innovative idea is context specific and grounded in identified organisational problems, needs, or areas that could be improved (De Jong & Den Hartog, 2010; Hughes et al., 2018; Messmann & Mulder, 2012). The M-BIP conceptualises idea development as a stage whose ultimate objective is the calibration and the cultivation for success of an innovative idea germane to organizational characteristics and needs (Hughes et al., 2018). I label this stage idea development rather than idea generation. It is important to note that the label is not substituted just for the sake of differentiating this model from existing ones, since this could be perceived as construct proliferation, but because the introduction of the word development meaningfully differentiates, extends, and more accurately portrays the construct's behavioural content and its evolving nature. Thus, this alteration is meaningful because word semantics are important to highlight subtle differences between words conveying meanings which are closely related in nature (Bagha, 2011).

The rationale for introducing the term idea development is twofold. First, according to the Oxford dictionary, generation is defined as the production or creation of something. However, as already discussed, the objective of innovation is the implementation of ideas and not their generation. The process of generating ideas is a topic that should be discussed in the creativity literature (Anderson et al., 2014; Hughes et al., 2018), whereas, the source of the innovative ideas could extend beyond creativity (Holman et al., 2012; Hughes et al., 2018). Thus, the first stage of the innovation process concerns how an already existing idea is introduced, adapted, or modified to fit the organisational context, and address an identified opportunity/problem. Second, the meaning of the word development has a temporal connotation and embeds the process of improving and growing something. Thus, labelling the first stage of the process as idea development emphasises the dynamic nature of the innovation process, indicating that an innovative idea is processed and evolved across time, so as to be as compatible as possible with the identified opportunity/problem within the organisational context. Idea development is hypothesised to be composed of two major categories of behaviour: opportunity exploration and strategic adaptation.

Table 3.1

Summary of the proposed behaviours which facilitate opportunity exploration and strategic adaptation

Opportunity Exploration	Strategic Adaptation
Being attentive (De Jong & Den Hartog, 2010)	Identifying necessary human and capital resources (Janssen, 2005)
Being on the lookout for alternative ways to do things (De Jong & Den Hartog, 2010)	Planning on resources acquisition (Howell, Shea, & Higgins, 2005)
Keeping oneself informed (Howell, 2005; Messmann & Mulder, 2012; Zhong et al., 2018)	Examining the idea’s compatibility with the organisation (Dutton et al., 2001; Howell, 2005; Howell & Boies, 2004)
Being critical/inquisitive (Messmann & Mulder, 2012)	Reflecting and modifying the idea (Messmann & Mulder, 2012)
Exchanging views/opinions (Howell, 2005; Ogzen & Baron, 2007)	

3.2.1.1 Opportunity exploration

The first activity of the idea development stage describes the behaviours that result in the identification of a work-related aspect that could be subjected to some form of change. These identified work-related aspects could be understood as the triggers that unfold the innovation process (Krause, 2004). These triggers could be of various kinds and are qualitatively different (De Jong & Den Hartog, 2010). For example, the identification of a problem in the way day to day tasks are carried out within an organisation could be one trigger that initiates the subsequent change oriented innovative work behaviours. One further trigger could be the identification of an organisational need that is not fulfilled with the existing procedures and practices. Furthermore, the triggers that initiate the innovative work behaviours do not necessarily have to address problems, impediments, or omissions, but they might be additions that would provide added value to an already well-functioning organisation. For example, noticing that the market's demand for a specific product or service is increasing, constitutes the identification of a potentially beneficial opportunity for the organisation, and thus, provides the trigger to initiate the subsequent innovative work behaviours. Infusing the adopted terminology with a positive connotation, henceforth, the outputs of the activity of opportunity exploration are called opportunities, as even the identification of problems can be seen as an opportunity to improve.

Whereas the identification of opportunities can emerge spontaneously without a person necessarily being on the lookout for them, research has suggested that opportunities are more likely to be the outcomes of focused and purposeful opportunity searching behaviours (Maier, Hülsheger, & Anderson, 2015). The identification of opportunities is largely dependent on heightened contextual awareness (Messmann & Mulder, 2012; Mumford, Scott, Gladdis, & Strange, 2002). The empirical literature has provided ample information regarding the types of behaviours associated with the identification of opportunities, via increasing one's awareness. Table 3.1 summarises the behaviours facilitating the objective of the activity of opportunity exploration. As shown in De Jong and Den Hartog's (2010) model of innovative work behaviour, the behaviours of being attentive to one's workplace environment and being actively on the lookout for alternative ways to do things, loaded onto the opportunity exploration factor. Furthermore, these behaviours significantly correlated (r = .30) with subordinate/supervisory dyadic ratings of innovative outputs, indicating that they are important facilitators of the innovation process (De Jong & Den Hartog, 2010). Other behaviours that have been empirically shown to be associated with the identification of opportunities are to be found in Messmann and Mulder's (2012) work. Messmann and Mulder's study indicated that a core behaviour of their proposed opportunity exploration factor was the acquisition of information regarding how things are run within the organisation, regarding advancements within one's professional field and also regarding intra- and extra-organisational developments. Their work is of particular importance as they used the qualitative methods of the Critical Incident Technique and the Generalized Case Approach in order to identify what people do when behaving innovatively, and then based on their qualitative data, generated items and tested their theoretical model by assessing a series of EFA and CFA models.

Messmann and Mulder's (2012) empirical findings get further support from Howell's (2005) work. Howell, in a research project spanning a decade combining qualitative and quantitative cross-sectional and longitudinal data on 72 technology or product innovations in 38 companies, reported that scanning the environment for ideas and information, via initiating social interactions with colleagues and customers, were behaviours linked to the identification of opportunities and consequently led to more successful innovations. Furthermore, Howell (2005) found that the use of a multitude of sources and social networks as a way of identifying existing problems, weaknesses and potential opportunities were behaviours also associated with identifying opportunities, which resulted in successful innovations. Other researchers have also empirically demonstrated that seeking and acquiring knowledge regarding customer needs ($r = .36$) (Shepherd & DeTienne, 2005) and new technologies and markets ($r = .26$) (Shu, Ren & Zheng, 2018) were positive correlates of identified opportunities. Moreover, the use of a multitude of sources and social networks, such as informal industry networks (r = .50), mentors (r = .40), professional forums (r = .48), as a way to acquire knowledge and information, has been shown to be positively correlated with opportunity identification (Ogzen & Baron, 2007). Overall, the importance of information seeking behaviours has been further supported by a recent study conducted on a large sample of 1247 nursing students, which found a correlation of 0.63 between information seeking behaviours and innovative work behaviour (Zhong, Hu, Zheng, Ding, & Luo, 2018). Concluding, carrying out the aforementioned behaviours is proposed to lead to the identification of a focal point that could be subjected to a positive change, in other words resulting in an identified opportunity which might trigger the unfolding of the innovation process.

3.2.1.2. Strategic adaptation

Strategic adaptation details the proactive behaviours aimed at transforming a raw idea into an idea that is suitable for the context and has the potential to lead to innovation (i.e., an innovative idea). Here, it is important to clarify, by the use of an example, what is meant by the terms raw and innovative idea, so as not to cause any unnecessary confusion, and not contaminate the M-BIP with creativity related content. In this example employee A suggests a change to a policy to improve productivity (Raw idea). Employee B takes the raw idea and modifies it so that it fits within the company's regulations/budget (Innovative idea). Thus, the raw idea can be understood as an initial idea or a potential solution to a given problem. Raw ideas could come from various sources. They could be the product of the innovator's creativity, they could be generated by a different person, or they could even be sourced outside the organisation, country, or industrial sector. Innovative ideas are the raw ideas that have been adapted and modified to fit reality constraints. For example, employee B, who has a more in-depth knowledge of the organisational realities modifies and adapts the proposition made by employee A so as to be more compatible with the given organisational context, and develops an innovative idea. Once more it should be clearly stated that the origin of the raw ideas is not a topic that should be covered by models of innovative work behaviour (Hughes et al., 2018). Models of innovative work behaviour should describe the behaviours that facilitate the transformation of a raw idea into an innovative idea that has been subjected to any adaptations and modifications necessary in order to be adapted to the specific context and compatible with the organisation's realities (Hughes et al., 2018). Thus, the modified idea that has accounted for the organisational context is herein defined as the innovative idea, and is suggested to be the outcome of the activity of strategic adaptation. Hence, one of the objectives of the activity of strategic adaptation is to examine the raw idea with respect to the organisational context, and subsequently make any adaptations necessary, so as the raw idea becomes context specific and compatible with the organisation.

It is important to note that the introduction of the activity of strategic adaptation, as part of the innovation process, is a novelty of the M-BIP, considering that the empirical literature did not provide any evidence binding the proposed behaviours (see Table 3.1) under a stage even remotely theoretically resembling to the activity of strategic adaptation. Of course, this is reasonable considering that existing models of innovative work behaviour have mostly focused on opportunity exploration and idea generation (see Table 2.1), and have not addressed the question of how ideas are to be processed and modified so as to fit into an organisational context (Hughes et al., 2018). Therefore, taking into account that this activity is novel to the M-BIP, prior to describing the behaviours that facilitate it, it is necessary to clearly illustrate the function it serves, and why it is important to transform a raw idea into an innovative idea.

The M-BIP model proposes that the likelihood of successfully promoting an idea is not only facilitated by the promotion efforts but also proactively facilitated by the attributes of the idea itself. In other words, strategically adapting the raw idea to be compatible with the organisation and its people can be perceived as a pre-emptive way of increasing the likelihood of the innovative idea being positively received. This novelty of the M-BIP (i.e., The explicit description of the behaviours directed at modifying and adapting raw ideas) is relevant to one of the major problems innovators face. That is, how to make the organisation and its people embrace a proposed idea, given that a proposed idea can be implemented only when others have been persuaded of its potential, its usefulness, its feasibility, and its compatibility with individual and organisational objectives (Chan, Li, & Zhu, 2018; Choi & Chang, 2009; Litchfield et al., 2015). Existing models of innovative work behaviour have mostly discussed how an individual's promotion efforts can make an organisation support an innovative idea. However, the idea generation stages, found in existing models of innovative work behaviour, have solely concentrated on the behaviours leading to the conception of an idea, herein defined as raw idea, but have not explicitly discussed what the idea creator could do in order to improve the idea and make it more appealing within a given context, in the first place.

Thus, the introduction of the activity of strategic adaptation aimed to fill this gap. The basic premises for the introduction of this activity as a dimension of idea development was that an innovative idea is as good as its relevance to the context and its applicability within a given context (Messmann, Mulder, & Gruber, 2010). For example, an ingenious but costly idea might be accepted with enthusiasm in a multinational corporation but rejected immediately as unrealistic in a small business. Practically, regardless of the quality of a raw idea, in the context of innovation all that matters is its positive evaluation by the members of the organization, translated in the acceptance of the innovative proposal (Shane, 1994). The importance of ideas' feasibility and practicality as a prerequisite for acceptance by organizational members has been emphatically supported (Chan et al., 2018; Rietzschel et al., 2010). Rietzschel and colleagues' experimental studies (2010) have shown that ideas are perceived more favourably if they are deemed feasible and desirable. Chan and colleagues (2018) confirmed these findings and further showed that a feasible idea that is perceived favourably and supported by others is more likely to be noticed and accepted at the higher levels of the organisation. Thus, it is proposed that idea adjusting behaviours aimed at increasing the ideas' feasibility, practicality, and compatibility with a given occupational environment is a pre-emptive way to increase the chances of an idea being successfully promoted (Dean, Hender, Rodgers, & Santanen, 2006). These behaviours complement the behaviours leading to the identification of opportunities and provide a more accurate representation of how promising innovative ideas are developed.

An important set of behaviours suggested to accomplish the objective of the activity of strategic adaptation are planning behaviours. It is proposed that planning requires the innovators to identify the co-workers that have the necessary skills and knowledge to participate in the innovation process stage, to find the influential people that may provide the necessary support in critical stages of the innovation process (Janssen, 2005), to pinpoint the necessary resources and contemplate ways to acquire them (Howell et al., 2005), and to identify sources of potential resistance in regards to the raw idea (Kanter, 1988). These forward thinking proactive planning behaviours have been associated with the identification of potential problems and difficulties (Frese & Fay, 2001; Frese et al., 2007) as, by contemplating the practicalities of the subsequent stages of the innovation process, potential incompatibilities between the raw idea and the environment become clearer. Following the identification of the incompatibilities and the mismatches between the raw idea and the context, innovators should then try to modify the idea and eliminate aspects that could lead to its premature abandonment. Planning has been shown to be an important facilitator of the innovation process, acting as a transitioning mechanism between the development of ideas, and their subsequent promotion and implementation (Montani, Odoardi, & Battistelli, 2015). Montani and colleagues have showed that planning was significantly positively correlated (r = .35) with idea promoting behaviours and their subsequent implementation. This relationship indicated that planning behaviours might be an important omission from models of innovative work behaviour. Hence, the incorporation of the planning behaviours in the M-BIP might provide an explanation on how innovators can identify potential incompatibilities between the raw idea and the context

Furthermore, as shown in two qualitative studies, understanding the organisational strategies and objectives and shaping the raw ideas accordingly so as to increase their compatibility with the organisational context, is related to an increased likelihood of ideas being positively received within the organisation (Dutton, Ashford, O'Neill, & Lawrence, 2001; Howell, 2005). Howell and Boies (2004) provided further support for this finding by empirically demonstrating that "*an in-depth understanding of* *the organizational context*" (p. 136) has a positive direct effect on successful idea promotion. It has been repeatedly stressed out that the customisation and tailoring of ideas so as to increase their compatibility with the organisation and its people, is imperative for the ideas' advancement toward implementation (Howell, 2005; Messmann & Mulder, 2012). Specifically, these idea modifying behaviours could be understood as a manifestation of reflexivity which has been shown to be a crucial component of the construct of innovative work behaviour (Messmann & Mulder, 2012). Thus, it is proposed that unless innovators can reflect on the raw ideas and adapt them by constructively using the outputs of the previously discussed behaviours (i.e., contextual knowledge), it is likely that the potential mismatches between the idea and the context would hinder the ideas' likelihood of getting successfully promoted.

Hypothesis 2: The second order factor of Idea development has two primary factors that correspond to Opportunity exploration and Strategic adaptation.

3.2.2. Idea Promotion

Following the development of the innovative idea, innovators need to promote the idea (Janssen, 2000; Holman et al., 2012). The M-BIP specified three discrete activities that facilitate successful promotion; Championing, Obtaining organisational approval, and Recruiting assistance. Through the implementation of these activities individuals aim to obtain the organisational approval needed to proceed with the implementation, to acquire the necessary resources to carry out the implementation, and to bring together a group of skilled and knowledgeable people that could assist with the implementation of the idea.

Idea promotion is a socio-political process (Baer, 2012; Janssen, 2005; Markham, 2000), taking place at different organisational levels where innovators need to engage in diverse behaviours and tactics in order to reach the implementation stage (Bjorklund et al., 2013). For example, an innovator might use rational persuasion in order to convince a superior, while at the same time engage in bargaining behaviours so as to appease a subordinate's objection. Because innovation implies change, which can be accompanied by conflicts, competing interests and power struggles, successful innovators need to be adept and have an in-depth understanding of organisational politics (Maute & Locander, 1994; Van de Ven, 1986).

Table 3.2

Summary of the proposed behaviours which facilitate championing, obtaining organisational approval and recruiting assistance

Championing	Obtaining Organisational Approval	Recruiting Assistance
Initiating discussions with as many people as possible (Bjorklund et al., 2013; Dutton et al., 2001; Howell & Higgins, 1990a) Pushing for innovation (Dutton et al., 2001) Advocating the innovation with enthusiasm, and confidence. (Dutton et al., 2001; Howell & Higgins, 1990a; Howell, Shea & Higgins, 2005) Expressing conviction about the value of the idea (Dutton et al., 2001; Howell & Higgins, 1990a; Howell, Shea & Higgins, 2005) Reflecting on the idea and championing behaviours (Messmann & Mulder, 2012)	Producing cost and benefit estimations (Dutton et al., 2001; Howell & Higgins, 1990a; Howell, 2005) Presenting diverse positive outcomes (Dutton et al., 2001; Howell & Higgins, 1990a; Howell, 2005) Presenting an implementation plan (Howell & Higgins, 1990a) Capitalising on colleagues' support (Howell & Higgins, 1990a; Messmann &Mulder. 2011) Persisting despite adversity (Howell et al., 2005) Reflecting on the idea and obtaining organisational approval behaviours (Howell, 2005; Messmann & Mulder, 2012)	Appealing to self-interest (Bruckman, 2008; Ford et al., 2008) Addressing fears/objections (Bruckman, 2008; Howell, 2005) Consulting and encouraging participation (Furst & Cable, 2008; Van Dam et al., 2008) Applying interpersonal influence tactics (e.g., ingratiation, bargaining.) (Dutton et al., 2001; Yukl, Guinan & Sottolano, 1995) Demonstrating determination and enthusiasm (Howell et al., 2005) Reflecting on the idea and recruiting assistance

Modifying championing behaviours (Messmann & Mulder, 2012)	Modifying obtaining organisational approval behaviours (Howell, 2005; Messmann & Mulder, 2012)	behaviours (Messmann & Mulder, 2012) Modifying recruiting assistance behaviours (Messmann & Mulder, 2012)

3.2.2.1. Championing

The activity of championing specifies the behaviours aimed at creating a pro-innovation momentum or simply put making as many people as possible notice and become supportive of the proposed innovation. Van de Ven (1986) argued that getting people to notice and appreciate new ideas is critical for the success of the innovation process. People in organisations fall into their everyday routines (Becker, Lazaric, Nelson, & Winter, 2005) and given that even a minor innovation implies a degree of disruption (Mueller et al., 2012), it is relatively easy to intentionally or unintentionally ignore an innovative proposal (Oreg, 2003), unless the innovator finds a way to capture attention (Kelley & Lee, 2010). Existing models of innovative work behaviour have not addressed how an idea is best introduced in an organisation and how an innovator could make people pay attention to an innovative idea. However, several studies, whose main focus was the championing of ideas within the workplace, have identified specific behaviours that create a pro-innovation momentum through increasing organisational awareness with respect to the proposed idea and making the organisational members positively inclined toward the potential of the innovative idea.

Howell and Higgins (1990a) used screening interviews in order to identify and subsequently interview middle managers whose championing behaviours had facilitated the implementation of successful innovations. Their findings showed that attention could be raised when innovators initiate discussions with as many people as possible and pushed for the innovation whenever the opportunity arose. These findings were also supported by Dutton and colleagues' (2001) study, whereby middle level managers were asked to describe successful and unsuccessful attempts to promote some kind of organisational change. The interviews indicated that managers repeatedly initiated conversations regarding the proposed change and the objective of this behaviour was to acclimatise the organisation's members to the proposed change, so as they would gradually consider it as something that would naturally occur. Furthermore, the involvement of many people in the discussions made the proposed change even more visible to the members of the organisation and thus raised more attention over the issue. Another qualitative study (Bjorklund et al., 2013) implementing critical incident based interviews, in a sample of product developers of a successful international company, also found that initiating face to face conversations with people occupying diverse positions within the organisation is a behaviour which plays an important role in raising awareness in people and inducing their support. The importance of initiating an innovation related debate with as many people as possible has been further supported by the results of a meta-analysis examining the relationships of several aspects of social networks with individual innovation (Baer et al., 2015). This meta-analysis reported a corrected correlation of .29 between network size and individual innovation, and suggested that an expanded network could provide a greater source of support which could facilitate innovation.

Of particular interest are the findings indicating that the aforementioned desirable social interactions could be particularly beneficial upon the inclusion and deliberate conveyance of both logical and emotional appeals to the recipients of the promoting behaviours (Howell & Higgins, 1990a; Dutton et al., 2001). The logical component of these promoting behaviours includes highlighting the advantages of the innovation and pointing out the positive impact of the innovation to the organisation (Howell & Higgins, 1990a). The emotional component has to do with overtly displaying positive innovation related emotions during the initiated social interactions. Both qualitative (Howell & Higgins, 1990a; Howell, 2005) and quantitative studies (Howell et al., 2005) have shown that innovators should display excitement, enthusiasm, confidence, and strong conviction about the potential of the innovative idea, as such behavioural – emotional displays highlight the importance of the proposed innovation and spread that excitement to other members of the organisation. Howell and colleagues (2005) in their championing measure validation study have shown that these emotional displays are one of the three facets of the construct of championing behaviour, whereas Howell and Shea (2006) provided empirical evidence demonstrating that the global factor of championing behaviour correlated with measures assessing the outcomes of the innovation process at two time points (T1 r = .49; T2 r =.34). It is worth mentioning though that Howell and Shea (2006) did not report facet level correlates, which negates fair comparison of the importance of each facet. However, the study used multisource ratings (i.e., Self-reported champion behaviour and top managers reported outcomes), which strengthens our confidence in the validity of the results and the importance of championing behaviours for the success of the innovation process. This qualitative and quantitative evidence is congruent with and can be explained by the findings of a series of 5 experiments conducted by Van Kleef, Van den Berg and Heerdink (2015). These experiments tested the hypothesis that emotional displays during social interactions can convey information that influence and shape attitudes. The findings of all 5 experiments converged and demonstrated that indeed behaviours that include an overt display of emotions could be applied as an influence tactic. Particularly, the authors recommended that change agents, such as innovators, could use these tactics so as to draw support for their change initiatives. Thus, bringing in the aforementioned evidence (i.e., Howell & Higgins, 1990a; Van Kleef et al., 2015) together it is suggested that the behavioural – emotional displays of innovators could be perceived by the organisational members as indicators of the innovation's value and could assist in building a support platform for the innovation.

Finally, reflective behaviours play an important role in the activity of championing. Considering that this activity deals with the initial introduction of the innovative idea in the workplace, it also serves as a way to screen the innovative idea and become aware of any possible disagreements or conflicts that were not thought of during the activity of strategic adaptation. Upon the identification of potential conflicts or disagreements, innovators could reflectively go back to the activity of strategic adaptation and apply the modifications deemed necessary. Therefore, this type of reflective behaviour could be understood as a correctional mechanism recursively linking a later activity to a previous one; in this case championing to strategic adaptation. Furthermore, as previously stated, reflective behaviours could be potentially focused on every component of an individual's innovative behaviour. Thus, innovators could also reflect on the way they approached their colleagues and modify this approach so as to increase the effectiveness of their promotion efforts. Hence, this type of reflective behaviour could be understood as an intra-activity correctional mechanism of expressed championing behaviours.

3.2.2.2. Obtaining organisational approval

Obtaining organisational approval refers to the behaviours aimed at securing organisational consent to proceed to the implementation of the innovative idea, as well as receiving the necessary resources. By definition, the facilitating behaviours of the activity of obtaining organisational approval are generally directed towards the upper levels of the organisation. A number of studies (Howell & Higgins, 1990a; Howell, 2005; Dutton et al., 2001) has pointed out the specific behaviours used in order to persuade upper level organisation members to grant their approval and provide the necessary resources for the implementation of the innovative idea. Howell and Higgins (1990a) identified a pattern of behaviours aimed at persuading the upper levels of the organisation and labelled it “the rational process”. The basic idea behind the rational approach is that the innovator attempts to gain approval by highlighting the merits of the innovative idea, and making it clear how the proposed innovation intends to benefit the organisation. Dutton and colleagues’ study (2001) also found that the use of rational justification is an effective upward influence tactic. Presenting a compelling business case, emphatically framed as an opportunity not to be missed, could increase the probability of getting approval and receiving at least some resources (Howell, 2005). One relevant behaviour is to produce a documented cost and benefit estimation that would emphasise the financial advantages of the proposed change (Howell & Higgins, 1990a; Dutton et al., 2001). One further behaviour is to explicitly link the innovation to potentially positive organisational outcomes that could not be directly assessed through a cost and benefit estimation (Howell & Higgins, 1990a; Dutton et al., 2001). For example, an innovation that would reduce the workload of the employees might indirectly benefit the organisation by increasing employees’ well-being and commitment to organisational objectives, while reducing employees’ turnover intentions. Howell (2005) found that framing the idea to positive outcomes, rather than associating it with threat avoidance, increased the chances of support, as positivity is perceived as being more attractive and desirable. Another behaviour is to present a detailed implementation plan so as to demonstrate the feasibility of the innovation and that the presented business case is well thought through (Howell & Higgins, 1990a). As discussed earlier, feasibility is one of the enablers of acceptance of innovation related proposals (Chan et al., 2018; Rietzschel et al., 2010).

Apart from making a formalised business case, organisational approval can also be gained by a variety of influence and communication tactics. Both Howell and Higgins (1990a), and Messmann and Mulder (2011) found that capitalising on workplace coalitions and persuading other members of the organisation or even customers to lend their active support and express their positive evaluation of the innovative idea, applied social pressure to the organisation's management, and thus could be another way to obtain organisational approval. Moreover, demonstrating persistence has been shown to be a core behaviour of the construct of championing (Howell et al., 2005). Demonstrating persistence even in the face of adversity could signify commitment and determination and thus persuade upper management to support the innovative idea (Howell et al., 2005). Finally, reflective behaviours could be important facilitators of this activity. For example, if the organisation's management is not convinced about the proposed innovation, returning to the strategic adaptation stage so as to modify the innovative idea and make it more appealing and compatible, or coming up with different selling strategies could be practical ways to keep pushing and negotiating until support is granted (Howell, 2005).

In conclusion, it should be pointed out that not all innovations require this step. There might be cases where innovators might skip the activity of obtaining organisational approval. For example, if a high degree of job control is granted by an organisation to its employees, minor innovations that do not have an organisation-wide impact could be carried out without obtaining organisational approval. An example of such a minor innovation could be a new way of filing documents by administrative staff. A second case where innovators might skip the activity of obtaining organisational approval, or engage in some of the described behaviours but not in the herein presented order, concerns what Howell and Higgins (1990a) described as the renegade process of innovation. In renegade innovation, individuals just identify an opportunity, develop an innovative idea and go about implementing it even against organisational norms and without seeking organisational approval (Howell & Higgins, 1990a; Shane & Venkataraman, 1996). Renegade innovators first attempt to implement the innovation, and upon the successful implementation, which accordingly could be associated with the capacity to demonstrate the tangible outcomes and benefits of the implemented idea, seek organisational approval to integrate the innovation into the organisational practices (Howell & Higgins, 1990a; Shane & Venkataraman, 1996). Quoting Howell and Higgins (1990a) the renegade innovators' approach to innovation can be summarised by the phrase “"It's better to beg forgiveness than to ask for permission" (p. 52). Therefore, the activity of obtaining organisational approval is facilitated when the innovation is not that minor and up to each employee's discretional freedom to be implemented without requesting approval, and when formal organisational procedures are followed in order to initiate some form of organisational change.

3.2.2.3. Recruiting assistance

Recruiting assistance details the behaviours directed at obtaining the active support and co-operation of the individuals whose skills and knowledge are deemed to be valuable for the successful implementation of an innovative idea. Bringing together skills and diverse knowledge is imperative for the success of the innovation process (Klein & Knight, 2005; Perry-Smith & Mannucci, 2017). This principle has been supported by meta-analytic evidence reporting a mean corrected correlation of .24 between team skills and knowledge diversity and innovation (Hülsheger et al., 2009). Furthermore, Perry-

Smith and Mannucci (2017) in their constructive review of the social network drivers of the innovation process, identified and proposed that idea implementation is more likely to be facilitated by the closure of the social networks' structural holes, which is the objective of the recruiting assistance activity. Perry-Smith and Mannucci (2017) defined a structural hole as when two of the innovator's contacts do not share a tie. Thus, the person who has ties with two individuals who do not share a tie, spans a structural hole. Closure of structural holes is defined as when an innovator's direct contacts maintain ties to each other (Perry-Smith & Mannucci, 2017). Closing structural holes, by applying the behaviours about to be described in this section, means that a cohesive team is formed, composed of organisational members who have direct ties to each other, and work toward a common objective (Perry-Smith & Mannucci, 2017).

Drawing on Perry-Smith and Mannucci's (2017) work further demonstrates how the activity of recruiting assistance differentiates itself from the activities of championing and obtaining organisational approval in terms of their social network drivers. Whereas here the objective is to close structural holes, the objective of the previous two activities, still regarding social network drivers, is to borrow structural holes, thus exploit their properties. In terms of social networks' terminology, borrowing structural holes means that the innovator uses individual A's (Individual A can be an influential employee, supervisor, or manager) legitimacy and influence so as to persuade individual B, who has no direct ties with individual A, about something (Perry-Smith & Mannucci, 2017). For example, when the innovator approaches an employee (Individual B) and attempts to persuade him/her to join the implementation team, by saying that the manager or a well-regarded colleague (Individual A) has already approved and/or supported the innovative idea, then the innovator borrows the structural hole, or in other words uses the legitimacy and influence of the manager or a well-regarded colleague (Perry-Smith & Mannucci, 2017). Thus, concurring with Perry-Smith and Mannucci's (2017) conclusions, it is suggested that different network elements are associated with the activities constituting the idea promotion stage, with the activities of championing and obtaining organisational approval being associated with enabling the capitalisation of the "benefits of borrowing structural holes" (Perry-Smith & Mannucci, 2017, p. 64), and the activity of recruiting assistance being associated with the closure of structural holes.

The activity of recruiting assistance takes place following the obtained organisational approval to carry on with the proposed innovation, and unless there is an organisational directive directly dictating which employees should carry through the implementation of the innovative idea. If that is the case, then the objective of the recruiting assistance activity is accomplished by the organisation itself and not by the behaviours that are later described. However, if the innovators are given permission to identify and recruit their collaborators, they need to employ diverse influence and persuasion tactics in order to convince the target individuals to participate in the innovation process (Markham & Aiman-Smith, 2001; Kleysen & Street, 2001) and to overcome potential resistance (Janssen, 2000, 2005).

Bruckman (2008), based on observations spanning almost four decades in over 300 organisations, identified that one of the behaviours that could be applied in order to persuade an individual to participate in the change process, is directly presenting to the target individual how they would benefit from the proposed change, thus appealing to self-interest. Explaining the potential personal benefits of the innovative idea could not only persuade target individuals to participate in the implementation stage but also could be a pre-emptive way to avoid resistance (Ford et al., 2008). As discussed in the section presenting the activity of obtaining organisational approval, tying the innovative idea to positive outcomes increases its attractiveness and the likelihood of it getting endorsed

(Howell, 2005). It should be noted though, that despite the conceptual similarity these two behaviours differ, as in the activity of recruiting assistance, personal gains are presented to the individuals of interest rather than broader positive organisational outcomes.

One further behaviour relevant to the activity of recruiting assistance is addressing an individual's fears and objections (Bruckman, 2008). Given that change could be associated with uncertainty and fear, it is important to discuss and dissolve these negative feelings by establishing that they are unrealistic, and by offering the opportunity to the target individuals to raise their objections and make counter-proposals (Howell, 2005; Bruckman, 2008). Engaging in such behaviours provides to the target individuals the opportunity to raise their concerns and counter-proposals, which in turn could increase felt safety, felt control over the change, and commitment to the innovation, thus increasing the likelihood of active support for and participation in the innovation process (West & Altink, 1996; Janssen, 2000; Higgins, Judge, & Ferris, 2003; Van Dam, Oreg, & Schyns, 2008).

Another behaviour relevant to the activity of recruiting assistance is actively seeking the target individual's consultation regarding the proposed innovation. Empirical evidence has shown that consultation tactics (i.e., asking for one's point of view, and providing suggestions for improvements) were negatively correlated with resistance to change (r = -26) (Furst & Cable, 2008). Asking a target individual to have a say in the innovation process could increase the sense of participation, which has also been shown to be negatively correlated with resistance to change (r = -.49) (Van Dam et al., 2008). This type of behaviours has been associated with higher commitment to the proposed change (Furst & Cable, 2008), which has been positively correlated (r = .27) with engagement in implementation behaviours (Michaelis, Stegmaier, & Sonntag, 2010).

An additional behaviour that could be used to recruit assistance is initiating social exchanges. Based on the principles of Social Exchange theory, quid pro quo transactions could be a practical way to negotiate assistance, by offering a future favour or something that is valued by the target individual (Cropanzano & Mitchel, 2005). Yukl, Guinan, and Sottolano (1995) found that the use of exchange as an influence tactic is particularly useful when individuals seek assistance. Another way to influence the target individuals is by asking for superiors' assistance as a means of applying social pressure to the target individual. Dutton and colleagues (2001) have shown that involving upper management in promotional efforts was one of the key differences between successful and unsuccessful selling episodes. Moreover, two behaviours that are involved in the other two activities of the idea promotion stage, could be also used in order to recruit assistance. Behaving with persistence and overtly displaying enthusiasm could be practical ways to overcome resistance and persuade target individuals. These behaviours are core elements of the construct of Championing (Howell et al., 2005), which as has been previously discussed is an important determinant of idea promoting endeavours. The reason for the reappearance of these previously described behaviours is because a certain amount of conceptual overlap is expected for the three activities of Idea Promotion, as they all deal with social interactions, and in essence persuasion tactics. It is reasonable therefore that some behaviours could be enablers of persuading different people and achieving diverse objectives.

Finally, reflective behaviours are important facilitators of the objectives of the present activity. Reflecting on unsuccessful attempts to persuade target individuals might indicate that the use of other persuasion tactics might be more appropriate, or signify that aspects of the innovative idea need to change. Once more these reflective behaviours might result in returning to previous activities of the process or adapt within activity sub-processes.

Hypothesis 3: The second order factor of Idea promotion has three primary factors that correspond to Championing, Obtaining organisational approval and Recruiting assistance.

3.2.3 Idea implementation

Implementing the innovative idea is the last stage of the innovation process. The objective of the stage of idea implementation is to manage and put into use the available human and capital resources obtained in the stage of idea promotion, and realise the innovative idea. The stage of implementation is split into two activities; implementation strategy and implementation facilitation. As discussed in Chapter 2, the behavioural manifestations facilitating the objectives of this stage have been sub-optimally addressed in the literature on innovative work behaviour. For all practical purposes, the only empirically grounded advice conveyed by existing models of innovative work behaviour regarding what an individual needs to do to transform an innovative idea into an innovative outcome, is to implement it (see item level review, Table 2.2). Generally, there are plenty of studies dealing with innovation implementation, but the majority approach implementation from a broad organisational perspective associating it with socio-economic factors, broad management practices, institutional enablers and organisational level processes (e.g., Aarikka-Stenroos, Jaakkola, Harrison, & Mäkitalo-Keinonen, 2017; Choi & Chang, 2009; Klein & Sorra, 1996). Therefore, the behaviours presented in this stage represent an exploratory attempt to bring in knowledge found in not directly relevant literature streams, by applying and translating broader principles to practical behaviours that can enable the implementation of an innovative idea.

Table 3.3

Summary of the proposed behaviours which facilitate implementation strategy and implementation facilitation

Implementation Strategy	Implementation Facilitation
Setting objectives (Cormican & O'Sullivan, 2004; Messmann & Mulder, 2011) Delineating the steps to be taken (Cormican & O'Sullivan, 2004; Messmann & Mulder, 2011) Distributing workload (Klein & Knight, 2005; Krause, 2004) Ensuring team members suitability for a given task (Breaugh, 2013; Lansisalmi et al., 2004) Allocating resources (Niazi, Wilson, & Zowghi, 2006) Reflecting on and revising the implementation strategy (Messmann & Mulder, 2012)	Experimenting to assess the appropriateness of the approach idea (Janssen, 2000, Kanter, 1988; Messmann & Mulder, 2012) Risk-taking (Cormican & O'Sullivan, 2004; Kanter, 1988; Klein & Knight, 2005) Establishing effective communication channels (Cormican & O'Sullivan, 2004; Krause, Gebert, & Kearney, 2007) Motivating team members (Howell & Higgins, 1990a) Scrutinising and appraising the process (Meyers et al., 2012; Messmann & Mulder, 2012) Reflecting on the implementation process and constructively using feedback (Messmann & Mulder, 2012)

3.2.3.1 Implementation strategy

The activity of implementation strategy concerns the planning and organising behaviours that regulate the practical aspects of the transformation of the idea into an innovative outcome. This activity is heavily dependent on the outputs of the idea promotion stage; namely the acquisition of resources and the formation of a team composed of skilled and knowledgeable individuals who are to implement the idea. As discussed with respect to the activity of strategic adaptation, planning behaviours have been shown to be an important correlate of promotion and implementation (Montani et al., 2015), because planning behaviours increase the likelihood of proactively identifying potential problems and difficulties (Frese & Fay, 2001; Frese et al., 2007). It should be noted though that the planning behaviours in this activity are fundamentally different from the planning behaviours described in the activity of strategic adaptation. Here, planning deals with how the idea is going to get implemented, whereas in the activity of strategic adaptation, planning behaviours focused on all those elements crucial for the modification of the idea in order to increase its chances of being promoted. Planning behaviours have been found to be at the core of the implementation process as shown by two studies examining how innovations are implemented in fundamentally different professional sectors (Cormican & O'Sullivan, 2004; Messmann &Mulder, 2011). Cormican and O'Sullivan (2004) conducted a case study on multinational corporations, across several industrial sectors, aiming to develop a best practice model of product implementation, whereas Messmann and Mulder (2011) applied the critical incidents technique in order to capture the behaviours that facilitate innovation in education. Despite the difference in the settings, both studies showed that planning behaviours are crucial for the success of the implementation process. Specifically, both studies concurred that the milestones and key objectives of the implementation process need to be set, because they can form both a way to guide and to direct the efforts of the implementation team, but also to provide the basis for an evaluation system.

Apart from delineating the specific steps that need to be followed in order to implement the innovative idea, it is also important, for the success of the implementation process, to arrange how the available resources are to be used. Niazi, Wilson, and Zowghi (2006), in a qualitative study, assessing the critical success factors for the implementation of incremental product innovations, found that being provided with the necessary resources is an important condition for the successful realisation of an idea. Thus, it follows that an important behaviour during the activity of implementation strategy is to properly allocate the necessary resources to each task and individual. Moreover, considering that the last activity of the idea promotion stage focused on how to obtain the assistance of skilled and knowledgeable colleagues, it follows that this gathering of skills and knowledge should be put to good use. Lansisalmi and colleagues (2004) have shown that not being able to capitalise on employees' unique skills, abilities and knowledge is associated with poor innovative performance, even when controlling for contextual characteristics of the organisations. Thus, applying the fundamental premise of employee selection processes, which essentially is, individual's skills matching task's requirements (Breaugh, 2013), the distribution of the workload should take into account individuals' skills and knowledge. This behaviour could serve two purposes. First, to improve coordination among the implementation team members and second, to increase the implementation effectiveness, as each member would focus on the task that is compatible with his/her area of expertise (Dong, Neufeld, & Higgins, 2008; Klein & Knight, 2005; Krause, 2004). Finally, innovators should once more be reflective and adaptive in order to overcome any shortcomings. For example, it is possible that the allocated resources are less than expected. If that is the case innovators should reflect on the devised plan and identify weaknesses and actively make changes so as to make the best out of a suboptimal situation.

3.2.3.2. Implementation facilitation

The activity of implementation facilitation entails the behaviours applied in order to execute the previously formulated plan and conclude the innovation process by the production of an innovative outcome. One behaviour frequently reported to be an indispensable component of the implementation of an innovative idea is the piloting of the innovation, or in other words the development of a prototype or a small-scale application of the innovative idea (Janssen, 2000; Kanter, 1988). Testing an innovative idea prior to going full scale, and committing all the resources, can be a practical way to assess potential bugs, problems, and impracticalities. Messmann and Mulder's (2012) qualitative work showed that piloting is part of the construct of idea realisation. However, despite the lack of quantitative empirical evidence showing that piloting is a behavioural component of the implementation process, it makes sense that testing an idea might be the only way to make an evidence-based assessment of its feasibility. The inclusion of this behaviour in the activity of implementation facilitation can also be supported by other product development studies that have described developing prototypes as an assessment of diverse types of innovations (e.g., Ma & Harmon, 2009; Hall et al., 2014; Hamilton, 2013).

Another important behaviour that could enable the facilitation of innovative outcomes is establishing effective communication channels with team members and superiors. Cormican and O'Sullivan (2004) found that communication is one of the critical factors fostering implementation. Communication is imperative so as to evaluate progress, coordinate efforts, exchange views, provide constructive feedback, reinforce commitment to the innovative project, eliminate conflicts, and create a safe and supportive environment, which could lead to the transformation of the innovative idea into a tangible innovative outcome (Howell & Higgins, 1990a; Howell, 2005; Klein & Knight, 2005; Meyers, Durlak, & Wandersman, 2012). Several qualitative studies have shown communication to be an important parameter of the implementation process both when the recipient end is the upper levels of the organisation and when it is directed at peers and other contributors to the implementation process (Howell & Higgins, 1990a; Howell, 2005; Messmann & Mulder, 2011; Niazi et al., 2006). Moreover, another study examining which facets of leaders' behaviours towards subordinates increased the likelihood of innovation implementation success, showed that consultative-advisory leadership is a positive correlate (r = .35) of implementation success (Krause et al., 2007). Consultative-advisory leadership entails the provision of advice, guidance, and information about the process of innovation. Considering that the initiating actor in a given innovative episode assumes an informal leadership role, given that it is his/her idea, it is sensible to extend the findings of that study to the herein described process and strengthen the suggestion that communicating is a core behaviour of the activity of implementation facilitation.

Furthermore, another function of establishing effective communication is the motivation of team members. Given that the implementation facilitation can be turbulent, and the commitment of the team members may waver, it is important to appear supportive and motivate team members to keep going despite the potential problems. Howell and Higgins' (1990a) qualitative study reported that during implementation it is important to exhibit transformational leadership behaviours, such as showing appreciation for team members' efforts and acting as a role-model. Their observations have been supported by several quantitative studies examining transformational leadership and innovation. For example, Reuvers, Van Engen, Vinkenburg, and Wilson-Evered (2008) examined how each of four facets of transformational leadership related to innovative work and reported a positive correlation (r = .44) with inspirational motivation. Lee, Lee, and Kim (2007) found that transformational leadership indirectly affects employees' innovative behaviour via empowering them. Furthermore, Herold, Fedor, Caldwell, and Liu (2008) reported a positive correlation between transformational leadership and change commitment (r = .35). Therefore, this aforementioned evidence provides sufficient empirical support in order to suggest that innovators should try and exhibit motivating behaviours characteristic of transformational leaders during the communication with the team members, because motivating behaviours can reinforce commitment and boost the innovative behaviours of the individuals participating in the activity of implementation facilitation.

Another proposed behaviour is risk-taking. Although, a well-planned innovation implementation should in principle not require taking risks, in real life this is not always the case, considering that several innovation processes might not produce the intended outcome, or do so at a disproportionate cost in comparison to the innovation's associated benefits (Khessina, Goncalo, & Krause, 2018). Innovative endeavours are often unpredictable and run the risk of failing, thus wasting time and resources (Kanter, 1988; Klein & Knight, 2005). The burden of successfully implementing an innovation that has been supported by the organisation through committing resources, could also promote conflict with other members of the organisation due to diverging beliefs and approaches (Janssen, 2000; 2003), and thus, increase the pressure on the implementation team members. Furthermore, the unpredictability of the innovation process might evoke negative emotions such as fear and stress (Vuori & Huy, 2016), which in turn might disrupt the facilitation of the innovative idea (Khessina et al., 2018). Therefore, it is likely that these conditions could undermine the facilitation of the idea implementation. Klein and Knight (2005) though, suggested that unless someone is willing to take the risk of failing, innovations would not occur.

There is empirical evidence pointing out that risk-taking is an occasional necessity so as to produce innovative outcomes. Cormican and O'Sullivan's study (2004) showed that an organisational climate that allows and encourages risk-taking was one of the factors associated with successful innovations. Andriopoulos (2003), in a case study, reported that experimenting and taking calculated risks is desirable considering that lack of risk taking would imply conventionality, which is opposed to the spirit of innovation. Bunduchi (2009), in another case study examining best practices in new product development, reported that a tolerance to risk and failure was an important enabler of the process. One further quantitative study reported a positive correlation (r = .33) between organisational encouragement to take risks and innovative outcomes (Sethi, Smith, & Park, 2001). Taken together, all this evidence directly implies that risk-taking is often desirable and necessary during innovation.

Finally, it is important to continually oversee, monitor and assess the progress made, so as to be able to make timely adjustments to the implementation process (Meyers et al., 2012; Messmann & Mulder, 2012). Constant monitoring of the implementation process, reflecting on its progress, and making constructive use of feedback could provide the opportunity to improve aspects of the idea that could make the implementation more feasible, alter the implementation approach taken, and even become an opportunity to increase knowledge and hone skills. Thus, an important set of behaviours, as of course is true throughout the innovation process, is reflective behaviours that might practically focus on every aspect of the implementation facilitation activity.

Hypothesis 4: The second order factor of Idea implementation has two primary factors that correspond to Implementation strategy, and Implementation facilitation.

3.3. Conclusion

The present chapter proposed a new model of innovative work behaviour. The M-BIP drew on the existing literature on innovative work behaviour and capitalised on the wealth of knowledge already produced. Furthermore, the M-BIP filled in the identified gaps by incorporating empirical knowledge found across relevant disciplines. The M-BIP makes a number of incremental contributions to the literature. Specifically, the M-BIP retains the broadly accepted structure of the innovation process, which with slight variations across theorists starts with the identification and development of an idea, proceeds with the promotion of the idea, and ends with the implementation of the idea, but introduces a further layer underneath the broad stages that serves two purposes. First, to describe the process of innovation in further detail by breaking down the broad factors in more narrowly defined facets. In doing so the proposed model describes the behavioural elements of the innovation process that have appeared only in theoretical debates, but hardly ever were introduced in conceptualisations and operationalisations of innovative work behaviour (i.e., activity of strategic adaptation). Second, the introduction of the underlying layer of behavioural indicators addresses the paradox of the models of innovative work behaviour not focusing on behaviours, and provides an opportunity to capitalise on interdisciplinary knowledge and empirically assess the usefulness of the aforementioned behaviours in the facilitation of the objectives of the innovation process. Additionally, the M-BIP explicitly accounts for the iterative nature of the innovation process by infusing the construct with the reflective behaviours facilitating the iterative nature of the process of innovation. Finally, the M-BIP pays particular attention to proposing a conceptualisation that would disentangle the construct of innovative work behaviour from construct irrelevant content, such as creativity related behaviours and innovative products.

Chapter 4

Study 1

In this chapter, the initial development of a psychometric measure that operationalises the Behavioural Innovation Process model (M-BIP) is presented. As discussed in Chapter 3, the present thesis proposes a new model of innovative work behaviour, thus existing measures cannot be used for theory testing. According to Irwing and Hughes (2018), theoretical advancement is an appropriate justification for the development of new psychometric instruments.

The evaluation of the existing models and measures of innovative work behaviour (Chapter 2) was conducted using the criteria of the Accuracy and Appropriateness model (Hughes, 2018) because this model provides the most theoretically robust framework for such purposes. Thus, in order to allow for fair comparisons and develop the most robust psychometric tool possible, the development and evaluation of the M-BIP's psychometric instrument is grounded in the same criteria. The remainder of this chapter describes how each of the Accuracy and Appropriateness criteria were assessed, the item generation procedure, and the method, results and discussion pertaining to a thorough psychometric evaluation.

4.1. Psychometric principles and research objectives

As illustrated in Chapter 2, Tables 2.6 and 2.7, existing models of innovative work behaviour have been tested using measures that were developed using only a small proportion of the techniques available to conduct scale validation (Hughes et al., 2018). As a result, current empirical estimates that serve as tests for models of innovative work behaviour, are sub-optimal. For example, some scales contain assessments of innovative outcomes and are then correlated with innovative outcomes and produce unreliable estimates (see Hughes et al., 2018). Similarly, as discussed in Chapter 2, many psychometric tools have assessed only a fraction of the content of the models of innovative work behaviour, meaning that any estimates or structural, predictive, convergent, and divergent validity remain sub-optimally examined, or not examined at all.

Broadly, the accuracy of a measure deals with how closely the instrument captures the represented theoretical construct whereas appropriateness deals with whether a measure is useful for a specific purpose and in a specific situation. Below, each of the two pillars of the Accuracy and Appropriateness model of psychometric measurement are broken down to their constituent components. Each component is then briefly discussed, and finally, it is presented how each component within this research project was assessed. It should be noted that this first measure development study did not assess all the components of the accuracy and appropriateness model. However, in order to show how the first study fits within the overall measure development project, to provide a more holistic and representative overview of the research process, and to show that what was not assessed in this first study was not neglected, the accuracy and appropriateness components that were assessed in the second validation study are outlined in the following two sections.

4.1.1. Accuracy

The first fundamental criterion of a measure's accuracy is its content accuracy. Content accuracy concerns the degree to which the measure represents a construct's theoretical content. The items of a measure should tap the entirety of the construct's content, should not under-represent the theoretical domain, and should not include construct irrelevant content. Furthermore, a measure's content accuracy is compromised when the items are not designed to consistently capture the 'nature' of the theoretical construct. In the domain of innovative work behaviour, the term 'nature' refers to Batey's (2012) 4Ps measurement framework (Person, Process, Press, Product). As discussed in Chapter 2, existing models of innovative work behaviour have used a combination of process and product items, thus including construct irrelevant variance. Considering that the evaluation of a measure's content accuracy is not easily assessed through quantitative techniques (Krabbe, 2017), the content accuracy of the M-BIP was ensured, by the inclusion of items that fully capture the theoretical content of the construct, and by making sure that the items have an exclusively behavioural orientation.

Structural accuracy is the second important accuracy criterion. This criterion is satisfied when a psychometric instrument's factorial structure is equivalent to the theoretical dimensionality of the construct it measures. Specifically, the examination of the M-BIP's structural accuracy was based on the testing of Hypotheses 1-4, presented in Chapter 3, which specified the theoretical dimensionality of the construct. The structural accuracy of the M-BIP was initially assessed by implementing factor analytic techniques. Specifically, in the first study Exploratory Factor Analysis (EFA) was implemented to explore the factorial solution that fits the data best, followed by Confirmatory Factor Analyses (CFA), which tested the solution obtained using EFA and whether the hypothesised structure of the model was supported by the data. The structural accuracy of the M-BIP was further assessed on a larger cross-validation sample in a second study. Moreover, the evaluation of the measure's structural accuracy was also screened by the examination of the discriminant validity of the measure's factors so as to verify that the proposed activities and higher order stages were meaningfully different from each other. The discriminant validity of the M-BIP's factors was investigated in both the first and the second measure development studies.

Furthermore, another important parameter of a measure's accuracy is its stability across groups (Hughes, 2018). A measure's content and structure should remain identical across groups to claim it is stable (Hughes, 2018). The examination of the M-BIP's stability was implemented in the second study of the present research project. The details of how the evaluation of the measure's stability was conducted is presented in the relevant fifth chapter, which is dedicated to Study 2.

Last but not least, the examination of the underlying processes taking place when responding to the items of a psychometric measure is a fundamental piece of evidence needed to establish accuracy (Borsboom et al., 2004; Embretson, 2016; Hughes, 2018). Unless we are confident that the variation in the responses to items represents a manifestation of true differences in the construct under examination, we cannot definitively claim that a measure is accurate. Indeed, scales can have good psychometric properties even if items are constructed poorly and do not require participants to draw on theoretically salient memories (Maul, 2017). Thus, a think aloud protocol (Ericsson & Simon, 1984) was implemented, whereby participants read items and then spoke aloud their thoughts and their justification for choosing a response option. The evaluation of the response processes underlying the M-BIP took place in this first study following the assessment of its content and structural accuracy properties.

4.1.2. Appropriateness

Once a measure is shown to provide an adequate level of accuracy (i.e., construct representativeness, response processes that assess relevant memories, structural accuracy, etc.), its appropriateness or suitability for theory testing and decision making should be established. In this case, appropriateness means that the M-BIP should be able to predict innovative outcomes, should converge with measures tapping identical constructs, should be discriminantly valid with respect to measures capturing related but distinct constructs, should not be biased against certain groups (e.g., Gender, Nationality), and should be practical to use in applied research.

The examination of the relationships with other variables is the best way to evaluate the appropriateness of a measure. A measure of innovative work behaviour is appropriate for theory testing when it has been shown to correlate with existing measures tapping the same construct (Carlson & Herdman, 2012). Obtaining evidence of convergent validity is necessary and standard practice for scale development studies (Hughes, 2018). However, as extensively discussed in the previous chapters, the M-BIP intentionally departs from existing models of innovative work behaviour, by exclusively adopting a behavioural orientation, and operating at a lower level of abstraction compared to the existing measures of innovative work behaviour. Therefore, accounting for this differentiation, it could be said that the M-BIP captures a closely overlapping but not identical construct. Thus, a high degree of convergent validity with existing measures would indicate that the M-BIP captures similar information (Carlson & Herdman, 2012), which contradicts the present thesis' objectives.

In the present thesis, the convergent validity of the M-BIP was examined in both the first and the second study. Specifically, in the first study, Holman and colleagues' (2012) measure was used to provide an initial assessment of how strongly the M-BIP correlates with an existing measure. However, it should be noted that in this case these two measures tap overlapping but not identical constructs. As shown in Table 2.3, Holman et al.'s (2012) measure operationalises the stages of generation and idea implementation as products, whereas only the stage of idea promotion has a behavioural albeit broadly operationalised orientation. Therefore, it was expected that the M-BIP would be moderately highly correlated with the Holman et al.'s measure at a global latent variable level. Furthermore, given the content related differences among the two measures, it was expected that the magnitude of the correlations would decrease when examining the narrower facets of the constructs, as opposed to the higher order latent variables. Moreover, it was expected that the stronger magnitude of correlations among the two measures corresponding stages would be observed for the stages of idea promotion as they share the highest degree of conceptual overlap, given that the Holman et al.'s stage of idea promotion is the only one that has a broad behavioural orientation.

Hypothesis 5: The M-BIP and Holman et al.'s (2012) measure share a moderately high correlation at a global latent factor level.

Hypothesis 6: The magnitude of the correlations among the respectively equivalent three stages of the M-BIP and the Holman et al.'s (2012) measure is weaker than the magnitude of the correlations among the global factors.

Hypothesis 7: The two stages of idea promotion of the M-BIP and Holman et al.'s (2012) measures are more strongly correlated compared to the magnitude of the correlations displayed by the other two pairs of stages.

Second, another necessary condition for the appropriateness of a newly developed instrument is the demonstration of its predictive validity (Hughes, 2018). Employees' innovative work behaviours aim to produce innovative outcomes (Amabile, 1988; De Jong & Den Hartog, 2010; Farr & Ford, 1990). Three types of innovative outcomes appear consistently in the innovation literature; innovative products, services, and administrative procedures (e.g., Amabile, 1988; Anderson et al., 2014; De Jong & Den Hartog, 2010; Farr & Ford, 1990; Messmann & Mulder, 2012). Reasonably, a measure of innovative work behaviour should predict those innovative outcomes as they are the process's objectives. As stated in Chapter 2, the only existing measure of innovative work behaviour that has provided that evidence was De Jong and Den Hartog's (2010). Here, one of the objectives of the present research project was the provision of empirical evidence supporting the predictive validity of the M-BIP over innovative outcomes. The examination of the predictive validity of the M-BIP was conducted in both the first and the second study.

Hypothesis 8: The M-BIP is a positive predictor of innovative outcomes.

Additionally, newly developed psychometric instruments should provide incremental predictive validity compared to existing measures (Hughes, 2018). The provision of empirical evidence indicating that a new measure explains incremental variance over an existing measure, for innovative outcomes, is an important condition to justify its appropriateness for use in theory testing and decision making. Thus, one of the objectives of both studies constituting the present research project was to assess whether the M-BIP explains incremental variance over and above the existing measures of innovative work behaviour for the innovative outcomes mentioned above. In this first study, the M-BIP's incremental predictive validity was assessed in conjunction with Holman and colleagues' (2012) innovative work behaviour measure.

Hypothesis 9: The M-BIP explains incremental predictive variance over and above Holman et al.'s (2012) measure for innovative outcomes.

Next, another piece of evidence necessary for the evaluation of a measure's appropriateness is its discriminant validity. Evidence of discriminant validity is best shown by demonstrating that the measure is unique and does not correlate strongly with a theoretically similar but distinct construct (Hair, Black, Babin, & Anderson, 2010; Shaffer et al., 2016). The examination of the discriminant validity of the M-BIP was assessed in the second study of the present research project, where it is presented in detail.

Finally, one practical but very important parameter of appropriateness is the feasibility of a psychometric instrument. As discussed in Chapter 2, existing measures of innovative work behaviour are relatively brief and thus, easy and practical to include in academic studies. Whereas lengthier measures can obviously capture theoretical constructs in more detail, measures should be extremely lengthy as questionnaire length has been shown to be associated with several problems during data collection (Galesic & Bosnjak, 2009). Specifically, the length of the questionnaires has been shown to be negatively related to participation rates and the quality of the responses. Thus, the final measure should include a reasonable number of items that would make it practical and easy to include in future studies, without though making extreme compromises in terms of its content representativeness and psychometric properties.

4.3. Item generation

The first necessary step in order to carry on with the first empirical examination of the M-BIP was the generation of items comprehensively tapping the construct as detailed in Chapter 3. The item generation process followed the procedures described by Irwing and Hughes (2018). Irwing and Hughes' item development process starts with the initial definition of the construct and the identification of themes that best describe its content, using when possible existing sources of knowledge or experts that would assist in the generation of a list of themes tapping the full extent of a theoretical construct. Here, the item development process aimed at creating an item pool that would accurately capture the construct's content, as described in the presentation of the M-BIP, thus, using the empirical literature as the source from which the construct's content was drawn.

Hence, particular attention was paid to include items measuring each of the behaviours that have been theorised to be part of the innovation process.

The first step of the item generation process was to review existing measures of innovative work behaviour and use items that were consistent with the present study's conceptualisation. The measures that were reviewed, were the ones discussed in the literature review and the items are presented in Table 2.3, in Chapter 2. Furthermore, Howell and colleagues' (2005) championing measure was reviewed, as their work on how individuals promote innovative ideas significantly contributed to the formulation of the M-BIP. That said, items that did not comply with the explicit behavioural orientation of the M-BIP, either because they assessed innovative products, or because they tapped broad activities, were not included in the item pool. The outcome of this screening process was to include 8 existing items in the Opportunity Exploration activity, 3 in the Championing activity and 1 in the Recruiting Assistance activity (De Jong & Den Hartog, 2010; Janssen, 2000; Messmann & Mulder, 2012; Howell et al., 2005). These items were, as shown below in Table 4.1, either used in their original form or slightly adapted.

Next, items were written by the current author following the item writing guidelines described by Irwing and Hughes (2018). Items were designed to be as simple and short as possible, specific, unambiguous, positively phrased, unbiased, not causing cognitive overload, and comprehensible by individuals with a basic reading level. The developed items were intentionally written in the form of statements exclusively capturing behaviours rather than outcomes, attitudes, beliefs, or traits, so as to emphasise the behavioural nature of the construct. Furthermore, considering that the final instrument should tap each of the construct's aspects, the construct's content was intentionally over-represented by creating slightly different items capturing the same domain. In that way, the best functioning items would have been retained following the subsequent statistical analyses. The items that were generated by the current author are also to be found in Table 4.1 and they are the ones that do not have any author/s cited next to them.

The initial item pool generated via the process described above was independently reviewed by two innovative work behaviour and psychometric measurement subject matter experts so as to examine its content representativeness and the quality of the items. The process of refining the initial item pool was subjected to several iterations and items that were evaluated as ambiguous, poorly worded, eliciting biases, and unnecessarily complex were reworded. Next, the refined item pool was given to three lay people in order to obtain their feedback regarding the comprehensibility and conciseness of the items. Regarding the non-expert reviewers, one held a PhD in Education, the other was an Organisational psychology PhD student, and the third was an undergraduate Psychology student. This final screening resulted in the further revision of items that were perceived to be lacking specificity and were characterised as ambiguous. Finally, the outcome of this iterative process was an item pool consisting of 79 items (see Table 4.1). Specifically, 12 items were developed tapping the scale of Opportunity Exploration, 14 items were created for the scale of Strategic Adaptation, 12 items assessed the scale of Championing, 11 items were generated for the scale of Obtaining Organisational Approval, 14 items were written for the scale of Recruiting Assistance, 6 items were produced for the scale of Implementation Strategy, and 10 items tapped the content of the scale of Implementation Facilitation.

Table 4.1

Item pool of the Behavioural Innovation Process Model

Scale	Items
Opportunity Exploration	OP1 Paid attention to work issues not directly part of my daily tasks. (Adapted from De Jong & Den Hartog, 2010) OP2 Wondered how things could be improved. (De Jong & Den Hartog, 2010) OP3 Searched out new working methods, techniques, or instruments. (Janssen, 2000) OP4 Kept myself informed about the organisation's structures and procedures. (Adapted from Messmann & Mulder, 2012) OP5 Kept myself informed about new concepts/insights within my field. (Adapted from Messmann & Mulder, 2012) OP6 Kept myself informed about new developments in other organisations (Adapted from Messmann & Mulder, 2012) OP7 Kept myself informed about new developments within my organisation. (Adapted from Messmann & Mulder, 2012) OP8 Examined predominant beliefs within my professional field critically. (Adapted from Messmann & Mulder, 2012) OP9 Exchanged thoughts on recent developments within my professional field with clients/customers. OP10 Got informed on how things were handled in other departments of my organisation. OP11 Spent time identifying my department's weaknesses. OP12 Kept an eye on identifying errors/problems/impracticalities on the way day to day tasks were performed within my organisation.
Strategic Adaptation	SA1 Identified influential individuals/groups within the organisation. SA2 Spent time identifying the right people to get involved. SA3 Spent time identifying the necessary resources. SA4 Spent time planning how resources could be obtained. SA5 Made sure that benefits were greater than the costs of the implementation. SA6 Made sure that the idea aligned to the organisation's strategy. SA7 Spent time identifying how the idea provided a competitive advantage to the organisation. SA8 Identified potential sources of conflict and resistance within the organisation. SA9 Modified the idea to be more appealing to influential individuals/groups. SA10 Modified the idea based on the evaluation of my co-workers' skills and knowledge. SA11 Modified the idea based on the evaluation of the availability of the necessary resources. SA12 Modified the idea based on the cost – benefit evaluation. SA13 Incorporated into the idea aspects that colleagues brought to the table and haven’t been thought of. SA14 Took into account colleagues' reasoned criticism regarding the approach taken.

Championing	CH1 Enthusiastically promoted the innovation’s advantages. (Howell et al., 2005) CH2 Pushed constantly for innovation. CH3 Initiated an open discussion regarding the proposed innovation. CH4 Involved as many people as possible into the discussion CH5 Expressed strong conviction about the innovation. (Howell et al., 2005) CH6 Expressed confidence in what the innovation can do. (Howell et al., 2005) CH7 Shared the vision of the innovative potential. CH8 Tailored the idea to fit different audiences. CH9 Pushed the idea with determination even if people did not find it appealing in the first place. CH10 Evaluated co-workers’ reactions and accordingly altered the style adopted. CH11 Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea. CH12 Evaluated how the promotion attempts were perceived by co-workers and accordingly adapted the chosen strategy.
Obtaining Organisational Approval	OA1 Produced documented cost and benefit estimations, to gain my boss's support. OA2 Framed the new idea as an opportunity, to gain my boss's support. OA3 Presented a detailed implementation plan, to gain my boss's support. OA4 Obtained the support of backers/customers, to gain my boss's support. OA5 Outlined potentially positive organisational/financial outcomes, to gain my boss's support. OA6 Persisted when superiors were unconvinced/hesitant. OA7 Did not give up when superiors provided negative feedback. OA8 Provided examples to demonstrate the feasibility of the plan, to gain my boss's support. OA9 Evaluated the selling strategy and came up with different approaches, to gain my boss's support. OA10 Modified the idea to address scepticism, to gain my boss's support. OA11 Took into account the management’s perspective, and integrated their counter-proposals into the original idea, to gain their support.

Recruiting Assistance	RA1 Promised that the change would not be disruptive, so as to get skilled and knowledgeable co-workers on board. RA2 Framed the idea positively, so as to get skilled and knowledgeable co-workers on board. RA3 Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board. RA4 Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board. RA5 Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board. RA6 Persisted in the face of adversity, so as to get skilled and knowledgeable co-workers on board. (Adapted from Howell et al., 2005) RA7 Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable co-workers on board. RA8 Reassured co-workers that they had the necessary skills/knowledge to participate to the implementation of the innovative idea. RA9 Asked for help in exchange of future favours, so as to get skilled and knowledgeable co-workers on board. RA10 Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board. RA11 Asked the co-workers of interest to point out areas of potential improvement, so as to get them on board. RA12 Adapted the selling approach to make it more appealing, when skilled and knowledgeable co-workers remained hesitant. RA13 Re-evaluated the idea, when skilled and knowledgeable co-workers remained hesitant. RA14 Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.
Implementation Strategy	IS1 Set clear objectives regarding the intended outcomes of the implementation process. IS2 Identified the most important steps within the overall project. IS3 Distributed the workload based on individual competencies. IS4 Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand. IS5 Made appropriate allocation of the available resources. IS6 Devised a new implementation strategy when the allocated resources were limited.
Implementation Facilitation	IF1 Piloted the innovation. IF2 Continually assessed whether the implementation efforts were bringing results. IF3 Took risks so as to assess the appropriateness of the approach. IF4 Kept co-workers/superiors informed about the progress of the implementation process. IF5 Showed appreciation for team members' efforts. IF6 Demonstrated persistence in the face of short term problems. IF7 Treated unpredicted difficulties as an opportunity to improve the original idea. IF8 Treated unpredicted difficulties as an opportunity to improve skills and knowledge. IF9 Continually thought of alternative solutions that could have made the implementation more feasible. IF10 Changed the implementation strategy when it was not working.

4.4. Method

4.4.1. Procedure

Data collection was implemented using the Qualtrics Survey software over a period of 4 weeks. Participants were recruited by the use of personal invitations containing the survey link, and advertisements on social media such as Facebook and Linkedin providing a brief description of the purpose of the survey alongside the survey link. The advertisement posts on social media were directed at a variety of professional groups such as engineers, administrative professionals, research and development professionals, and groups of no specific professional orientation but with an interest in creativity, innovation, and entrepreneurship. No monetary incentive was provided for participation. The only requirement for participation was that participants were in an active employment status at the time they completed the survey. In order to screen unwanted responses from participants who failed to pay attention to this inclusion instruction, participants who stated with respect to the relevant question that they were unemployed were directed immediately to the end of the survey. Furthermore, in order to proactively deal with the issue of missing data the force response option was chosen. Qualtrics Survey software provides the option to disallow participants to proceed filling in the survey unless they have provided their responses to all items. Thus, this option permitted the collection of datasets without missing data.

4.4.2. Ethical considerations

The present research project has been granted favourable ethical approval, based on its compliance with the Alliance Manchester Business School research ethics template, ratified by the University of Manchester Research Ethics Committee. Participants were informed that their participation in the study was voluntary, and that they had the right to withdraw at any point. Anonymity and confidentiality were ensured, and no sensitive personal data were collected. The present research project did not involve any activities that could potentially physically harm the participants or induce psychological strain. The collected data were strictly used for research purposes and were not shared to any third parties. Furthermore, my personal contact details were provided in the consent form, and participants were encouraged to contact me for any questions, complaints, or feedback on the study results. Finally, participants were informed that by filling in the questionnaire they provided their consent for using their responses in the present study. The ethical approval form is presented in the appendix.

4.4.3. Sample

In sum 294 individuals provided a full set of responses. Females comprised 67% of the sample (n = 197) whereas males made up 33% of the sample (n = 97). Regarding the sample's age distribution 3.7% (n = 11) were aged between 18 - 24, 50% (n = 147) were aged between 25 - 34, 35.7% (n = 105) were aged between 35 - 44, 7.8% (n = 23) were aged between 45 - 54, 2% (n = 6) were aged between 55 - 64, and 0.3% (n = 1) was over 64 years old. Regarding the educational status of the sample the vast majority had at least a Bachelor's degree. Specifically, 68.4% (n = 201) had obtained an MSc degree or a PhD, 21.8% (n = 64) had a Bachelor's degree, 7.1% (n = 21) had attained non-university higher education, and 2.7% (n = 8) had completed secondary education to age 18. Occupational status, occupational grouping and tenure are presented in Table 4.2. The observed distribution of the sample's educational background is certainly not characteristic of the general population and may imply a self-selection bias, which when taken into consideration with the occupational grouping of the sample might indicate that academically qualified individuals working in knowledge intensive jobs have a greater interest in innovation and thus were more willing to participate in the study.

Table 4.2

Occupational characteristics of sample by frequency (%)

Employment Status	**Full-time**	**Part-time**	**Self-employed**
	81.3% (*n* = 239)	9.2% (*n* = 27)	9.5% (*n* = 28)

Occupational Group	**Professional/ Senior manager**	**Junior manager**	**Other white collar/Service**	**Skilled worker**	**Semi/ Unskilled Worker**	**Other**
	52.4%	10.2%	9.9%	17.7%	3.4%	5.8%
	(*n* = 154)	(*n* = 30)	(*n* = 29)	(*n* = 52)	(*n* = 10)	(*n* = 17)

Tenure (in years)	**0-1**	**1.1-5**	**5.1-10**	**10.1-15**	**15.1-20**	**20.1-25**	**>25**
	33.3%	39.1%	14.3%	4.8%	3.7%	2%	1%
	(*n* = 98)	(*n* = 115)	(*n* = 42)	(*n* = 14)	(*n* = 11)	(*n* = 6)	(*n* = 3)

4.4.4. Statistical power

The statistical power of a study corresponds to the likelihood of correctly rejecting the null hypothesis, given that the null hypothesis is indeed false (Cohen & Lea, 2004). The recommended power of a study is commonly set at .80 (Cohen, 1988), which means that there is an 80% probability that a study's findings are indeed statistically significant, hence existent. Power analysis includes four parameters, whereby three of them are used in order to calculate the fourth (Kyriazos, 2018). The first parameter is the sample's size (N). The second parameter is the probability of identifying a non-existing relationship (α), also known as Type I error. The third parameter is the power of the study. The power of the study is estimated by subtracting β from 1. β is the probability of not identifying an existing relationship, also known as Type II error. The fourth parameter is the effect size of an examined relationship among variables.

Researchers commonly use power analysis for two purposes (Kyriazos, 2018). First, an a priori power analysis can be conducted during a study's design process to determine the required sample size necessary to achieve the desired power level. For the purposes of an a priori power analysis, researchers specify the desirable and expected values of the last three parameters (i.e., Type I error, Power, and Effect size) and calculate the required sample size. Second, a post-hoc power analysis can be conducted to assess the power of a completed study, based on an existing dataset. Hence, a post-hoc power analysis utilises the already known values for the three known parameters so as to calculate the power of the study.

In the present study, I implemented a post-hoc power analysis for each of the study's findings in order to evaluate whether the study's sample size was sufficient to achieve a power value above .80. A combination of two methods was used, the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996) and the Satorra and Saris (1985) method. The Kim and M.B.S. method is appropriate for Structural Equation Models and is based on the RMSEA, which is a goodness-fit-index. The Kim and M.B.S. method tests for a model's power to achieve an RMSEA value that corresponds to a good model fit. In order to calculate post-hoc statistical power, the Kim and M.B.S. method requires to input the study's sample size, the degrees of freedom of the tested model, the significance levels, the observed RMSEA value, and the null hypothesis RMSEA value, which corresponds to a perfect fit (RMSEA = .000). The Satorra and Saris (1985) method estimates power based on the non-centrality parameter (i.e., the amount of model misspecification). In order to calculate post-hoc statistical power, the Satorra and Saris (1985) method requires to input the study's sample size, the degrees of freedom of the tested model, the observed significance levels, and the effect sizes. The Satorra and Saris (1985) method does not calculate the statistical power for the overall model, but for each specific estimate of interest. Hence, the combination of these two methods provided support for the correct rejection of the null hypotheses both at an overall model level and for the specific within model estimates of interest (i.e., factor loadings, inter-factor correlations, regression effects). The statistical power for each estimate of interest is presented in the results sections.

4.4.5. Measures

The M-BIP was measured by the items presented earlier in Table 4.1. Participants used a six-point Likert scale (Never – Always) to state how frequently they manifested the innovative work behaviours specified by the items.

The existing measure of innovative work behaviour included in the study was the Holman and colleagues' (2012) 9 item measure. This measure consists of three discreet dimensions of innovative work behaviour; namely idea generation, idea promotion, and idea implementation. Each dimension is represented by three items. "Found new ways of doing things" is a sample item from idea generation. "Tried to get approval for improvements you suggested" is a sample item tapping idea promotion. Finally, "Had your ideas implemented" is a sample item assessing idea implementation. Participants used a six-point Likert scale (Never – Always) to state how frequently they manifested the innovative work behaviours specified by the items. The internal reliabilities reported by the authors for each scale were $\alpha = 0.90$, $\alpha = 0.93$, $\alpha = 0.95$, for idea generation, promotion, and implementation respectively. Meanwhile, the observed internal consistencies in the present study were $\alpha = 0.82$ for idea generation, $\alpha = 0.86$ for idea promotion, $\alpha = 0.91$ for idea implementation, and the global second order latent factor of innovative work behaviour had an internal consistency of .91.

Innovative outcomes were assessed by three items generated for the purposes of this study. These items directly enquired whether the participant's idea was transformed into innovative products, services and administrative procedures. Specifically, innovative products were measured by "My innovative idea was transformed into a customer focused product”, innovative services by “My innovative idea was transformed into a customer focused service”, and innovative procedures by “My innovative idea was transformed into a new procedure that changed, to some degree, the way things were done within my organisation”. Participants used a six-point Likert scale to state how frequently their innovative endeavours were successful (Never – Always). The internal reliability for the innovative outcomes scale was .76.

4.4.6. Analysis strategy

The analysis had four stages. In the first stage I assessed the hypothesised factorial structure of the M-BIP. The hypothesised factorial structure was initially tested by implementing a series of Exploratory Factor Analyses (EFA) followed by Confirmatory Factor Analyses (CFA). Here, it is important to discuss two decisions I made with respect to the implementation of the EFA and the CFA. First, I discuss whether these two factor analytic techniques should be implemented on the same dataset or not, and state the two reasons why both techniques were used in the first study. Second, I discuss the issue of fit statistics in the context of structural equation modelling when using a categorical estimator (i.e., WLSMV).

Fabrigar, Wegener, MacCallum and Strahan (1999) suggested that CFA should be conducted in a follow-up study with a new sample used to cross-validate the EFA results. However, Van Prooijen and Van der Kloot (2001) suggested that it would be prudent to cross-validate the EFA derived factorial structure using CFA on the same sample, prior to committing resources to conduct a second study. The rationale behind that argument is that EFA is a data driven technique that yields very approximate estimates and as a result the more restrictive and stringent CFA procedures often fail to replicate EFA obtained factorial solutions (Van Prooijen & Van der Kloot, 2001). This is the case for even some of the most widely used psychometric models such as those assessing the Big Five personality traits (see Booth & Hughes, 2014). Given the huge advantages of CFA over EFA, such as its appropriateness for testing a priori specified theoretical models, and the provision of fit indices enabling the evaluation of how well a model fits the data (Fabrigar et al., 1999), it is imperative that the M-BIP scale can be used in a CFA framework. Implementing CFA within a Structural Equation Modelling framework is the only way to assess the proposed theoretical model and test the hierarchical structure of the M-BIP. Thus, unless a good model fit can be achieved when CFA is used to cross-validate the EFA results on the same data, it would be difficult to find a good model fit in a follow-up confirmatory study. For this methodological reason CFA was implemented both using the same dataset, and also in a second dataset, presented in Study 2.

The estimator chosen to implement EFA and CFA was Weighted Least Squares Means and Variances (WLSMV). The WLSMV is a "robust estimator which does not assume normally distributed variables and provides the best option for modelling categorical or ordered data " (Brown, 2006). Although WLSMV is considered an appropriate estimator for categorical data, the criteria used for the evaluation of the models' fit have yet not been concretely established. In fact, the most widely used cut-off points indicative of a good fit (i.e., RMSEA $\leq$ .06, CFI $\geq$ .95, TLI $\geq$ .95; Hu & Bentler, 1999) were benchmarked using continuous data and implementing the Maximum Likelihood (ML) estimator. The root mean square error of approximation (RMSEA; Steiger, 1990) is an absolute fit index that evaluates "how far a hypothesized model is from a perfect model" (Xia & Yang, 2019). The comparative fit index (CFI; Bentler, 1990), and the Tucker–Lewis index (TLI; Bentler & Bonett, 1980; Tucker & Lewis, 1973) are "incremental fit indices that compare the fit of a hypothesized model with that of a baseline model (i.e., a model with the worst fit)" (Xia & Yang, 2019). Hu and

Bentler (1999) recommended that their cut-off points should not be generalised to other types of data and estimators. Nevertheless, Hu's and Bentler's work has become a golden standard for evaluating model fit across all types of estimators (Xia & Yang, 2019). However, several empirical studies (Xia & Yang, 2019; Beauducel & Herzberg, 2006; Nye & Drasgow, 2011; Sass, Schmitt, & Marsh, 2014) have suggested that the application of the conventional cut-off values for RMSEA, CFI, and TLI (Hu & Bentler, 1999) is not appropriate for WLSMV, and thus, fit statistics should be cautiously interpreted. There is a number of reasons why the conventional cut-off values cannot be applied similarly to models consisted of ordered categorical indicators. For example, the sample's size, the type of variables (i.e., binary, normal, and non-normal data), the type of model misspecification, the categorical distributions, and the model's complexity are conditions that disallow the use of universal cut-off points for the evaluation of models' fit, because the performance of the fit indices varies as a function of these conditions (Xia & Yang, 2019). Xia and Yang (2019) recommended that in the absence of studies that have established appropriate cut-off criteria for ordered categorical data, Hu and Bentler's cut-off points should not be treated as absolute indicators of an acceptable model, but should be treated as "diagnostic tools for model improvement" (p. 421). Thus, the present study did not use Hu's and Bentler's cut-off points as absolute fit indicators, but as subjective indicators and statistical aids of the models' fit, and the fit statistics were also evaluated in conjunction with the theory based evaluation of the model (Garrido, Abad, & Ponsoda, 2016).

The second stage of the analysis focused on the examination of the discriminant validity of the M-BIP's latent factors. This was accomplished by specifying competing CFA models to the hypothesised one, and by using the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler, Ringle, & Sarstedt, 2015). The Heterotrait-monotrait (HTMT) ratio of correlations has its roots in the classical multitrait-multimethod (MTMM) matrix (Campbell & Fiske, 1959). Among others, the MTMM matrix includes two types of correlations, which can be used to assess discriminant validity. “First, the monotrait-heteromethod correlations quantify the relationships between two measurements of the same construct by means of different methods (i.e., items). Second, the heterotrait-heteromethod correlations quantify the relationships between two measurements of different constructs by means of different methods (i.e., items)” (Henseler et al., 2015, p. 120). The MTMM matrix analysis indicates discriminant validity when the monotrait-heteromethod correlations are greater than the heterotrait-heteromethod correlations. Henseler and colleagues (2015) argued that although the method is theoretically sound, in practice, ambiguities can arise because, even if two constructs are different, the heterotrait-heteromethod correlations can sometimes exceed monotrait-heteromethod correlations (Schmitt & Stults, 1986). Additionally, the MTMM’s practical utility is limited because one-by-one comparisons of values, in big correlation matrices, can be laborious (Henseler et al., 2015). To overcome these limitations of the MTMM, Henseler and colleagues (2015) proposed to assess the heterotrait-monotrait (HTMT) ratio of the correlations, which averages the heterotrait-heteromethod correlations relatively to the geometric mean of the averaged monotrait-heteromethod correlations. Hence, the HTMT method is an estimate of the correlation between two constructs, which parallels the “disattenuated construct score correlation” (Henseler et al., 2015, p. 121). The Heterotrait-monotrait (HTMT) ratio of correlations method has been empirically demonstrated, using Monte Carlo simulations, to be the most sensitive method of detecting a lack of discriminant validity in variance based Structural Equation Models (Henseler et al., 2015; Voorhess, Brady, Calantone, & Ramirez, 2016). The HTMT method has the advantage of a straightforward interpretation. Practically, if the HTMT value is lower than a predefined threshold value, discriminant validity is supported. In the present study, the HTMT,90 was the adopted threshold criterion for the assessment of the discriminant validity of the measure's activities and stages. The HTMT,90 criterion indicates the lack of discriminant validity when the calculated ratio exceeds .90 and is recommended for structural models where constructs are conceptually similar (Henseler et al., 2015), as it is the case with the dimensions of a multi-dimensional construct, such as the M-BIP. The HTMT ratio of correlation analysis was conducted using the Smart PLS statistical software.

The third stage of the analysis concerned the correlation analyses performed to test how strongly the M-BIP correlated with an existing measure of innovative work behaviour. Finally, structural equation modelling was employed to test the predictive and incremental predictive validity of the M-BIP.

4.5. Results

4.5.1. Exploratory Factor Analysis (EFA)

EFA, using Mplus 7 statistical software, was implemented in order to explore the factorial structure of the data. In order to do so, all 79 items were included in the analysis. Weighted Least Squares Means and Variances (WLSMV) was the chosen extraction method because, "the WLSMV is a robust estimator which does not assume normally distributed variables and provides the best option for modelling categorical or ordered data " (Brown, 2006). An important decision that had to be made in order to explore the factorial structure of the M-BIP, was to decide which rotation criterion would be used. There is a wide range of rotation criteria and there is no explicit statistical reason that would make one rotation criterion more appropriate over another (Asparouhov & Muthen, 2009). However, each rotation criterion has its own subtle specifications that makes it more or less appropriate for the fulfilment of a researcher's objective. In the present study, I used the Geomin rotation criterion (Yates, 1987), which is appropriate when factors are expected to be correlated (Muthén, & Muthén, 2010). The Geomin rotation criterion has been developed as a compromise between pattern matrices' complexity and interpretability (Sass & Schmitt 2010). As such, the Geomin rotation criterion allows, although in a suppressed way, items to load on more than one factors, and produces an interpretable pattern matrix, provided that one exists (Sass & Schmitt 2010). Hence, the Geomin rotation criterion can produce clean factor structures that can resemble to CFA factor structures and is particularly useful when there is no a priori knowledge of the expected factor loadings (Sass & Schmitt 2010), as it is the case in the present measure development study. However, it should be noted that a disadvantage of the Geomin rotation criterion is that it tends to inflate the magnitude of inter-factor correlations, since it prioritises the minimisation of variables' complexity (i.e., items cross-loading on multiple factors) (Schmitt & Sass, 2011; Sass & Schmitt 2010).

The examination of the factorial structure of the M-BIP included three steps. First, I conducted a Parallel analysis (Horn, 1965) to identify the maximum number of factors that were to be retained for rotation. Parallel analysis compares the eigenvalues observed in the actual data with the eigenvalues observed in randomly generated datasets retaining an identical number of variables and the same sample size. The factors to be retained are indicated when each specific factor's eigenvalue obtained from the actual dataset is greater than the factor's eigenvalue calculated from the simulated data (Schmitt, 2011). Timmerman, Lorenzo-Seva, and Ceulemans, (2018) suggested that Parallel analysis is particularly useful for determining the maximum number of factors to be retained for rotation. Garrido's and colleagues' (2016) Monte Carlo simulation study also demonstrated the usefulness of Parallel analysis, and they argued that Parallel analysis is probably the most accurate factor retention method. Parallel analysis was conducted using the syntax provided by O'Connor (2000, p. 398), and indicated a 7-factor model as the best solution.

Second, in order to further explore the factorial structure of the data, I tested for seven different forced factor solutions, ranging from 1 to 7 factors. The range of the potential factor solutions was 1 to 7, because I wanted to test for all possible solutions. In order to decide which of the seven was the best solution, the CFI, TLI, and RMSEA goodness of fit indices were used. Larger CFI and TLI values, and smaller RMSEA values were indicative of a better fitting model. It should be noted that for the purposes of the present analyses the aforementioned fit statistics were not required to exceed specific cut-off values but were used to compare the models to each other (Garrido et al., 2016; Timmerman et al., 2018). Table 4.3 presents the fit statistics for all seven models.

Table 4.3.

Exploratory Factor Analyses fit statistics

Models	CFI	TLI	RMSEA
1 factor solution	.754	.747	.082
2 factor solution	.825	.816	.070
3 factor solution	.863	.852	.063
4 factor solution	.890	.877	.057
5 factor solution	.915	.903	.051
6 factor solution	.931	.918	.047
7 factor solution	.942	.930	.043

Upon the inspection of the CFI, TLI, and RMSEA values (see Table 4.3) the 7-factor solution was suggested to be the preferable one. Thus, both the Parallel analysis and the inspection of the fit statistics converged and indicated the 7-factor solution to be the optimal one.

Finally, I proceeded to the evaluation of the 7-factor model by strictly applying the following criteria (Costello, & Osborne, 2005):

i. Items with factor loadings less than 0.3 were removed

ii. The number of cross-loading items should be minimal

iii. There must be at least 3 items comprising each factor

iv. Factors must be theoretically coherent.

Following the application of these criteria, the 7-factor solution was deemed inadmissible as the items tapping the implementation strategy and implementation facilitation dimensions consistently formed a single factor, thus the 7th factor had no primary loadings on it. Hence, the 6-factor solution was inspected next. As shown in the pattern matrix in Table 4.4, 76 items were retained following the removal of 3 items that loaded on two or more factors. Considering, that all the criteria were fulfilled, and the hypothesised dimensionality was replicated, with the exception to the merging of the two implementation factors into one, it was decided that the 6-factor solution is the optimal solution according to EFA. The 6-factor solution explained 57.57 % of the variance.

Table 4.4

6 factor solution EFA pattern matrix

Items	F1	F2	F3	F4	F5	F6
OE7 Kept myself informed about new developments within my organisation	.614					
OE6 Kept myself informed about new developments in other organisations	.610					
OE5 Kept myself informed about new concepts/insights within my field.	.544					
OE4 Kept myself informed about the organisation's structures and procedures.	.495					
OE3 Searched out new working methods, techniques, or instruments.	.469					
OE8 Examined predominant beliefs within my professional field critically.	.443					
OE12 Kept an eye on identifying errors/problems/impracticalities on the way day to day tasks were performed within my organisation.	.438					
OE1 Paid attention to work issues not directly part of my daily tasks.	.398					
OE11 Spent time identifying my department's weaknesses.	.392					
OE9 Exchanged thoughts on recent developments within my professional field with clients/customers.	.376					
OE2 Wondered how things could be improved.	.374	.303				
OE10 Got informed on how things were handled in other departments of my organisation.	.354					
SA6 Made sure that the idea aligned to the organisation's strategy.		.670				
SA11 Modified the idea based on the evaluation of the availability of the necessary resources		.606				
SA3 Spent time identifying the necessary resources.		.601				
SA5 Made sure that benefits were greater than the costs of the implementation.		.564				
SA2 Spent time identifying the right people to get involved.		.554				
SA4 Spent time planning how resources could be obtained.		.525				
SA10 Modified the idea based on the evaluation of my co-workers' skills and knowledge.		.520				
SA9 Modified the idea to be more appealing to influential individuals/groups.		.501		.328		
SA7 Spent time identifying how the idea provided a competitive advantage to the organisation.		.498				
SA12 Modified the idea based on the cost – benefit evaluation.		.494				
SA1 Identified influential individuals/groups within the organisation.		.471				
SA8 Identified potential sources of conflict and resistance within the organisation.		.469				
SA13 Incorporated into the idea aspects that colleagues brought to the table and haven’t been thought of.		.342				

Items	F1	F2	F3	F4	F5	F6
CH6 Expressed confidence in what the innovation can do			.817			
CH11 Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea			.780			
CH5 Expressed strong conviction about the innovation.			.748			
CH2 Pushed constantly for innovation			.728			
CH12 Evaluated how the promotion attempts were perceived by co-workers and accordingly adapted the chosen strategy.			.708			
CH7 Shared the vision of the innovative potential.			.707			
CH10 Evaluated co-workers' reactions and accordingly altered the style adopted.			.682			
CH9 Pushed the idea with determination even if people did not find it appealing in the first place.			.681			
CH3 Initiated an open discussion regarding the proposed innovation.			.622			
CH1 Enthusiastically promoted the innovation's advantages.			.594			
CH4 Involved as many people as possible into the discussion			.579			
CH8 Tailored the idea to fit different audiences.			.575			
OA5 Outlined potentially positive organisational/financial outcomes, to gain my boss's support.				.813		
OA3 Presented a detailed implementation plan, to gain my boss's support.				.808		
OA2 Framed the new idea as an opportunity, to gain my boss's support.				.791		
OA1 Produced documented cost and benefit estimations, to gain my boss's support.				.780		
OA4 Obtained the support of backers/customers, to gain my boss's support.				.725		
OA8 Provided examples to demonstrate the feasibility of the plan, to gain my boss's support.				.712		
OA10 Modified the idea to address skepticism, to gain my boss's support.				.668		
OA9 Evaluated the selling strategy and came up with different approaches, to gain my boss's support.				.645		
OA11 Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.				.596		
OA6 Persisted when superiors were unconvinced/hesitant.				.588		
OA7 Did not give up when superiors provided negative feedback.				.373		

Items	F1	F2	F3	F4	F5	F6
RA12 Adapted the selling approach to make it more appealing, when skilled and knowledgeable co-workers remained hesitant.					.727	
RA10 Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.					.657	
RA13 Re-evaluated the idea, when skilled and knowledgeable co-workers remained hesitant.					.656	
RA5 Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.					.646	
RA11 Asked the co-workers of interest to point out areas of potential improvement, so as to get them on board.					.618	.329
RA4 Spent time addressing my colleagues’ fears/objections, so as to get skilled and knowledgeable co-workers on board.					.597	
RA9 Asked for help in exchange of future favours, so as to get skilled and knowledgeable co-workers on board					.595	
RA14 Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.					.589	
RA6 Persisted in the face of adversity, so as to get skilled and knowledgeable co-workers on board.	.302				.564	
RA3 Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.					.547	
RA2 Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.				.304	.484	
RA7 Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable co-workers on board.					.463	
IS1 Set clear objectives regarding the intended outcomes of the implementation process.						.849
IS2 Identified the most important steps within the overall project.						.838
IS5 Made appropriate allocation of the available resources.						.816
IS4 Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.						.791
IS3 Distributed the workload based on individual competencies.						.741
IF8 Treated unpredicted difficulties as an opportunity to improve skills and knowledge.						.726
IF7 Treated unpredicted difficulties as an opportunity to improve the original idea.						.716
IF6 Demonstrated persistence in the face of short term problems.						.686
IF9 Continually thought of alternative solutions that could have made the implementation more feasible.						.684
IS6 Devised a new implementation strategy when the allocated resources were limited.						.674

IF5 Showed appreciation for team members' efforts.	.649
IF2 Continually assessed whether the implementation efforts were bringing results.	.643
IF4 Kept co-workers/superiors informed about the progress of the implementation process.	.612
IF10 Changed the implementation strategy when it was not working.	.578
IF3 Took risks so as to assess the appropriateness of the approach.	.400
IF1 Piloted the innovation.	.311

Note: F1: Opportunity exploration; F2: Strategic adaptation; F3: Championing; F4: Obtaining organisational approval; F5: Recruiting assistance; F6: Idea implementation

4.5.2. Confirmatory Factor Analysis (CFA)

Based on the EFA results, the extracted factorial structure was subjected to a series of CFAs in order to further investigate the results and test the hypothesised hierarchical structure of the M-BIP. For all CFAs, WLSMV was the method of estimation chosen. The assessment of the models' fit to the data was based on four fit statistics; the chi-square ($\chi 2$), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root-Mean-Square Error of Approximation (RMSEA), in conjunction with the theory based evaluation of the model (Garrido et al., 2015). As discussed in Section 4.4.6., the Hu and Bentler (1999) recommended cut-off points indicative of a good fit (CFI $\geq$ .95, TLI $\geq$ .95, RMSEA $\leq$ .06) should not be used as absolute fit indicators when the method of estimation is the WLSMV. Hence, these cut-off points are conservatively used as subjective, approximate indicators and statistical aids of the models' fit.

4.5.2.1. Confirmatory Factor Analysis of single factor models

To further estimate the psychometric robustness of the factors, each of the 6 factors was estimated. Initially, each factor was specified as it was extracted from the EFA. Subsequently, items were dropped upon the inspection of high modification indices in order to make each single factor model adequately fit, prior to the specification of the item-level measurement model in which all factors were freely correlated. Table 4.5 presents the fit statistics for each factor.

This process revealed that the implementation factor, as extracted from the EFA, was sub-optimal. The iterative removal of items in order to improve the model fit, dropped 3 out of the 6 items that were intended to measure Implementation strategy, thus hampering the content accuracy of the instrument. Moreover, among the 3 remaining items originally intended to measure Implementation strategy two of them shared a high modification index which could be potentially problematic in the next stage of the statistical analysis. Therefore, considering that the M-BIP has theorised two conceptually discreet dimensions and given that EFA results do not always produce the optimal factorial structure (Van Prooijen & Van der Kloot, 2001), the a priori two implementation activities were specified in a two factor CFA model including all 16 items, so as to explore an alternative operationalization of the theoretically broad implementation factor. Results indicated an acceptable fit to the data for the two-factor model; $\chi 2$ (103) = 498.867, $p < .001$, CFI = .946, TLI = .937, RMSEA (90% confidence interval) = .115 [.105 - .125]. This result compared to the single factor implementation model with all 16 items, as shown in Table 4.5, is deemed preferable both in terms of model fit but also in terms of content accuracy as it retains the theorised dimensions and underlying behaviours. The two factors were correlated at .77 which is probably why EFA collapsed them into a single factor. Subsequently, each of the two implementation factors was modelled as a single factor model and, as shown in Table 4.5, demonstrated an acceptable fit to the data. Thus, it was decided that a two-factor solution is statistically superior and given its consistency to the a priori specified theoretical model, should be retained for further statistical analyses.

Regarding the other five factors, results indicated that each single factor model's fit was improved following the removal of items that displayed high modification indices. However, it should be noted that whereas the CFI and TLI values were acceptable for all revised models, the RMSEA values were sub-optimal. An explanation for the sub-optimal RMSEA values can be drawn from Kenny, Kaniskan, and McCoach's (2015) work. Kenny and colleagues (2015) demonstrated that the RMSEA is problematic when used for model fit assessment when the following two conditions coexist. The first condition refers to the model size (i.e., small models with small degrees of freedom), and the second condition refers to the sample size (i.e., sample is not very large). Under these conditions, the RMSEA tends to indicate model misfit. Accordingly, Kenny and colleagues (2015) urged researchers not to reject models displaying large RMSEA values, under these conditions. Hence, considering that other scholars have also suggested that the RMSEA is sensitive to model size (Fan & Sivo, 2007; Kenny & McCoach, 2003; Shi, Lee, & Maydeu-Olivares, 2019), it is argued that the inflated RMSEA values might be due to the models' size, and that the measurement model with all seven factors could provide a more robust assessment of the M-BIP's model fit.

Table 4.5

Single factor models' fit statistics

Dimensions	X^2	df	CFI	TLI	RMSEA
Opportunity exploration	274.163*	54	.922	.904	.118
Revised (10)	116.178*	35	.962	.951	.086
Strategic adaptation	646.119*	65	.878	.854	.175
Revised (10)	178.160*	27	.943	.924	.139
Championing	566.205*	54	.923	.906	.181
Revised (7)	65.313*	14	.982	.973	.112
Obtaining Org. Approval	402.784*	44	.956	.945	.167
Revised (9)	182.383*	27	.977	.969	.141
Recruiting Assistance	612.079*	54	.884	.858	.188
Revised (10)	112.311*	20	.974	.963	.126
Implementation	950.014*	104	.884	.866	.167
Revised (12)	280.163*	54	.946	.934	.120
Implementation strategy+	168.181*	36	.965	.941	.247
Revised (5)	11.706**	5	.998	.996	.068
Implementation facilitation+	228.184*	35	.955	.942	.138

*Note: *p < .001, **p < .01;* + Hypothesised implementation stages; Numbers in parentheses indicate how many items were retained.

4.5.2.2. Confirmatory Factor Analysis of full measurement model

Next, all 7 factors were specified in a correlated measurement model comprised of 58 items. Fit statistics indicated a good model fit and no items were dropped; $\chi 2$ (1574) = 2270.882, $p < .001$, CFI = .960, TLI = .957, RMSEA (90% confidence interval) = .039 [.035 - .043]. The range of the factor loadings for the opportunity exploration factor is .501 – .739. The range of the factor loadings for the strategic adaptation factor is .664 – .767. The range of the factor loadings for the championing factor is .710 – .857. The range of the factor loadings for the obtaining organisational approval factor is .753 – .881. The range of the factor loadings for the recruiting assistance factor is .560 – .833. The range of the factor loadings for the implementation strategy factor is .744 – .893. The range of the factor loadings for the implementation facilitation factor is .597 – .830. Table 4.6 presents the means, standard deviations, inter-factor correlations, Cronbach's *a*, and McDonald's Ω reliabilities. Means, standard deviations, and Cronbach's α were calculated in IBM SPSS V.23, whereas McDonald's Ω reliabilities were computed in Mplus 7. Factor correlations were calculated both in IBM SPSS V.23, so as to obtain Pearson's correlations, and in Mplus 7, so as to obtain latent factor correlations. However, it should be noted that Pearson correlations are used to discuss and evaluate the M-BIP. The reason is that latent factors correlations are inflated compared to the Pearson correlations and the empirical literature on innovative work behaviour consistently reports Pearson correlations. Thus, in order to be able to compare and contrast the present study's findings with the existing literature, the adoption of the same frame of reference is preferred. However, throughout this thesis both Pearson and latent factor correlations were calculated and presented.

Table 4.6

Means, Standard Deviations, Correlations, Cronbach α's and Ω reliabilities

	M	SD	1	2	3	4	5	6	7
Idea development	-	-	-	-	-	-	-	-	-
1.Opportunity exploration	4.31	.79	**.86**/.86	*.73**	*.64**	*.52**	*.55**	*.57**	*.61**
2.Strategic adaptation	4.43	.94	.64*	**.88**/.88	*.69**	*.64**	*.63**	*.61**	*.63**
Idea promotion	-	-	-	-	-	-	-	-	-
3.Championing	4.47	1.00	.57*	.59*	**.89**/.89	*.70**	*.72**	*.54**	*.65**
4.Obtaining Org. Approval	4.06	1.26	.46*	.57*	.63*	**.94**/.94	*.74**	*.47**	*.59**
5.Recruiting Assistance	4.26	1.05	.48*	.56*	.67*	.67*	**.90**/.90	*.50**	*.59**
Idea Implementation	-	-	-	-	-	-	-	-	-
6.Implementation Strategy	4.82	1.01	.49*	.52*	.47*	.41*	.45*	**.89**/.89	*.78**
7.Implementation Facilitation	4.82	.85	.56*	.56*	.60*	.53*	.54*	.71*	**.91**/.91

Note: * p < .01; Along the diagonal: **Cronbach's alpha (In bold)** and omega (ω) reliability coefficients. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal

So far, results have indicated that the M-BIP satisfies the content and structural accuracy criteria stated by the Accuracy and Appropriateness model (Hughes, 2018). However, there was a practical issue that has arisen and concerned the feasibility and ease of use of the M-BIP in applied research. As explained in the item generation section, the construct's content was over-represented and several items were written so as to keep the best performing items following the factor analytic procedures implemented. However, the resultant 58 item M-BIP was considered lengthy and impractical. Furthermore, the number of items comprising each dimension varied, without this number necessarily being reflective of the behavioural richness of each factor. For example, in some factors the "surplus" items were written so as to over-represent the construct's content were dropped during the factor analytic techniques, whereas in others the majority or all items were retained, resulting in having lengthy and impractical operationalisations of the dimensions. Thus, it was decided that the measure should be shortened in a way that the factors would retain their content accuracy but at the same time contain a more reasonable number of items, thus increasing the feasibility of the measure. However, in order to evaluate whether the shortened M-BIP would have similar psychometric properties to the full form, it was decided that the subsequent assessment of the Accuracy and Appropriateness criteria would be conducted both with the full and the short forms of the M-BIP.

4.5.2.2.1 Item reduction process

The item reduction process began with the screening of the items comprising each factor of the M-BIP. A list of all the items dropped, alongside with the rationale for doing so, is to be found in Table 4.7. Considering that the present research project is a theory driven endeavour to map the process of innovation from an individual, behavioural perspective, and that all items load quite highly on their respective factors, theory rather than data was the first and foremost criterion applied in order to decide which items to retain and which to remove. Therefore, each key behaviour should be captured by at least one item. For example, given that reflective behaviours are an indispensable part of the construct at least one item tapping such behaviours was retained regardless of whether there are items with higher factor loadings. By paying attention and ensuring content representativeness the theoretically grounded content accuracy of the short form of the M-BIP is not compromised. Additionally, the uniqueness of the items is an important factor that guided the removal of items. Hence, when an item taps on a behaviour whose variation appears on more than one dimensions, this item was preferred to be removed in contrast to an item describing a unique to a dimension behaviour. For example, the item “Modified the idea based on the cost – benefit evaluation” from the strategic adaptation dimension was dropped, as variations of that behaviour appear on the factor of obtaining organisational approval. By applying this principle throughout the item reduction process, the content representativeness of the construct, in its entirety, was retained and the conceptual overlapping between the dimensions was minimised. Moreover, another criterion applied was the level of specificity of an item in order to reduce potential ambiguity in its interpretation. Therefore, when it came to a choice between items tapping similar content, the item that left less room for subjective interpretation of its meaning was preferred. For example the “work issues” within the item “Paid attention to work issues not directly part of my daily tasks” can be more open to multiple interpretations about what is considered a work issue compared to other items that narrow down the focus of the question.

Table 4.7

List of dropped items

Activity	Items dropped	Rationale
Opportunity Exploration	Examined predominant beliefs within my professional field critically.	Item was dropped as the item "*Kept myself informed about new concepts/insights within my field*" was preferred, because it is more consistent with other similar items in terms of wording. Specifically, the commonality of the retained item with the other items in the scale that promotes consistency was "*Kept myself informed about*". Consistency reduces potential cognitive overload on behalf of the participants.
	Exchanged thoughts on recent developments within my professional field with clients/customers.	Item was dropped as it might not be applicable in many types of jobs. Retained items are more likely to apply in a wider range of professional settings.
	Kept myself informed about the organisation's structures and procedures.	Item was dropped because there are two other items enquiring about intra-organisational aspects which are more specific and both assess the level of intra-organisational knowledge. (i.e., "*Kept myself informed about new developments within my organisation*" and "*Spent time identifying my department's weaknesses*")
	Paid attention to work issues not directly part of my daily tasks.	Item was dropped as it had the weakest loading and also the other items remaining in this scale tap similar content with more precision.

Strategic Adaptation	Modified the idea based on the cost – benefit evaluation.	Item was dropped because the element of cost and benefit evaluation reappears in the obtaining organisational approval activity, and also there were two more items in the scale tapping reflexivity.
Strategic Adaptation	Made sure that benefits were greater than the costs of the implementation.	The item was dropped as it captured similar content to the item "*Spent time identifying how the idea provided a competitive advantage to the organisation*" but had a weaker loading.
	Incorporated into the idea aspects that colleagues brought to the table and haven't been thought of.	The item was dropped as two reflective items were already retained for this scale, and also a similar reflective item was retained in the recruiting assistance scale.
Championing	Shared the vision of the innovative potential	The item was dropped because the other items of this scale covered the content aimed to be captured by the dropped item, while being more concise and specific. (i.e., "*Enthusiastically promoted the innovation's advantages*" and "*Expressed confidence in what the innovation can do*")
Obtaining Organisational Approval	Provided examples to demonstrate the feasibility of the plan, to gain my boss's support	Item was dropped as other items were deemed to be more concise while tapping similar content. (i.e., "*Presented a detailed implementation plan, to gain my boss's support*" and "*Produced documented cost and benefit estimations, to gain my boss's support*")
	Framed the new idea as an opportunity, to gain my boss's support.	Item was dropped as another item was deemed to be more concise while tapping similar content. (i.e., "*Outlined potentially positive organisational/financial outcomes, to gain my boss's support*")

	Modified the idea to address scepticism, to gain my boss's support.	Item was dropped as the concept of reflecting on the original innovative idea was already included in this and other scales. (i.e., "*Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support*")
Recruiting Assistance	Persisted in the face of adversity, so as to get skilled and knowledgeable co-workers on board.	Item was dropped as persistent behaviour was assessed in obtaining organisational approval activity, and the other items within this scale are more specific and important for the assessment of this activity's behavioural content.
Implementation Facilitation	Treated unpredicted difficulties as an opportunity to improve skills and knowledge.	Item was dropped as it was decided that the other two retained reflexivity items are more important and relevant to the objective of this activity. (i.e., "*Treated unpredicted difficulties as an opportunity to improve the original idea*" and "*Continually thought of alternative solutions that could have made the implementation more feasible*")
	Changed the implementation strategy when it was not working	Item was dropped as it captures similar content with the item "*Continually thought of alternative solutions that could have made the implementation more feasible*" and has a weaker loading.
	Demonstrated persistence in the face of short term problems.	Item was dropped in order to retain unique items, because persistence is tapped in earlier activities.
	Piloted the innovation.	Item was dropped as it has the weakest loading and was more vague than the other items within this scale.

4.5.2.2.2 Confirmatory Factor Analysis of the short form M-BIP

Following the identification of the items to be retained, a CFA item level measurement model, with all seven factors freely correlated, was specified in order to assess whether the hypothesised factorial structure could be replicated for the short form measure. The short form M-BIP is comprised of 42 items and the fit statistics indicated a good fit to the data; $\chi 2$ (798) = 1293.335, $p < .001$, CFI = .959, TLI = .956, RMSEA (90% confidence interval) = .046 [.042 - .051]. Table 4.8 presents the means, standard deviations, correlations, and Cronbach's α and McDonald's Ω reliabilities.

Table 4.8

Means, Standard Deviations, Correlations, Cronbach a's and Ω reliabilities for the short form M-BIP

	M	SD	1	2	3	4	5	6	7
Idea development	-	-	-	-	-	-	-	-	-
1.Opportunity exploration	4.69	.81	**.80**/.81	*.72**	*.63**	*.51**	*.53**	*.56**	*.62**
2.Strategic adaptation	4.44	.95	.59*	**.83**/.82	*.69**	*.63**	*.67**	*.61**	*.62**
Idea promotion	-	-	-	-	-	-	-	-	-
3.Championing	4.41	1.01	.54*	.58*	**.87**/.87	*.69**	*.75**	*.51**	*.63**
4.Obtaining Org. Approval	3.99	1.30	.43*	.53*	.60*	**.90**/.90	*.76**	*.47**	*.58**
5.Recruiting Assistance	4.32	1.03	.44*	.56*	.67*	.76*	**.88**/.88	*.52**	*.59**
Idea Implementation	-	-	-	-	-	-	-	-	-
6.Implementation Strategy	4.82	1.01	.48*	.49*	.45*	.40*	.46*	**.89**/.89	*.79**
7.Implementation Facilitation	4.83	.90	.55*	.50*	.56*	.49*	.51*	.69*	**.87**/.87

Note: * $p < .001$; Along the diagonal: **Cronbach's alpha (in bold)** and omega (ω) reliability coefficients. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal

4.5.2.3. Confirmatory Factor Analysis assessment of the hierarchical structure of the M-BIP

Following the examination of the construct's dimensionality in both the full and the short forms of the M-BIP, two CFA models were specified in order to test the a-priori hypothesised hierarchical structure, as stated by the Hypotheses 1-4 (see Figures 4.1 and

4.2 below). All primary factors (i.e., activities) loaded onto their corresponding second order factors (i.e., stages) and subsequently the second order factors loaded onto a global M-BIP factor. Fit statistics indicated a good fit to the data both for the full form; $\chi 2$ (1585) = 2279.156, $p < .001$, CFI = .960, TLI = .958, RMSEA (90% confidence interval) = .039 [.035 - .042], and for the short form; $\chi 2$ (809) = 1296.609, $p < .001$, CFI = .960, TLI = .957, RMSEA (90% confidence interval) = .046 [.041 - .050]. Figure 4.1 presents the assessed hierarchical model with the second order latent factors' loading onto the global M-BIP factor for the full form measure, and Figure 4.2 presents the results for the short form. Table 4.9 and 4.10 present the retained items and their factor loadings for the full and short form respectively.

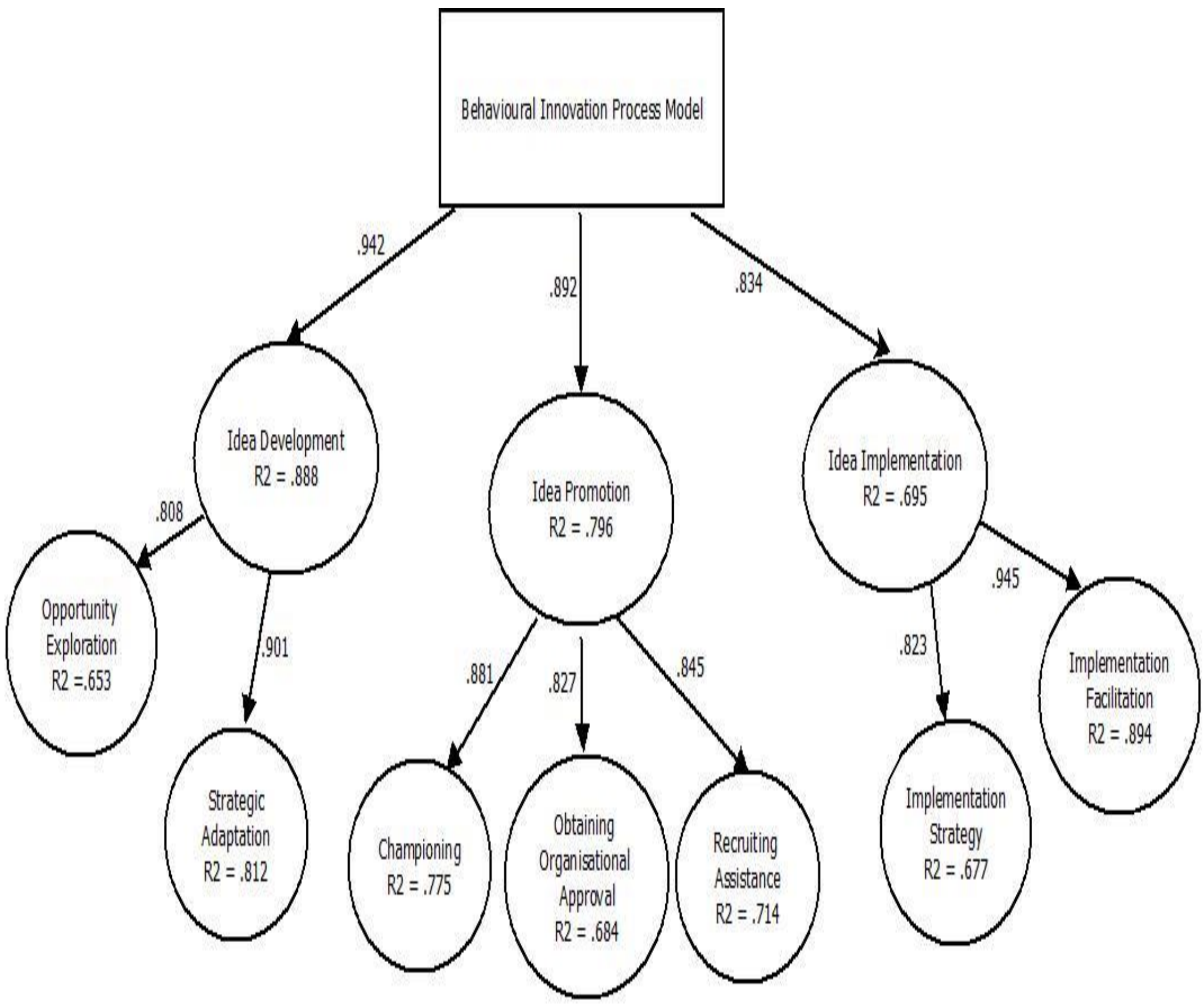

Figure 4.1. *3rd order CFA of the full form M-BIP*

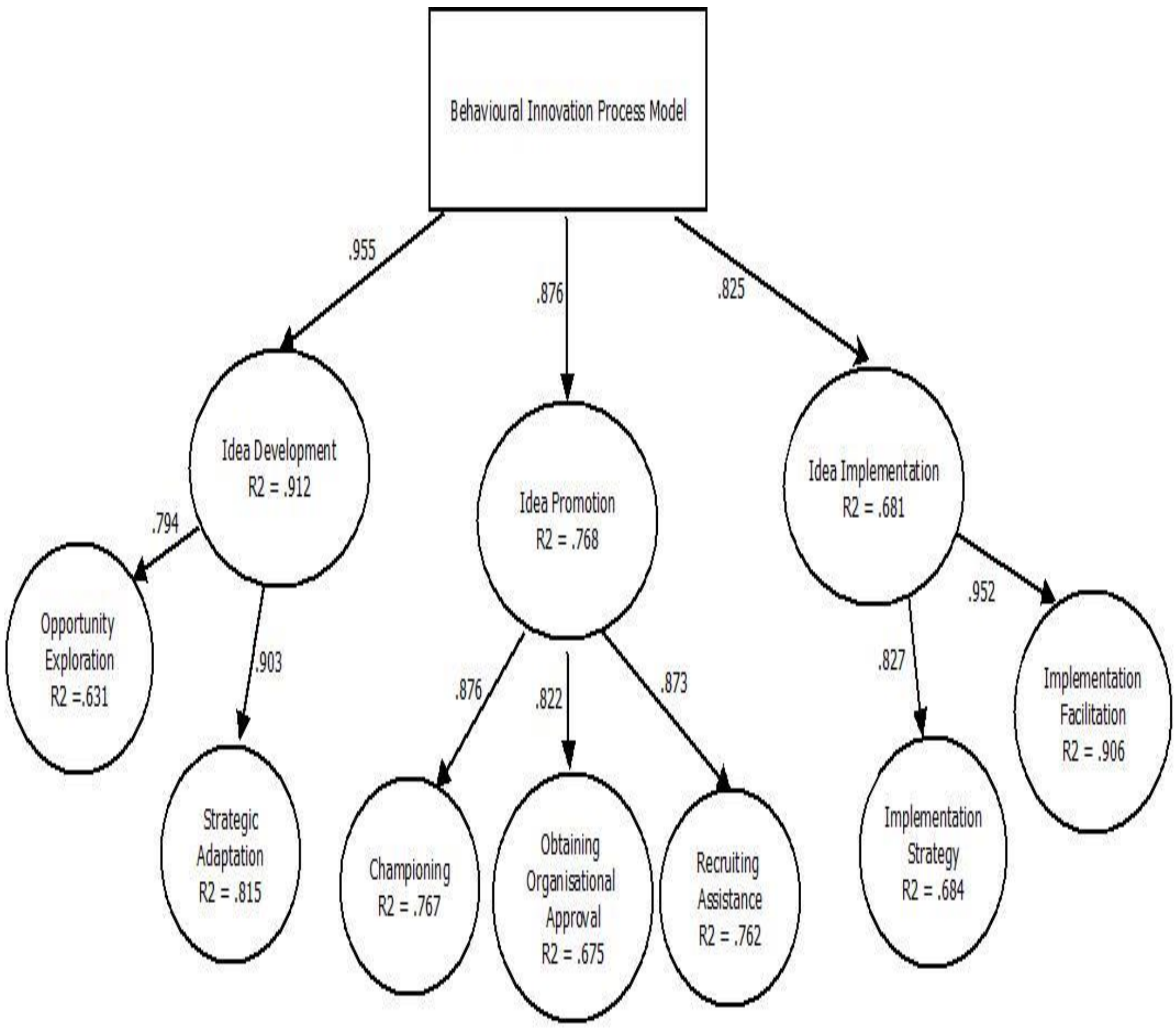

Figure 4.2. *3rd order CFA of the short form M-BIP*

Table 4.9

CFA pattern matrix for the full form M-BIP

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Kept myself informed about new developments within my organisation	.739						
Examined predominant beliefs within my professional field critically.	.733						
Spent time identifying my department's weaknesses.	.725						
Searched out new working methods, techniques, or instruments.	.697						
Exchanged thoughts on recent developments within my professional field with clients/customers.	.690						
Kept myself informed about new developments in other organisations	.689						
Kept myself informed about new concepts/insights within my field.	.679						
Kept myself informed about the organisation's structures and procedures.	.672						
Wondered how things could be improved.	.628						
Paid attention to work issues not directly part of my daily tasks	.501						
Modified the idea based on the cost – benefit evaluation.		.767					
Spent time identifying how the idea provided a competitive advantage to the organisation.		.758					
Made sure that benefits were greater than the costs of the implementation.		.752					
Incorporated into the idea aspects that colleagues brought to the table and haven't been thought of.		.719					
Spent time planning how resources could be obtained.		.703					
Modified the idea based on the evaluation of the availability of the necessary resources.		.693					
Identified potential sources of conflict and resistance within the organisation.		.684					
Modified the idea to be more appealing to influential individuals/groups.		.681					
Spent time identifying the right people to get involved.		.663					
Shared the vision of the innovative potential.			.857				
Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea.			.835				
Expressed confidence in what the innovation can do.			.782				
Initiated an open discussion regarding the proposed innovation.			.764				
Evaluated co-workers reactions and accordingly altered the style adopted.			.745				
Enthusiastically promoted the innovation's advantages.			.720				
Pushed the idea with determination even if people did not find it appealing in the first place.			.710				

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Provided examples to demonstrate the feasibility of the plan, to gain my boss's support.				.881			
Framed the new idea as an opportunity, to gain my boss's support.				.862			
Presented a detailed implementation plan, to gain my boss's support.				.859			
Outlined potentially positive organisational/financial outcomes, to gain my boss's support.				.855			
Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.				.837			
Produced documented cost and benefit estimations, to gain my boss's support.				.818			
Modified the idea to address skepticism, to gain my boss's support.				.813			
Obtained the support of backers/customers, to gain my boss's support.				.804			
Persisted when superiors were unconvinced/hesitant.				.753			
Persisted in the face of adversity, so as to get skilled and knowledgeable co-workers on board.					.833		
Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.					.822		
Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable co-workers on board.					.819		
Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board.					.815		
Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.					.793		
Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.					.746		
Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.					.679		
Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.					.559		
Made appropriate allocation of the available resources.						.893	
Devised a new implementation strategy when the allocated resources were limited.						.878	
Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.						.861	
Distributed the workload based on individual competencies.						.836	
Set clear objectives regarding the intended outcomes of the implementation process.						.745	

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Treated unpredicted difficulties as an opportunity to improve the original idea.							.830
Continually assessed whether the implementation efforts were bringing results.							.825
Continually thought of alternative solutions that could have made the implementation more feasible.							.815
Treated unpredicted difficulties as an opportunity to improve skills and knowledge.							.807
Changed the implementation strategy when it was not working.							.802
Demonstrated persistence in the face of short term problems.							.797
Kept co-workers/superiors informed about the progress of the implementation process.							.776
Showed appreciation for team members' efforts.							.774
Took risks so as to assess the appropriateness of the approach.							.678
Piloted the innovation.							.596

Table 4.10

CFA pattern matrix for the short form M-BIP

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Kept myself informed about new developments within my organisation.	.746						
Spent time identifying my department's weaknesses	.744						
Searched out new working methods, techniques, or instruments.	.710						
Kept myself informed about new developments in other organisations	.697						
Kept myself informed about new concepts/insights within my field.	.674						
Wondered how things could be improved.	.643						
Spent time identifying how the idea provided a competitive advantage to the organisation.		.762					
Modified the idea to be more appealing to influential individuals/groups.		.714					
Spent time planning how resources could be obtained.		.713					
Identified potential sources of conflict and resistance within the organisation.		.691					
Spent time identifying the right people to get involved.		.684					
Modified the idea based on the evaluation of the availability of the necessary resources.		.684					
Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea.			.871				
Evaluated co-workers' reactions and accordingly altered the style adopted.			.825				
Initiated an open discussion regarding the proposed innovation.			.765				
Expressed confidence in what the innovation can do.			.762				
Enthusiastically promoted the innovation's advantages.			.713				
Pushed the idea with determination even if people did not find it appealing in the first place.			.711				
Outlined potentially positive organisational/financial outcomes, to gain my boss's support.				.857			
Presented a detailed implementation plan, to gain my boss's support.				.847			
Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.				.844			
Produced documented cost and benefit estimations, to gain my boss's support.				.816			
Obtained the support of backers/customers, to gain my boss's support.				.802			
Persisted when superiors were unconvinced/hesitant.				754			

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.					.837		
Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.					.829		
Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board.					.801		
Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable on board.					.799		
Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.					.759		
Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.					.682		
Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.					.570		
Made appropriate allocation of the available resources.						.896	
Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.						.867	
Devised a new implementation strategy when the allocated resources were limited						.865	
Distributed the workload based on individual competencies.						.834	
Set clear objectives regarding the intended outcomes of the implementation process.						.745	
Continually assessed whether the implementation efforts were bringing results.							.837
Treated unpredicted difficulties as an opportunity to improve the original idea.							.803
Continually thought of alternative solutions that could have made the implementation more feasible.							.794
Kept co-workers/superiors informed about the progress of the implementation process.							.791
Showed appreciation for team members' efforts.							.787
Took risks so as to assess the appropriateness of the approach.							.680

It should be noted that the χ^2 difference test, for the full form, ($\chi 2 difftest$ (12) = 29.232, $p < .01$) between the measurement model (Number of free parameters: 368) and the hypothesised hierarchical model (Number of free parameters: 357) was significant indicating that the least restrictive measurement model better fits the data. Likewise, for the short form the $\chi 2$ difference test ($\chi 2 difftest$ (11) = 27.385, p < .01) between the measurement model (Number of free parameters: 272) and the hypothesised hierarchical model (Number of free parameters: 261) was significant. Nevertheless, given that in the hierarchical model's fit statistics are good, and that the specification of the higher order model was not an exploratory data mining approach but rather a means to provide empirical support to a predefined model, results were interpreted as being supportive of the a priori hypothesised hierarchical structure. Whereas, the χ^2 difference tests indicated that the more restrictive models are not preferable, theory should be considered and accounted for when evaluating hierarchical CFA models (Marsh, 1987).

In order to further assess the hypothesised factorial structure with more scrutiny two further statistical analyses were conducted to evaluate the discriminant validity of the full and short forms of the M-BIP. First, three more competing alternative models were specified, one where the seven primary factors (i.e., activities) loaded directly onto the one global latent factor, another where the items loaded directly onto the three second order factors (i.e., stages), and another where the items loaded directly onto one global actor. These alternative models were compared against the a priori hypothesised hierarchical model. Regarding the full form, results indicated a notable decrease in the fit statistics compared to the hypothesised hierarchical structure for the model where the first order factors loaded directly onto one global factor; $\chi 2$ (1588) = 2708.416, $p < .001$, CFI = .935, TLI = .932, RMSEA (90% confidence interval) = .049 [.046 - .052]. Moreover, the $\chi 2$ difference test ($\chi 2 difftest$ (3) = 106.589, $p < .01$) between the hypothesised hierarchical model (Number of free parameters: 357) and the first alternative model (Number of free parameters: 354) was significant indicating that the least restrictive hypothesised hierarchical model better fits the data. As for the short form, results also indicated a notable decrease in the fit statistics compared to the hypothesised hierarchical structure for the model where the activities loaded directly onto the M-BIP factor; $\chi 2$ (812) = 1684.220, $p < .001$, CFI = .928, TLI = .924, RMSEA (90% confidence interval) = .061 [.057 - .065]. Moreover, the $\chi 2$ difference test ($\chi 2difftest$ (3) = 114.792, $p < .01$) between the hypothesised hierarchical model (Number of free parameters: 261) and the first alternative model (Number of free parameters: 258) was again significant. These results indicated that removing the second order latent factors from the model, which group the underlying activities into broader stages, did not provide a better description of the data.

The second alternative model, which operationalised the construct as a three-dimensional process where items loaded on the corresponding stages rather than activities, demonstrated a significant drop in the fit statistics for the full form of the M-BIP; $\chi 2$ (1592) = 3252.016, $p < .001$, CFI = .904, TLI = .900, RMSEA (90% confidence interval) = .060 [.057 - .063]. The $\chi 2$ difference test ($\chi 2difftest$ (7) = 276.768, $p < .01$) between the hypothesised hierarchical model (Number of free parameters: 357) and the second alternative model (Number of free parameters: 350) was significant indicating that the least restrictive hypothesised hierarchical model better fits the data. Similarly, for the short form a significant drop in the fit statistics was observed; $\chi 2$ (816) = 1977.819, $p < .001$, CFI = .905, TLI = .899, RMSEA (90% confidence interval) = .070 [.066 - .074]. Likewise, the $\chi 2$ difference test ($\chi 2difftest$ (7) = 258.282, $p < .01$) between the hypothesised hierarchical model (Number of free parameters: 261) and the second alternative model (Number of free parameters: 254) was significant. These findings showed that an operationalisation that merges the seven activities into their corresponding stages and simplifies the construct into the broad stages renders the model unacceptable.

Regarding the third alternative model where the items loaded directly on the M-BIP factor, the fit statistics dramatically dropped indicating a bad model fit for the full form; $\chi2$ (1595) = 5507.809, p < .001, CFI = .773, TLI = .764, RMSEA (90% confidence interval) = .092 [.089 - .094]. The $\chi2$ difference test ($\chi2difftest$ (10) = 753.086, p < .01) between the hypothesised hierarchical model (Number of free parameters: 357) and the third alternative model (Number of free parameters: 347) was significant, indicating that the least restrictive hypothesised hierarchical model better fits the data. As for the short form, fit statistics were again indicative of bad model fit; $\chi2$ (819) = 3609.091, p < .001, CFI = .771, TLI = .759, RMSEA (90% confidence interval) = .108 [.105 - .112]. Once more, the $\chi2$ difference test ($\chi2difftest$ (10) = 703.517, p < .01) between the hypothesised hierarchical model (Number of free parameters: 261) and the third alternative model (Number of free parameters: 251) was significant. Thus, these findings provided further support to the suggestion that the examined construct is not better operationalised as a uni-dimensional one.

The second type of analysis conducted to evaluate the factorial discriminant validity of the full and short forms of the M-BIP, was the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015). Table 4.11 presents the full form's results for the first and second order latent factors respectively. Table 4.12 presents the equivalent results for the short form. As shown in both tables, no values exceed the .90 cut-off point, thus the discriminant validity of the measure's factors has been supported. It should be noted that the HTMT analyses were conducted to test for the discriminant validity of same level factors, and not higher order factors with their facets.

Table 4.11

HTMT ratio of correlations for the full form M-BIP

	1	2	3	4	5	6	7	8	9	10
1.Opportunity exploration	1									
2.Strategic adaptation	.75	1								
3.Championing	.67	.68	1							
4.Obtaining Org. Approval	.52	.61	.71	1						
5.Recruiting Assistance	.54	.62	.73	.76	1					
6.Implementation Strategy	.57	.58	.51	.46	.51	1				
7.Implementation Facilitation	.63	.64	.64	.58	.57	.79	1			
8.Idea Development	-	-	-	-	-	-	-	1		
9.Idea Promotion	-	-	-	-	-	-	-	.72	1	
10.Idea Implementation	-	-	-	-	-	-	-	.69	.65	1

Table 4.12

HTMT ratio of correlations for the short form M-BIP

	1	2	3	4	5	6	7	8	9	10
1.Opportunity exploration	1									
2.Strategic adaptation	.71	1								
3.Championing	.65	.69	1							
4.Obtaining Org. Approval	.50	.61	.68	1						
5.Recruiting Assistance	.52	.66	.77	.75	1					
6.Implementation Strategy	.56	.57	.51	.45	.52	1				
7.Implementation Facilitation	.65	.59	.64	.56	.58	.78	1			
8.Idea Development	-	-	-	-	-	-	-	1		
9.Idea Promotion	-	-	-	-	-	-	-	.73	1	
10.Idea Implementation	-	-	-	-	-	-	-	.69	.64	1

Concluding, the evaluation of the conducted exploratory and confirmatory factor analytic techniques, in conjunction with the discriminant validity analyses conducted applying the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al.,

2015) supported all stated hypotheses concerning the dimensionality and structure of the M-BIP. Specifically, the aforementioned analyses supported Hypothesis 1, which stated that the construct of innovative work behaviour has three second-order factors that correspond to Idea Development, Idea Promotion, and Idea Implementation. Hypothesis 2, which stated that the second order factor of Idea development has two primary factors that correspond to Opportunity exploration and Strategic adaptation, was also supported. Hypothesis 3, which stated that the second order factor of Idea promotion has three primary factors that correspond to Championing, Obtaining organisational approval and Recruiting assistance was likewise supported. Finally, Hypothesis 4 which stated that the second order factor of Idea implementation has two primary factors that correspond to Implementation strategy, and Implementation facilitation was also supported.

Upon the completion of the analyses that provided support for the Hypotheses 1-4, which specified the M-BIP's factorial structure, a post hoc power analysis was conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method. These two methods were used to assess whether the probability to reject an incorrect model (i.e., Power) was above .8. The Kim and M.B.S. method was applied to both the full and the short forms of the M-BIP, and specifically to the two hierarchical structural models (see Figures 4.1 and 4.2). The analyses yielded a power estimate of 1 for both models. Regarding the Satorra and Saris (1985) method, I calculated the statistical power for each specific estimate of interest (i.e., items' loadings; subordinate factors' loadings to higher order latent factors) for both the full and the short forms of the M-BIP. The Satorra and Saris (1985) method demonstrated that all the statistical power estimates were above .8. Thus, given that both methods identified sufficient power estimates, it is safe to assume that the tested hierarchical structural models' estimates are not chance findings, but they are truly significant.

4.5.3. Response processes

Following the assessment of the M-BIP's structural properties and the creation of a more feasible psychometric instrument, the remaining items' elicitation of responses was evaluated. In order to do so 8 employed individuals (5 males, 3 females) aged 25 to 43, agreed to participate in the study. Participants were employed in diverse professional sectors. Three of them were employed in the hospitality industry, two were employed in a logistics company, two were engineers in a construction company, and one was employed in a kids after-school centre.

During the think aloud process the survey with the same introductory section and instructions was used, but only the items retained for the short form of the instrument were presented to the participants. Participants were asked to read each item and state their response option (1-6; Never – Always) while explaining their rationale, thoughts, or memories for doing so. Moreover, participants were encouraged to express their views on the comprehensibility and clarity of the items and make any comment they felt appropriate about them. Table 4.13 presents sample responses for three items from each stage. Overall, results revealed that the items were concise and well understood, and no matter what the given answer was, items generated responses tapping the intended core of each question. This process made it clear that the variation in responses was a function of the participants' degree of involvement in innovative work behaviours. However, this process revealed one limitation of the measure's utility that does not concern the quality of the items but rather the behavioural orientation of the measure. Specifically, one participant after responding to the first six questions tapping opportunity exploration responded that the remainder of the items were not applicable since he did not intend to pursue any sort of innovation. This response indicates that the M-BIP should be administered to individuals who have attempted to introduce some form of innovation in their organisation. Thus, if an employee has not been involved in some form of constructive change within his/her workplace, items enquiring how he/she went about realising that change are by definition non applicable.

Table 4.13. *Assessment of the response processes elicited by the M-BIP's items*

Stage	Item	Example response for low scores (1-2; Never, Rarely)	Example response for medium scores (3-4; Sometimes)	Example response for high scores (5-6; Often, Always)
Opportunity Exploration	Kept myself informed about new developments within my organisation.	No participant answered 1-2	Now and then, and usually during staff meetings I get informed about any worthwhile news in the job	I chat with my colleagues on a daily basis about what is going on at work
	Spent time identifying my department's weaknesses	I don't really care about things that do not have a negative impact on my work related tasks	I am certainly aware of some problems in the organisation particularly when it comes to my job, but it is not something I regularly do.	It is very important for me to know all malfunctions in my job. I constantly observe and ask my colleagues about any problems they face.
	Kept myself informed about new concepts/insights within my field.	I don't think there is anything new in such a job as mine. Things are pretty standard.	I sometimes talk with my colleagues about new trends in products that are relevant to our job.	Being up to date is a necessity if you want to be a successful professional. I always discuss about field advancements with colleagues, and I am a subscriber in professional journals
Strategic Adaptation	Spent time identifying the right people to get involved.	There are only 4 of us working here so this is not really an option.	I certainly have some people in my mind but I do not give it much though.	It is critical to find the right person for each task. Each person has different skills and talents.
	Spent time planning how resources could be obtained.	I don't bother thinking of such issues. It is the boss who deals with such things.	I do consider whether my demands would be realistic but I do not spend a lot of time thinking about resources as I have no decision making power.	Considering we have a specified budget it is important to assess the availability of resources and whether there can be any cuts from other projects.

Factor	Item	Example response for low scores (1-2; Never, Rarely)	Example response for medium scores (3-4; Sometimes)	Example response for high scores (5-6; Often, Always)
Strategic Adaptation	Spent time identifying how the idea provided a competitive advantage to the organisation.	I hardly ever do this. I just think of how I could do my job better.	I know what job related improvements I want to accomplish. I don't spend much time though overthinking it.	It is the nature of the industry to be able to offer services that beat the competition. If something does not improve our market position, it is not worth doing.
Championing	Initiated an open discussion regarding the proposed innovation.	Almost always when I believe something that needs to be changed I make my recommendations directly to the boss.	I discuss my idea with my colleagues but I do not do it on an everyday basis, and far less frequently with less qualified workers.	It is the nature of the job that requires team work and coordination. So when I propose a change I seek for every colleagues' opinions.
	Pushed the idea with determination even if people did not find it appealing in the first place.	I don't really like being pushy. If people don't like my idea I will not try to persuade them. After all it is not my own business.	I can be persistent when pitching an idea of mine but only if I am extremely confident of its value and I think that my colleagues' objections can be succumbed.	To be honest my position in the organisation allows me to keep pushing even if people do not always agree with my idea. Thus, I do not step back when people are not initially convinced.
	Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea.	No participant answered 1-2	When I am convinced that their proposals would make my idea better I do take them into account.	An idea can always be improved by a diversity in perspectives. I value my colleagues' opinions and I have no problem to incorporate things that I have not thought of in my idea.

Factor	Item	Example response for low scores (1-2; Never, Rarely)	Example response for medium scores (3-4; Sometimes)	Example response for high scores (5-6; Often, Always)
Obtaining Organisational Approval	Produced documented cost and benefit estimations, to gain my boss's support.	I have never provided such detailed information. Usually I just say that this aspect of the job would be improved in such a way…	I do that occasionally, and when the proposed change is quite important. When it is something relatively minor I just explain its merits.	Considering that the projects we work on have a predefined budget, any proposed adjustments have to be accompanied by contractors' suppliers' formal offers
	Obtained the support of backers/customers, to gain my boss's support.	I have never tried to use other people as leverage. I prefer a more direct approach.	I have discussed with long term customers, that we have a good relationship, about an idea of mine… and asked them to have a word with the shop owner and request a particular service to be provided.	It is almost standard practice to ask for my colleagues' support when a proposal is to be made to the company's director.
	Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.	No participant answered 1-2	Most of the times I try to reconcile my thoughts with those of the boss's. However, if I truly believe that my way is better I try to persuade my boss about my idea rather than find a middle ground.	It is impossible to pursue a change without the consent of the management. So you have to take their view into account.
Recruiting assistance	Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.	I hardly ever have to ask my boss's intervention to help me obtain the assistance of my colleagues.	Occasionally when esteemed colleagues are ambivalent about whether they want to participate in the implementation, I ask superiors to have an incentivization talk with them.	My organisation's way of operation necessitates relying for support in your superiors. Unless, superiors stand behind you when proposing to change something, few people would risk to join you.

Factor	Item	Example response for low scores (1-2; Never, Rarely)	Example response for medium scores (3-4; Sometimes)	Example response for high scores (5-6; Often, Always)
Recruiting assistance	Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board.	No participant answered 1-2	When someone was deemed absolutely necessary due to the post he/she held or his/her importance for the implementation I tried to listen to and disprove his/her objections.	I always try to make people help me not because I forced them to, but because they share my views. Having a team-member's wavering support could be problematic if and when obstacles arise.
	Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.	I don't do this as it is not required for the type of changes I usually propose.	I usually engage in more in-depth conversations with colleagues that I know we have opposing views on several work related issues.	Asking the inputs of several people is quite effective as it makes the innovation appear as a group effort and makes it harder for a single individual to refuse to help.
Implementation Strategy	Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.	Never had to. We all more or less possess similar skills and knowledge.	When a task requires some kind of specialisation I try to assign it to the person I deem more capable of carrying it out. On the other tasks though I just ask who wants to take them over.	Considering that innovations in our field require technical knowledge it is always the case that all tasks are assigned to the persons having the necessary expertise to accomplish them.
	Set clear objectives regarding the intended outcomes of the implementation process.	No participant answered 1-2	More or less everyone knows what to do and what we need to accomplish. When minor changes are pursued we don't explicitly set objectives.	The expectations from each person participating in the implementation are clearly predefined.

Factor	Item	Example response for low scores (1-2; Never, Rarely)	Example response for medium scores (3-4; Sometimes)	Example response for high scores (5-6; Often, Always)
Implementation Strategy	Made appropriate allocation of the available resources.	Whoever needs something asks it when the need arises.	Usually resources are allocated to tasks and individuals when we have resources restrictions. When the implementation is not expected to be resource consuming then we just overview the use of the resources.	Resources are always monitored and allocated based on concise plans.
Implementation Facilitation	Continually assessed whether the implementation efforts were bringing results.	Implementation was relatively straightforward so there was no need for continual assessment.	I was overviewing and assessing the process of implementation but I cannot say that it was something of the highest priority. Most of the time I just informally asked how things are proceeding.	I inspected the project on a daily basis so as to make sure that each person was keeping up with the rest of the team and that resources were being put to good use.
	Kept co-workers /superiors informed about the progress of the implementation process.	I have taken full responsibility and it was my job to see it through.	I discussed with my superiors about the progress when certain milestones were achieved. Day to day tasks though were handled by myself.	Everyday before we started work we held brief meetings with the staff where progress and problems were discussed, and directions were given.
	Continually thought of alternative solutions that could have made the implementation more feasible.	Not really, a decision has been made on how to proceed and since nothing unexpected happened we proceeded without second thoughts.	I tried to figure out alternative ways to do things when the desirable outcome was not satisfactory or the progress was stalled.	As I had the overview of the project I constantly evaluated the plan's progress and suggested alternative ways to speed up the process and reduce the cost.

4.5.4. Correlational analyses

A series of correlational analyses was carried out to examine how the full and short forms of the M-BIP correlated both at a global, and at first and second order latent factors' level with Holman et al.'s (2012) measure of innovative work behaviour. Results for the full form (see Tables 4.14 and 4.15) indicated a moderately high correlation at a global level ($r = .68$), thus supporting Hypothesis 5. Hypothesis 6, which stated that the magnitude of correlations among the respectively equivalent three stages of the M-BIP and the Holman et al. (2012) measure is weaker than the magnitude of correlation of the global factors, was also supported as the magnitude of the correlations ranged from .46 to .60. This result is reasonable given the content differences of the two measures. The content differences of the two measures become even more obvious when examining the magnitude of correlations among the activities specified by the M-BIP and the stages of the Holman et al.'s measure, with the strength of the correlations decreasing as the level of specificity of the M-BIP factors increases. Specifically, as shown in Table 4.15, the magnitude of the correlations among the M-BIP activities and Holman et al. stages ranged from .38 to .56. Regarding Hypothesis 7, which stated that the two idea promotion factors of M-BIP and Holman et al.'s (2012) measure are more strongly correlated ($r = .60$) compared to the magnitude of correlations displayed by the other two pairs of factors (Idea development- Idea generation: $r = .52$, and Idea implementation: $r = .49$), results are supportive. It is worth noting that the variation of the strength of the correlations does not always follow the theoretical proximity of the dimensions of the two measures. For example, the stage of idea development does not display a stronger correlation with idea generation, but with idea promotion. Moreover, as shown in Tables 4.14 and 4.15 there is a pattern indicating that the stage of idea promotion of the Holman et al.'s measure of innovative work behaviour exhibits on average stronger correlations with the M-BIP activity factors compared to the other two stages of Holman et al.'s measure. This finding indicates that, as intended, the M-BIP meaningfully departs from Holman et al.'s conceptualisation and operationalisation of the innovation process, due to its explicit behavioural orientation.

Table 4.14

Correlations between the full form M-BIP and the Holman et al.'s measure of IWB at a global and 2nd order level

	1	2	3	4	5	6	7	8
1. **M-BIP**	1	*.93**	*.91**	*.82**	*.82**	*.69**	*.75**	*.64**
2. Idea development	.87*	1	.84*	*.77**	*.76**	*.64**	*.70**	*.60**
3. Idea promotion	.89*	.68*	1	.75*	*.75**	*.63**	*.68**	*.58**
4. Idea implementation	.86*	.64*	.61*	1	.68*	.57*	.62*	.53*
5. **IWB (Holman et al., 2012)**	.68*	.59*	.64*	.56*	1	*.84**	*.92**	*.78**
6. Idea generation	.59*	.52*	.53*	.49*	.82*	1	*.77**	*.65**
7. Idea Promotion	.63*	.55*	.60*	.49*	.88*	.58*	1	*.71**
8. Idea implementation	.57*	.46*	.53*	.49*	.89*	.60*	.69*	1

Note: * p < .01. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal

Table 4.15

Correlations between the full form M-BIP and the Holman et al.'s measure of IWB at a 1st order level

	1	2	3	4	5	6	7	8	9	10
Idea development M-BIP	-	-	-	-	-	-	-	-	-	-
1. Opportunity exploration	1	*.73**	*.62**	*.57**	*.58**	*.51**	*.60**	*.53**	*.57**	*.49**
2. Strategic adaptation	.64*	1	*.66**	*.62**	*.63**	*.55**	*.65**	*.56**	*.62**	*.53**
Idea promotion M-BIP	-	-	-	-	-	-	-	-	-	-
3. Championing	.57*	.59*	1	*.74**	*.75**	*.54**	*.64**	*.56**	*.61**	*.52**
4. Obtaining Org. Approval	.46*	.57*	.63*	1	*.69**	*.50**	*.59**	*.52**	*.57**	*.48**
5. Recruiting assistance	.48*	.56*	.64*	.67*	1	*.51**	*.60**	*.52**	*.57**	*.49**
Idea implementation M-BIP	-	-	-	-	-	-	-	-	-	-
6. Implementation strategy	.49*	.52*	.47*	.41*	.45*	1	*.78**	*.46**	*.50**	*.43**
7. Implementation facilitation	.56*	.56*	.60*	.53*	.54*	.71*	1	*.54**	*.59**	*.51**
IWB (Holman et al., 2012)	-	-	-	-	-	-	-	-	-	-
8. Idea generation	.49*	.45*	.54*	.45*	.41*	.38*	.53*	1	*.77**	*.65**
9. Idea Promotion	.53*	.47*	.56*	.51*	.51*	.39*	.53*	.58*	1	*.71**
10. Idea implementation	.48*	.39*	.50*	.43*	.43*	.39*	.52*	.60*	.69*	1

Note: * p < .01. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal

As for the short form of the M-BIP, correlation analyses were conducted in order to assess how the short form correlated with the full one, and also with the Holman et al. (2012) measure of innovative work behaviour. As shown in Tables 4.16 and 4.17 the full and short forms of the M-BIP were virtually identical (r = .996), whereas their correlations with the existing measure of innovative work behaviour were practically the same. Thus, hypotheses 5-7 are once more supported.

Table 4.16

Correlations between full- and short- form M-BIP and the Holman et al.'s measure of IWB at a global and 2nd order level

	1	2	3	4	5	6	7	8	9
1. **M-BIP full**	1	-	-	-	-	-	-	-	-
2. M-BIP short	.996*	1	.928*	*.905**	*.815**	*.812**	*.669**	*.747**	*.638**
3. Idea development	.848*	.862*	1	*.840**	*.756**	*.753**	*.621**	*.693**	*.593**
4. Idea promotion	.882*	.882*	.659*	1	*.737**	*.734**	*.605**	*.676**	*.578**
5. Idea implementation	.849*	.848*	.612*	.592*	1	*.661**	*.545**	*.609**	*.520**
6. **IWB (Holman et al., 2012)**	.685*	.674*	.555*	.631*	.556*	*1*	*.824**	*.920**	*.787**
7. Idea generation	.586*	.574*	.495*	.515*	.477*	.818*	*1*	*.759**	*.648**
8. Idea Promotion	.630*	.662*	.523*	.595*	.489*	.885*	.582*	1	*.724**
9. Idea implementation	.566*	.556*	.428*	.525*	.480*	.890*	.598*	.687*	1

Note: $p < .01$; Correlations were displayed with three decimal points to indicate the minimal degree of change of the magnitude of correlations between the full and short M-BIP forms and the existing IWB measure. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal.

Table 4.17

Correlations between short form M-BIP and the Holman et al.'s measure of IWB at a 1st order level

	1	2	3	4	5	6	7	8	9	10
Idea development M-BIP	-	-	-	-	-	-	-	-	-	-
1.Opportunity exploration	1	*.716**	*.609**	*.563**	*.590**	*.501**	*.598**	*.507**	*.566**	*.484**
2.Strategic adaptation	.594*	1	*.654**	*.605**	*.634**	*.539**	*.642**	*.545**	*.608**	*.520**
Idea promotion M-BIP	-	-	-	-	-	-	-	-	-	-
3.Championing	.545*	.583*	1	*.729**	*.764**	*.532**	*.633**	*.537**	*.600**	*.513**
4.Obtaining Org. Approval	.426*	.529*	.603*	1	*.706**	*.491**	*.586**	*.497**	*.555**	*.474**
5. Recruiting assistance	.445*	.565*	.671*	.665*	1	*.515**	*.641**	*.521**	*.582**	*.497**
Idea implementation M-BIP	-	-	-	-	-	-	-	-	-	-
6. Implementation strategy	.480*	.490*	.449*	.403*	.466*	1	*.786**	*.443**	*.494**	*.422**
7. Implementation facilitation	.547*	.501*	.561*	.495*	.510*	.687*	1	*.527**	*.589**	*.503**
IWB (Holman et al., 2012)	-	-	-	-	-	-	-	-	-	-
8. Idea generation	.472*	.417*	.529*	.422*	.412*	.385*	.499*	1	*.759**	*.648**
9. Idea Promotion	.509*	.431*	.574*	.488*	.511*	.393*	.513*	.582*	1	*.724**
10. Idea implementation	.422*	.349*	.501*	.452*	.430*	.390*	.500*	.598*	.687*	1

Note: * $p < .01$; Correlations were displayed with three decimal points to indicate the minimal degree of change of the magnitude of the correlations between the full and short M-BIP forms and the existing IWB measure. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal.

4.5.5. Predictive validity of the M-BIP

Two structural equation models, in which the three stages of the M-BIP were correlated (see Figures 4.3 and 4.4) were specified to assess the predictive validity of the full and short forms of the M-BIP. This operationalization modelled the innovation process in the manner that provided the closest possible approximation to the theorized model. The correlated model accounted for the recursive nature of the process, where at any point innovators might need to return to a previous stage in order to address a potential problem they faced. Moreover, it was decided to assess only the idea implementation's direct effect on the innovative outcomes, as in real conditions it is those behaviours that actually transform an innovative idea into an innovative product. Furthermore, the rationale for primarily focusing on the mid-level constructs of the M-BIP concerns the parsimony and consistency of the present study with the empirical literature, which tests the relationships of the construct of innovative work behaviour with other variables at a stage level, rather than the activities and specific behaviours facilitating the stages. However, in order to comprehensively assess the predictive validity of the M-BIP, the activity level predictive validity of the instrument was also evaluated.

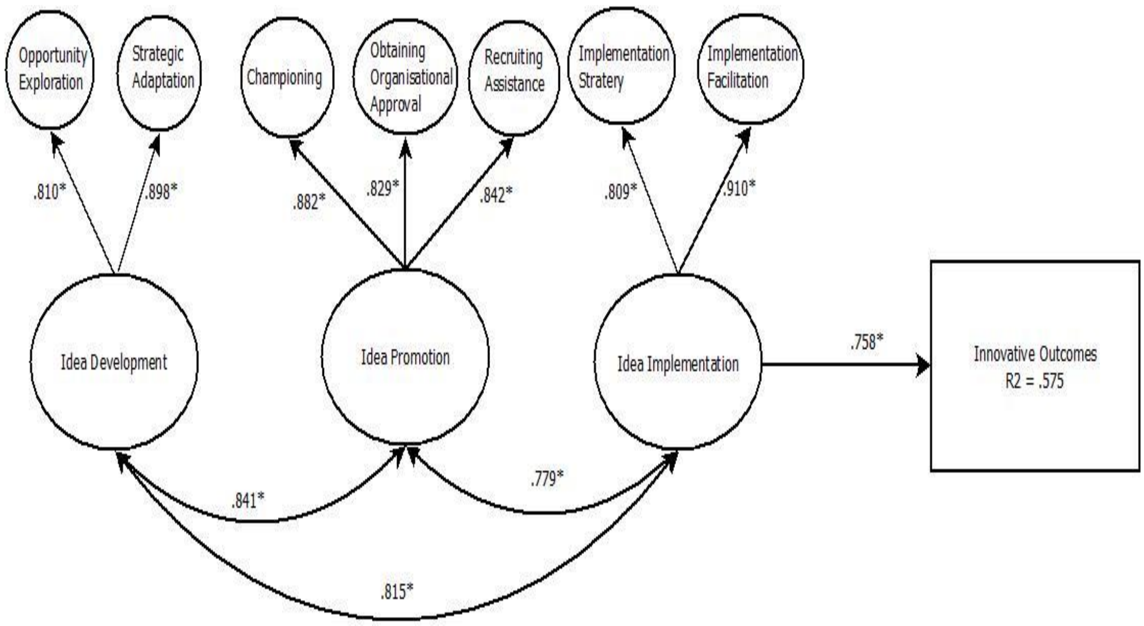

Figure 4.3. Full form M-BIP as a predictor of innovative outcomes

Note: **p* < .001; $\chi 2$ (1758) = 2513.586, p < .001, CFI = .957, TLI = .955, RMSEA (90% confidence interval) = .038 [.035 - .042]

As shown in Figure 4.3, the full form M-BIP is a significant positive strong predictor (β = .758; 99% CI [.699 - .817]) of innovative outcomes, explaining 57.5% of the innovative outcomes' variance. Whereas the observed effect size is relatively large, indicating that the M-BIP is a strong predictor of innovative outcomes, the magnitude of the effect should be conservatively interpreted because the present study includes only self-reported data, which are highly likely to inflate the observed relationships.

Figure 4.4 also demonstrates that the short form of the M-BIP is a significant positive strong predictor (β = .755; 99% CI [.693 - .817]) of innovative outcomes, explaining 57% of the innovative outcomes' variance. Thus, the short form explains .5% less variance than the full M-BIP form.

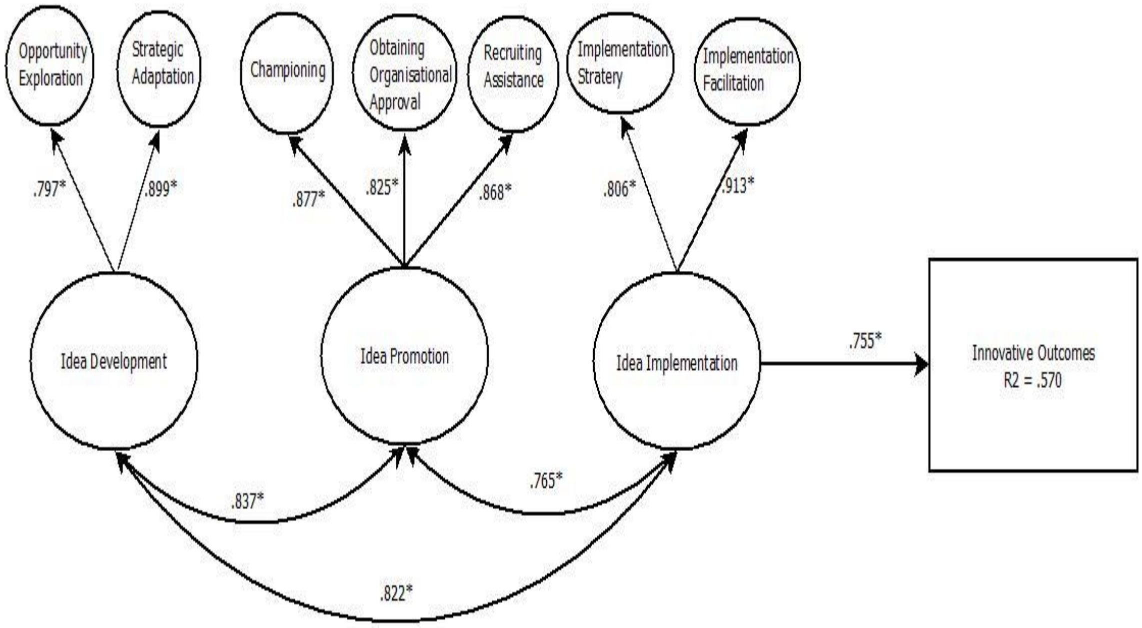

Figure 4.4. Short form M-BIP as a predictor of innovative outcomes

*Note: * p* < .001; χ2 (935) = 1476.237, p < .001, CFI = .957, TLI = .954, RMSEA (90% confidence interval) = .045 [.040 - .049]

Although the correlated predictive models displayed good fit statistics and were positive strong predictors of innovative outcomes, in order to empirically demonstrate the superiority of the proposed operationalisation as opposed to a linear one, two linear models were also specified (see Figures 4.5 and 4.6). For the full form of the M-BIP, in comparison to the hypothesised correlated model, the linear model (Figure 4.5) has slightly worse fit statistics, albeit indicative of a good model fit. Though, the *χ2* difference test (*χ2difftest* (1) = 22.910, $p < .01$) between the hypothesised correlated model (Number of free parameters: 376) and the alternative linear model (Number of free parameters: 375) was significant, indicating that the least restrictive hypothesised correlated model better fits the data. Thus, both theory and empirical evidence suggested that the model that operationally accounted for the recursive nature of the innovation process is preferable.

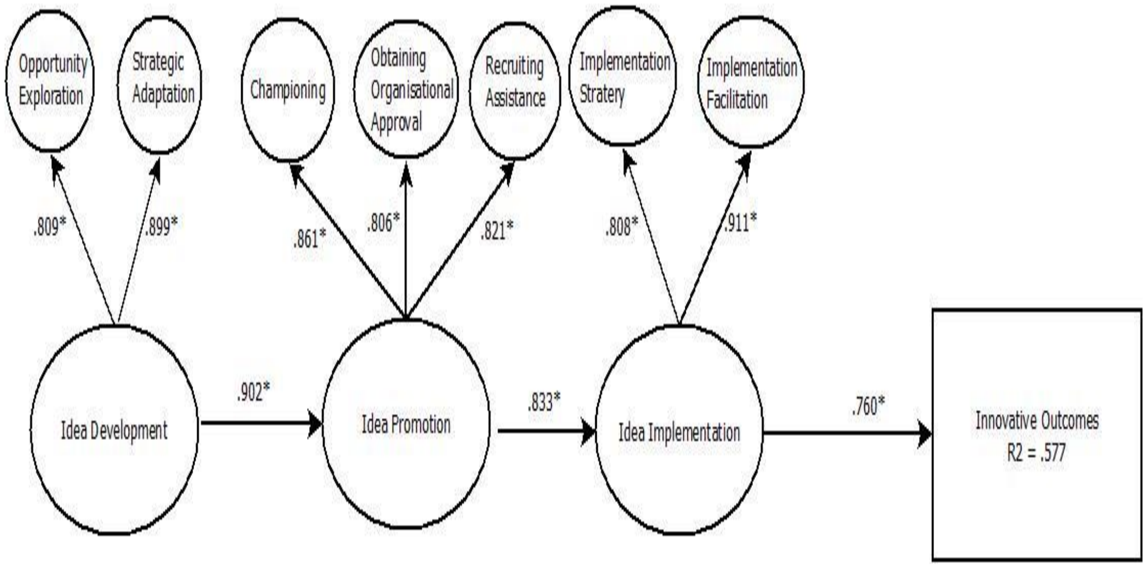

Figure 4.5. Linear full form M-BIP as a predictor of innovative outcomes

Note: * $p < .001$; $\chi2$ (1759) = 2601.855, $p < .001$, CFI = .952, TLI = .950, RMSEA (90% confidence interval) = .041 [.037 - .044].

For the short form of the M-BIP, the alternative linear operationalisation (Figure 4.6) once more indicated that the linear model has slightly worse fit statistics, and the $\chi2$ difference test (*χ2difftest* (1) = 25.611, p < .01) between the hypothesised correlated model (Number of free parameters: 280) and the alternative linear model (Number of free parameters: 279) was significant. Thus, once more the hypothesised correlated predictive model was shown to be superior.

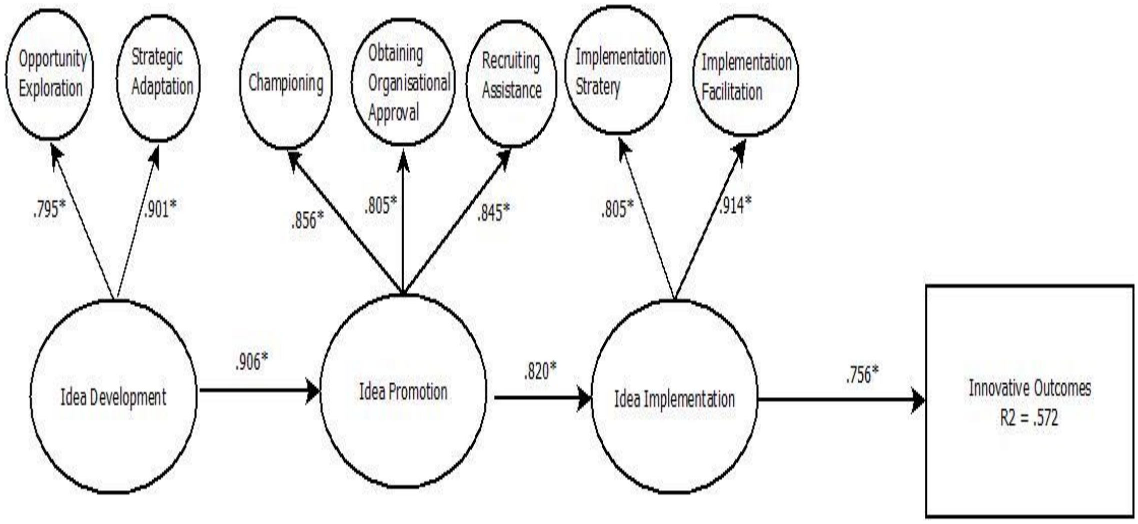

Figure 4.6. Linear short form M-BIP as a predictor of innovative outcomes

Note: * $p < .001$; $\chi 2$ (935) = 1558.780, $p < .001$, CFI = .950, TLI = .947, RMSEA (90% confidence interval) = .048 [.044 - .052].

Upon the completion of the analyses that investigated the predictive validity of the M-BIP, post hoc power analyses were conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method. The Kim and M.B.S. method was applied to both the full and the short forms of the M-BIP, and specifically to the four structural models specified to test the predictive validity of the M-BIP (see Figures 4.3, 4.4, 4.5, and 4.6). The analyses yielded a power estimate of 1 for all four models. Regarding the Satorra and Saris (1985) method, I calculated the statistical power for each specific estimate of interest (i.e., direct effects; magnitude of correlations between factors) for all four models. The Satorra and Saris (1985) method demonstrated that all the statistical power estimates were above .97. Thus, given that both methods identified sufficient power estimates, it is safe to assume that the tested hierarchical structural models' estimates are not chance findings, but they are truly significant.

The next step in the statistical analysis was the examination of the incremental predictive validity of the M-BIP over and above the Holman et al.'s (2012) measure of innovative work behaviour for innovative outcomes. To do so, three structural models were specified. The first baseline model (see Figure 4.7) assessed the predictive validity of Holman and colleagues' measure and explained 61.2% of the innovative outcomes' variance. The idea implementation factor was shown to be a significant positive strong predictor (β = .782; 99% CI [.727 - .838]) of innovative outcomes.

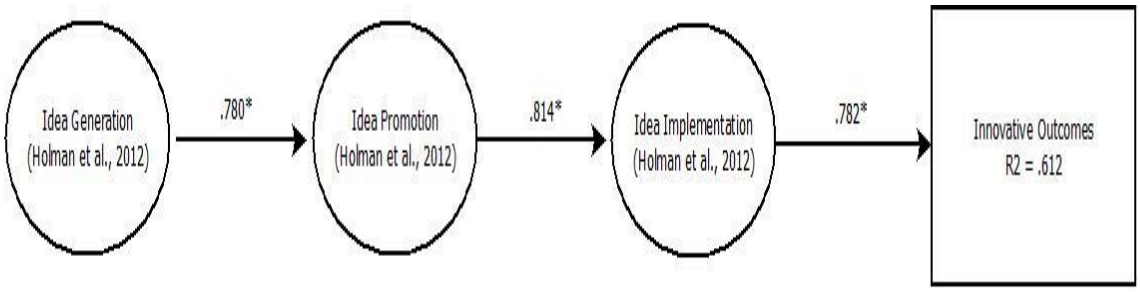

Figure 4.7. Holman et al.'s measure of IWB as a predictor of innovative outcomes

Note: * $p < .001$; $\chi 2$ (51) = 277.404, $p < .001$, CFI = .968, TLI = .958, RMSEA (90% confidence interval) = .124 [.109 - .138].

The Holman et al.'s measure was operationalised in a linear fashion as specified by the authors in their paper. The Holman et al.'s measure predicted a greater percentage of variance than both forms of the M-BIP, but this is considered to be a biased estimate as measures containing outcome assessments might falsely predict outcome measures (Hughes et al., 2018). In order to empirically evaluate this interpretation regarding the predictive validity of the Holman et al.'s measure, the idea implementation scale which exclusively assesses outcomes (see Table 2.3) was removed from the specified model. This alternative model explained 44.8% of the innovative outcomes' variance, thus explaining 16.4% less variance than the model including outcome assessments.

In the second model (Figure 4.8) the full form of the M-BIP and the Holman et al.’s measure were modelled, and collectively explained 68.7% of the innovative outcomes’ variance. Thus, the full form of the M-BIP explained 7.5% incremental variance over and above the existing measure. The M-BIP’s idea implementation factor was shown to be a significant positive moderate predictor (β = .390; 99% CI [.308 - .472]) of innovative outcomes, whereas Holman et al.’s idea implementation factor was shown to be a significant positive moderately strong predictor (β = .560; 99% CI [.477 - .643]) of innovative outcomes.

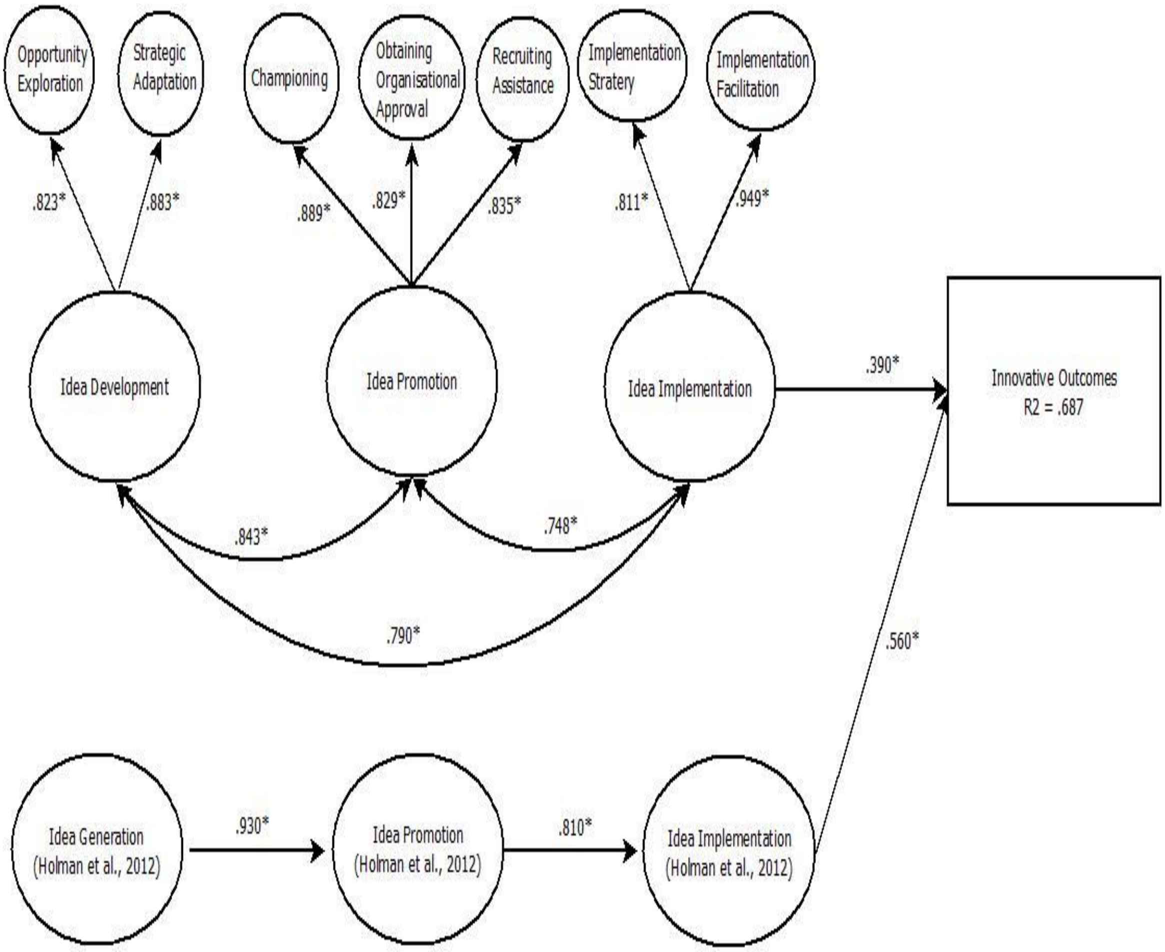

Figure 4.8. Full form M-BIP and Holman et al.’s measure as predictors of innovative outcomes

Note: * p < .001; $\chi 2$ (2328) = 32908.370, p < .001, CFI = .957, TLI = .955, RMSEA (90% confidence interval) = .036 [.033 - .039].

In the third model (Figure 4.9), the short form of the M-BIP and the Holman et al.'s measure were modelled and collectively explained 68.9% of the innovative outcomes' variance. Thus, the short form of the M-BIP explained 7.7% incremental variance over and above the existing measure, which is .2% more than the full form M-BIP did. The M-BIP's idea implementation factor was shown to be a significant positive moderate predictor (β = .371; 99% CI [.281 - .461]) of innovative outcomes, whereas Holman et al.'s idea implementation factor was shown to be a significant positive moderately strong predictor (β = .577; 99% CI [.493 - .662]) of innovative outcomes.

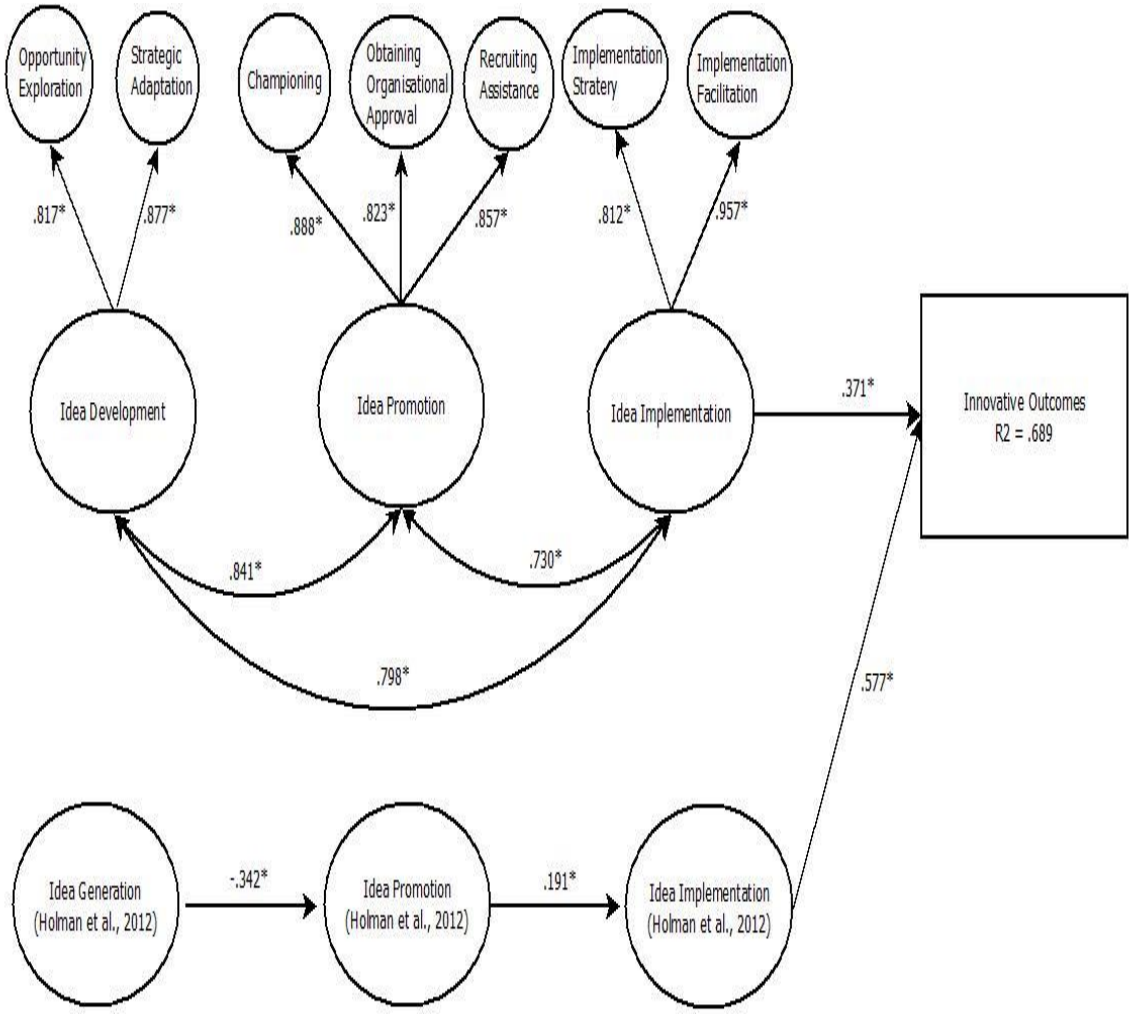

Figure 4.9. Short form M-BIP and Holman et al.'s measure as predictors of innovative outcomes

Note: * p < .001; $\chi 2$ (1357) = 1986.646, p < .001, CFI = .959, TLI = .957, RMSEA (90% confidence interval) = .040 [.036 - .044].

Regarding the predictive validity of the full form of the M-BIP at an activity level, 58.4% of the innovative outcomes' variance was predicted, thus explaining 0.9% more variance that the full measure at a stage level. The short form of the M-BIP, at an activity level, predicted 57.2% of the innovative outcomes' variance, thus explaining 0.2% more variance that the short measure at a stage level.

Following the completion of the analyses that investigated the incremental predictive validity of the M-BIP, post hoc power analyses were conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method. The Kim and M.B.S. method was applied to both the full and the short forms of the M-BIP, and specifically to the two structural models specified to test the M-BIP's incremental predictive validity (see Figures 4.8 and 4.9), and to the structural model specified to assess the predictive validity of the Holman et al.'s measure. The analyses yielded a power estimate of 1 for all three models. Regarding the Satorra and Saris (1985) method, I calculated the statistical power for each specific estimate of interest (i.e., direct effects; magnitude of correlations between factors) for all three models. The Satorra and Saris (1985) method indicated that not all statistical power estimates were above .80. Specifically, the examination of the statistical power for the direct effect between idea implementation and innovative outcomes indicated statistical power estimates of .50 and .65 for the full form M-BIP and the short form M-BIP respectively. With respect to all other estimates concerning the M-BIP's full and short form models, the Satorra and Saris (1985) method indicated that all statistical power estimates were above .80. Regarding Holman et al.'s idea implementation's direct effect on innovative outcomes, the observed statistical power was respectively .75 and .93. However, in the second model (see Figure 4.9), in which the Holman et al.'s measure was concurrently specified with the short form M-BIP, the statistical power estimates for the direct effects between idea generation and idea promotion, and idea promotion and idea implementation were indicated to be .59 and .28 respectively. Thus, given that both statistical power analysis methods identified fluctuating power estimates across models and estimates of interest, the interpretation of the findings concerning the incremental predictive validity should be cautiously implemented.

4.6. Discussion

The primary purpose of this first study was to develop a psychometric instrument capturing the theoretical content of the M-BIP, by applying the principles of the Accuracy and Appropriateness model (Hughes, 2018). Overall, results indicated that the structure of the hypothesised model was supported by the data. Additionally, the assessment of the response processes indicated that the M-BIP measure accurately captured the intended underlying construct. Furthermore, the present study supported the hypotheses concerning the convergent validity of the M-BIP in relation to Holman et al.'s (2012) measure of innovative work behaviour, indicating that the newly developed measure overlaps to a degree with the existing one but at the same time captures, as intended, a different aspect of the construct. Moreover, the study has demonstrated the predictive validity of the M-BIP by supporting both stated hypotheses. The remainder of this section first discusses how the previously presented empirical evidence contributed to the development of an accurate and appropriate measure of innovative work behaviour, while discussing the results in conjunction with the empirical literature. Subsequently a discussion of the theoretical implications derived from the empirical assessment of the measure is conducted. Finally, the study's limitations are discussed.

4.6.1 Accuracy and Appropriateness properties of the M-BIP

The representation of the construct's content was deemed successful because all items are behaviourally oriented and cover all the core activities identified, thus ensuring as little construct under-representation and construct irrelevant content as possible. Moreover, the content accuracy of the M-BIP was not compromised during the subsequently applied factor analytic techniques, and retained items load onto their a priori factors. The fact that the M-BIP includes only behavioural items addresses one of the empirical literature's limitations. Existing measures of innovative work behaviour encompass substantial proportions of construct irrelevant content. As illustrated in Table 2.4, product assessments have, to varying degrees (Percentage range of product indicators 28.6% to 100%), contaminated the existing measures, with the exception of Messmann and Mulder's (2012) measure. In that respect, probably the most significant contribution of the M-BIP pertains to the measurement of the idea implementation stage. The only exclusively behavioural measure does not specify such a scale (Messmann & Mulder, 2012), whereas 76.9 % of the existing measures' items tapping idea implementation assess products. Arguably, the M-BIP is the most comprehensive, behavioural measure developed to date, and thus, can be considered an incremental but notable improvement towards developing an accurate measure of innovative work behaviour.

This incremental contribution to the measurement of innovative work behaviour was further strengthened by the examination of how the M-BIP's items elicit participants' responses. The examination of the response processes demonstrated that the items prompt construct relevant cognitions which in turn cause the variation in the responses. Thus, this process provided further support for the validity of the results obtained from the survey data, as it strengthens confidence that the observed variation in the items' score is due to true variation in the manifested innovative behaviours in question. Further, the fact that participants did not make any comments on the comprehensibility of the items is attributed to the item generation procedure, whereby a series of iterative evaluations and modifications were conducted, and the flawed items were identified at that stage.

Next, results concurred with Holman et al.'s (2012) and Messmann and Mulder's (2012) work and indicated that innovative work behaviour can be operationalised multi-dimensionally. The M-BIP's structural accuracy examination is deemed successful because the results of the Exploratory and Confirmatory factor analytic techniques, supplemented by the examination of the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015) are interpreted as supportive of all stated structure related hypotheses. The evidence based interpretation of the M-BIP's multi-dimensionality needs though to be further discussed with respect to the reported inter-factor correlations and the arguments of Janssen (2000), De Jong and Den Hartog (2010), and Holman and colleagues (2012) regarding the meaning of inter-factor correlations of differing magnitude.

The M-BIP's primary latent factors' (i.e., Activities) magnitude of correlations ranged from .41 to .71 and the second-order latent factors (i.e., Stages) magnitude of correlations range from .61 to .68. In contrast, Janssen's proposed three dimensions shared inter-factor correlations of .76 -.87, which were interpreted as indicative of the presence of a uni-dimensional model. De Jong and Den Hartog reported inter-factor correlations ranging from .60 to .74, which are substantially lower than Janssen's, and specified competing CFA models (1-, 2-, 3-, and 4- factors), with the 4-factor model providing the best fit. Nevertheless, De Jong and Den Hartog preferred the uni-dimensional model. Finally, Holman and colleagues reported inter-factor correlations ranging from .59 to .76, which are similar to those of De Jong and Den Hartog, but argued that correlations of such magnitude do not indicate uni-dimensionality. Further, Holman and colleagues also specified 1-, 2-, and 3-factor CFA models, with the 3-factor model fitting best. Accordingly, Holman et al. adopted a multi-dimensional model.

The current author concurs with Holman and colleagues' line of argument, and proposes that the M-BIP dimensions are meaningfully distinct for five reasons. First, this conclusion is based on the premises that the observed inter-factor correlations were of reasonable magnitude, given that they are all dimensions of a recursive process, whose stages and activities are interdependent, and behaviours corresponding to different activities can occur simultaneously (Rosing et al., 2018). Thus, moderate to high correlation coefficients were expected. Second, the distinctiveness of the dimensions was explicitly supported through the assessment of the discriminant validity of the M-BIP's factors, implementing the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015). Third, the meaningful distinctiveness of the M-BIP dimensions was shown via the examination of the competing hierarchical models which was implemented with the intention to provide further evidence regarding the superiority of the a-priori hypothesised hierarchical structure of the M-BIP, against other alternative operationalisations. If we assume that the reported correlations of this study were high enough to justify merging the dimensions into a single factor, then the alternative model that has all the items loading onto a single global latent factor should have been performing better than the hypothesised one which distinguished between dimensions. However, results were definitively in favour of the a-priori hypothesised model. Thus, based on the empirical evidence it is safe to suggest that the construct is significantly better operationalised using seven dimensions, rather than one. Fourth, the examination of the response processes also indicates that items measuring different activities made participants draw from qualitatively different memories and instigated substantially discreet cognitions in order to provide a response. This is another indicator that the items should not be modelled uni-dimensionally. Finally, supplementing the empirical evidence, the theoretical underpinnings of the M-BIP suggest that each activity is comprised of qualitatively different behaviours and has a distinctive objective. Hence, such diverse behaviours cannot be a single factor. Thus, in evaluation of the present study's results, the M-BIP presents the only exclusively behavioural measure that is structurally accurate and provides the most comprehensive representation of the innovation process to date.

Next, the present study's empirical findings indicate that notable progress has been made toward developing an appropriate measure of innovative work behaviour. The M-BIP correlated with Holman et al.'s (2012) measure at .68. Carlson and Herdman (2012) recommended that a new instrument aiming to capture the same construct should ideally converge with existing ones above the minimum value of r = .70, whereas values below r = .50 should be avoided. The correlations between the second order factors of the M-BIP (i.e., Idea Development, Idea Promotion, Idea implementation) and their matching counterparts from the Holman et al.'s measure (i.e., Idea Generation, Idea Promotion, Idea implementation) were respectively .52, .60, and .49. These findings obviously depart from the recommended cut-off points, but these findings would be problematic if the objective of the present study was to create a substitute measure that tried to capture the same content of the theoretical domain. However, the M-BIP intentionally departs from existing operationalisations, for reasons extensively discussed in the previous chapters, and its orientation is explicitly behavioural rather than product focused. Hence, the observed convergent validity values were expected and not indicative of failing to tap the domain of innovative work behaviour. On the contrary, hypothetical evidence of strong convergent validity ($r > .85$; Carlson & Herdman, 2012) should have raised concerns about the success of this research project to shift the focus of the new instrument from outcomes to behaviours.

The second indicator of the M-BIP's appropriateness is the empirical demonstration of its predictive capacity with respect to innovative outcomes, and also of its capacity to explain incremental predictive variance over and above the Holman et al.'s measure. However, is should be noted that the findings with respect to the incremental predictive validity of the M-BIP necessitate caution, because the study did not obtain a sufficient sample size so as to achieve acceptable statistical power. Nevertheless, the M-BIP's exclusively behavioural content, presents notable progress in the appropriateness of innovative work behaviour measures to predict innovative outcomes. Results indicate that the Holman et al.'s measure explained a greater portion of variance than the M-BIP when each predictor was modelled individually, and when both were modelled simultaneously the effect of the M-BIP's idea implementation stage on innovative outcomes was substantially suppressed, but the effect of Holman et al.'s idea implementation stage decreased considerably less. As explained though, and illustrated through the specification of a predictive model where product items were removed from Holman et al.'s measure, the presence of product assessments in predictor and outcome variables misleadingly inflated the relationship between innovative work behaviour and innovative outcomes (Hughes et al., 2018). Thus, when accounting for the fact that all existing measures (see Table 2.4), with the exception of Messmann and Mulder's (2012), incorporate product indicators, the M-BIP satisfactorily addresses this circularity issue, and presents a measurement option that is not susceptible to produce biased estimates that emerge from the presence of similar content in predictor and outcome variables. Furthermore, the fact that the correlated predictive models, at an activity level, explained negligibly larger percentages of variance (.5% and .2% for the full and short M-BIP forms respectively) compared to the models operating at a stage level, suggests that for reasons of parsimony and consistency with the empirical literature the stage level examination of the M-BIP is preferable.

Taken together with the accuracy evidence, this initial evidence indicates that the scale is appropriate for further testing. However, one further appropriateness related issue that emerged during the evaluation of the items' response processes needs to be discussed. The response of one participant that the M-BIP items were not applicable to his/her case indicates that unlike measures that assess innovative performance, measures assessing innovative behaviours are not relevant under all conditions. For example, if a measure assesses whether an idea was generated it makes sense for an individual to answer no. This response is meaningful and provides valid information as it assesses innovative performance. However, if a measure enquires about how an individual went about making an idea compatible with the workplace (i.e., Strategic adaptation), there is no applicable response if there was no idea in the first place. Therefore, the M-BIP measure is appropriate for assessing how employees innovated, but not for assessing whether and how successfully they innovated. Administering the M-BIP to individuals who have not engaged in the innovation process would provide misleading and biased datasets. Instead, measures such as Axtell et al.'s (2000) and Holman et al.'s (2012) are much more appropriate for assessing innovative performance. Thus, consistent with the a priori intention of the present thesis, the developed measure is appropriate for assessing the how of the innovation process, but not designed to assess innovative performance.

4.6.2. Theoretical implications

Despite the fact that this study presents the initial assessment of the M-BIP and it was conducted on a modestly sized sample, cautious suggestions of how the M-BIP fits into and contributes to the literature on innovative work behaviour can be made. Although additional evidence and replication is required in order to draw strong conclusions, the evidence generated in this study produced a number of valuable and potentially important findings.

The first broad contribution of the present study concerns the provision of empirical evidence supporting the behavioural and multi-dimensional nature of the construct of innovative work behaviour. Specifically, the M-BIP incrementally contributes to the literature on innovative work behaviour, by extending the widely accepted three-dimensional conceptualisation (Janssen, 2000; Kanter, 1988; Holman et al., 2012; Potočnik & Anderson, 2016) of the innovation process (i.e., Idea generation, Idea promotion, Idea implementation) through introducing an underlying layer of activities which describes with greater detail the behavioural facilitators of the innovation process. Furthermore, the M-BIP offers an alternative conceptualisation of the individual innovation process that takes into account the limitations of the literature on innovative work behaviour, as discussed in Chapter 2. Specifically, results indicate that the innovation process can be modelled behaviourally and thus, present a more detailed description of how individuals go about accomplishing the broad innovation tasks rather than about what these tasks are. Moreover, the M-BIP offers a clearly defined conceptualisation which disentangles innovative work behaviour from creativity, and innovative performance, thus addressing the issue of conceptual clarity and lack of operational distinctiveness (Hughes et al., 2018; Potočnik & Anderson, 2016). Additionally, the M-BIP provides an explanation of how the stages are linked and offers a theoretically consistent way to operationalize how innovative behaviours collectively predict innovative performance.

Here, the ways in which the M-BIP resembles and differentiates itself from existing models of innovative work behaviour are discussed. Overall, the stage of idea development describes how an opportunity is identified and subsequently how an innovative idea is adapted and modified to fit a given organisational context. The activity of opportunity exploration is consistent with De Jong and Den Hartog's, (2010) Messmann and Mulder's, (2012), and Kleysen and Street's (2001) conceptualisation, and essentially is grounded to a great extent in existing models of innovative work behaviour. As shown in Chapter 3, the opportunity exploration stage integrates knowledge found in existing models of innovative work behaviour, but also capitalises on research findings from the championing (Howell, 2005) and entrepreneurship literatures (e.g., Ogzen & Baron, 2007; Shu et al., 2018) so as to identify further relevant behaviours to the opportunity exploration activity.

Strategic adaptation is a novelty of the M-BIP, considering that existing models have not presented such a stage, but rather included the stage of idea generation (e.g., De Jong & Den Hartog, 2010; Holman et al., 2012; Messmann & Mulder, 2012). The introduction of strategic adaptation makes an important contribution to the literature as it facilitates the disentanglement between innovative work behaviour and creativity. As such, the strategic adaptation stage differentiates itself from existing models by not discussing how its underlying behaviours contribute to the generation of an idea, but by describing how individuals process and modify existing ideas so as to fit an organisational context. Thus, this content shift addresses Hughes et al.'s (2018) call for developing clearly defined conceptualisations that would not perpetuate the confusion between creativity and innovation.

The next three activities which compose the stage of idea promotion (championing, obtaining organisational approval, and recruiting assistance) are consistent with the behavioural focus of the idea promotion stage of the existing models of innovative work behaviour (see Table 2.2). Overall, results indicate that M-BIP retains the content of the idea promotion stage, as it appears in existing models of innovative work behaviour. Specifically, consistent with the empirical literature the present study's results show that championing the innovative idea so as to build a pro-innovation coalition (Messmann & Mulder, 2012; Holman et al., 2012), the acquisition of organisational approval (Janssen, 2000; Holman et al., 2012) the acquisition of necessary resources (Messmann & Mulder, 2012), and the building of a team of skilled individuals (De Jong & Den Hartog, 2010) are all core components of the idea promotion stage. In that respect, the M-BIP integrates the unique contributions of existing models. However, as shown in Chapter 3, the M-BIP differentiates itself from existing models by focusing on the specific behaviours facilitating these broad activities and the objectives of the idea promotion stage rather than describing broad behaviours that lack specificity (see Section 2.2.2, Figure 2.1, and Table 2.5). Thus, the M-BIP presents an evidence based extension of the existing models of innovative work behaviour and incrementally contributes to the literature on innovative work behaviour by filling in the absence of specific behavioural indicators, through capitalising on the knowledge provided in the literatures on championing (e.g., Bjorklund et al., 2013; Dutton et al., 2001; Howell & Higgins, 1990a) and organisational change (e.g., Bruckman, 2008; Ford et al., 2008).

For the idea implementation stage, the present study's empirical findings indicate that a notable progress was accomplished. The M-BIP provides, to the author's knowledge, the only evidence-based model of innovative work behaviour that conceptualises the implementation stage by drawing on behaviours rather than outcomes.

As a reminder, Messmann and Mulder (2012) provided some discussion on the behavioural facilitators of idea implementation, but their conceptualisation was not supported by their empirical evidence. Hence, accounting for the dearth of behavioural indicators aiming to facilitate the implementation of an innovative idea in existing models of innovative work behaviour, the M-BIP drew on other relevant disciplines so as to identify how individuals can implement their ideas. (e.g., Implementation management; Cormican & O'Sullivan, 2004; Klein & Knight, 2005; Krause et al., 2007). Thus, the M-BIP is the only empirically supported model of innovative work behaviour to date, that describes the behaviours involved in the implementation of innovative ideas.

Additionally, the behavioural conceptualisation and operationalisation of the implementation stage indicates that it is feasible to describe the innovation process independently from its outcomes. The M-BIP promotes definitional clarity and measurement precision, thus addressing the perilous jingle jangle fallacy observed in the literature, whereby the term innovative work behaviour is used to describe both processes (i.e., behaviours) and outcomes (Hughes et al., 2018; Potočnik & Anderson, 2016), and explicitly illustrates that innovative work behaviour is a distinct, antecedent construct of innovative performance. The innovation process is characterised by unpredictability and its success is not guaranteed (Van de Ven, 2017). Innovators can only try to increase the chances that their idea will be successfully implemented in an innovative product (Van de Ven, 2017). Therefore, it would be misleading to allow innovative performance to dictate whether a series of goal oriented innovative behaviours should be labelled as innovative or not (De Spiegelaere et al., 2012; Hughes et al., 2018). It is suggested that the primary determinant of whether behaviours can be considered innovative, is the presence of an innovative goal that would initiate goal directed behaviours, whose objective is to contribute to some extent to the production of an innovative outcome.

Finally, one further contribution of the present study is the provision of empirical evidence supporting a more realistic description of the innovation process in terms of inter-stage relationships. Accounting for the superiority of the correlated predictive models, in comparison to the linear ones, in conjunction with the reflective behaviours being shown to transcend the innovation process, results support a widely accepted theoretical conceptualisation that has not been previously integrated in empirical models of innovative work behaviour. Specifically, the present study conceptualises and operationalises the innovation process as an iterative, rather than a linear activity stage model, combining elements of both the “linear” and “complexity” perspectives (Anderson et al., 2014; Bledow et al., 2009; Messmann & Mulder, 2012; Rosing et al., 2018; Scott & Bruce, 1994; Paulus, 2002; West, 1996, 2002a). The iterative nature of the process and the way it is manifested is suggested to be a function of reflexivity. Contrary to Messmann and Mulder’s (2012) conceptualisation, the present study empirically demonstrates that reflective behaviours are not a discreet stage but transcend the innovation process. Thus, the M-BIP incrementally enriches the construct of innovative work behaviour by empirically showing that reflective behaviours are spread throughout the innovation process and constitute the binding factor among stages and activities. As such individuals can re-evaluate ideas, selling approaches, and implementation behaviours in order to overcome potential obstacles that impede the successful accomplishment of the ultimate objective of the innovation process. This iterative process can take place as many times as the innovator sees fit and ceases either with the production of an innovative outcome or with the abandonment of the innovative endeavour, when obstacles cannot be overcome.

4.6.3. Limitations

As with every study, the present study comes with a number of limitations. The first limitation concerns the modestly sized sample (N = 294), which resulted in suboptimal statistical power for the assessment of the incremental predictive validity of the M-BIP, and its composition, which is highly likely to be a function of the data collection method adopted. Specifically, an online survey by definition excludes participants who have no access to the internet. Moreover, the fact that the sample mostly consists of highly educated individuals (70.2% had at least a Bachelor's degree) might either indicate that the social media groups selected to advertise the survey were most appealing to highly educated individuals, or that highly educated individuals that work in knowledge intensive professions are more interested in innovation and thus a self-selection bias, has shaped to a degree, the sample's composition. In both cases though, the results of the present study can be deemed generalizable and inferences can be drawn for highly educated individuals, who might indeed be the "true" population of innovators.

One more limitation that necessitates caution regarding the findings and implications of the present study is the fact that both EFA and CFA were conducted on the same dataset. The sample size did not allow splitting the dataset into two separate ones so as to perform the factor analytic techniques on different samples. Whereas the rationale for doing so was discussed in the analyses strategy section, and was a necessary condition in order to proceed with the evaluation of the psychometric properties of the M-BIP, this methodological decision may call for results to be cautiously evaluated.

One further limitation of the present study is the reliance on self-report ratings for all the variables assessed in the present study, which raises the possibility of common method bias. Self-report ratings might be influenced by social desirability biases which could inflate the relationship between the M-BIP and innovative performance. Moreover, the M-BIP's degree of convergence with the Holman et al. (2012) measure of innovative work behaviour could also be affected by common method bias. Obtaining ratings from multiple sources would counter this possibility. Nevertheless, given the exploratory nature of this first study, it would have been unrealistic to commit resources and time without having first at least some concrete evidence that the M-BIP is accurate and appropriate. Therefore, the use of self-reports was a conscious compromise so as to evaluate the initial accuracy and appropriateness of the M-BIP.

Another limitation was that the existing measure chosen to examine the convergent validity of the M-BIP is heavily reliant on product items. Therefore, this inherent inconsistency among the two measures did not allow the direct assessment of the measures' convergence. Despite that though, Holman et al.'s (2012) measure was chosen as it was the only available measure that has empirically demonstrated its multi-dimensionality and adhered to the broadly accepted three-dimensional conceptualisation of innovative work behaviour, hence allowing inter-stage comparisons among the two measures. Thus, in this case the structural similarity of the measures was the prevailing criterion for choosing the Holman et al. measure.

One final limitation of the present study is its use of a cross-sectional design that does not allow drawing causality inferences. Although it is realistically unlikely that innovative outcomes could cause implementation behaviours, the causal relationship between the M-BIP and innovative outcomes cannot be definitively established with the present study design.

4.6.4 Summary

The first study of the thesis developed and tested a psychometric instrument tapping the M-BIP. The developed measure was scrutinised under some of the criteria set by the Accuracy and Appropriateness model (Hughes, 2018). The rigorous item generation procedure that took place, resulted in a measure with proper coverage of the underlying theoretical content of the construct, which structurally matches the a priori theoretical model, and whose items elicit construct relevant responses. The developed measure displays acceptable fit statistics, and its structural accuracy was held when examined against competing CFA models, and further supported by the assessment of the discriminant validity of the M-BIP's factors. Additionally, all scales display acceptable Cronbach's α and McDonald's Ω reliabilities.

Furthermore, the examination of the measure's appropriateness provided empirical evidence concerning the M-BIP's convergence with Holman and colleagues' existing measure of innovative work behaviour, and demonstrated how the differences in the focal orientation (i.e., Behavioural and Product orientation) of the measures result in the fluctuation of the magnitude of correlations across seemingly conceptually similar inter-model stages. Moreover, the present study demonstrated that the M-BIP is not only a significant positive predictor of innovative outcomes but also eliminates the possibility of biased regression estimates, as a function of the predictor-criterion circularity issue (i.e., the presence of similar content in predictor and outcome variables), because the M-BIP has an exclusively behavioural focal orientation. Finally, in order to meet the feasibility criterion of appropriateness, and make the developed measure more practical, a short form was developed and tested alongside the initial form of the M-BIP, as identified by the factor analytic techniques. The short form of the instrument retains similar psychometric properties to the full measure and thus is better fitted for further assessment.

Sensibly, this initial assessment of the measure did not conclusively establish its accuracy and appropriateness, as there are more criteria to be assessed (i.e., Invariance measurement, Divergent validity), and also the already assessed criteria need to be cross-validated on a larger sample. However, the provided evidence and the firm psychometric instrument development procedures followed, justify the commitment of time and resources to further investigate the psychometric properties of the measure. In conclusion, the present study findings suggest that the M-BIP offers a concise, comprehensive, and updated conceptualisation of the construct of innovative work behaviour that is characterised by definitional and operationalisational clarity.

Chapter 5

Study 2

Study 2 was designed to provide a more rigorous assessment of the psychometric properties of the M-BIP by implementing a wider range of methodologies and statistical analyses, and capitalising on a more robust research design. Study 2 encompassed the re-evaluation of Study 1 findings, supplemented by the assessment of the Accuracy and Appropriateness model criteria omitted from Study 1. Furthermore, Study 2 aimed to address the limitations of Study 1. Specifically, Study 1 was conducted on a modest sample (N = 294), with both exploratory and confirmatory factor analyses implemented on the same dataset. Study 2 addressed this limitation by cross-validating Study 1's results on a significantly larger and more diverse sample. Furthermore, Study 2 obtained multi-source data (i.e., Measures of innovative work behaviour and innovative outcomes were rated by the participants' supervisors), allowing for a more robust test of the predictive validity of the M-BIP, and addressing concerns regarding common method bias. Finally, in Study 1, the convergent validity of the M-BIP was assessed in relation to the Holman et al.'s (2012) measure, which includes a substantial proportion (67%) of product items (Holman et al., 2012). In Study 2, De Jong and Den Hartog's (2010) measure is used because it is less reliant on, though still includes (30%), product items.

The remainder of this chapter reintroduces the Accuracy and Appropriateness criteria and more explicitly state the objectives and hypotheses of Study 2.

5.1. Research objectives

5.1.1. Accuracy

The first objective of Study 2 was to cross-validate the stability of the factorial structure of the M-BIP on a new dataset, as a further test of the structural accuracy of the measure. The demonstration of structural stability across different samples provides evidence to indicate that the model's good fit is attributable to the underlying theory rather than the data's chance characteristics (Fabrigar et al., 1999; Van Prooijen & Van der Kloot, 2001). As in Study 1, the same set of four hypotheses was assessed in order to test for the structural accuracy of the M-BIP:

Hypothesis 1: The construct of innovative work behaviour has three second-order factors that correspond to Idea Development, Idea Promotion, and Idea Implementation

Hypothesis 2: The second order factor of Idea development has two primary factors that correspond to Opportunity exploration and Strategic adaptation.

Hypothesis 3: The second order factor of Idea promotion has three primary factors that correspond to Championing, Obtaining organisational approval and Recruiting assistance.

Hypothesis 4: The second order factor of Idea implementation has two primary factors that correspond to Implementation strategy, and Implementation facilitation.

Another important parameter of a measure's accuracy is its stability across groups (Hughes, 2018). If a measure assesses fundamental behaviours or psychological attributes, it should perform similarly across groups, otherwise, its accuracy and therefore appropriateness is group-limited. In technical terms, the measure should be invariant across groups (Putnick & Bornstein, 2016), meaning that its structure should be consistent across groups (Hughes, 2018). A stable measure would practically mean that two individuals with hypothetically identical 'true scores' on a given construct (i.e., actual level of innovative work behaviour), would have the same observed score on a latent factor regardless of group membership (Wu, Li, & Zumbo, 2007). Measures that operate differently across groups cannot be used to develop holistic theories that generalise, and if used for decision-making can result in biases due to measurement error. Thus, the utility of the measure for multi-group research would be compromised. Assessments of scale invariance do not examine the existence of differences among these groups (i.e., it is perfectly acceptable for group differences to arise), but examine whether the measurement operates in similar manner across groups (e.g., stable factor loadings) and thus any differences that do arise are genuine and not due to measurement error.

The grouping variables that were used to evaluate the M-BIP's stability are sex and country (Populations from U.K. and Greece). Sex was chosen as a grouping variable for two reasons. First, the vast majority, if not all, of organisations employ both males and females and thus sex represents a ubiquitously important grouping variable. If a measure provides a biased (positive or negative) assessment of males' or females' innovative behaviour, and is used to develop theory, that in turn informs policy and practice (e.g., selection and training), it could result in widespread malpractice. Second, sex differences in the capacity and approach to innovation is an emerging field of scholarly interest (Alsos, Hytti, & Ljunggren, 2013). It is beyond the scope of this thesis to discuss, in detail, the literature on sex and innovation, it is particularly noteworthy though, that scholars have reached the conclusion that there are sex related biases concerning innovation (Alsos et al., 2013; Belghiti-Mahut, Lafont, & Yousfi, 2016; Poutanen & Kovalainen, 2013; Thebaud, 2015). This conclusion has been based on empirical evidence suggesting that, on average, there are no sex differences in idea generation (the creativity end of the spectrum) but that males outperform females in implementation (the innovation end of the spectrum) (Foss, Woll, & Moilanen, 2013). Several arguments have been advanced to support these findings, including, that ideas introduced by female employees are less well received intra-organisationally (Thebaud, 2015), and females tend to perceive less social support than males when promoting ideas

(Foss et al., 2013). Of note, however, is that current research typically uses tools that have not been examined in terms of their invariance across males and females, thus, current research might be biased. If the M-BIP is shown to be invariant across males and females, it could provide an accurate tool to use when assessing sex differences in innovation and potentially be of great use in identifying the factors that stifle female innovation, and subsequently inform non-biased policy development (Carrasco, 2014; Diaz-Garcia, Gonzalez-Moreno, & Saez-Martinez, 2013; Turner, 2009).

Country was chosen as a grouping variable (U.K. and Greek populations) in order to make sure that the sampling procedure would not threaten the validity of the present study’s results. As presented later, in the methods section of the present study, data collection was conducted both in the U.K. and in Greece, thus the M-BIP was administered in both English and Greek languages. It is important therefore to examine whether U.K. and Greek participants interpreted the items in a similar way, and thus the obtained latent variables observed scores captured participants’ true scores regardless of their cultural background. Based on Hofstede’s (1980) cultural dimensions classification, significant differences have been observed between the two countries. Greece has a more collectivist orientation, compared to the U.K.’s individualist one, and also Greece scores higher in power-distance and uncertainty avoidance dimensions compared to the U.K. The empirical literature has shown that these cultural dimensions do have an impact on innovation. A recent review of the cultural dimensions’ effects on innovation (Andrijauskiene & Dumcieviene, 2017) showed that individualist, low in power distance, and low in uncertainty avoidance cultures are positively associated with innovative performance. Thus, considering that the U.K. and Greece significantly differ in these dimensions, it is likely that differences in cultural norms would differentiate the meaning attributed to certain items of the M-BIP. Furthermore, testing across countries provides an assessment of the M-BIP in diverse conditions, because the aforementioned cultural differences certainly influence the organisational structures and the economic environment in which organisations operate (Kalogeraki, 2009; Kessapidou & Varsakelis, 2002). Additionally, the change in language and the examination of the M-BIP in Greece is also a test of the universality of the behaviours identified in a predominantly English-speaking literature.

5.1.2. Appropriateness

Four different criteria of appropriateness were examined, that extend the analyses of Study 1. First, the convergent validity of the measure was assessed by examining its magnitude of correlations with an existing measure of innovative work behaviour. In Study 1, the Holman and colleagues' measure (2012) was used because it provided the only multi-dimensional measure that operationalises the three broad stages of the innovation process. In Study 2, the De Jong and Den Hartog's (2010) measure of innovative work behaviour was selected. The De Jong and Den Hartog's (2010) measure is one of the two most widely used measures of innovative work behaviour (Hughes et al., 2018), and in comparison to the Holman et al.'s (2012) measure, its items are more behaviourally oriented (70% of items, see Table 2.4). Specifically, the stage of idea generation is exclusively result dependent, the stages of idea exploration and idea championing are exclusively behavioural, and the stage of idea implementation combines two broad behavioural indicators and one outcome indicator. Thus, because De Jong and Den Hartog's measure has a notable proportion of behavioural content, the correlation with the M-BIP's global latent factor is likely to be close to or to exceed Carlson and Herdman's (2012) recommended minimum value of r = .70, which indicates that two measures satisfactorily converge. However, the magnitude of correlations should decrease when examining the narrower facets of the constructs, because they are conceptually distinct. Finally, it was expected that M-BIP's second order factors (i.e., Idea development, Idea promotion, Idea implementation) would exhibit the strongest correlations with their conceptually equivalent factors in the De Jong and Den Hartog's measure. Testing the convergent validity of the M-BIP with multiple measures of innovative work behaviour provides stronger tests of convergence and a broader assessment of how the M-BIP relates to the existing literature.

Hypothesis 5: The M-BIP and De Jong and Den Hartog's (2010) measure share a correlation at a global latent factor level which exceeds the value of .70.

Hypothesis 6: The magnitude of correlations among the respectively equivalent three stages of the M-BIP and the De Jong and Den Hartog's (2010) measure's stages are weaker than the correlation of the global factors.

Hypothesis 7: The stages of a. Idea development, b. Idea promotion, and c. Idea implementation exhibit the strongest magnitude of correlations with the respectively equivalent stages of De Jong and Den Hartog's (2010) measure.

Second, the M-BIP was expected to be correlated with supervisory ratings of employees' innovative work behaviour, obtained by the use of the De Jong and Den Hartog's measure, thus addressing one of the limitations of Study 1, namely, the reliance on single-source data. From a theoretical point of view, supervisor ratings are useful because they are not influenced by the egocentric bias that inflates self-ratings (Harris & Schaubroeck, 1998). Moreover, supervisors have a more objective and impartial view of the employees' behaviours and performance, and can evaluate an individual's behaviours and performance relative to other individuals in a given organisation, thus provide a more accurate and objective rating (Harris & Schaubroeck, 1998). From a measurement point of view, Conway and Huffcutt (1997) have presented evidence suggesting that supervisor ratings are more reliable compared to self-reports. The degree of convergence among multi-source ratings is significantly weaker than single source ones, with correlations of self- and supervisor ratings ranging from .34 to .43 (Harris & Schaubroeck, 1998; Heidemeier & Moser, 2009). Thus, it is expected that a correlation that falls within that range would be an acceptable demonstration of the M-BIP's convergence with supervisor rated innovative work behaviour.

Hypothesis 8: The M-BIP and the supervisor rated De Jong and Den Hartog's (2010) measure share a correlation at a global latent factor level which falls between the values of .30 and .45.

Third, I examined whether the M-BIP is unique or discriminant from closely related scales. Assessing for discriminant validity is crucial to avoid unnecessary construct proliferation. Evidence of discriminant validity is best shown by demonstrating that the measure is unique from a theoretically similar but distinct construct (Hair et al., 2010; Shaffer et al., 2016). Personal initiative (Frese, Fay, Hilburger, Leng & Tag, 1997) was chosen because it shares common characteristics with innovative work behaviour but is not synonymous (Zacher & Frese, 2016). Personal initiative entails proactive, change-oriented behaviours, including, environmental scanning, anticipation, planning, persistence, regulating actions, monitoring behaviours and feedback seeking (Crant, 2000; Grant & Ashford, 2008; Parker & Collins, 2010; Frese & Fay, 2001; Zacher & Frese, 2016). Many of these behaviours occur repeatedly throughout the innovation process and are captured by the M-BIP. Furthermore, personal initiative has been empirically shown to correlate with idea generation, idea promotion, and idea implementation in the region of .45 -.65 (Binnewies & Gromer, 2012; Daniels, Wimalasiri, Cheyne, & Story, 2011). Considering the theoretical similarities and the empirical relationships, it was expected that personal initiative would correlate with the

M-BIP at approximately .65, and would display a Heterotrait-monotrait (HTMT) ratio of correlations (Henseler et al., 2015) at approximately a similar value, which would mean that the two are related but distinct.

Hypothesis 9: The M-BIP displays a moderately high correlation with personal initiative, and the HTMT value does not exceed the .90 cut-off point.

Fourth, the predictive and incremental predictive validity of the M-BIP were assessed, but using supervisory ratings of performance, which again eliminates the single-source bias. It is important to note that in this study the incremental predictive validity of the M-BIP was assessed over both the self- and supervisory ratings of the De Jong and Den Hartog's (2010) measure, to provide a more rigorous test of the utility of the M-BIP.

Hypothesis 10: The M-BIP is a positive predictor of supervisor rated innovative outcomes.

Hypothesis 11: The M-BIP explains incremental predictive variance over and above the self-rated De Jong and Den Hartog's (2010) measure for innovative outcomes.

Hypothesis 12: The M-BIP explains incremental predictive variance over and above the supervisor-rated De Jong and Den Hartog's (2010) measure for innovative outcomes.

5.2. Positioning within the nomological network of Innovative Work Behaviour

Following the examination of the M-BIP's accuracy and appropriateness, the final objective of the present research project was to evaluate how the M-BIP is positioned within the established nomological network of innovative work behaviour. The concept of nomological network concerns the empirically observed relationships of a construct with theoretically relevant variables (Cronbach & Meehl, 1955), including predictors, outcomes, and correlates.

The variables constituting the nomological network of innovative work behaviour fall into three broad categories; contextual factors, job characteristics, and individual differences (Anderson et al., 2014; Hammond et al., 2011; Shalley, Zhou, & Oldham, 2004). Because the M-BIP is multi-dimensional and includes novel content (e.g., Strategic adaptation, Idea implementation behaviours), it was important to assess whether the M-BIP's relationships with variables from each of the three broad categories remain largely consistent with those observed in the empirical literature. Supervisory support was chosen from the contextual factors, job control was chosen from the job characteristics factors, and Openness to experience was chosen from individual differences category. These variables were chosen because they are considered important correlates or antecedents of innovative behaviour. Each is discussed in greater detail below.

5.2.1. Supervisor support and Innovative Work Behaviour

Supervisor support in the context of innovative work behaviour refers to the 'psychological and physical assistance' (De Jong, 2007, p. 54) provided by the supervisor on expressed ideas and implementation attempts (De Jong, 2007). The empirical literature has provided consistent empirical evidence demonstrating the positive relationship between supervisor support and innovative work behaviour, and has discussed several ways through which supportive supervision enhances employees' innovative behaviours. Supportive supervisors increase the likelihood of employees engaging in innovative behaviours through enhancing intrinsic motivation (Chen et al., 2016; Shalley et al., 2004), fostering feelings of safety (Edmondson, 1999), heightening self-efficacy, and augmenting employee empowerment (Nisula, 2015). Considering that the proposal of new ideas is not always well accepted within the workplace, and that negative judgements on proposed ideas tend to make employees less likely to continue engaging in idea developing behaviours (Byron, Khazanchi, & Nazarian, 2010), a supportive supervisor would alleviate such a social-evaluative threat and would not stifle employees' innovative potential. Moreover, supervisor support can be seen as a resource employees can draw on (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Skerlavaj et al., 2014). Supervisors are higher in the organisational hierarchy, and thus, are likely to have increased influence, socio-political power, credibility, and greater access to material and human resources (Janssen, 2005; Skerlavaj et al., 2014). When employees perceive that they are supported by their supervisors, and consequently that they can draw on the aforementioned resources, their confidence that they can overcome the potential obstacles to the innovation process, with the help of the supervisor, might make them more willing to engage in innovative behaviours (Janssen, 2005; Skerlavaj et al., 2014).

The importance of supportive supervision in fostering employees' innovative behaviours has been emphatically supported in the empirical literature. Hammond et al.'s (2011) meta-analysis reported a corrected true score correlation estimate of .21 between supervisor support and the overall innovation process, which when broken down to the two components of the construct (Ideation and Innovation) demonstrated correlations coefficients of .17 and .23 respectively. Krause (2004) also found supervisor support to be a positive correlate of the generation (r = .28) and the implementation of ideas (r = .22). Messmann and Mulder (2012), in their scale development study, reported that the correlations between supervisor support and the dimensions of their measure ranged from 0.21 to 0.44, without though providing further details. Other studies, operationalising innovative work behaviour as a uni-dimensional construct, have reported correlation coefficients of .20 (Chen et al., 2016) and .36 (De Jong, 2007; Janssen, 2005).

Likewise, in the present study, it was expected that supervisor support is a positive force, encouraging employees to initiate innovative endeavours and persist in pursuing the promotion and implementation of their innovative ideas. Furthermore, a relative uniformity of the effects of supervisor support on the three stages of the M-BIP was expected. The psychological conditions (e.g., safety, empowerment, self-efficacy, intrinsic motivation) supervisor support promotes are suggested to be pervasive mechanisms facilitating across-stage behaviours. For example, throughout the innovation process there are various sources of uncertainty. As such, employees could feel uncertain as to how their ideas would be perceived (thus being discouraged to develop ideas), on whether they could be able to gather support and resources (hence being reluctant to promote their ideas), and as to how potential failures during the implementation could be received (producing hesitancy in initiating the implementation process). Thus, having a supervisor who promotes feelings of safety could encourage employees to engage in across-stage innovative behaviours, rather than manifesting threat-avoidant routine seeking behaviours (Edmondson & Mogelof, 2006; Hennessey & Amabile, 2010). Similarly, the same line of argumentation is extended to the other psychological conditions perceived to be driving forces of innovative work behaviours.

Hypothesis 13: Supervisor support is a positive predictor of a. Idea Development, b. Idea Promotion, and c. Idea Implementation.

5.2.2. Job control and Innovative Work Behaviour

Job control, also commonly referred in the literature as job autonomy, has been defined as “the level of discretion an employee has over the timing of work tasks and methods used in work tasks" (Holman et al., 2012, p. 178). Job control is a significant positive correlate of innovative work behaviour, and enables the transformation of employees' innate tendencies into expressed behaviours (Judge & Zapata, 2015). Increased job control is a valuable resource (Bakker, Demerouti, & Euwema, 2005) because it allocates the necessary time and the procedural freedom employees need in order to engage in innovative behaviours. Increased job control positively affects individual innovativeness through empowering and motivating employees (Hennessey & Amabile, 2010). Furthermore, the procedural freedom to shape one's professional environment is positively conductive of innovative behaviours because it heightens work engagement (De Spiegelaere, Van Gyes, De Witte, Niesen, & Van Hootegem, 2014a).

Hammond and colleagues' meta-analysis (2011) reported a corrected true score correlation of .32 between job control and the overall innovation process, but the estimate was notably larger for implementation (ρ = .44) compared to ideation (ρ = .19). In two recent studies, in which innovative work behaviour was measured uni-dimensionally, Orth and Volmer (2017) reported a correlation of .33, whereas, Battistelli, Montani and Odoardi (2013) reported a correlation of .61. Holman et al. (2012) provided a more fine-grained analysis of the relationship of job control to innovative work behaviour, using their three-dimensional measure. Results indicated that job control was a positive correlate of idea generation (r = .27), idea promotion (r = .32) and idea implementation (r = .24). Krause's study (2004) also supported the positive impact job control has on the generation (r = .35) and implementation of ideas (r = .38). In the present study, it was expected that the empirical findings would be replicated, and therefore individuals who operate within an environment providing the procedural freedom to shape the way they work, would engage more often in innovative behaviours, whose focus is on developing, promoting, and implementing innovative ideas. Regarding the expected magnitude of the effects of job control on the three stages of the M-BIP, it was assumed that the effect on idea implementation would be larger than the effects on idea development and idea promotion, because imposing an actual change within the organisation is more dependent on increased job control rather than thinking about what needs to change, and trying to promote an idea.

Hypothesis 14: Job control is a positive predictor of a. Idea Development, b. Idea Promotion, and c. Idea Implementation.

5.2.3. Openness to experience and Innovative Work Behaviour

Individuals high on openness to experience are perceived to be imaginative, intellectually curious, willing to explore and accept new unconventional and unfamiliar concepts and ideas, as opposed to individuals who value routine, familiarity and hesitate to change the established way of doing things (Costa &, McCrae, 1992; McCrae & Costa, 1997). Considering these characteristics, it is sensible that openness to experience has been consistently shown to be a positive predictor of creativity, which to some extent overlaps with the onset of the innovation process (Hennessey & Amabile, 2010). Baer (2010) reported a correlation of .24 between openness to experience and supervisory ratings of creativity, whereas, Furnham, Hughes and Marshal (2013) also found openness to experience to be a positive correlate of two measures of creativity (r = .37). Likewise, Raja and Johns (2010) reported a correlation of .24 between openness to experience and creativity, whereas, Sung and Choi (2009) reported openness to experience to correlate at .26 with creative performance.

Nevertheless, the relationship of Openness to experience to innovative work behaviour is much more inconsistent and has produced conflicting and contradictory outcomes. Meta-analytic evidence (Hammond et al., 2011) indicated a corrected true score correlation estimate of .24 between openness and the overall innovation process, which when broken down to the two broad components of the construct (Ideation and Innovation) showed correlations of .34 and .16 respectively. Contrary to these findings, George and Zhou (2001) found that openness to experience did not correlate with creative behaviour, which they measured as a composite variable of creative and innovative behaviours. Concurring with George and Zhou’s findings, Woods, Mustafa, Anderson, and Sayer (2018) found that openness to experience did not significantly correlate with innovative work behaviour both at a global factor level and at a facet level (i.e., Idea generation, Idea Promotion, Idea Implementation). This empirical inconsistency suggests that the examination of the main effects of personality traits on innovative work behaviour is not always appropriate and sufficient to understand the dynamics of the relationship. Thus, we should consider the impact contextual variables have on shaping the relationships between personality traits and innovative work behaviour (Anderson et al., 2014; Niu, 2014; Patterson et al., 2009).

In fact, both George and Zhou’s (2001) and Woods and colleagues’ (2018) studies empirically demonstrated that relying on the examination of the direct effects could produce a misleading impression regarding the predictive validity of openness to experience on innovative work behaviour. The adoption of an interactionist perspective in their studies revealed that openness to experience is an important predictor of innovative work behaviour, when accounting for moderator variables. Thus, to assess the way openness to experience relates to the M-BIP in the present study, the present study also adopted an interactionist perspective, and more specifically Trait Activation theory (Tett & Guterman 2000; Tett & Burnett 2003), rather than simply focusing on the main relationships between the constructs. The rationale for using Trait Activation theory as the nomological network testing framework was grounded in the empirically observed inconsistencies in the predictive validity of personality traits on innovative work behaviour, and the theoretical and empirical work that has pointed out to the importance of considering the moderating role of contextual variables (Anderson et al., 2014; George & Zhou, 2001; Judge & Zapata, 2015; Woods et al., 2018).

Trait Activation theory (Tett & Guterman 2000; Tett & Burnett 2003) provides an explanatory interactionist framework enhancing the understanding of how personality traits relate to innovative work behaviour. The basic premise of Trait Activation theory is that expressed behaviour, as a function of personality traits, is contingent on the relevance and the strength of contextual cues. The situation trait relevance is one of two key features of the Trait Activation theory, the other being the situation strength. A situation is trait relevant when it provides the opportunity for the expression of a trait or not. For example, a social gathering is a situation where talkative individuals have the opportunity to talk to different people, socialise and expand their social networks. However, the same talkative individuals would not manifest the same behaviours in a non-relevant situation such as exam taking. Thus, according to Trait Activation theory, the propensity to behave in a certain manner remains dormant and gets activated when the situation provides an opportunity to do so. Therefore, the true relationship between a personality trait and a behavioural outcome can be properly assessed when a trait relevant situation allows the behavioural manifestations to vary as a function of the underlying trait.

The second key feature of Trait Activation theory is the strength of the situation. Strong situations are the conditions overruling the influence of traits on expressed behaviours and are the primary predictors of behavioural manifestations. Strong situations render the influence of individual differences non-significant as they allow little room for variability. An example of a strong situation that overrides the relationship between trait talkativeness and the actual amount of time spent talking to people is delivering a university lecture. In such a situation the expressed behaviours are a function of the explicit lecturer's role requirements rather than the trait talkativeness. Thus, regardless of whether individuals are talkative or not, they would more or less express the same behaviours due to contextual constraints. Therefore, if the context is not accounted for, the examination of the main effect between trait and behaviour would have been misleading..

To test the nomological network, via applying Trait Activation theory, two moderating variables were used; job control and organisational tenure. Within the context of innovative work behaviour job control is a situational variable that either provides the opportunity for openness to experience to be expressed as innovative behaviours or not. If employees have the freedom to shape the way they go about their jobs, then, engaging in innovative work behaviour could be a way to satisfy their dispositional curiosity and their tendency to explore and develop new and improved ways of doing things. Alternatively, if they have absolutely no control over their job then this strong situation would suppress their innate dispositions and thus, openness to experience would not be translated to innovative work behaviours. Therefore, it was expected that when job control is high, individuals who score higher in openness to experience would engage more frequently in behaviours whose focus is developing, promoting, and implementing innovative ideas.

Hypothesis 15: Job control moderates the relationship between Openness to experience and a. Idea development, b. Idea promotion, and c. Idea implementation, such that their positive relationships are stronger when job control is higher.

The second moderating variable chosen was organisational tenure, in order to replicate Woods and colleagues study (2018), and investigate whether the use of the M-BIP, and a sample of different composition would produce similar results. Woods and colleagues (2018) proposed that the length of organisational tenure is associated with different job demands, and a progressively increasing level of contextual knowledge, which in turn activates innovation relevant traits, such as openness to experience. Their study's findings indicated that the interaction term of openness to experience and organisational tenure was significant only for idea generation, showing that individuals high on openness to experience and with longer organisational tenure engaged more in idea generation, but individuals high in openness to experience and with shorter organisational tenure engaged less often in idea generation than the individuals low in openness and shorter tenure. This finding suggested that openness to experience is a negative predictor of idea generation when the organisational tenure is short, which was rather surprising particularly when coupled with the finding that openness to experience did not have a significant direct effect on innovative work behaviour. The authors provided a plausible interpretation of this finding suggesting that it was due to the sample's range restriction regarding organisational tenure, because the sample was mostly composed of graduate trainees. Thus, Woods and colleagues' a priori theorisation was adopted, and it was expected that organisational tenure would moderate the relationships between openness to experience and all three stages of the M-BIP, because the change in demands and contextual knowledge, associated with organisational tenure, would provide a fertile ground for individuals high on openness to experience to behaviourally manifest their innate curiousness, and also because the present study's sample is much more diverse, thus range restriction was not a potential limitation.

Hypothesis 16: Organisational tenure moderates the relationship between Openness to experience and a. Idea development, b. Idea promotion, and c. Idea implementation, such that their positive relationships are stronger when Organisational tenure is higher.

5.3. Method

5.3.1. Procedure

The data collection procedure took place over a period of six months using both paper-pencil and online survey methodology. The objective of the data collection process was to collect dyadic employee and supervisor data in the U.K. and Greece. It should be noted that the data collection from a Greek population was pursued not because the present study had intentions to test any cross-cultural hypotheses, but for reasons of convenience and in order to capitalise on the current author's social network in Greece. The paper and pencil questionnaires were used to approach participants that could not be approached with the online version of the survey. Specifically, paper and pencil questionnaires were handed out to individuals that were willing to distribute them within their workplace, collect them, and bring them back to the researcher. The online data collection was implemented using the Qualtrics Survey software. As in Study 1, participants were recruited by the use of personal invitations containing the survey link, and advertisements on social media such as Facebook and Linkedin providing a brief description of the purpose of the survey alongside the survey link. No monetary incentive was provided for participation. The only requirement for participation was that participants were in active employment at the time they completed the survey. Furthermore, in order to address the limitation of the present measure, as was identified during the response processes evaluation conducted in Study 1 (i.e., The non-applicability of the measure to individuals who have not engaged in innovative behaviours), the following brief introductory description was included in the survey:

"Innovative work behaviour concerns the activities that aim to produce innovative outcomes (e.g., new products, new services, new workplace procedures). Innovative outcomes are not exclusively about ground-breaking changes but include "minor" improvements in existing products, in organisational processes, or in how you do your work."

Following this description, participants were asked whether they have been actively involved in any activities aimed at producing an innovative outcome within the last year. Participants who responded yes were allowed to proceed to the completion of the survey, whereas those who responded no, were automatically directed to the end of the survey in the online version, or instructed not to proceed to fill in the paper and pencil version.

An important aspect of the data collection process was the collection of dyadic data. Whereas the collection of self-report data was straightforward as participants had to fill in only the online or paper-pencil version of the questionnaire, obtaining and pairing dyadic data required a different strategy. Two approaches were implemented in order to obtain dyadic data. First, the participants who filled in the self-report questionnaire were also asked to approach, if possible, their supervisors and ask them to fill in the supervisor questionnaire. Second, when a person in a supervisory position agreed to participate in the study, that person also distributed the self-report questionnaire to his/her subordinates, and subsequently filled in the supervisor questionnaire for those employees agreeing to participate.

5.3.2. Ethical considerations

The present research project has been granted favourable ethical approval, based on its compliance with the Alliance Manchester Business School research ethics template, ratified by the University of Manchester Research Ethics Committee. Participants were informed that their participation in the study was voluntary, and that they had the right to withdraw at any point. Anonymity and confidentiality were ensured, and no sensitive personal data were collected. The present research project did not involve any activities that could potentially physically harm the participants or induce psychological strain. The collected data were strictly used for research purposes, and were not shared to any third parties. Furthermore, my personal contact details were provided in the consent form, and participants were encouraged to contact me for any questions, complaints, or feedback on the study results. Finally, participants were informed that by filling in the questionnaire they provided their consent for using their responses in the present study. The ethical approval form is presented in the appendix.

5.3.3. Translation from English to Greek

The translation of the survey was implemented using the back-translation method (Brislin, 1970). In the first step of the process, the current author, who is a native Greek speaker, translated the survey from English to Greek. In the second step, an organisational psychology PhD student, who is a native speaker of both English and Greek, translated the Greek version back to English. The next step included the comparison of the back-translation with the original version, as well as the evaluation of the Greek translation's accuracy and whether the translation achieved conceptual equivalence with the original English version. This third step of the process was conducted by a Lecturer in Education at the University of Leeds, whose native language is Greek, but completed her post-graduate studies in the UK. Finally, the resultant Greek version of the questionnaire was examined for grammatical, syntactical errors, and for evaluating its comprehensibility by two Greek language teachers.

5.3.4. Sample

5.3.4.1. Overall sample

861 participants provided full responses. In total 81.8% (n = 704) of the sample filled in the English version of the survey, whereas 18.2% (n = 157) filled in the Greek version. Males comprised 55.4% of the sample (n = 477) and females made up 42.6% of the sample (n = 367), and there were 17 missing responses. Regarding the sample's age distribution 6.7% (n = 58) were aged between18 - 24, 51% (n = 439) were aged between 25 - 34, 23.6% (n = 203) were aged between 35 - 44, 9.9% (n = 85) were aged between 45 - 54, 5.5% (n = 47) were aged between 55 - 64, and 0.8% (n = 7) was over 64 years old.

Regarding the educational status of the sample, the majority had at least a Bachelor's degree. Specifically, 18.8% (n = 162) had obtained an MSc degree or a PhD, 57% (n = 491) had a Bachelor's degree, 13.5% (n = 116) had attained non-university higher education, 7.1% (n = 61) had completed secondary to age 18 education, 0.7% (n = 6) had completed secondary to age 16 education, and 0.7% (n = 6) reported no schooling. Moreover, there were 19 missing cases. Finally, the length of the organisational tenure and the occupational grouping of the sample is presented in Table 5.1.

Table 5.1

Overall sample's organisational tenure and occupational grouping

Tenure In YEARS	**0 - 1**	**1.1 - 5**	**5.1 - 10**	**10.1 - 15**	**15.1 - 20**	**20.1 - 25**	**>25**
	8.4% (*n* = 72)	43.9% (*n* = 72)	21.8% (*n* = 188)	10.1% (*n* = 87)	4.4% (*n* = 38)	1.6% (*n* = 14)	2.1% (*n* = 18)

Occupational Group	**Engineering**	**Retail**	**Communications**	**Services**	**Education**
	5.6% (*n* = 48)	8.6% (*n* = 74)	3.8% (*n* = 33)	14.3 (*n* = 123)	9.5% (*n* = 82)
	Computer Sciences	**Manufacturing**	**Administration**	**Consultants/ Managers**	**Other**
	9.5% (*n* = 82)	7.8% (*n* = 67)	15.3% (*n* = 132)	10.9% (*n* = 94)	6.5% (*n* = 56)

5.3.4.2. Sample of dyadic data

306 employees' full responses were paired with supervisor ratings. 183 of the total number of dyads were obtained from the English speaking population and 123 from the Greek speaking one. Males comprised 52.9% of the sample (*n* = 162) and females made up 47.1% of the sample (*n* = 144). Regarding the sample's age distribution 3.6% (*n* = 11) were aged between 18 - 24, 46.7% (*n* = 143) were aged between 25 - 34, 25.5% (*n* = 78) were aged between 35 - 44, 15% (*n* = 46) were aged between 45 - 54, 6.9% (*n* = 21) were aged between 55 - 64, and 1% (*n* = 3) was over 64 years old, while there were also 4 missing responses.

Regarding the educational status of the sample the majority had at least a Bachelor's degree. Specifically, 16% (*n* = 49) had obtained an MSc degree or a PhD, 52.6% (*n* = 161) had a Bachelor's degree, 13.1% (*n* = 40) had attained non-university higher education, 14.4% (*n* = 44) had completed secondary to age 18 education, 1.3% (*n*

= 4) had completed secondary to age 16 education, while 2% (*n* = 6) reported no schooling. Moreover, there were 2 missing cases. Finally, the length of the organisational tenure and the occupational grouping of the paired sample is presented in Table 5.2.

Table 5.2

Organisational tenure and occupational grouping for dyadic data

Tenure In YEARS	**0 - 1**	**1.1 - 5**	**5.1 - 10**	**10.1 - 15**	**15.1 - 20**	**20.1 - 25**	**> 25**
	8.5%	39.2%	21.8%	15.7%	5.6%	2.3%	2.6%
	(*n* = 26)	(*n* = 120)	(*n* = 67)	(*n* = 48)	(*n* = 17)	(*n* = 7)	(*n* = 8)

Occupational Group	**Engineering**	**Retail**	**Communications**	**Services**	**Education**
	4.9%	11.1%	5.2%	12.7%	10.5%
	(*n* = 15)	(*n* = 34)	(*n* = 16)	(*n* = 39)	(*n* = 32)
	Computer Sciences	**Manufacturing**	**Administration**	**Consultants/ Managers**	**Other**
	12.7%	22.9%	11.1%	5.6%	2.6%
	(*n* = 39)	(*n* = 70)	(*n* = 34)	(*n* = 17)	(*n* = 8)

5.3.5. Statistical power

In the present study, a series of post-hoc power analyses were implemented for each of the study's findings, in order to evaluate whether the study's sample size was sufficient to achieve a power value above .80. As in Study 1, a combination of two methods was used for the tested SEM models; the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996) and the Satorra and Saris (1985) method. However, as discussed below, in Section 5.3.7, the assessment of whether job control and organisational tenure moderated the relationship between openness to experience and the three stages of the innovation process, was conducted by a series of hierarchical moderation regressions. Thus, the post-hoc statistical power for the hierarchical moderation regressions was conducted by the use of a "Post-hoc Statistical Power Calculator for Hierarchical Multiple Regression" (www.danielsoper.com). This statistical tool requests the input of the observed effect size, the number of predictors in Step 1, the number of predictors in Step 2, the probability level which is set at .05, and the sample size, so as to calculate the observed statistical power. The statistical power for each estimate of interest is presented in the results sections.

5.3.6. Measures

5.3.6.1. Self-report measures

The M-BIP was operationalised with the short form of the instrument as described in Chapter 4.

Innovative work behaviour was measured by De Jong and Den Hartog's (2010) 10 item measure. The items tap four dimensions of the innovation process; Idea exploration, Idea generation, Idea championing and Idea implementation. The authors did not report the internal reliability for the global innovative work behaviour factor, but stated that all subscales demonstrated α's above the .70 cut-off point. In the present study, the observed Cronbach's α, for the self-report ratings of the De Jong & Den Hartog's measure, was .90. Participants used a six-point Likert scale (Never – Always) to state how frequently they manifested the innovative work behaviours specified by the items.

Personal initiative was assessed by a seven-item scale (Frese et al., 1997). Sample items are: "I actively attack problems", "I use opportunities quickly in order to attain my goals". Frese and colleagues (1997) reported a Cronbach's α value of .84, in this study it was .87. Participants used a six-point Likert scale (Strongly disagree– Strongly agree) to indicate their level of agreement with the items. To avoid repetition, all measures presented below used the same rating scale, unless stated otherwise.

Supervisor support was measured by De Jong's (2007) four item scale. Sample items are: "My leader/supervisor shows sincere interest whenever I come up with an idea" and "My leader/supervisor supports me when I want to improve things". De Jong reported a Cronbach's α value of .85, in this study it was .88.

Job control was assessed by the use of Holman and colleagues' (2012) three item scale, which was slightly adapted. The adaptation regarded the change of the items from questions to statements. For example, in its original form one sample item was "Do you plan your own work?". This question was turned into the statement "I plan my own work". The reason for this adaptation was to have a consistent response format with the other measures included in the present study, and thus avoid unnecessary confusion. Holman et al. reported a Cronbach's α value of .83, in this study it was .79.

Openness to experience was assessed by the use of the Ten Item Personality Inventory (TIPI) (Gosling, Rentfrow, & Swann, 2003). TIPI assesses each of the five personality dimensions with two items in the form of statements. The TIPI was designed to be used when time and space constraints did not allow the use of multi-item Big 5 personality measures, and when the Big 5 is not the core variable of interest in a study (Gosling et al., 2003). The TIPI items used in the present study were: "I see myself as open to new experiences, complex" and "I see myself as conventional, uncreative". The authors reported a Cronbach's α value of .45, in this study it was .44. It should be noted that the authors and several other researchers have noted this limitation of the measure, but argued that this is a conscious compromise given the high practicality of the measure, its acceptable test retest reliability, and its evidence based adequately high convergence with multi-item Big 5 measures (Gosling et al., 2003; Ehrhart, Ehrhart, Roesch, Chung-Herrera, Nadler, & Bradshaw, 2009; Romero, Villar, Gomez-Fraguela, & Lopez-Romero, 2012).

Finally, organisational tenure was measured by an open-ended single item enquiring how many years participants have worked in their current jobs.

5.3.6.2. Supervisor measures

Supervisor rated innovative work behaviour was measured by De Jong and Den Hartog's (2010) 10 item measure. The observed Cronbach's α for the supervisor ratings of innovative work behaviour was .96. Supervisors used a six-point Likert scale (Never – Always) to state how frequently their employees manifested the innovative work behaviours specified by the items.

Innovative outcomes (i.e., products, services, administrative procedures) were assessed by three items which enquired how often the employee transformed an idea into innovative products, services and administrative procedures. The items used to measure supervisor ratings of innovative outcomes were: "Transformed his/her innovative ideas into customer focused product", "Transformed his/her innovative ideas into a customer focused service", and "Transformed his/her innovative ideas into a new procedure that changed, to some degree, the way things were done within your organisation". The observed internal reliability for innovative outcomes was .83. Supervisors used a six-point Likert scale to state how frequently their subordinates' innovative endeavours were successful (Never – Always).

5.3.7. Analysis strategy

The analysis had seven stages. First, the factorial structure of the M-BIP, as derived from Study 1, was cross-validated. In doing so, I specified an item-level measurement model in which the 7 primary factors freely correlated, without specifying higher-order factors. Next, I specified a hierarchical structural CFA model in accordance to Hypotheses 1-4. In addition to the 7 primary factors (i.e., activities), the hierarchical model included three second order latent factors (i.e., The stages of idea development, idea promotion, idea implementation), and a third order global M-BIP factor. The discriminant validity of the M-BIP's factors was assessed using the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015). The Heterotrait-monotrait (HTMT) ratio of correlations method indicates the lack of discriminant validity when the calculated ratio exceeds the value of .90. The HTMT ratio of correlation analysis was conducted using the Smart PLS statistical software.

Second, the measurement invariance of the M-BIP was assessed across sex, and country grouping variables. Measurement invariance tests for the psychometric equivalence of measures across groups (Putnick & Bornstein, 2016; Bowen & Masa, 2015). The present study examined four forms of invariance, following Kite, Jorgensen, and Chen's (2018) approach to testing measurement invariance with ordered – categorical data. Configural invariance assesses whether the construct has the same items loading on their respective latent factors for each group. Thus, this form of invariance assesses whether the construct holds its basic structure for each grouping variable of interest. Metric invariance assesses whether the items have equal loadings on their respective factors across groups, thus contributing equally to the specified latent factor. Scalar invariance assesses whether the items intercepts or thresholds are equal across groups. Scalar invariance implies that mean scores of latent variables are comparable across groups. Finally, strict invariance assesses whether the items' residuals are equal across groups. Strict invariance means that between item differences are accounted for true latent factors' differences across groups. The assessment of the level of invariance that can be empirically established is accomplished by the comparison of each model against its precursor. So, for example, the metric invariance model is compared to the configural model, and the strict invariance model to the scalar invariance model. It should be noted that only when one form of invariance has been established, the more restrictive form of invariance can be put under examination.

Measurement invariance was examined within a structural equation modelling framework. The syntax used to examine measurement invariance is presented in the appendix. The most widely accepted conventional Changes (Δ) to Approximate Fit Indexes (AFI) (Dimitrov, 2010; Putnick & Bornstein, 2016), and the DIFFTEST (which is an option provided by Mplus7 for comparing models with categorical indicators) were used to evaluate whether measurement invariance was held across its four forms. Each of the two sets of criteria is discussed in turn. The AFIs that were examined are the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). Specifically, I tested for the extent to which ΔAFIs indicated a worse model fit, for each progressively more restrictive model compared to its precursor (e.g., Metric vs Scalar). The exact value of AFIs' change that supports invariance has been debated. Some researchers applied a more liberal criterion (Cheung & Rensvold, 2002; ΔAFI = .01) whereas others a more strict one (Meade, Johnson, & Braddy, 2008; ΔAFI = .002). This study adopted Meade et al.'s strict criterion. The reason for applying the strict criterion was because there have not been set ΔAFI criteria for categorical estimators, as the practical recommendations made for the ΔAFI indicative of non-invariance were mostly based on continuous indicators' datasets, and therefore, the degree of applicability of these recommendations to categorical datasets is unclear (Bowen & Masa, 2015; Sass, 2011). Thus, when comparing two models, when the CFI and TLI decreased above .002, or RMSEA increased above .002, then the more restrictive model was suggested to be non-invariant.

The second criterion was the DIFFTEST. The DIFFTEST calculates nested models' differences in the mean and variance adjusted x^2 ($\Delta\chi^2_{MV}$) (Satorra, 2000). However, Kite et al.(2018) demonstrated that the DIFFTEST is over- sensitive under certain conditions and tends to inflate Type 1 errors. Thus, the DIFFTEST is prone to suggesting non-invariance when actually a measure is invariant (Kite et al., 2018). The conditions that inflate DIFFTEST's likelihood to produce Type 1 errors concern the presence of asymmetric thresholds in conjunction with the lack of a large sample size. Considering therefore, that the criteria for evaluating measurement invariance with the WLSMV estimator have not been without their limitations, given that it is a topic where research is still conducted and definitive answers have yet to be provided (Putnick & Bornstein, 2016), the criteria used for testing the M-BIP measurement invariance need to be cautiously interpreted.

Third, the convergent validity of the M-BIP was assessed by conducting a series of correlation analyses. The analyses examined how the M-BIP correlated with De Jong and Den Hartog's (2010) measure at a global, second order, and primary latent factor level. Moreover, following Hughes et al. (2018) recommendation, the De Jong and Den Hartog measure of innovative work behaviour was operationalized both at a global and at a sub-factor level, so as to evaluate how the two measures' theoretically similar constituent dimensions relate to each other.

Fourth, the discriminant validity of the M-BIP against the construct of personal initiative (Frese et al., 1997) was examined by implementing the Heterotrait-monotrait

(HTMT) ratio of correlations method (Henseler et al., 2015) and by assessing the strength of correlations.

Fifth, the predictive and incremental predictive validity of the M-BIP on supervisor-rated innovative outcomes were assessed within a Structural Equation Modelling framework. The examination of the incremental predictive validity of the M-BIP was implemented on self- and supervisor-ratings of the De Jong and Den Hartog's (2010) measure.

The sixth step entailed the specification of a structural equation model, where the direct effects of job control and supervisor support were regressed on the M-BIP's constituent stages.

The final step consisted of a series of hierarchical moderation regressions which assessed whether job control and organisational tenure moderated the relationship between openness to experience and the three stages of the innovation process. The rationale for choosing mean scale score regression, instead of Structural Equation Modelling in testing for interaction effects, was threefold. First, hierarchical moderation regression provides direct assessment of the range and significance of the incremental variance explained by interaction term. Second, it produces standardized effects which enables cross-models' comparisons. Third, the openness to experience variable has only two indicators which is a suboptimal condition for latent factor specification. A factor comprised of two indicators is not considered reliable, particularly when the two indicators correlate weakly (Worthington & Whittaker, 2006; Yong & Pearce, 2013), as it is the case in the present study (r = .29). The hierarchical moderation regression analyses were conducted using the IBM SPSS v.23 statistical software.

5.4. Results

5.4.1 Confirmatory Factor Analysis (CFA)

An item-level CFA measurement model comprised of 42 items and seven correlated factors (i.e., The seven constituent activities: Opportunity exploration, Strategic adaptation, Championing, Obtaining organisational approval, Recruiting assistance, Implementation strategy, and Implementation facilitation) was specified to cross-validate the M-BIP on a different dataset. As discussed in detail in Study 1 (pp. 146-147), the assessment of the models' fit to the data, when using the WLSMV estimator, cannot be based on the Hu and Bentler (1999) recommended cut-off points; CFI $\geq$ .95, TLI $\geq$ .95, RMSEA $\leq$ .06 (Hu & Bentler, 1999). Hence, it the present study, the Hu and Bentler's cut-off points were not used as absolute fit indicators, but as subjective indicators and statistical aids of the models' fit, and the fit statistics were also evaluated in conjunction with the theory based evaluation of the model (Garrido, Abad, & Ponsoda, 2015). That said, fit statistics suggested a good model fit and no items were dropped; $\chi 2$ (798) = 2672.798, $p < .001$, CFI = .957, TLI = .954, RMSEA (90% confidence interval) = .052 [.050 - .054]. Table 5.3 presents the means, standard deviations, inter-factor correlations, Cronbach's *a*, and McDonald's Ω reliabilities. Means, standard deviations and Cronbach's α were calculated in IBM SPSS V.23, whereas McDonald's Ω reliabilities were computed in Mplus 7. Factors correlations were calculated both in IBM SPSS V.23, so as to obtain Pearson's correlations, and in Mplus 7, so as to obtain latent factor correlations.

Table 5.3

Means, Standard Deviations, Correlations, Cronbach a's and Ω reliabilities

	M	SD	1	2	3	4	5	6	7
Idea development	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
1.Opportunity exploration	4.62	.82	**.80**/.80	*.73**	*.69**	*.52**	*.63**	*.57**	*.65**
2.Strategic adaptation	4.31	.98	.60*	**.87**/.87	*.81**	*.74**	*.80**	*.71**	*.72**
Idea promotion	-	-	-	-	-	-	-	-	-
3.Championing	4.39	.99	.56*	.71*	**.88**/.88	*.79**	*.86**	*.75**	*.81**
4.Obtaining Org. Approval	3.97	1.12	.41*	.64*	.69*	**.87**/.88	*.81**	*.70**	*.70**
5.Recruiting Assistance	4.31	1.04	.52*	.70*	.78*	.72*	**.92**/.92	*.79**	*.87**
Idea Implementation	-	-	-	-	-	-	-	-	-
6.Implementation Strategy	4.42	1.05	.45*	.61*	.66*	.61*	.71*	**.88**/.88	*.87**
7.Implementation Facilitation	4.49	.95	.51*	.62*	.71*	.60*	.77*	.76*	**.86**/.86

Note: *n = 861;* * p < .01; Along the diagonal: Cronbach's alpha and omega (ω) (**In bold**) reliability coefficients. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal.

Next, a hierarchical structural CFA model was specified in order to test the M-BIP's hierarchical structure, as stated by Hypotheses 1-4, and presented in Figure 5.1 below. Fit statistics suggested a good fit to the data supporting the hypothesised hierarchical structure; $\chi 2$ (809) = 2774.473, $p < .001$, CFI = .955, TLI = .952, RMSEA (90% confidence interval) = .053 [.051 - .055]. Figure 5.1 presents the assessed hierarchical model, and Table 5.4 presents the items' factor loadings.

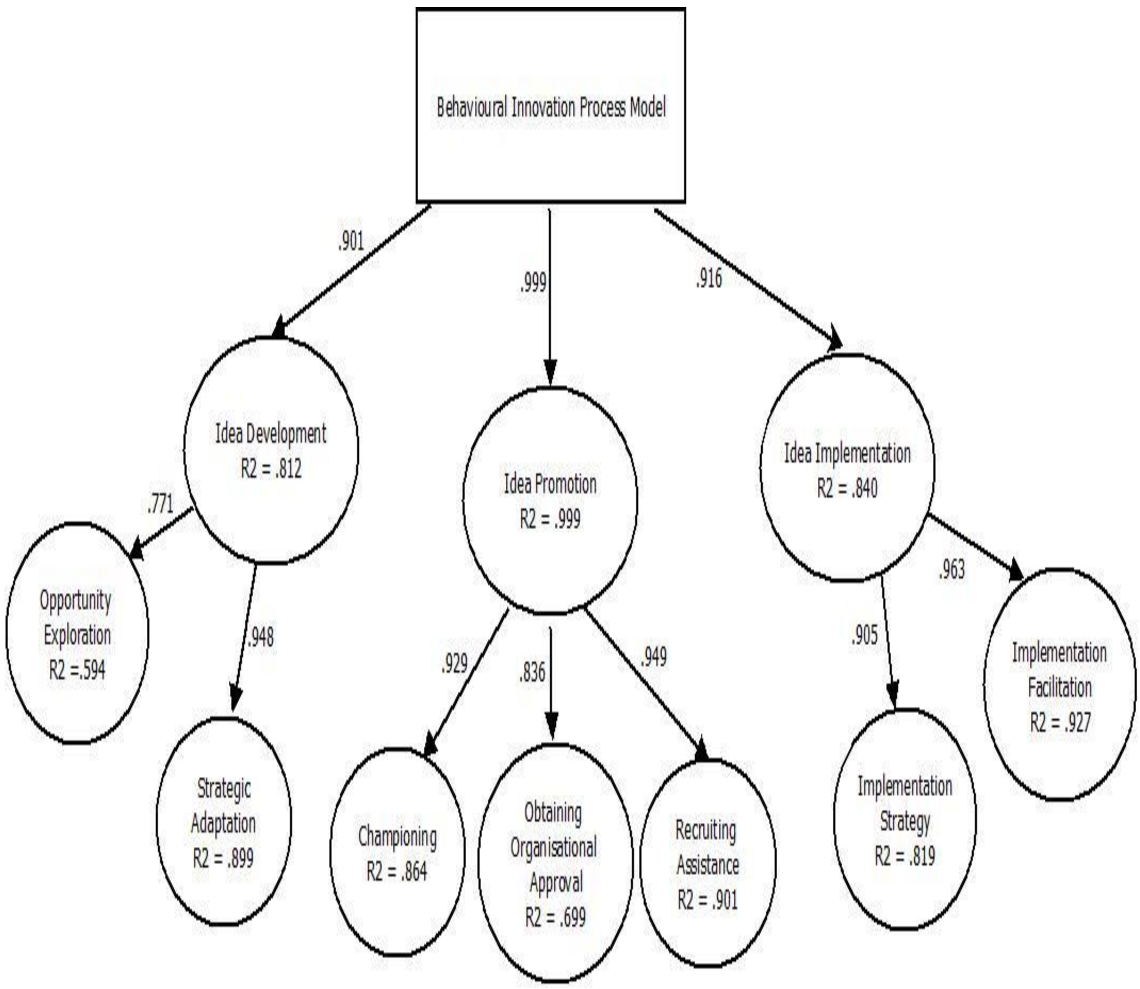

Figure 5.1. 3rd order CFA of the M-BIP

Table 5.4

CFA pattern matrix for the M-BIP

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Searched out new working methods, techniques, or instruments.	.772						
Kept myself informed about new developments within my organisation.	.771						
Kept myself informed about new concepts/insights within my field.	.766						
Kept myself informed about new developments in other organisations	.673						
Wondered how things could be improved.	.649						
Spent time identifying my department's weaknesses	.578						
Spent time identifying how the idea provided a competitive advantage to the organisation.		.813					
Modified the idea based on the evaluation of the availability of the necessary resources.		.786					
Spent time identifying the right people to get involved.		.784					
Modified the idea to be more appealing to influential individuals/groups.		.749					
Spent time planning how resources could be obtained.		.748					
Identified potential sources of conflict and resistance within the organisation.		.627					
Expressed confidence in what the innovation can do.			.817				
Enthusiastically promoted the innovation's advantages.			.797				
Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea.			.794				
Initiated an open discussion regarding the proposed innovation.			.783				
Evaluated co-workers' reactions and accordingly altered the style adopted.			.754				
Pushed the idea with determination even if people did not find it appealing in the first place.			.742				
Presented a detailed implementation plan, to gain my boss's support.				.844			
Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.				.817			
Outlined potentially positive organisational/financial outcomes, to gain my boss's support.				.813			
Produced documented cost and benefit estimations, to gain my boss's support.				.766			
Obtained the support of backers/customers, to gain my boss's support.				.698			
Persisted when superiors were unconvinced/hesitant.				.647			

Items	O.E.	S.A.	CH	O.O.A.	R.A.	I.S.	I.F.
Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.					841		
Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.					.811		
Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.					.808		
Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board.					.808		
Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable on board.					.796		
Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.					.791		
Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.					.782		
Set clear objectives regarding the intended outcomes of the implementation process.						.851	
Devised a new implementation strategy when the allocated resources were limited						.810	
Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.						.808	
Distributed the workload based on individual competencies.						.774	
Made appropriate allocation of the available resources.						.765	
Continually assessed whether the implementation efforts were bringing results.							.822
Kept co-workers/superiors informed about the progress of the implementation process.							.773
Continually thought of alternative solutions that could have made the implementation more feasible.							.762
Treated unpredicted difficulties as an opportunity to improve the original idea.							.726
Showed appreciation for team members' efforts.							.722
Took risks so as to assess the appropriateness of the approach.							.673

Next, to assess the relative robustness of the hypothesised model, three alternative models were specified and compared against they a priori hypothesised hierarchical structural model (see Figure 5.1). In model 1, the seven activities loaded directly onto one global latent factor. In model 2, the items loaded directly onto the three stages. In model 3, the items loaded directly onto one global actor. All three alternative models showed significantly reduced model fit compared to the hypothesised model (see Table 5.5). Moreover, the $\chi 2$ difference test between the hypothesised hierarchical model and all alternative models was significant providing further support that the least restrictive hypothesised hierarchical model better fits the data.

Table 5.5

Alternative models' CFA fit statistics

Model	CFI	TLI	RMSEA	*χ2difftest*	*(p)*
Model 1	.948	.945	.057	97.631	($p < .01$)
Model 2	.916	.911	.072	622.831	($p < .01$)
Model 3	.868	.861	.090	1048.882	($p < .01$)

Next, the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015) was calculated. The results displayed in Table 5.6 showed that no value exceeded the .90 cut-off point. Results therefore, provide further support for the discriminant validity of the M-BIP's factors, and thus hypotheses 1-4. It should be noted that the analyses were conducted to test for the discriminant validity of same level factors, and not higher order factors with their facets.

Table 5.6

HTMT ratio of correlations for the M-BIP

	1	2	3	4	5	6	7	8	9	10
1.Opportunity exploration	1									
2.Strategic adaptation	.74	1								
3.Championing	.67	.84	1							
4.Obtaining Org. Approval	.48	.74	.79	1						
5.Recruiting Assistance	.60	.79	.87	.80	1					
6.Implementation Strategy	.53	.70	.70	.70	.79	1				
7.Implementation Facilitation	.61	.71	.81	.69	.86	.87	1			
8.Idea Development								1		
9.Idea Promotion								.80	1	
10.Idea Implementation								.73	.86	1

Upon the completion of the analyses that provided support for the Hypotheses 1-4, which specified the M-BIP's factorial structure, post hoc power analyses were conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method . These two methods were used to assess whether the probability to reject an incorrect model (i.e., Power) was above .8. The Kim and M.B.S. method was applied to the hierarchical structural model (see Figure 5.1). The analysis yielded a power estimate of 1. Regarding the Satorra and Saris (1985) method, I calculated the statistical power for each specific estimate of interest (i.e., items' loadings; subordinate factors' loadings to higher order latent factors). The Satorra and Saris (1985) method yielded power estimates of 1 for all specific estimates of interest. Thus, given that both methods identified sufficient power estimates, it is safe to assume that the tested hierarchical structural model's estimates are not chance findings, but they are truly significant.

5.4.2 Measurement Invariance

Results for testing the M-BIP's measurement invariance are presented in Tables 5.7 and 5.8. Following Kite et al.'s (2018) approach, the first step into testing for measurement invariance was identifying the baseline multigroup configural models. Fit statistics for both the Sex and Country configural models were indicative of good fitting models, which is a prerequisite for proceeding to testing more restrictive forms of measurement invariance. First, the results for the sex grouping variable are presented. Following the specification of the configural model, the next step was to specify the metric model. For the sex grouping variable, comparisons of the CFI, TLI and RMSEA for the configural versus metric invariance models yielded ΔCFI = .000, ΔTLI = .000, and ΔRMSEA = -.001. Furthermore, the DIFFTEST was non-significant. Thus, all available evidence indicated that metric invariance held for the sex grouping variable. The next step was to specify the scalar model. Comparisons of the CFI and TLI and RMSEA for the metric versus scalar invariance models yielded ΔCFI = .000, ΔTLI = .004, and ΔRMSEA = -.002. However, the DIFFTEST was significant. Thus, evidence was mixed regarding whether scalar invariance could be supported, with conventional ΔAFI indicators applying the strict Meade et al. (2008) criterion suggesting invariance, and the DIFFTEST suggesting non invariance. However, when taking into consideration the supportive ΔAFIs which indicated a slight improved model fit, the fact that in absolute terms the scalar model is a good-fitting one, and that upon the inspection of the scalar model's thresholds it was observed that thresholds were severely asymmetric, which inflates Type 1 error (Kite et al., 2018), it is possible that the measure is either invariant or very close to it. The next step was to specify the strict model. Comparisons of the CFI and TLI and RMSEA for the scalar versus strict invariance models yielded ΔCFI = .003, ΔTLI = .003, and ΔRMSEA = -.002. ΔAFIs therefore indicated that the strict model had a slightly improved fit, however, the DIFFTEST was again significant. Applying the same logic as with the scalar model it is suggested that measure is either invariant or very close to it. These findings are further discussed in the discussion section of this chapter.

Table 5.7

Measurement invariance for the sex grouping variable

Model	Model Comparison	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA	DIFF-TEST	*df*	*p*
M1. Configural		.959		.955		.053				
M2. Metric	M2 vs M1	.959	.000	.957	.002	.052	-.001	46.837	35	.087
M3. Scalar	M3 vs M2	.959	.000	.961	.004	.050	-.002	287.726	156	.000
M4. Strict	M4 vs M3	.962	.003	.964	.003	.047	-.003	19.528	81	.000

For the country grouping variable, comparisons of the CFI, TLI and RMSEA for the configural versus metric invariance models yielded ΔCFI = .000, ΔTLI = .002, and ΔRMSEA = .000. However, the DIFFTEST was significant, thus suggesting non-invariance. In order to pinpoint the items causing this misfit, the modification indices were inspected across English and Greek groups. Three items were identified to be non-invariant and their equality constraints were released (i.e., Spent time identifying my department's weaknesses; Pushed the idea with determination even if people did not find it appealing in the first place; Persisted when superiors were unconvinced/hesitant). Invariance models with some of their equality constraints released are labelled partial invariance models (Dimitrov, 2010). Comparisons of the CFI and TLI and RMSEA for the configural versus the partial metric invariance models yielded ΔCFI = .000, ΔTLI = .002, and ΔRMSEA = .000. The DIFFTEST of the comparison of the configural model with the partial metric one was non-significant, and thus partial metric invariance was supported, where all but 3 items’ loadings were equal. It should be noted that there is no established rule about how many parameters can be freed in order to establish partial invariance, but Dimitrov (2010) suggests that less than 20% of freed parameters is an acceptable rule of thumb, whereas in the present study 7.14% of the parameters were freed. The next step was to specify the scalar model for the country grouping variable. Fit indices yielded ΔCFI = -.001, ΔTLI = .001, and ΔRMSEA = -.002 suggesting invariance, however, the DIFFTEST was again significant. Again, applying the same reasoning provided for the sex grouping variable, it is suggested that an evidence based but cautious interpretation points to the direction that the measure is practically invariant or very close to it, because the DIFFTEST is over- sensitive under certain conditions and tends to inflate Type 1 errors (Kite et al., 2018). The next step was to specify the strict model. Comparisons of the CFI and TLI and RMSEA for the scalar versus strict invariance models yielded ΔCFI = .000, ΔTLI = .001, and ΔRMSEA = .000. ΔAFIs indicated that the strict model had an equally good fit compared to the scalar model, however, the DIFFTEST was significant. Again, it is suggested that a cautious interpretation of the findings suggests that the measure is either invariant or very close to being invariant. A more detailed discussion of these findings is provided in the discussion section of this chapter.

Table 5.8

Measurement invariance for the country grouping variable

Model	Model Comparison	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA	DIFF-TEST	*df*	*p*
M1. Configural		.966		.963		.047				
M2. Metric	M2 vs M1	.966	.000	.965	.002	.047	.000	59.553	35	.006
M3. Partial Metric	M3 vs M2	.966	.000	.965	.000	.047	.000	453364	32	.059
M4. Scalar	M4 vs M3	.965	.001	.966	.001	.045	-.002	287.726	156	.000
M5. Strict	M5 vs M4	.965	.000	.967	.001	.045	.000	184.521	43	.000

5.4.2.1. Latent factors' mean differences

Considering that the measurement invariance analyses suggested that the M-BIP is either practically invariant or very close to being invariant, the mean differences of the M-BIP's latent factors can be compared directly across both sex and country grouping variables. With respect to the sex grouping variable, results indicated that there are no significant differences for 6 out of the 7 latent variables. Findings revealed that males, exhibit a higher latent mean for the factor of obtaining organisational approval than females. Specifically, the latent factor mean difference was -.242. With respect to the country grouping variable, results indicated that there are significant differences for 6 out of the 7 latent variables. Specifically, with the exception of the factor of implementation facilitations in which no latent factor mean difference was observed, findings revealed that the Greek group exhibits higher latent mean (.198) for the factor of opportunity exploration than the U.K. group. However, findings revealed that the U.K. group exhibits higher latent means for the factors of strategic adaptation (.542), championing (.149), obtaining organisational approval (.334), recruiting assistance (.243), and implementation strategy (.148) than the Greek group.

5.4.3. Correlational analyses

A series of correlational analyses of the M-BIP and the De Jong and Den Hartog's measure of innovative work behaviour was carried out to examine how the M-BIP correlated both at a global, and at primary and second order latent factors' level with De Jong and Den Hartog's (2010) measure of innovative work behaviour (see Tables 5.9 and 5.10). The correlational analyses were conducted on both self- and supervisory ratings for the De Jong and Den Hartog's measure. The M-BIP displayed a moderately high correlation (r = .77) with the self-report De Jong and Den Hartog's measure at a global latent factor level, which measures global innovative work behaviour, hence supporting hypothesis 5. Moreover, as stated in hypothesis 6 the magnitude of the correlations between the lower order latent factors of the M-BIP and the De Jong and Den Hartog (2010) measure were weaker than the magnitude of correlations of the global factors, ranging from .49 to .74 for the second order factors (i.e., stages), and .47 to .69 for the primary factors (i.e., activities). These results were interpreted as indicative of the M-BIP's intentional differentiation in terms of construct's content, through the consistent tapping of innovative behaviours instead of products and broad activities. Hypothesis 7, which stated that the stages of idea development, idea promotion, and idea implementation would exhibit the higher magnitudes of correlations with the respectively equivalent stages of De Jong and Den Hartog (2010) measure, received partial support. Specifically, the M-BIP's stages of idea promotion and implementation, as expected, were more strongly correlated with De Jong and Den Hartog's idea championing (r = .74) and idea implementation (r = .68) factors, however the idea development stage correlated more weakly with the conceptually closer stages of opportunity exploration (r = .49) and idea generation (r = .54), than with the De Jong and Den Hartog's idea championing (r = .58), and idea implementations (r = .62) stages.

Table 5.9

Correlations between the M-BIP and the self-report De Jong and Den Hartog (2010) measure of IWB at a global and 2nd order level.

	1	2	3	4	5	6	7	8	9
1. **M-BIP**	1	*.92**	*.99**	*.93**	*.86**	*.72**	*.76**	*.84**	*.83**
2. Idea development	.86*	1	.90*	*.85**	*.79**	*.66**	*.70**	*.77**	*.76**
3. Idea promotion	.96*	.74*	1	.91*	*.85**	*.71**	*.75**	*.83**	*.82**
4. Idea implementation	.90*	.66*	.79*	1	.80*	.67*	.71*	.78*	.77*
5. **Global IWB (De Jong & Den Hartog, 2010)**	.77*	.66*	.73*	.69*	1	*.84**	*.88**	*.97**	*96*
6. Idea Exploration	.50*	.49*	.44*	.45*	.78*	1	*.74**	*.82**	*.81**
7. Idea generation	.61*	.54*	.57*	.54*	.85*	.62*	1	*.86**	*.85**
8. Idea Championing	.74*	.58*	.74*	.65*	.86*	.50*	.66*	1	*.94**
9. Idea implementation	.75*	.62*	.73*	.68*	.91*	.56*	.71*	.79*	1

Note: n = 861; * *p* < .01. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal; IWB: Innovative Work Behaviour.

Table 5.10

Correlations between the M-BIP and self-report De Jong and Den Hartog (2010) measure of IWB at a 1st order level

	1	2	3	4	5	6	7	8	9	10	11
Idea development M-BIP	-	-	-	-	-	-	-	-	-	-	
1. Opportunity exploration	1	.73*	.66*	.59*	.67*	.60*	.65*	.52*	.55*	.60*	.60*
2. Strategic adaptation	.60*	1	.79*	.70*	.79*	.71*	.76*	.62*	.65*	.71*	.71*
Idea promotion M-BIP	-	-	-	-	-	-	-	-	-	-	
3. Championing	.56*	.71*	1	.78*	.88*	.77*	.83*	.67*	.70*	.77*	.76*
4. Obtaining Org. Approval	.41*	.64*	.69*	1	.79*	.69*	.74*	.60*	.63*	.69*	.68*
5. Recruiting assistance	.52*	.70*	.78*	.72*	1	.77*	.83*	.67*	.71*	.78*	.77*
Idea implementation M-BIP	-	-	-	-	-	-	-	-	-	-	
6. Implementation strategy	.45*	.61*	.66*	.61*	.71*	1	.87*	.60*	.63*	.70*	.69*
7. Implementation facilitation	.51*	.62*	.71*	.60*	.77*	.76*	1	.65*	.68*	.75*	.74*
IWB (De Jong & Den Hartog, 2010)	-	-	-	-	-	-	-	-	-	-	
8. Idea exploration	.50*	.38*	.45*	.32*	.43*	.38*	.47*	1	.74*	.82*	.81*
9. Idea generation	.47*	.49*	.58*	.45*	.53*	.48*	.54*	.62*	1	.86*	.85*
10. Idea Championing	.42*	.61*	.68*	.63*	.69*	.59*	.64*	.50*	.66*	1	.94*
11. Idea implementation	.48*	.62*	.70*	.61*	.69*	.61*	.66*	.56*	.71*	.79*	1

Note: n = 861; * p < .01. Pearson correlations on the bottom of the diagonal and latent factors' correlations on top of the diagonal; IWB: Innovative Work Behaviour.

Regarding the M-BIP's correlates with the supervisor rated measure of De Jong and Den Hartog, results indicated a noteworthy correlation of .40 at a global level, thus supporting hypothesis 8. Findings indicated that the M-BIP converged to supervisor rated innovative work behaviour acceptably and in line with the empirically demonstrated range of correlations between self- and other- rated scales.

5.4.4. Discriminant validity

The implementation of the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015) indicated that no value exceeded the .90 cut-off point, thus the discriminant validity of the M-BIP against the construct of personal initiative (Frese et al., 1997) and the associated Hypothesis 9 has been supported. The global M-BIP displayed an HTMT value of .69, the idea development stage a value of .68, the idea promotion stage a value of .60, and the idea implementation stage a value of .68. The correlations between the global M-BIP and the three stages with personal initiative were .62, .59, .54, and .60 respectively.

5.4.5. Predictive validity

Five structural equation models were specified to examine the predictive and incremental predictive validity of the M-BIP over and above De Jong and Den Hartog's (2010) measure of innovative work behaviour over supervisor rated innovative outcomes. As in Study 1, the three stages of the M-BIP were modelled in a correlated fashion (see Figure 5.2), with the idea implementation stage being the one which directly predicted innovative outcomes.

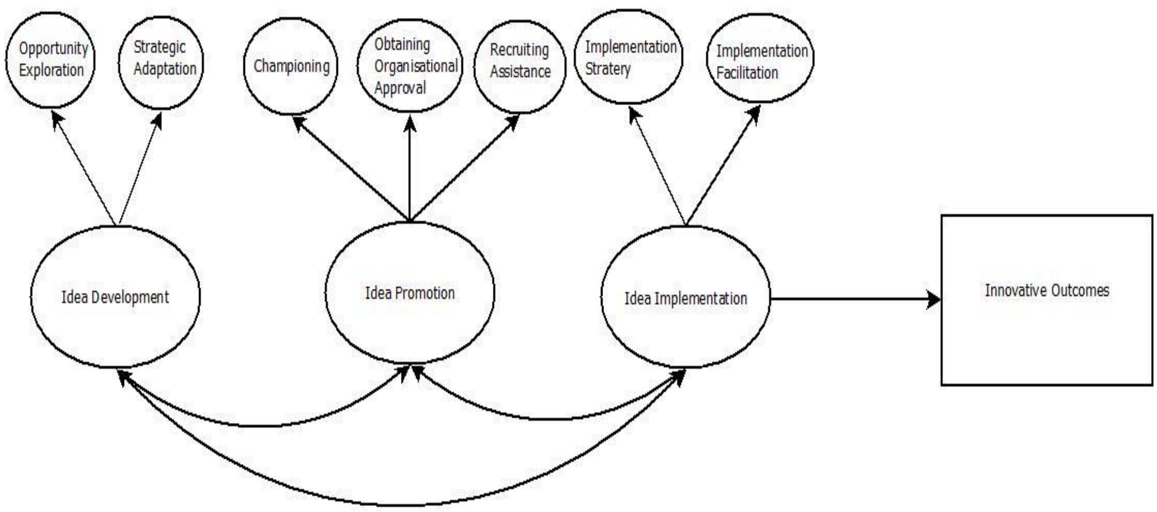

Figure 5.2. Correlated predictive model of the M-BIP on innovative outcomes

Results are presented in Table 5.11. The M-BIP's idea implementation factor was shown to be a significant positive moderately strong predictor (β = .608; 99% CI [.508 - .707]) of innovative outcomes (Model 1), explaining 36.9% of the innovative outcomes' variance, thus supporting hypothesis 10. Next, in order to investigate the incremental predictive validity of the M-BIP over self-ratings of the De Jong and Den Hartog measure, two more structural models were specified. The baseline Model 2 assessed the predictive validity of the De Jong and Den Hartog measure and explained 33.1% of the innovative outcomes' variance. The De Jong and Den Hartog's measure was also shown to be a significant moderately strong predictor (β = .576; 99% CI [.477 - .674]) of innovative outcomes (Model 2). Model 3, which included both measures as predictors explained 38.3% of the innovative outcomes' variance. Thus, the M-BIP model explained 5.2% incremental variance over and above the De Jong and Den Hartog measure, hence supporting hypothesis 11. In Model 3, the M-BIP's idea implementation factor was shown to be a significant positive moderate predictor (β = .354; 99% CI [.172 - .536]) of innovative outcomes, whereas, the De Jong and Den Hartog's measure was also shown to be a significant moderate predictor (β = .305; 99% CI [.121 - .488]) of innovative outcomes.

The same process was replicated in order to investigate the incremental predictive validity of the M-BIP over and above the supervisor-rated De Jong and Den Hartog's measure of innovative work behaviour. Model 4 assessed the predictive validity of the supervisor-rated De Jong and Den Hartog's measure and explained 56.5% of the innovative outcomes' variance. The supervisor-rated De Jong and Den Hartog's measure was shown to be a significant strong predictor (β = .752; 99% CI [.675 - .828]) of innovative outcomes (Model 4). Model 5, in turn, explained 66.5% of the innovative outcomes' variance. Thus, the M-BIP explained 10% incremental variance over and above the supervisor-rated existing measure, hence supporting hypothesis 12. In Model 5, the M-BIP's idea implementation factor was shown to be a significant positive moderate predictor (β = .340; 99% CI [.238 - .442]) of innovative outcomes, whereas, the De Jong and Den Hartog's measure was also shown to be a significant moderately strong predictor (β = .611; 99% CI [.513 - .709]) of innovative outcomes. Regarding the predictive validity of the M-BIP, at an activity level, the M-BIP predicted 37.9% of the innovative outcomes' variance, thus explaining 1% more variance that the measure at a stage level.

Table 5.11

Parameter estimates and fit statistics for models assessing the predictive validity of the M-BIP

Predictors	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β
M-BIP	.608* [.477 - .674]		.354* [.172 - .536]		.340* [.238 - .442]
Self-reported De Jong & Den Hartog IWB		.576* [.477 - .674]	.305* [.121 - .488]		
Supervisor rated De Jong & Den Hartog IWB				.752* [.675 - .828]	.611* [.513 - .709]
R^2	36.9%	33.1%	38.3%	56.5%	66.5%
X^2(df)	1753.654* (934)	390.169* (64)	2614.539* (1415)	398.094* (64)	2348.513* (1415)
CFI	.960	.960	.952	.979	.964
TLI	.957	.951	.950	.974	.962
RMSEA	.054	.129	.053	.131	.046

Note: n = 306; * $p < .001$; In brackets [] 99% Confidence intervals are presented.

Next, in order to evaluate how the issue of predictor and outcome circularity (i.e., Product assessments in both the De Jong and Den Hartog' measure and the dependent outcome variable) has influenced results, the one item tapping product assessments of the De Jong and Den Hartog' scale of idea implementation was dropped. The remaining 9 items were regressed on supervisor rated innovative outcomes. Results surprisingly indicated that without the idea implementation product item the self-reported De Jong and Den Hartog's measure explained 36.5% of the innovative outcomes' variance, hence explaining 3.4% more variance than the measure including the product item. In order to identify the reason for this anomaly, one further model was specified in which the two items tapping broad behaviours in the De Jong and Den Hartog's scale of idea implementation were removed, whereas, the item tapping product assessments was included in the analysis. Supervisor rated innovative outcomes were regressed onto the remaining 8 items . Results indicated that without the idea implementation's behavioural items, the self-reported De Jong and Den Hartog's measure explained 27.5% of the innovative outcomes variance, hence explaining 5.6% less variance than the measure including the behavioural items. To further explore the reason for this finding, the means and standard deviations of the product assessment items in both De Jong and Den Hartog's measure and the supervisor rated innovative outcomes measure were inspected. The De Jong and Den Hartog's product item had a mean score of 3.99 and a standard deviation of 1.42. Regarding the supervisor rated innovative outcomes' measure, the item tapping innovative products had a mean score of 3.02 and a standard deviation of 1.40, the item assessing innovative services had a mean score of 2.55 and a standard deviation of 1.19, and the item assessing innovative procedures had a mean score of 3.19 and a standard deviation of 1.37. Thus, it was observed that overall, participants inflated their responses to product items whereas supervisors had less positive view. In the discussion section of the present chapter, a discussion of these findings is provided.

Following the analyses that investigated the predictive and incremental predictive validity of the M-BIP, post hoc power analyses were conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method. The Kim and M.B.S. method was applied to all five models (see Table 5.11). The analyses yielded power estimates of 1 for all five models. Regarding the Satorra and Saris (1985) method, the statistical power for each specific estimate of interest (i.e., direct effects; magnitude of correlations between factors) for all five models was calculated. The Satorra and Saris (1985) method indicated that not all statistical power estimates of statistical power exceeded .80. Specifically, in Model 3, the examination of the statistical power for the direct effect between the M-BIP's idea implementation factor and innovative outcomes indicated a statistical power estimate of .63. Also, in Model 3, the examination of the statistical power for the direct effect between the De Jong and Den Hartog's measure and innovative outcomes yielded a statistical power estimate of .53. Additionally, in Model 5, the examination of the statistical power for the direct effect between the M-BIP's idea implementation factor and innovative outcomes indicated a statistical power estimate of .60. With respect to all other estimates, presented in Table 5.11, the Satorra and Saris (1985) method indicated that all statistical power estimates exceeded .80.

5.4.6. Nomological network

For the examination of hypotheses 13 and 14 (that supervisor support and job control would positively predict the three stages), a structural model was specified, in which the three stages of the M-BIP were regressed directly onto supervisor support and job control (see Figure 5.3). Supervisor support was shown to be a moderately weak positive predictor of idea development (β = .257; 99% CI [.136 - .378]), of idea promotion (β = .288; 99% CI [.172 - .404]), and of idea implementation (β = .262; 99% CI [.145 - .379]). Job control was shown to be a moderate positive predictor of idea development (β = .453; 99% CI [.340 - .566]), of idea promotion (β = .350; 99% CI [.236 - .464]), and of idea implementation (β = .443; 99% CI [.329 - .557]). Thus, results were supportive of hypotheses 13 and 14.

Following the analyses that investigated hypotheses 13 and 14, post hoc power analyses were conducted using the Kim and M.B.S. method (Kim 2005; MacCallum, Browne, & Sugawara, 1996), and the Satorra and Saris (1985) method. Both analyses indicated that for both the overall model, and for each specific estimate of interest (i.e., direct effects; magnitude of correlations between factors), the statistical power estimates were 1.

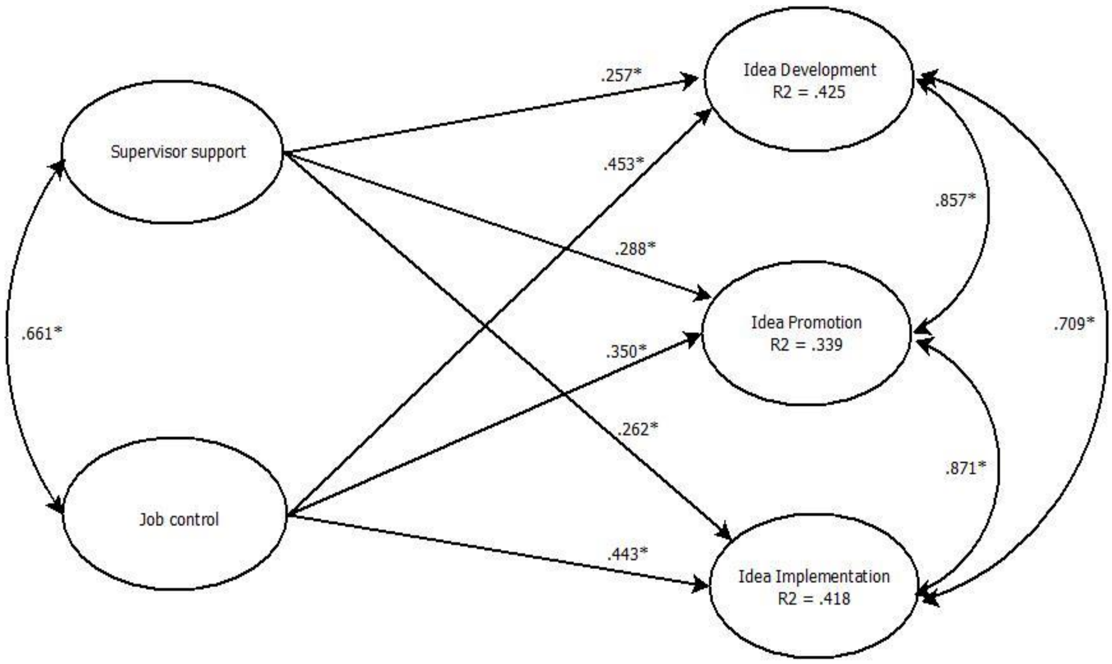

Figure 5.3. Supervisor support and Job control as predictors of the M-BIP's stages
Note: n = 861;* p < .001; $\chi 2$ (1110) = 3521.952, p < .001, CFI = .952, TLI = .949, RMSEA = .050 [.048 - .052].

Next, hierarchical moderated regression models were estimated to test the moderating role of job control and organisational tenure on the relationship between openness to experience and the three stages of the M-BIP. The interaction effects were also tested on the global M-BIP scale for comparison purposes (see Table 5.12). Results indicated that hypothesis 15a (Job control moderates the relationship of openness to experience and idea development) is not supported because the 95% confidence intervals for the interaction effect included zero (β= .054; 95% CI [-.020 - .107]). Hypothesis 15b was supported, as job control moderates the relationship of openness to experience and idea promotion, such that their positive relationship is stronger when job control is higher. However, the interaction effect on idea promotion was very small (β= .067; 95% CI [.006 - .122]), and the interaction term explained only a minimal amount of incremental variance (.4%) above the direct effects of openness to experience and job control for idea promotion. Hypothesis 15c was also supported, as job control moderates the relationship of openness to experience and idea implementation, such that their positive relationship is stronger when job control is higher. Nevertheless, the interaction effect on idea implementation was very small (β= .082; 95% CI [.022 - .131]), and the interaction term explained only a minimal amount of incremental variance (.7%) above the direct effects of openness to experience and job control for idea implementation. Finally, job control moderates the relationship of openness to experience and the global M-BIP scale, but again, the interaction effect was very small (β= .075; 95% CI [.013 - .110]), and the interaction term explained only a minimal amount of incremental variance (.6%).

Next, the interaction plots were constructed using Jeremy Dawson's freely available "2-way standardised" excel spread sheet. Jeremy Dawson's Excel spread sheet automatically creates interaction plots by entering the unstandardized Beta coefficients of both the predictors and the interaction term into the appropriate Excel cells. The interaction plots (see Figure 5.4) indicate that Openness to experience is a positive predictor of innovative work behaviour, and its effects are enhanced when job control is high.

Table 5.12

Hierarchical Moderation Regression of Openness to experience and Job control with M-BIP

	M-BIP		Idea Development		Idea promotion		Idea implementation	
	STEP 1	*STEP 2*	*STEP 1*	*STEP 2*	*STEP 1*	*STEP 2*	*STEP 1*	*STEP 2*
Variables	β	β	β	β	β	β	β	β
Openness	.160***	.156***	.146***	.144***	.132***	.129***	.165***	.161***
Job Control	.434***	.444***	.401***	.409***	.354***	.381***	.430***	.440***
Interaction		.075*		.054		.067*		.082**
		[.013 - .110]		[-.020 - .107]		[.006 - .122]		[.022 - .131]
R^2	.251***	.256***	.213***	.215***	.181***	.185***	.250***	.256***
ΔR^2		.006*		.003		.004*		.007**

Note: n = 861; *p < .05, ** p < .01, *** p < .001; In brackets [] 95% Confidence intervals are presented.

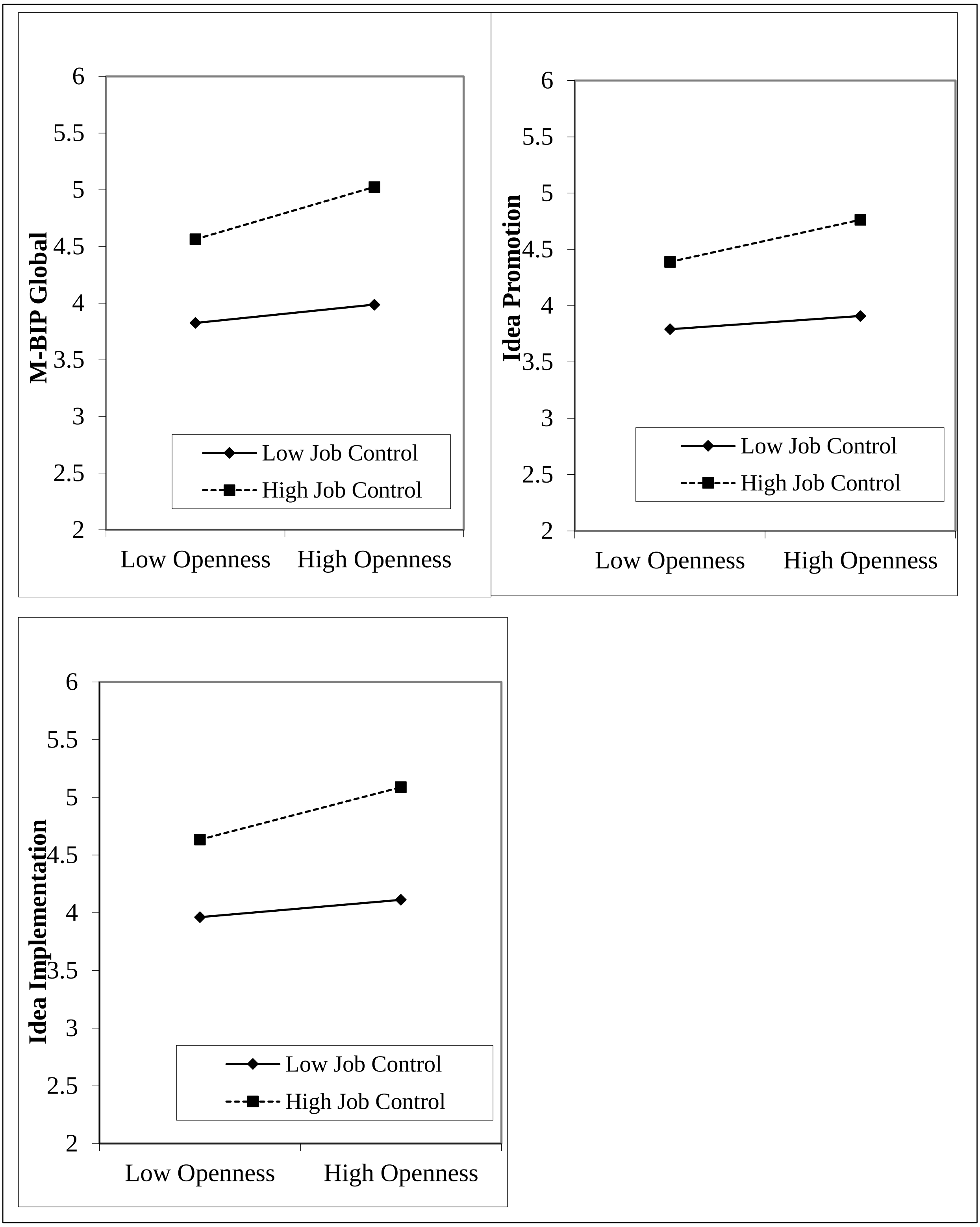

Figure 5.4. Plotted interaction terms for Openness to experience and Job control

Regarding the moderating role of organisational tenure, results indicated that hypothesis 16a (Organisational tenure moderates the relationship of openness to experience and idea development) is not supported because the 95% confidence intervals for the interaction effect included zero (β= .057; 95% CI [-.009 - .102]). Hypothesis 16b was supported, as organisational tenure moderates the relationship of openness to experience and idea promotion, such that their positive relationship is stronger when organisational tenure is higher. However, the interaction effect on idea promotion was small (β= .101; 95% CI [.033 - .164]), and the interaction term explained only a small amount of incremental variance (1%) above the direct effects of openness to experience and organisational tenure for idea promotion. Hypothesis 16c was also supported, as organisational tenure moderates the relationship of openness to experience and idea implementation, such that their positive relationship is stronger when organisational tenure is higher. The interaction effect on idea implementation was rather small (β= .145; 95% CI [.075 - .200]), and the interaction term explained a small amount of incremental variance (2%) above the direct effects of openness to experience and organisational tenure for idea implementation. Finally, organisational tenure moderates the relationship of openness to experience and the global M-BIP scale, but again, the interaction effect was small (β= .112; 95% CI [.039 - .151]), and the interaction term explained a small amount of incremental variance (1.2%).

Table 5.13 summarises the results, and Figure 5.5 presents the interaction plots, which were constructed using the Jeremy Dawson's Excel spread sheet.

Following the analyses that investigated hypotheses 15 and 16, post hoc power analyses were conducted using the "Post-hoc Statistical Power Calculator for Hierarchical Multiple Regression" (www.danielsoper.com). The analyses indicated that the statistical power estimates were 1 for all the interaction effects.

Table 5.13

Hierarchical Moderation Regression of Openness to experience and Organisational tenure with M-BIP

	M-BIP		Idea Development		Idea promotion		Idea implementation	
	STEP 1	*STEP 2*	*STEP 1*	*STEP 2*	*STEP 1*	*STEP 2*	*STEP 1*	*STEP 2*
Variables	β	β	β	β	β	β	β	β
Openness	.296***	.298***	.270***	.271***	.253***	.255***	.300***	.303***
Tenure	.020***	.007***	.035	.029	-.006	-.017	.041	.025
Interaction		.112*		.057		.101*		.145***
		[.039 - .151]		[-.009 - .102]		[.033 - .164]		[.075 - .200]
R^2	.087***	.098***	.073***	.075***	.061***	.070***	.091***	.111***
ΔR^2		.012***		.003		.010**		.021***

Note: n = 861; *p < .05, ** p < .01, *** p < .001; In brackets [] 95% Confidence intervals are presented.

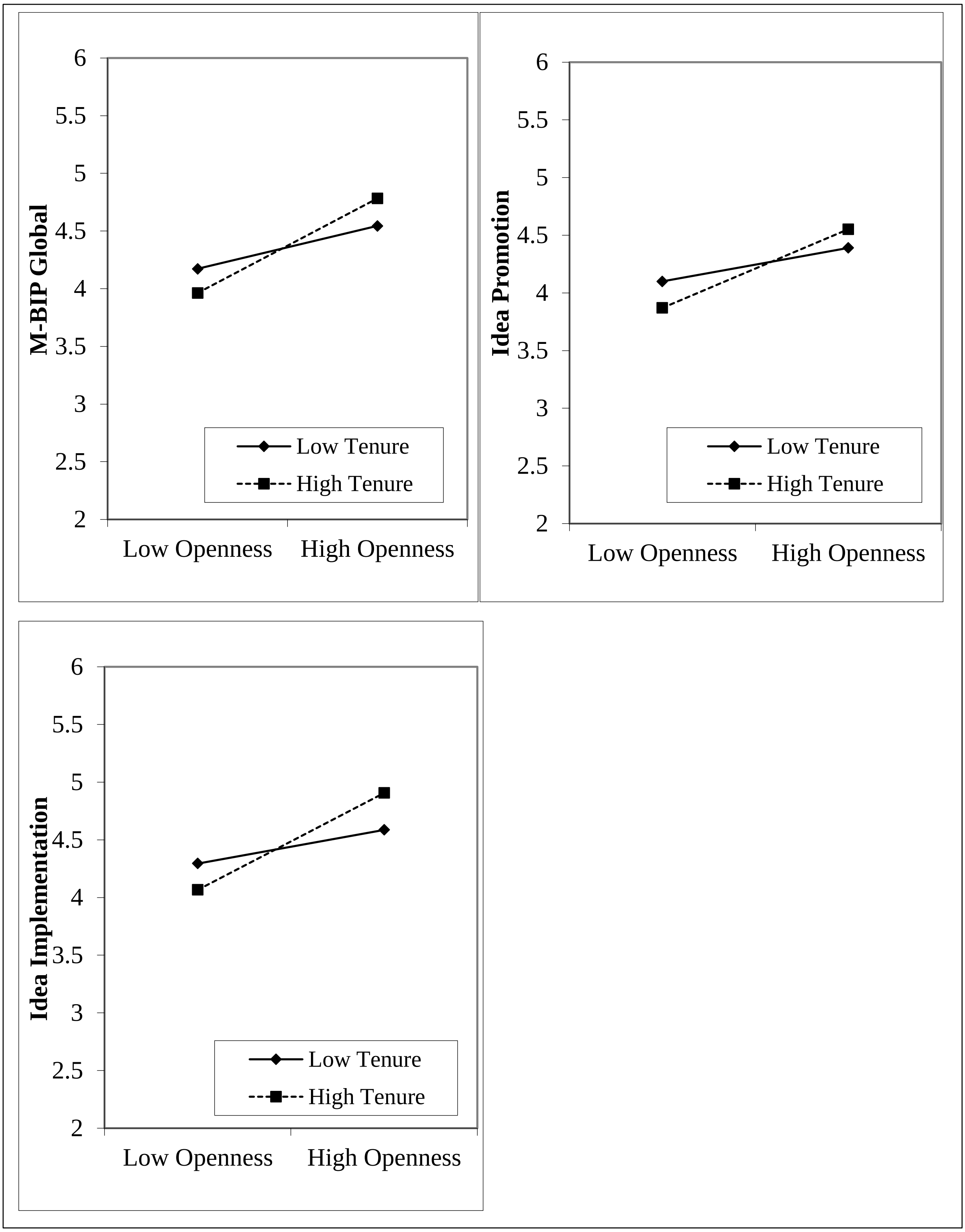

Figure 5.5. Plotted interaction terms for Openness to experience and Organisational tenure

5.4.7. Supplementary analyses

Hypotheses 15a and 16a, that job control (15a) and organisational tenure (16a) would moderate the relationship between openness to experience and idea development were not supported. This is, perhaps, because idea development involves mental activities that can occur in isolation, meaning that they are less susceptible to job design changes (Messmann and Mulder, 2011). In contrast, idea promotion and implementation are mostly interpersonal and occur within a social context that is constrained by job design (Messmann & Mulder, 2011). As a tentative test of the plausibility of this explanation, the same hypotheses were assessed by substituting the dimension of idea development (M-BIP) for two dimensions from the De Jong and Den Hartog's measure: Idea exploration and idea championing. The rationale being that idea exploration contains items that are predominantly cognitive, whereas idea championing contains items that are predominantly interpersonal in nature. Consistent with the M-BIP's findings, the interaction terms were not significant for idea exploration (see Table 5.14) but were significant for idea championing (see Table 5.15).

Table 5.14

Hierarchical Moderation Regression on De Jong and Den Hartog's idea exploration stage

	Idea exploration			
	STEP 1	*STEP 2*	*STEP 1*	*STEP 2*
Variables	*β*	*β*	*β*	*β*
Openness to Experience	.175*	.177*	.272*	.273*
Job control	.336*	.330*		
Openness X Job control		-.039 [-.087 - .020]		
Tenure			.005	.001
Openness X Tenure				.044 [-.021 -.100]
R^2	.174*	.175*	.072*	.072*
ΔR^2		.001		.002

Note: n = 861; * *p* < .001; In brackets [] 95% Confidence intervals are presented.

Table 5.15

Hierarchical Moderation Regression on De Jong and Den Hartog's idea championing stage

	Idea Championing			
	STEP 1	*STEP 2*	*STEP 1*	*STEP 2*
Variables	*β*	*β*	*β*	*β*
Openness to Experience	.139*	.133*	.239*	.241*
Job control	.324*	.339*		
Openness X Job control		.112* [.056 - .195]		
Tenure			-.036	-.051
Openness X Tenure				.127* [.068 - .225]
R^2	.147*	.159*	.055*	.069*
ΔR^2		.012*		.016*

Note: n = 861; * *p* < .001; In brackets [] 95% Confidence intervals are presented.

5.5. Discussion

The overall objective of Study 2 was to complement the initial assessment of the M-BIP's psychometric properties, through cross-validating Study 1's findings. One further objective was to address the limitations of Study 1 and to test the accuracy and appropriateness criteria that were not investigated in Study 1. Specifically, Study 1's findings were cross-validated on a larger and more diverse dataset and multi-source ratings were obtained. Additionally, the assessment criteria went beyond the Accuracy and Appropriateness model and examined the nomological network of the construct. The present study builds on the contributions of Study 1, but also reveals potential limitations that did not appear in Study 1.

5.5.1 Accuracy properties of the M-BIP

5.5.1.1. Content and Structural accuracy

The cross-validation of the findings obtained in Study 1 provided further support for the content and structural accuracy of the measure. None of the 42 M-BIP's items was dropped during the confirmatory factor analyses applied to test hypotheses 1-4, and all items loaded onto their a priori factors. Also, Hypotheses 1-4, which specified the factorial structure of the M-BIP, were all supported. The evidence based support for the content and structural accuracy of the M-BIP in a larger and more diverse dataset further suggests that Study 1's findings were not due to attributes of Study 1's modestly sized dataset (Fabrigar et al., 1999), but a function of the M-BIP's strong theoretical and empirical underpinnings. As such, Study 1's cautious suggestions of how the M-BIP fits into and contributes to the literature on innovative work behaviour can now be presented with greater confidence.

The assessment of the M-BIP's content and structural accuracy produced similar results in both the first and the second empirical study. The only change with respect to the results' implications, is that the second study provides further support for the already discussed theoretical implications in Study 1. In order to avoid unnecessary repetition, the implications of the satisfactory re-assessment of the content and structural accuracy properties of the M-BIP are briefly discussed.

Overall, the assessed CFA models and the evaluation of the discriminant validity of the M-BIP's latent factors, via the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015), suggest that the present thesis' objective to develop an exclusively behavioural model of innovative work behaviour, conforming to the a priori hypothesised factorial structure, was successfully achieved. In doing so, the M-BIP differentiates itself from existing models of innovative work behaviours that to varying degrees confuse innovative behaviours with innovative performance (see Tables 2.2, 2.4), specifically in relation to their corresponding idea generation and idea implementations stages (see Table 2.5). Furthermore, the M-BIP incrementally improves the existing models' capacity to describe the facilitators of the idea promotion stage by building upon their unique contributions and describing in detail the three behaviourally focused activities (i.e., Championing, Obtaining organisational approval, Recruiting assistance) that facilitate promotion. As such, the M-BIP presents a systematic explanatory framework that describes how individuals go about accomplishing the goals of the innovation process, rather than stating what the goals are. This is important because the M-BIP differentiates itself from the construct of innovative performance and hence, promotes definitional clarity and operational discriminance (Hughes et al., 2018; Potočnik & Anderson, 2016).

Moreover, the M-BIP provides a "purer" assessment of innovative work behaviour because it has replaced creativity related content found in existing models of innovative work behaviour (see Table 2.1) with behavioural descriptions of how individuals process and modify existing ideas so as to become germane to an organisational context (Hughes et al., 2018), rather than descriptors of how ideas are generated. Specifically, the M-BIP's idea development stage has an explicitly organisational focus and utilitarian orientation, which complies with theoretical rationales distinguishing the creative and innovation processes (Hughes et al., 2018; Potočnik & Anderson, 2016), and thus contributes to the discontinuation of the confusion between creativity and innovation. This is particularly important because such a distinction enables the differential assessment of the antecedents of creativity and innovation, and also the assessment of the "true" relationship between the two constructs, since the empirical evidence would not be biased due to the constructs' content overlaps, which can produce inflated and biased empirical estimates (Hughes et al., 2018).

Finally, another important contribution to the literature, derived from the empirical evaluation of the M-BIP's content and structural accuracy properties, is the re-affirmation that reflective behaviours are part of the construct, and that they should be modelled not as a distinct stage (e.g., Messmann & Mulder, 2012), but integrated within activities, because they transcend the innovation process (Rosing et al., 2018).

5.5.1.2. Cross-group stability of the M-BIP

The assessment of the M-BIP's stability across males and females, and English and Greek groups was conducted by examining the measurement invariance properties of the measure. Overall, results for both grouping variables were mixed regarding their scalar and strict invariance. However, taking into account that the models' fit indices suggest good models' fit, and the limitations of the criteria used to assess invariance, a cautious interpretation of the findings suggests that the M-BIP model is either invariant or approximately/practically invariant (Davidov, Cieciuch, Meuleman, Schmidt, Algesheimer, & Hausherr, 2015; Lek, Oberski, Davidov, Cieciuch, Seddig, & Schmidt, 2019; Millsap & Kim, 2018; Van de Schoot , Schmidt, Beuckelaer, Lek, & Zondervan-Zwijnenburg, 2015). The following discussion explains why I suggest the possibility that the measure is approximately/practically invariant.

The current status of the literature on measurement invariance has not provided clear guidelines on how to conduct and assess the invariance of scales that include categorical indicators using factor analytic techniques (Kite et al., 2018; Bowen & Masa, 2015; Sass, 2011). Thus, the assessment of measurement invariance using the WLSMV estimator relied on criteria that have been benchmarked using other estimators (i.e., ΔAFI; Bowen & Masa, 2015; Sass, 2011), and criteria that inflate Type 1 errors (i.e., DIFFTEST; Kite et al., 2018). This practical problem is magnified by the fact that establishing measurement invariance requires zero tolerance (i.e., Cross-model's parameters should be identical) in the deviation of models' parameters across groups (Van de Schoot et al., 2015). Several researchers have questioned the practical utility of posing zero tolerance constraints across models, because it causes models with negligible parameter differences to be found non-invariant (Lek et al., 2019; Davidov et al., 2015; Van de Schoot et al., 2015). Accordingly, researchers have argued about the potential value of testing for approximate invariance that permits some variation on the constrained parameters across models (Lek et al., 2019; Davidov et al., 2015; Van de Schoot et al., 2015). Thus, considering the limitations of the assessment criteria, and the fact that ΔAFIs did not indicate non invariance, because the model fit did not deteriorate, and AFIs suggested good fitting models (see Tables 5.7 and 5.8), it is assumed that the present study's empirical evidence implies that at worst the differences across groups are practically and realistically negligible. Hence, a cautious evidence-based initial interpretation of the findings is that the M-BIP is invariant across sex and country grouping variables.

Accounting for the limitations and ambiguity of the present study's measurement invariance findings, it is suggested that practically the M-BIP taps the same construct regardless of sex and country group membership. Furthermore, taking into account that for both grouping variables, and across samples, the M-BIP retained its structural stability, it is safe to assume that examining its relationships with other external variables would not produce misleading results due to within sample sub-groups differentially interpreting the construct (i.e., configural invariance), and due to unequal variation of the factors' scores following the differential contribution of each item in the factors' scores across groups (i.e., Metric invariance) (Wu et al., 2007). Here, it should be noted that for the country grouping variable, three items (i.e., Spent time identifying my department's weaknesses; Pushed the idea with determination even if people did not find it appealing in the first place; Persisted when superiors were unconvinced / hesitant) were identified to be differentially contributing to three different dimensions, and thus only partial metric invariance was achieved. What they all have in common is that they demonstrated higher factor loadings in the Greek sample, indicating that these behaviours are more central to the innovation process in the Greek sample. Whereas, one option would be to remove these items, it was decided to retain them for two reasons. First, it has been suggested that a small number of biased items might have a minimal impact for the majority of the uses of a measure (Millsap & Kim, 2018; Stark, Chernyshenko, & Drasgow, 2004). Second, the removal of these items would have a negative impact on the construct's content representativeness. Thus, taking into account that these three items are non invariant only for the country grouping variable, it was decided to be retained. Accordingly, since only 3 out of 42 items were found not to show metric invariance, it is argued that it is safe to assume that the relationships of the M-BIP model and external variables are also comparable across Greek and English groups (Dimitrov, 2010). Furthermore, based on the provided interpretation of the study's findings, it appears that the mean scores of latent variables are comparable across groups and thus across groups individuals did not attribute different meanings to items (i.e., Scalar invariance) and that the between items differences are accounted for true latent factors' differences across groups and not due to group membership related biased interpretations of the items (i.e., Strict invariance). Whereas the examination of the latent variables mean score differences was beyond the scope of the present thesis, nevertheless, the present study's findings suggest that the measure is not biased and that the M-BIP could be used for making such assessments in future research. In fact, the observed latent factors' mean differences (see Section 5.4.2.1.) indicate that there are no differences between males and females across 6 out of 7 factors of the M-BIP, with the exception of the factor of obtaining organisational approval, whereby females scored lower than males. However, with respect to the country grouping variable, significant across groups' latent factors' means were observed for 6 out of 7 factors of the M-BIP, whereby the Greek group scored lower than the U.K. group in all factors, with the exception of the opportunity exploration factor in which the Greek group scored higher, and the implementation facilitation factor in which no difference was observed.

5.5.2. Appropriateness properties of the M-BIP

Following the evaluation of the M-BIP's accuracy properties a series of empirical tests was conducted to assess the appropriateness of the instrument.

Regarding the convergent validity of the M-BIP, the magnitude of correlations was shown to be at the expected range, both with self- and supervisor rated innovative work behaviour. Specifically, the global M-BIP's scale correlated at .77 with self-report ratings of the De Jong and Den Hartog measure of innovative work behaviour, and therefore above the recommended minimum value of r = .70 (Carlson & Herdman, 2012), and correlated at .40 with supervisor ratings of the De Jong and Den Hartog's measure of innovative work behaviour, which again is deemed reasonable when examined with respect to the literature assessing the convergence of multi-source ratings (Harris & Schaubroeck, 1998; Heidemeier & Moser, 2009). Thus, the M-BIP is found to be converging as hypothesised to both single- and multi-source ratings of innovative work behaviour. However, it is worth discussing the partial support Hypothesis 7 received, as the M-BIP's idea development scale correlated more weakly with the De Jong and Den Hartog's (2010) seemingly conceptually closer stages of idea exploration (r = .49) and idea generation (r = .54), than with the conceptually more distinct stages of idea championing (r = .58) and idea implementation (r = .62).

Regarding the correlation between the M-BIP's idea development scale and De Jong and Den Hartog's idea generation scale, the finding is not that surprising, considering that it is not a scale assessing behaviours, but exclusively assesses product indicators. For the scale of idea exploration though, the magnitude of correlation is unexpected, particularly when taking into account that De Jong and Den Hartog operationalised this stage exclusively in behavioural terms, and moreover, used behavioural items, that are included, among others, in the M-BIP. Upon further inspection, a plausible explanation for this finding was identified in the sub-optimal functioning of an item found in De Jong and Den Hartog's idea exploration stage. Specifically, the item "Pay attention to issues that are not part of his daily work" displayed a weak factor loading (.352) and also, weakly correlated with the other two items tapping idea exploration in De Jong and Den Hartog's measure (r =.34 and r = .24). This item from the De Jong and Den Hartog opportunity exploration scale (i.e., Pay attention to issues that are not part of his daily work) correlated at .17 with the M-BIP's idea development scale, whereas the other two items from the De Jong and Den Hartog opportunity exploration scale correlated with the M-BIP's idea development scale at .46 and .51. As discussed in Chapter 2 (p. 73), this item was initially considered for inclusion in the item pool for the M-BIP. However, during the preliminary examination of the response processes elicited by the items, a reviewer of the items pointed out that this item represented a measure of procrastination or distraction (i.e., The item could be potentially interpreted as an enquiry of whether the respondent paid attention to issues that were neither part of his/her daily work nor part of innovative work behaviour, such as sport, fashion, or politics). Thus, this item was adapted as it was deemed to be an inaccurate measure of the opportunity exploration element of innovative work behaviour. Therefore, it is suggested that this might be an explanation for the sub-optimal functioning of this item, and for the weaker than expected correlation between idea development and idea exploration stages of the two measures.

Following the investigation of the convergent validity of the M-BIP, the instrument's discriminant validity was assessed against the construct of personal initiative (Frese et al., 1997). Results supported the distinctiveness between the two constructs both at a global and at a lower order level, and showed that despite the constructs' similarities, they are unique and different. Furthermore, the magnitude of correlations observed in the present study between the M-BIP and personal initiative did not significantly differ from the ones found in the empirical literature (Daniels et al., 2011; Binnewies & Gromer, 2012), thus providing further supportive evidence regarding the close relationship of the construct of personal initiative and the process of individual innovation. Furthermore, results indicate that the M-BIP does indeed have a forward looking, proactive orientation (Parker & Collins, 2010). The M-BIP includes all the types of characteristics and behaviours that constitute proactive behaviour and it is argued that the optimal way to develop innovative outcomes is to behave proactively. Proactive behaviour is a change oriented, forward thinking behaviour, which incorporates the elements of environmental scanning, anticipation, planning, persistently acting upon plans, and regulating actions upon monitoring behaviours and actively seeking and constructively using feedback (Crant, 2000; Grant & Ashford, 2008; Parker & Collins, 2010; Frese & Fay, 2001; Zacher & Frese, 2017). As was illustrated during the presentation of M-BIP in Chapter 3, all these elements are repeatedly emerging throughout the innovation process, and all these proactive behaviours have been tapped by the M-BIP's items.

Next, the current study was the first one to empirically demonstrate that an exclusively behavioural measure of innovative work behaviour is a significantly positive moderately strong predictor of innovative outcomes, as demonstrated by the fact that the 99% confidence intervals, for all direct effects, did not include zero. Additionally, the substantial percentage of incremental variance explained over and above self- and supervisor rated innovative work behaviour (De Jong & Den Hartog, 2010) further suggests that the M-BIP provides an improved description of the individual level innovation process which is associated with producing innovative outcomes. What reinforces this finding, compared to Study 1 of this thesis, is that results were not due to self-report biases, as innovative outcomes were independently rated by supervisors. The value of using an exclusively behaviourally oriented measure of innovative work behaviour is further supported by the supplementary analyses conducted with the De Jong and Den Hartog's measure, which once more revealed that the issue of predictor-outcome circularity can produce biased empirical estimates (Hughes et al., 2018). Whereas, in Study 1 the removal of the product items from Holman et al. (2012) measure decreased explained variance, in this study the effect was in the opposite direction. This is suggested to be a function of the rating source of the dependent variable. Upon inspecting the means and standard deviations for the product indicators of the De Jong and Den Hartog (M = 3.99, SD = 1.42) and the innovative outcomes measure (Innovative products M = 3.02, SD = 1.40; Innovative services M = 2.55, SD = 1.19; Innovative procedures M = 3.19, SD = 1.37), it was evident that employees believed they were substantially more innovative than their supervisors thought them to be. Hence, the presence of product indicators in the self-report measure instead of inflating the relationship with the outcome variable, suppressed it because the supervisor and self-report ratings did not converge. Therefore, the discrepancy between self- and supervisor reported scores suggests that the predictor-outcome circularity can both inflate, as observed in Study 1, and suppress effects, as observed in the current study.

Despite, the strong support provided for the predictive validity of the M-BIP, a noteworthy observation is the large M-BIP's inter-factor correlations produced in the correlated predictive model (Ranged from .84 to .97). One potential explanation could be that the stages are highly similar. However, it is argued that this is not the case for three reasons. First, the assessment of the response processes in Study 1 revealed diverse thought processes across stages and activities. For example, the following 6 sample responses, provided by participants, for items included in the factors of opportunity exploration, championing and implementation facilitation clearly indicate that participants refer to issues that are not identical, because the qualitative assessment of these responses suggests that the items draw on different types of innovative behaviours

Opportunity exploration example response 1: I sometimes talk with my colleagues about new trends in products that are relevant to our job.

Opportunity exploration example response 2: It is very important for me to know all malfunctions in my job. I constantly observe and ask my colleagues about any problems they face.

Championing example response 1: I can be persistent when pitching an idea of mine but only if I am extremely confident of its value and I think that my colleagues' objections can be succumbed.

Championing example response 2: It is the nature of the job that requires team work and coordination. So when I propose a change I seek for every colleagues' opinions.

Implementation facilitation example response 1: I discussed with my superiors about the progress when certain milestones were achieved. Day to day tasks though were handled by myself.

Implementation facilitation example response 2: I inspected the project on a daily basis so as to make sure that each person was keeping up with the rest of the team and that resources were being put to good use.

Second, the examination of the factorial structure of the M-BIP, conducted in both Study 1 and Study 2, showed that both the theorised stages and underlying activities are discriminantly valid, and that the hypothesised model is a better descriptor of the data than the alternative ones. Third, the theoretical content of the M-BIP clearly indicates that the underlying behaviours are different among activities.

The proposed theoretical explanation for the observed high inter-factor correlations has two elements, both concerning how the stages are linked to each other. First, the observed high inter-factor correlations might reflect the proposal made by several scholars that the innovation process is not a linear progression through discreet stages, but often involves pursuing stages simultaneously and transitioning from one stage to another and back again (Anderson et al., 2014; Hammond et al., 2011; Messmann & Mulder, 2012; Paulus, 2002; Rosing et al., 2018; Scott & Bruce, 1994; Shalley et al., 2015). Thus, the magnitude of correlations could be viewed as due to the re-iterative nature of the innovation process (Anderson et al., 2014; Rosing et al., 2018). However, considering that this study is cross-sectional, and thus, no assertions containing temporal connotations can be made, this is an explanation that cannot be satisfactorily supported with the available evidence, but is logically plausible.

Second, it is suggested that the high inter-factor correlations can be interpreted in the light of the proposal made in Chapter 3, that the innovation process is a hierarchy of inter-related goals (Cropanzano et al., 1995; Gutman, 1997), and in line with Rosing and colleagues' (2018) findings ,which suggested that the stages of the innovation process are interdependent. As such, the innovation process can be understood as a chain of sub-goals that enables the facilitation of the superordinate goal which is no other than the implementation of the innovative idea. In that respect, the M-BIP's stages are characterised by high inter-dependency, as the attainment of sub-goals is a necessary prerequisite in order to proceed to the next stage. For example, it is sensible that unless an idea has been developed there is no rationale to proceeding into the next stages, as both promotion and implementation are relevant only when an innovative idea has been developed (Paulus, 2002). Therefore, it is assumed that the observed high inter-factor correlations are attributable to both the interdependency of the stages, and to the recursive components of the process. These stage transition mechanisms are suggested to occur simultaneously, as it would be unrealistic to assume that the objective of one stage would be always perfectly achieved. For example, individuals who diligently applied the behaviours described under the idea development stage, might notice, when actually approaching co-workers and superiors, that there are obstacles they were unaware of, and thus the need to reflect on their ideas' attributes might emerge (i.e., Return to the idea development stage).

Furthermore, apart from the two proposed theoretical explanations, the observed high inter-factor correlations might be due to methodological limitations inherent in cross-sectional survey designs. First, self-report ratings are unavoidably susceptible to a number of sources of common method bias, such as social desirability, consistency motif or common scale formats (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The consistency motif bias might be relevant in this case as participants might try to appear to behave consistently across activities even when they did not actively engage in some of them. The nature of individual survey-based assessments of innovative work behaviour is such that the same person is being asked to think about their involvement at all stages. In reality though, many innovations are collaborative and thus, an individual's involvement in any activity might differ depending on the project. Nevertheless, the consistency motif bias is likely to make the survey participants respond consistently throughout the survey even though they did not actively participate in some activities assessed by the M-BIP. Thus, it is likely that such high inter-factor correlations might be an unavoidable limitation of the measurement approach.

Altogether, the M-BIP's appropriateness state is deemed satisfactory, as it has been shown to acceptably converge with a theoretically similar construct, to diverge from a distinct but closely related construct, and to predict the production of innovative outcomes, which is the a priori superordinate goal of the innovation process.

5.5.3. Nomological network

The examination of the M-BIP's position within the established innovative work behaviour's nomological network aimed to evaluate whether the extended content of the construct, and the explicit focus on narrower behavioural descriptors, altered the construct's documented relationships with the three predictors of innovative work behaviour. Overall, results supported ten out of the twelve stated hypotheses.

Consistent with the empirical literature (Chen et al., 2016; De Jong, 2007; Hammond et al., 2011; Janssen, 2005; Krause, 2004; Messmann & Mulder, 2012) results indicate that having a supportive supervisor is positively, albeit weakly, associated with idea developing, promoting, and implementing behaviours. The relative uniformity of the direct effects of supervisor support on the three M-BIP stages indicates that, as hypothesised, being supported by supervisors is equally important to initiate, sustain and complete the innovation process. As such, supportive supervisors are assumed to embody a safety net, encouraging employees to take their chances in initiating innovative proposals (Byron et al., 2010; Edmondson, 1999), and a valuable resource upon which employees can draw on during idea promotion and implementation (Janssen, 2005; Skerlavaj et al., 2014).

Job control's positive moderate effect on all three stages of the innovation process was also demonstrated, in alignment with the empirical literature (Battistelli et al., 2013; Hammond et al., 2011; Holman et al., 2012; Krause, 2004; Orth & Volmer, 2017). Results suggest that job control can constitute an useful resource for innovators (Bakker et al., 2005). Contrary to expectations, job control has a similar moderate effect on idea development and idea implementation, departing from Hammond et al.'s (2011) meta-analytic findings that showed job control's effect to be larger for implementation rather than ideation. A plausible explanation is that the relationships have been somewhat altered due to the focal shift of the idea development stage. Whereas Hammond and colleagues' ideation stage substantially overlapped with creativity, idea development excludes such content and is innovation specific. Thus, in comparison, the M-BIP's idea development is considerably more conceptually close to the M-BIP's idea implementation, than Hammond and colleagues' ideation operationalisation was conceptually close to their implementation operationalisation. Thus, this finding might be a manifestation of how external variables correlate with stages of innovative work behaviour when they are not contaminated by construct irrelevant content. Another plausible explanation might be the previously discussed inter-dependence of the stages, which is also, partially, a function of the M-BIP's differentiated content. For example, idea development explicitly requires initiating forward-looking proactive behaviours so as to increase the raw ideas' compatibility with the organisation and its people. Individuals though, operating within a rigid organisational environment, allowing limited procedural freedom, might not spend time developing an innovative idea, considering the difficulties they would subsequently face in the latter stages of the process. Therefore, low levels of job control can stifle innovation at its onset, by decreasing employees' motivation to attempt to develop an innovative idea (Hennessey & Amabile, 2010).

Regarding openness to experience, given that theoretical considerations and empirical evidence has shown that the trait-context interaction provides a more fine grained understanding of how personality traits translate into behaviours (Anderson et al., 2014; George & Zhou, 2001; Judge & Zapata, 2015; Tett & Guterman 2000; Tett & Burnett 2003; Woods et al., 2018), a series of moderated hierarchical regressions were implemented, whereby job control and organisational tenure were treated as the moderating variables.

Results showed that job control moderates, albeit very weakly, the relationship between openness to experience and global M-BIP, idea promotion, and idea implementation, but not for idea development. Employees high on openness to experience engage more frequently in innovative behaviours when operating within organisations that allow their employees to control how they go about doing their jobs. According to trait activation theory (Tett & Guterman 2000; Tett & Burnett 2003), these findings show that job control represents a relevant situation characteristic that has the potential to facilitate the activation of the openness to experience trait when it is weak (i.e., high job control) but can stifle openness to experience when it is strong (i.e., low job control).

The fact that the job control x openness to experience interaction term did not predict idea development is attributed to the nature of the behaviours forming that stage. The behaviours constituting idea development depict primarily intra-personal cognitions that can expressed at one's own volition, and without departing from institutional behavioural norms. Thus, being receptive to information, inquisitive, imaginative (Costa & McCrae, 1992; McCrae & Costa, 1997) or wanting to learn more about a work-related topic, could occur even when an organisation does not grant increased job control. Although job control is a positive predictor of idea development, that does not mean that job control could activate or suppress the innate propensity of individuals high on openness to experience to engage in idea development behaviours. Thus, the manifestation of the mental intra-personal behaviours, underlying the idea development stage, is proposed to be a function of the personal inclination to behave in a trait consistent way. This interpretation was also supported by the supplementary assessment of the interaction term's effect on De Jong and Den Hartog (2010) measure, whereby, the interaction effect of openness to experience x job control was significant for idea championing, which involves interpersonal behaviours, constrained by the social context, but non significant for idea exploration, which involves primarily intra-personal cognitions that can expressed at one's own volition

The examination of the effects of the organisational tenure x openness to experience interaction term on the M-BIP confirmed all but one hypotheses, however results were exactly the opposite than those of Woods et al. (2018). High organisational tenure appears to strengthen the positive relationship between openness to experience and the global M-BIP, idea promotion and idea implementation, but not with idea development. This discrepancy might have emerged because the present study's sample is more diverse and the tenure range is larger than in Woods and colleagues' study. Organisational tenure has been associated with several characteristics that might either promote or suppress innovative behaviours For example, high tenure is associated with accumulated work related experience and contextual knowledge, heightened understanding of organisational strategies and politics, but also with being set in the existing ways of doing things, engaging in habitual behaviours and having an aversion to change (Hammond et al., 2011; Ng & Feldman, 2010, 2013; Woods et al., 2018). Therefore, organisational tenure appears to be a proxy variable for confounding variables that moderate the relationship between openness to experience and the M-BIP. Thus, for individuals low on openness to experience high organisational tenure might activate the trait consistent preference for habitual behaviours and a desire to sustain organisational routine. For individuals high on openness to experience, the accumulated knowledge and heightened understanding of the organisation associated with high tenure, could provide a contextual situation which activates the openness to experience trait and enables individuals to translate their dispositional tendencies into idea promotion and implementation behaviours. Thus, it is suggested that high organisational tenure enables the capitalisation of the innovation relevant positive characteristics associated with the prolonged presence in a given organisation, and individuals who are dispositionally open to new ideas and innovative procedures take advantage of these conditions and engage in the promotion and the implementation of their innovative ideas.

Regarding the rejection of the hypothesis concerning idea development, it was assumed that the reason is similar to that discussed for job control. Specifically, it is argued that organisational tenure is not a relevant or weak situation that can enable or suppress the translation of openness to experience to cognitive behavioural manifestations. Naturally curious and inquisitive individuals would think in a similar manner regardless of whether they work in the organisation for 1 or 20 years. The supplementary analyses with De Jong and Den Hartog's measure further supported the assumption that high organisational tenure does not suppress the effect of openness to experience on idea development, because trait consistent cognitive behaviours would be manifested regardless of the length of the organisational tenure.

In conclusion, the examination of the nomological network of innovative work behaviour through the selection of three predictor variables tapping the three types of predictors commonly found in the literature on innovative work behaviour, produced an overall picture consistent with the empirical literature but with some differentiated relationships, which nevertheless were expected when accounting for the differentiated content of the M-BIP (i.e., the exclusion of broad behaviours, of creativity indicators, and innovative product indicators, and the inclusion of specific/reflective behaviours). However, although the construct's content could be a reasonable explanation for the differentiations observed, which were earlier presented and discussed, it would be premature to state that the added construct's content definitively changed the nature of the relationships, based on the assessment of just three predictor variables. Nevertheless, the present study's results, alongside the supplementary analyses conducted, might suggest that to be a well-substantiated possibility. Furthermore, the comparison of the interaction findings at a global and stage level indicate the usefulness of using a multi-dimensional measure, as it enables a more detailed understanding of the effects of antecedent variables on innovative behaviours. These differentiations would have been impossible to assess if the construct was operationalised uni-dimensionally.

5.5.4. Limitations

One limitation of the present study is its cross-sectional design which did not permit causal inferences. Whereas for the predictive model, it is unlikely that a reverse causal relationship could exist, with the produced innovative outcomes causing innovative behaviours, reverse causality cannot be ruled out in the examination of the nomological network of the M-BIP. For example, it is plausible that employees who have consistently proven their innovative capabilities would be granted increased job control or would be supported by their supervisors. In that respect job control and supervisory support could be a consequence of successfully implemented innovative work behaviours. Therefore, a bidirectional causality is plausible, but could not be tested with the adopted cross-sectional design.

One further limitation of the present study is that the examination of the nomological network was based on self-report data, and therefore the presence of common method bias cannot be ruled out. Self-report ratings might be influenced by social desirability and consistency motif biases (Podsakoff et al., 2003), which could affect the relationship between the M-BIP and the three predictor variables.

Another limitation concerns the measure chosen to assess openness to experience. Although the TIPI (Gosling et al., 2003) is useful for practical purposes and has acceptable convergent validity with multi-item measures of the Big 5, results should be interpreted with caution as 2 items can only superficially cover the construct's content and do not allow a facet level examination, which could provide more fine-grained information regarding the trait-situation interaction.

Finally, another limitation of the present study is the reliance on single level data. Multi-level analysis could provide a more rigorous investigation of how individual innovative behaviours are affected by organisational contextual variables, and also assist the investigation of whether different types of organisations require alternative ways of engaging in the innovation process.

5.5.5. Summary

Study 2 of the present thesis provided a thorough evaluation of the accuracy and appropriateness of the M-BIP and assessed how this measure positions itself within the established nomological network of innovative work behaviour. Overall, the newly developed instrument displayed good model fit, hence, supporting its hypothesised multi-dimensionality, and ensured its content representativeness. Moreover, for the purposes of the present thesis and accounting for the unavoidable methodological limitations, the M-BIP appears to be invariant or at worst practically or approximately invariant. Furthermore, the measure's convergent, divergent, and predictive validity were thoroughly assessed on a diverse sample of sufficient size, and the measure's predictive validity was further strengthened by the use of multi-source ratings. Finally, the nomological network was tested and findings overall supported the established relationships. Additionally, the examination of the nomological network of innovative work behaviour revealed the usefulness in using a multi-dimensional measure, because global innovative work behaviour scales impede the evaluation of the relationships between the antecedent variables and the different stages of the innovation process (Baer et al., 2015; Hammond et al., 2011; Hughes et al., 2015). The general implications and conclusions of the present study are discussed in Chapter 6.

Chapter 6

General Discussion

This chapter presents and discusses how the present thesis made a contribution to the literature on innovative work behaviour . The literature on innovative work behaviour is focused on the individual level innovation process, and one of its main objectives should be the modelling of the process's stages and the identification of the underlying behaviours that facilitate the objectives of the stages. Accordingly, models of innovative work behaviour form a theoretical and empirical research framework that enables the examination of the individual and contextual factors that promote or suppress individual innovativeness. The scholarly assessment of the facilitators and suppressors of individual level innovativeness is particularly important for organisational practice (Bos-Nehles et al., 2017; Hammond et al., 2011).

The present thesis detailed a research project designed to address two important questions:

1. Which behaviours and activities constitute innovative work behaviour?
2. Can these behaviours and activities be grouped into discrete stages?

To evaluate how these questions have been addressed in the existing literature, I conducted a systematic literature review of empirically tested models of innovative work behaviour. This literature review presents one of this thesis' notable contributions, because it systematically detailed and critically discussed the strengths and limitations of existing models regarding their conceptualisation and operationalisation. The major conclusions of the systematic review are four. First, models of innovative work behaviour have sub-optimally captured the behavioural content of the construct, because they include construct irrelevant content. Specifically, to varying degrees, existing models of innovative work behaviour include creativity and innovative products/performance related content. Second, models of innovative work behaviour under-represent the construct's content both because they include construct irrelevant content and also because their behavioural focus is predominantly broad, thus abstractly describing the individual behavioural facilitators of the innovation process. Third, the measurement of innovative work behaviour has been negatively affected by the limitations of the corresponding theoretical models, and thus existing measures do not capture the entirety of the construct, and also assess creativity and innovative performance. Fourth, the empirical assessments of the measures' validity only implemented a fraction of the available methodologies, thus measures were poorly constructed and their accuracy and appropriateness status could not be properly assessed, because of the lack of empirical evidence.

To address the identified limitations of the literature and answer the first question (i.e., Which behaviours and activities constitute innovative work behaviour?), I conducted a systematic review of the literature on innovative work behaviour, and also sought for relevant sources of information in inter-disciplinary literatures. In doing so, I integrated relevant intra- and inter-disciplinary knowledge, thus capitalised on the unique contributions of existing models of innovative work behaviour, and filled in the gaps with knowledge provided in other research fields, such as the literatures on championing, resistance to change, and implementation management. Via this integrative approach, I developed an updated model of innovative work behaviour, the M-BIP, with the intention to create a more comprehensive taxonomy of innovative work behaviours that described the behaviours involved in producing innovative outcomes.

To test the M-BIP, and thus answer the second question (i.e., Can these behaviours and activities be grouped into discrete stages?) I conducted two complementary empirical studies. The two empirical studies suggest that the developed M-BIP provides a satisfactory answer to the second question concerning the behavioural content of innovative work behaviour and its dimensionality. Specifically, factor analytic techniques in separate samples (*n* = 294 and *n* = 861) support the a priori specified content and structural accuracy of the measure. As such, all the behaviours theorised to be parts of the M-BIP (see Chapter 3) are actually measured by the M-BIP scale, and the hypothesised structure of the M-BIP, as specified by Hypotheses 1-4, is supported. Furthermore, the examination of the discriminant validity of the M-BIP' factors, using the Heterotrait-monotrait (HTMT) ratio of correlations method (Henseler et al., 2015), provides further support for the distinctiveness between the M-BIP's activities and stages, whereas the examination of the response processes, via the inspection of the thought processes/cognitions prompted by the M-BIP's items, also suggests the distinctiveness between activities and stages. Moreover, the M-BIP appears to be stable across samples, and across sex and country grouping variables. Additionally, the M-BIP is shown to converge as hypothesised with existing models of innovative work behaviour, is shown to predict self- and supervisor rated innovative outcomes, and to diverge from the related but distinct construct of personal initiative (Frese et al., 1997). Moreover, the M-BIP's position within the established nomological network of innovative work behaviour is shown to be largely consistent with the empirical literature, although some differentiations appeared (see Section 5.5.3), which are attributable to the novel and differentiated content introduced into the M-BIP compared to existing models of innovative work behaviour. Specifically, results supported 10 out of 12 stated hypotheses, concerning how the M-BIP fitted within the established nomological network of innovative work behaviour. Results showed that the interaction terms of openness to experience with job control, and organisational tenure were non-significant only when regressed on the idea development stage. A detailed discussion of these findings was presented in section 5.5.3.

The remainder of this chapter discusses how the present research project has addressed the limitations of the literature on innovative work behaviour, by stating the thesis' contributions to the theory and measurement of innovative work behaviour. Furthermore, the potential practical implications derived from this research project are presented. Subsequently, the general limitations of the study are discussed and recommendations for future research are made.

6.1. Present thesis' contributions

The present thesis makes six contributions to the literature on innovative work behaviour. The first four contributions are predominantly of a theoretical nature, and the last two are predominantly empirical. This section first summarises the contributions and subsequently discusses them. The first contribution of the present thesis is the development of a novel, comprehensive and integrative theoretical model of innovative work behaviour with an explicit behavioural focal orientation. The second contribution of the present thesis is that the M-BIP integrates aspects of both the "linear" and "complexity" perspectives (Rosing et al., 2018), thus provided a more realistic description of the innovation process. The third contribution of the thesis is that the M-BIP clearly differentiates creativity from innovative work behaviour. The fourth contribution of the thesis is that the M-BIP clearly distinguishes between the innovation process and innovative products/performance. The fifth contribution, which is of empirical nature, is the empirical support provided for the multi-dimensionality of the construct of innovative work behaviour. Finally, the sixth contribution, concerns an empirical contribution to the measurement of innovative work behaviour, through the development of an accurate and appropriate measure of innovative work behaviour.

The first major theoretical contribution of the present thesis is the development of a novel theoretical model of innovative work behaviour explicitly focusing on behaviours. This was accomplished through the integration of the unique aspects of each existing model of innovative work behaviour, the omission of aspects that referred to creativity and innovative products/performance, and by filling in the gaps through infusing knowledge found in relevant and underutilised literature (Adams et al., 2006), such as the literatures on championing, implementation, and resistance to change. This synthesis and extension is important because there is a wealth of inter-disciplinary knowledge providing answers for questions directly related to the objectives of the literature on innovative work behaviour. For example, the literature on championing has provided some evidence based answers concerning the question of how individuals can promote their innovative idea, whereas the literature on implementation management has presented an abundance of information regarding best practices and behaviours facilitating implementation. Considering that the literature on innovative work behaviour has previously neglected discussing the specific behaviours facilitating promotion and implementation, as illustrated in Sections 2.3.2, 2.2.3.2 and 2.2.4.1 (see also Tables 2.2 and 2.5), integrating interdisciplinary knowledge into a model of innovative work behaviour fills in these gaps. In doing so, the present study constructively utilises and unifies the scattered literature (Hughes et al., 2018; Walker & Batey, 2014) and incrementally contributes to a more comprehensive description of the behaviours involved in the development, promotion, and implementation of innovative ideas.

The second major theoretical contribution of the present thesis is that the M-BIP integrates aspects of both the “linear” and “complexity perspectives” (Rosing et al., 2018). Specifically, the M-BIP's development process (see Chapter 3) accounted for the limitations of the activity stage framework of innovative work behaviour modelling, and both empirical studies provided some evidence supporting Rosing et al.'s (2018) evidence based recommendation that innovation modelling should integrate aspects of both perspectives. Previous studies have either adopted the "complexity perspective" (e.g., Den Jong & Den Hartog, 2010; Janssen, 2000; Kleysen & Street 2001), which does not account for the distinctiveness between the stages, the need for some form of separation, and the fundamental axiom that idea development predates idea implementation (Rosing et al., 2018), or the "linear perspective" (e.g., Dorenbosch et al., 2005; Holman et al., 2012; Krause, 2004) which does not account for the iterative nature of the innovation process and the fact that behaviours primarily categorised under the early stages of the innovation process are likely to re-appear in the latter ones (Rosing et al., 2018). Messmann and Mulder (2012) attempted to bridge that gap among the two perspectives by introducing the stage of reflection, however, the fact that reflective behaviours remained compartmentalised in a discreet stage still renders their model to adhere to the "linear perspective".

The present study's theory development and empirical findings are deemed to be supportive of Rosing et al.'s (2018) observations and comply with their recommendations. Specifically, the implemented factor analytic techniques and the correlated predictive models, specified in both studies, have shown that the M-BIP's stages and activities are indeed separate and discriminantly valid but interdependent, and a certain sequential order is in place at the macro-level. I concur that at a macro-level the innovation process has indeed an oversimplified pre-defined temporal course, which reasonably starts with the development of an innovative idea and ends with its implementation. This macro-level separation of stages has been repeatedly called for in the empirical literature (Baer et al., 2015; Bos-Nehles et al., 2017; Hammond et al., 2011; Hülsheger et al., 2009) because it enables the identification of individual level and contextual factors that facilitate innovation. However, at a micro-level, reflective behaviours initiate sub-processes that are characteristic of previous stages. At a micro-level, the temporal evolution of the process cannot be realistically and meaningfully depicted with a stage-like "linear perspective" (Anderson et al., 2014; Bledow et al., 2009). In the real world, individuals might re-initiate idea developing behaviours because colleagues and superiors were not fully convinced about the value of the idea, or because during implementation employees realised that the idea was not feasible. The present study has attempted to integrate this "complexity perspective" into the M-BIP while retaining the distinctiveness between its stages and activities, not just by theorising that the process was re-iterative, but by empirically demonstrating that reflective behaviours are core components of the primary factors (i.e., activities). It should be noted though, that the temporal order of the behavioural manifestations of the innovation process could not be explicitly assessed with the present cross-sectional design, but the fact that reflective behaviours load onto their a priori designated factors provides an approximate indication that Rosing et al. (2018) findings are supported by the present thesis. Moreover, the fact that the correlated predictive models were shown to be better descriptors of the innovation process compared to the linear predictive models in both studies, is another approximate indicator that the M-BIP has successfully combined the "linear" and "complexity" perspectives.

The third major theoretical contribution of the present thesis is that the M-BIP differentiates creativity from innovative work behaviour. Specifically, the M-BIP is the first model of innovative work behaviour that aimed to systematically remove creativity related content, and provide a more accurate and precise assessment of innovative work behaviour, thus addressing the issues of conceptual clarity and lack of operational distinctiveness between the constructs and the measures of creativity and innovation (Hughes et al., 2018; Potočnik & Anderson, 2016). As extensively discussed throughout the present thesis, creativity and innovation are terms that have often been used interchangeably, in the empirical literature, as if they capture the same construct (Baer, 2012; Sears & Baba, 2011), and it has often been the case that models of creativity included innovation related content and vice versa (Hughes et al., 2018; Potočnik & Anderson, 2016). For example, Amabile and Pratt (2016), and Mumford et al. (1991), in their models of creativity process, described processes that are similar to the M-BIP's strategic adaptation. Specifically, Amabile and Pratt, and Mumford and colleagues suggested that novel ideas should be evaluated in terms of their usefulness and appropriateness for a given context, prior to their subjection to the organisational implementation process. Thus, Amabile and Pratt's, and Mumford and colleagues' conceptualisations of creativity made the explicit assumption that the construct of creativity should include processes that relate to how a creative idea should be best managed in order to be implemented. Hence, the M-BIP is substantially differentiated from these two creativity models because the M-BIP explicitly states that creative ideas are not necessarily part of the innovation process (Anderson et al., 2014; Hughes et al., 2018; Potočnik & Anderson, 2016), and that behaviours explicitly referring to the innovation process should be part of the construct of innovative work behaviour.

Furthermore, all existing models of innovative work behaviour, to varying degrees, include some elements of creativity (see Section 2.3.1), and thus promote and perpetuate definitional confusion. Although, the M-BIP does not include creativity related content (i.e., behaviours describing how ideas are generated), the M-BIP's opportunity exploration activity is, at an abstract level, analogous to creativity sub-processes, as modelled by Amabile and Pratt (2016) and Mumford et al. (1991). Specifically, Amabile and Pratt (2016), and Mumford et al. (1991) suggested that the creativity process starts with the identification of a goal, which is facilitated through gathering information. The identification of a goal, albeit an innovation related goal (i.e., opportunity) that can trigger the innovation process, is also the objective of the M-BIP's opportunity exploration stage. However, this conceptual overlap is not deemed to be problematic, and indicative of conceptual imprecision, as generally, all types of processes aiming at achieving a goal, need first to identify the goal (Gutman, 1997). What meaningfully distinguishes the M-BIP's opportunity exploration from the creative goal identification is that opportunity exploration behaviours are explicitly focused on identifying opportunities that are grounded in a specific organisation's problems, needs, and areas that could be improved, with the explicit intention to act upon the identified opportunities (Hughes et al., 2018). Hence, the M-BIP's broad idea development stage focuses exclusively on innovative behaviours by describing the behaviours associated with identifying opportunities and adapting raw ideas to fit a given organisational context, rather that discussing how these ideas are generated (see Section 3.2.1 for an extended discussion). The distinction between creativity and innovation is also important from a measurement point of view, because it enables the differential assessment of the antecedents of creativity and innovation. Additionally, this distinction enables the assessment of the "true" relationship between the two constructs, since content overlaps among constructs' operationalisations could negatively affect the constructs' discriminant validity, which could produce inflated and biased empirical estimates (Hughes et al., 2018).

Having argued that the M-BIP clearly differentiates between creative and innovative behaviours, it is important to discuss how the M-BIP fits into the literature on creativity and innovation, and specifically into the two popular theories of creativity and innovation (i.e., Amabile and Pratt's (2016) Dynamic Componential Model of Creativity and Innovation, and Mumford, Mobley, Reiter-Palmon, Uhlman, and Doares' (1991) Creative Process Model). As discussed in Section 2.1, these two models theorise creativity and innovation to be inextricable components of the same process. Although, it has already been argued that creativity and innovation do not necessarily have to be part of the same process, because creative ideas do not always get generated to be implemented, and innovation is not always dependent on the existence of a novel creative idea (Hughes et al., 2018; Holman et al., 2012), the M-BIP does not antagonise, but could potentially complement the aforementioned models. Specifically, the M-BIP relates to the fourth stage of Amabile's and Pratt's model, which is labelled "Testing and Implementing Ideas", and to the seventh and eighth stages (i.e., Implementation Planning and Adaptive Execution) of the Mumford and colleagues' model. Considering that Amabile and Pratt, and Mumford and colleagues discussed these innovation related stages from an organisational level perspective, the M-BIP could complement these models by providing an individual level perspective on how employees' behaviours could facilitate the implementation of ideas. Hence, researchers who are interested in studying creativity and innovation as a single process can combine these models, which jointly provide a more comprehensive description of the individual level processes of creativity and innovation.

The fourth major theoretical contribution of the present thesis is that the M-BIP clearly distinguishes between the innovation process and innovative performance/outcomes. Specifically, the thesis answers the call of several researchers to concentrate on the underlying processes facilitating innovation and put an end to the interchangeable use of the term innovative work behaviour to describe both the process and the outcomes (Hughes et al., 2018; Potočnik & Anderson, 2016; Rosing et al., 2018). In accordance with these calls, the M-BIP explicitly states that the construct of innovative work behaviour should adopt a behavioural orientation and describe the stages, activities, and specific behaviours through which individuals develop, promote, and implement innovative ideas. As shown in both empirical studies, these behaviours are indeed predictors of innovative performance, and thus directly related but distinct constructs. The disentanglement of the M-BIP from innovative performance is important for three reasons.

First, in terms of theory, it promotes definitional clarity, construct discriminant validity and counters the inherently flawed result dependency (i.e., Behaviours can be defined as innovative only when innovative outcomes have been produced; see Section 2.1.2) of the innovative work behaviour definitions (De Spiegelaere et al., 2012; 2014b; Hughes et al., 2018), thus enabling scholars to concisely communicate research findings and develop theory (Hughes et al., 2018; Potočnik & Anderson, 2016). Hence, individuals who aim to develop an innovative idea adapted to the context in which they operate, with the intention to engage in goal directed behaviours so as to change some aspect of their organisation, are by definition engaging in innovative work behaviour, regardless of whether or not they achieve their intended goal.

Second, an empirical implication of this theoretical contribution is that the exclusively behavioural focus of the M-BIP eliminates the circularity bias, which has distorted the predictive capacity of innovative work behaviour measures. This distortion is attributed to items tapping similar content in both the measures of innovative work behaviour and in the measures of innovative performance (Hughes et al., 2018). As shown in both empirical studies of the present thesis, the inclusion of outcome indicators in the existing measures of innovative work behaviour (i.e., De Jong & Den Hartog, 2010; Holman et al., 2012) has produced misleading and biased empirical estimates during the assessment of their predictive validity over self- and supervisor-rated innovative outcomes. Thus, a purely behavioural conceptualisation and operationalisation, free of outcome indicators contamination, enables the assessment of the M-BIP's predictive validity without the interference of circularity bias, and also indicates that any suggestion that innovative work behaviour cannot be assessed without knowing the outcome is flawed.

Third, one further empirical implication is that the disentanglement of the M-BIP from innovative performance, might eliminate the survivor bias from assessments of innovative work behaviour. Survivor bias implies that only successful innovative endeavours have been identified as innovative endeavours, and thus received attention, due to the result dependency of existing definitions and operationalisations of innovative work behaviour (see Tables 2.1 and 2.3). Hence, when a result dependent conceptualisation of innovative work behaviour is applied, unsuccessful innovative endeavours are not considered innovative. However, this logic is inherently flawed, because innovation is a change-oriented endeavour, and as such the outcomes of the process are not guaranteed, and failure is always a possibility (De Spiegelaere et al., 2012; 2014b; Rosing et al., 2018). Defining past behaviours depending on future consequences is impractical and illogical and does not allow the examination of factors that resulted in the process's success or failure. For example, in an organisational setting that would imply that employees' innovative behaviours could not be credited as innovative until their behaviours succeeded in producing an innovative outcome, which is intended to be of benefit to the organisation. Such a result dependency would disallow the distinction between successful and unsuccessful innovative endeavours, thus introducing a biased perception of the innovation process. However, studying failed innovative endeavours is equally important as studying successful ones, because both can further our understanding of the conditions that enable or suppress individual innovativeness. Considering that the M-BIP is not result dependent, but defines innovative work behaviour in relation to the behaviours aimed at facilitating its intended goal, rather than its achieved outcome, the M-BIP does not discriminate in favour of successful innovative endeavours and thus provides an unbiased, in terms of result dependency, assessment of the innovation process.

The fifth major contribution, of an empirical nature, of the present thesis is the empirical support provided for the multi-dimensionality of the construct of innovative work behaviour. The existing literature seemed to have converged on the identification of a fine grained multi-dimensional conceptualisation of the innovation process, compared to the baseline distinction between the development and implementation of innovative ideas (Hughes et al., 2018; Potočnik & Anderson, 2016), in which three broad stages of the innovation process are described (Janssen, 2000; Holman et al., 2012). However, with the exception of Holman and colleagues' (2012) study, this three-stage conceptualisation is predominantly theoretical, and it was often the case that empirical tools failed to support it (e.g., Janssen, 2000; Wang et al., 2015). Thus, the present thesis has provided further support for this three-stage conceptualisation of innovative work behaviour. Furthermore, the M-BIP incrementally contributes to theory, by further extending the construct's content through providing an insight into the constituent activities and their behavioural manifestations that facilitate the objectives of each stage. Hence, the M-BIP is the only strictly behavioural activity stage model that operates at three levels of abstraction and provides three layers of conveyed information (see Figure 2.1). Specifically, the three stages describe the tasks innovators need to accomplish, the seven activities describe the broad pathways through which the tasks are to be accomplished, and the underlying behaviours describe in detail the specific behaviours through which each activity is to be carried out. Thus, the M-BIP could serve both as a descriptor of the innovation process at an abstract level, and as a literature derived and empirically supported taxonomy of goal directed behaviours that facilitate the process's objectives. This sort of three-layered taxonomy, presents the first of its kind in the literature on innovative work behaviour, and is important because the M-BIP provides a more comprehensive coverage of the construct of innovative work behaviour, compared to existing models of innovative work behaviour, and thus, promotes our understanding of the behavioural manifestations that underlie the innovation process by directly associating specific behaviours with broad activities and tasks.

Furthermore, the multi-faceted nature of innovation is highlighted by the introduction of the activities that facilitate the stages of the innovation process highlighted (Bledow et al., 2009) and shifts its focus on the micro-foundations of innovation (Felin, Foss, & Ployhart, 2015). Specifically, the M-BIP is the only available empirically tested model of innovative work behaviour that describes the behaviours involved in managing conflicting interests, overcoming resistance to change, navigating through organisational politics, building and co-ordinating diverse teams, and managing unforeseen complications (Bjorklund et al., 2013; Hadjimanolis, 2003; Hueske & Guenther, 2015; Janssen et al., 2004; Maute & Locander, 1994; Mueller et al., 2012; West 2002b; Van de Ven, 1986). Moreover, the M-BIP is the first theoretical conceptualisation of innovative work behaviour that explicitly accounts for (see Chapter 3) the proactive orientation of the innovation process (Crant, 2000; Grant & Ashford, 2008; Parker & Collins, 2010) and the inter-dependency of the activities and stages (Rosing et al., 2018). Specifically, this is accomplished by the introduction of the activity of strategic, which acts as a precursor and enabler of successful promotion, because it details how an idea can best be developed, hence, successfully adapted to fit an organisational context. Additionally, the M-BIP describes how individuals can raise awareness within the organisation though the activity of championing. The outputs of the activity of championing (e.g., Support base) can be useful inputs in the subsequent activities of the idea promotion stage, because this set of behaviours can facilitate the acquisition of the social network characteristics (i.e., Borrowing structural holes; legitimacy and influence, Perry-Smith & Mannucci, 2017), which enable the successful attainment of the goals of the activities of obtaining organisational approval and recruiting assistance (i.e., Organisational consent, provision of resources, team building). Also, the activity of obtaining organisational approval postulates the ways through which approval can be obtained and resources can be acquired, with approval being associated with borrowed legitimacy and influence (Perry-Smith & Mannucci, 2017), which makes the facilitation of the objectives of the activity of recruiting assistance more likely to be attained. Furthermore, the introduction of the activity of recruiting assistance describes the behavioural facilitators of securing the active support and co-operation of the organisational members whose skills and knowledge are deemed to be valuable. Successful attainment of the objectives of the recruiting assistance activity provides valuable inputs to the subsequent implementation of innovative ideas (e.g., Closure of structural holes, Perry-Smith & Mannucci, 2017; Bringing together skills and knowledge diversity, Hülsheger et al., 2009; Klein & Knight, 2005). Finally, the introduction of the activities of implementation strategy and facilitation, makes the M-BIP the first ever model of innovative work behaviour to discuss how individuals plan and facilitate implementation. Planning for the implementation is a particularly proactive behaviour (Frese & Fay, 2001; Frese et al., 2007) contributing to the implementation of innovative ideas (Montani et al., 2015).

Finally, the sixth major contribution, of an empirical nature, of the present thesis concerns the development of a measure that accurately captures the theoretical content of the M-BIP and is appropriate for theory testing. The M-BIP was subject to the most rigorous validation process to date (see Tables 2.6 and 2.7), compared to the existing measures of innovative work behaviour. Both empirical studies designed to develop and test the M-BIP were based on Hughes' (2018) accuracy and appropriateness systematic framework of psychometric instrument development, and covered all the criteria necessary to empirically support the accuracy and appropriateness of the M-BIP. The Accuracy and Appropriateness framework presents a systematic checklist that promotes good scientific practice by paying particular attention both to the harmony among theory and measurement, and to the use of sophisticated quantitative and qualitative methodologies. The implementation of the Accuracy and Appropriateness framework aspired to ensure that the produced psychometric instrument provides all the necessary information to researchers and practitioners, so as to be able to make an informed decision on whether a measure is fit for their purpose. Considering that innovative work behaviour scale development studies were suggested to be piecemeal (see Tables 2.6 and 2.7), the present thesis shows how the Accuracy and Appropriateness framework can be used to standardise the psychometric instrument development process. In fact, both the literature review and the two empirical studies highlight the usefulness of the Accuracy and Appropriateness framework as a systematic framework that guides both the critical evaluation of published measures, and the design and the empirical evaluation of the psychometric properties of new ones.

The development of the M-BIP offers an accurate assessment of the innovation process and an appropriate psychometric tool for theory testing, whose scales demonstrate good internal consistency (Study 1: Cronbach a's and Ω reliabilities for all scales were above .80 and .81 respectively; Study 2: Cronbach a's and Ω reliabilities for all scales were above .80 and .80 respectively), and can be used by researchers whose interest lies in how employees innovate, rather than whether they innovate. The research utility of the measure is enhanced by the fact that the measure development process has acknowledged the literature's calls for behavioural, and clearly defined novel measures (Hughes et al., 2018; Potočnik & Anderson, 2016), and thus ensured that its use would not advance construct proliferation, but rather would promote definitional clarity and operational conciseness. Furthermore, the developed instrument could enable the examination of the differential impact various predictors have on the innovation process at three different levels of abstraction (i.e., Global, Stage, and Activity levels), as it has the capacity to discriminate among stages and activities, thus accommodating researchers embracing each side of the bandwidth-fidelity dilemma (Cronbach & Gleser, 1965; Judge, Rodell, Klinger, Simon, & Crawford, 2013). Thus, researchers favouring bandwidth (i.e., Broadness and variety of information) can use the M-BIP at a global level, whereas researchers who favour fidelity (i.e., thoroughness, specificity and certainty of information) can use the M-BIP at an activity level (Cronbach & Gleser, 1965; Judge et al., 2013). Meanwhile, the mid-level stages of the M-BIP present a compromise between bandwidth and fidelity. Moreover, the M-BIP is not liable to circularity and survivor biases because of its behavioural orientation.

6.2. Practical implications

The present study has a number of implications for practitioners. The M-BIP could be used as a source of information assisting organisations to conduct a job analysis for positions where being innovative is necessary or desirable. Specifically, the M-BIP could guide the job description by informing on the tasks, activities, and behaviours necessary for an individual to be successful in an innovation-demanding job, and the person specification by advancing on the skills, characteristics, and abilities of the candidate. Furthermore, the M-BIP has the potential to be used for the recruitment and assessment of job candidates by providing the backbone of a structured interview. Moreover, the M-BIP could be used as an appraisal tool for the innovative efforts of existing employees and the identification of their strengths and weaknesses in terms of innovativeness. Supplementary to the appraisal, the M-BIP could play the role of an informative medium that might raise awareness regarding the individual innovation process, and could inform training and development interventions aiming to educate and increase employees' innovative outputs, and foster employees' personal development. In terms of training, the capacity of the M-BIP to describe the process at a stage and activity level enables its use as a training plan template, to structure more focused interventions and specialised training programmes across thematic areas (e.g., Broad stages or narrower activities of the M-BIP). For example, organisations could use the M-BIP to develop seminars and practical workshops so as to train employees to be more effective and efficient in identifying opportunities and developing innovative ideas that coincide with organisational objectives. Moreover, organisations could organise seminars where employees could explore their approach to promoting their ideas, could increase their awareness of alternative approaches, and organisations could introduce practical training workshops where employees could practice and hone their social, negotiating, persuading, and innovation pitching skills. Finally, interactive teamwork training seminars and workshops could be organised to teach and practice how employees could set mutually agreed plans for the implementation of an innovative idea, and how to foster effective and efficient team-working so as to facilitate the implementation of the innovative idea.

6.3. Limitations

In both empirical studies of the present thesis a number of study specific limitations was discussed. To avoid replication this section discusses three overarching limitations of the present research project which limit the generalizability of the M-BIP and its capacity to provide evidence based conclusions, as opposed to inferential assumptions based on theoretical logic, as well as one more specific limitation, since it possesses the potential for further research. The way the discussed limitations should be addressed by future research is discussed in Section 6.4.

The first overarching limitation of the present research project is its cross-sectional nature that had a twofold impact on the interpretation of the present project's findings. The first one concerns the causal direction of the supervisor support and job control variables over the M-BIP, as discussed in the Section 5.5.4. The second one concerns the provided interpretation of the findings which stated that the empirical examination of the M-BIP supported the Rosing and colleagues' (2018) findings, and as such the model has successfully integrated the "linear" and "complexity perspectives". Whereas, the reflective items load on each factor as intended, and the inter-factor magnitude of correlations of the correlated predictive model reasonably suggest the offered explanation to be a plausible one, it is impossible to empirically confirm this explanation based on the available evidence.

The second limitation of the present study is its single-level design. This design does not allow the examination of the relationships of the M-BIP with higher level constructs (Peugh, 2010). This limitation has three implications for the present thesis. First, it disallows the evidence-based examination of the context dependency of innovative work behaviours (Messmann & Mulder, 2012). Whereas the empirical literature and the empirical evidence provided in the present thesis support the proposition that the identified innovative behaviours, grouped into the seven proposed activities, constitute the construct of innovative work behaviour, and in turn predict the production of innovative outcomes, the adopted single-level design does not allow the examination of the importance and the applicability of each activity during the innovation process, across diverse organisational contexts. Specifically, in the presentation of the M-BIP, in Chapter 3, I discussed example instances where the proposed activities would not necessarily be needed to be carried out to their full extent. For example, I suggested that obtaining organisational approval behaviours might not be necessary when a minor innovation is pursued and when employees are granted increased job control. Furthermore, I suggested that recruiting assistance behaviours might not be implemented if the organisation directly appoints the implementation team members. Whereas, these assumptions are reasonable and based on theoretical logic, the present thesis cannot empirically test them. It might be the case that organisational level variables such as the business sector, organisational structure, decision making centralisation, level of bureaucracy, and organizational climate might have an effect on the importance of a specific activity, for the successful facilitation of the innovation process. However, the present study's design does not allow the examination of how organisational level variables relate to each activity and shape the individual level innovation process. Second, the present thesis' single level design does not permit the examination of the influence organisational level variables might have on the predictive validity of the M-BIP. As such the influence, for example, organisational membership or business sector might have on the predictive validity of the M-BIP cannot be assessed in the present thesis. Third, the evaluation of how individual level innovative behaviours contribute to team and organisational innovativeness is also beyond the present study's capacity to answer.

The third limitation of the present study concerns the generalizability of the appropriateness of the M-BIP measure for theory testing and decision making. Psychometric measures can be used in a multitude of ways and thus, what makes a measure appropriate for use in any two given scenarios is likely to differ to some extent (Hughes, 2018). Thus, a measure could be suggested to be appropriate for a given situation, only if its degree of appropriateness has been empirically examined in respect to this situation. For example, the generalizability of the M-BIP's appropriateness is limited with respect to the variables chosen in the present study to assess the measurement invariance properties of the measure. Hence, whereas the present thesis' empirical findings suggest the M-BIP to be practically invariant for sex and country (U.K. and Greece) grouping variables, if researchers are interested in using the M-BIP and examine its relationships with other grouping variables, the M-BIP's appropriateness should not be taken for granted, and further examination of the measurement invariance properties of the measure should be undertaken. Assuming that the M-BIP is invariant for grouping variables that have not been included in the present study, without empirically verifying it, could potentially produce misleading and biased empirical estimates, that would have a negative impact on theory development, and could misinform applied decision making. Furthermore, the generalizability of the M-BIP's predictive validity is limited with respect to the sample's composition. Whereas, the predictive validity of the M-BIP was assessed over self-reported (Study 1) and supervisor-rated (Study 2) innovative outcomes, both samples are composed predominantly of highly educated individuals. Thus, further assessments of the M-BIP's predictive validity should be conducted in order to confidently claim that the proposed innovative behaviours predictive validity can be generalised to the general population, or to examine whether the general population of innovators is indeed predominantly composed of highly educated individuals.

Finally, a non-generic limitation concerns the examination of the innovative work behaviour nomological network. The innovative work behaviour nomological network was assessed on a few antecedent variables considering that the nomological network assessment's primary purpose was to assess the degree of consistency of the present study's results with the broader empirical literature. However, such an investigation provides only preliminary evidence of satisfactory positioning within the innovative work behaviour's nomological network. A comprehensive examination of the nomological network of innovative work behaviour implementing more complex studies, and testing detailed theoretical models, is needed, so as to explore how the updated content of the M-BIP fits within the construct's nomological network. Furthermore, the two-item measure of openness to experience was chosen for convenience reasons, nevertheless, this measure constitutes a poor decision, as it disallows the implementation of SEM, and also because brief personality measures make compromises in terms of construct representativeness (Hughes, 2018). Thus, less variance in the assessed construct is explained, and therefore brief personality measures' predictive validity is reasonably diminished.

6.4. Future research

Future research should aim to address the limitations of the current research project, and also build upon the M-BIP, so as to obtain methodologically rigorous assessments of how individuals innovate in relation to individual differences and contextual variables. Four avenues for future research are proposed to further our understanding of individual level innovative work behaviour.

The first proposed future research project concerns a diary study. A diary study could assess the interdependence of the stages and the role of reflective behaviours throughout the process of innovation. In such a design, participants, who actively engage in the process of innovation, should record their innovative behaviours on a regular basis, using the M-BIP as a template. This design could enable the direct observation of the temporal pattern of the innovative behaviours specified by the M-BIP, and the assessment of whether the manifestation of behaviours described in the late stages of the M-BIP (e.g., idea promotion and idea implementation) are indeed dependent on the outcomes of their respective predecessor stages (e.g., idea development and idea promotion). Additionally, a diary study would enable the assessment of whether the behaviours presented in the initial stages of the process, re-emerge in the late time frames of the innovation process due to participants' reflective behaviours. Furthermore, a diary study that would recruit participants from different organisations, and different teams could also enable the implementation of multi-level analyses. Hence, if organisational-level data were to be obtained, measuring contextual antecedent variables (e.g., business sector, organisational structure, decision making centralisation, level of bureaucracy, and organizational climate), we could test the effects of these organisational level variables on each stage of the innovation process. Additionally, the data obtained from the diary study could be used to conduct a latent profile analysis so as to investigate whether there are different types of innovation processes, and also to investigate what is the role of organisational level variables in shaping different types of innovation processes. For example, such an analysis could help answering the proposition made earlier in this thesis, that the behaviours described in the activity of obtaining organisational approval might not be necessary when employees are granted increased job control. Finally, such a study would enable the assessment of the effect organisational level variables have on team level innovation.

The second proposed future research project concerns a longitudinal randomised control experimental study, which would enable the examination of the causal effects of contextual antecedents on the M-BIP's stages. In such a study, an initial baseline data collection should be conducted, prior to the random assignment of the participating organisations to an experimental and control test group. Next, the organisations assigned to the experimental group would receive training. The training intervention should instruct organisations on how they can improve contextual characteristics that have been empirically shown to foster employees' innovative behaviours. Subsequently, another data collection involving both the experimental and the control groups should take place. Such a research design could empirically test for causality.

The third proposed future study again concerns a longitudinal randomised control experimental study, whose objective should be the assessment of the differential impact each stage of the M-BIP has on innovative performance/outcomes. It is proposed that following the initial baseline data collection, organisations should be randomly assigned to three experimental and one control group. Each of the three experimental groups would receive an innovation training intervention, which would be informed and developed using the M-BIP as a template (see Section 6.2). Specifically, the first experimental group would be trained on the idea development stage, the second experimental group would be trained on the idea promotion stage, and the third experimental group would be trained on the idea implementation stage. The control group would not receive any training. Subsequently, another data collection involving both the experimental and the control groups should take place and objective innovative performance data should be also collected. Such a research design could provide a more accurate assessment of the relative importance of each stage of the M-BIP for the production of innovative outcomes.

Finally, the fourth proposed future research area concerns the further assessment of the nomological network of innovative work behaviour, which should be accomplished through the integration of the M-BIP into well-respected and empirically supported theoretical frameworks. For example, a theoretical framework that could be used to assess the nomological network of innovative work behaviour is the Dynamic Componential Model of Creativity and Innovation (Amabile & Pratt, 2016), which specifies the internal and external variables that shape creativity and innovation. Another option would be the Job Demands Resources (JD-R) Model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), which is a theoretical framework widely used in innovation studies. Additionally, it is suggested that the examination of the nomological network of innovative work behaviour should be conducted with adequate multi-faceted personality measures, operationalizing personality traits at a domain and facet level, and via applying Trait Activation Theory (Tett & Guterman 2000; Tett & Burnett 2003). Additionally, it is proposed that the choice of the moderating variables should be grounded in the aforementioned established theoretical models, so as to further integrate the M-BIP to established theoretical frameworks. Furthermore, it is proposed that the examination of the personality antecedents of innovative work behaviour should be expanded to cover the Dark Personality traits (i.e., Machiavellianism, Psychopathy, Narcissism; Paulhus & Williams, 2002). The Dark Personality traits relationships to innovative work behaviour is a rather underexplored research field, which nevertheless could provide interesting insights into the individuals' contributions to the costs and side effects of the innovation process (Khessina et al., 2018). This is important because the literature predominantly assumes innovation to be a desirable and positive phenomenon. However, Khessina and colleagues (2018) have identified a number of undesirable side effects and by-products of creativity and innovation, which might be partially due to the engagement of individuals high on dark traits in the creative and innovation processes.

6.4. Conclusion

In conclusion, the present research project's findings indicate that the behaviours clustered under the proposed seven activities compose a compelling theoretical model of innovative work behaviour, which describes how individuals go about producing innovative outcomes. The M-BIP is rooted in firm theoretical grounds as the theory building process utilised an extended breadth of relevant literature resources that have not been exploited in previous studies of innovative work behaviour model development. Hence, the M-BIP presents an important step forward for the literature on activity-stage models of innovative work behaviour. Furthermore, the empirical examination of the M-BIP was conducted applying a comprehensive and rigorous psychometric instrument development framework, which provided a detailed evaluation of the psychometric properties of the M-BIP. The transparency of the measure's development and evaluation process through which the psychometric instrument was developed, enables scholarly critical evaluation to determine its utility for research purposes. The M-BIP furthers our understanding of the objectives and processes constituting innovative work behaviour and presents a comprehensive integration of the up to date empirical literature. As such, it has the potential to significantly contribute to further theoretical and empirical advancement, by countering the vicious cycle of poorly conceptualised constructs which in turn result in inadequate measurement specification and altogether impede theory building and empirical testing (MacKenzie, 2003).

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Appendix

Appendix 1: Study 1 Survey

First and foremost, I deeply appreciate your interest in participating in my study! I am currently undertaking my PhD in Organisational Psychology at the University of Manchester. The purpose of this study is to develop and test a model of Innovative Work Behaviour. Innovative Work Behaviour entails the sequence of actions/behaviours aiming to produce, promote, and implement an innovative idea. Additionally, individuals may behave innovatively both in isolation and/or as part of a social group. It is of great interest therefore, to examine whether individuals' preference to engage in innovative behaviours either individually or as part of a team has a differentiated impact on the success of the innovative endeavour. The results of this questionnaire will form the foundations of my further study.

Participation

Your participation is voluntary. You may refuse to take part in the research or exit the survey at any time. The survey should take approximately 15-20 minutes to complete and instructions are provided before each section.

Confidentiality and Anonymity

All responses will be completely anonymous. Access to results is restricted to the researchers involved (myself and supervisor Dr. David Hughes) and none of the information will be disclosed to any third parties. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

Contact

If you have any questions or wish to obtain feedback on the results of the study please contact: ioannis.kratsiotis@postgrad.mbs.ac.uk.
Thank you very much for your time and help. Without you this research would not be possible. Thank you!

By completing the present questionnaire you give your informed consent of agreement that you wish to participate in this research project, and that your answers will be used for research purposes exclusively.

Please use the rating scale below to indicate how often you have engaged in the following behaviours within the last year.

Paid attention to work issues not directly part of my daily tasks.	Never	1	2	3	4	5	6	Always
Wondered how things could be improved.	Never	1	2	3	4	5	6	Always
Searched out new working methods, techniques, or instruments.	Never	1	2	3	4	5	6	Always
Kept myself informed about the organisation's structures and procedures.	Never	1	2	3	4	5	6	Always
Kept myself informed about new concepts/insights within my field.	Never	1	2	3	4	5	6	Always
Kept myself informed about new developments in other organisations.	Never	1	2	3	4	5	6	Always
Kept myself informed about new developments within my organisation.	Never	1	2	3	4	5	6	Always
Examined predominant beliefs within my professional field critically.	Never	1	2	3	4	5	6	Always
Exchanged thoughts on recent developments within my professional field with clients/customers.	Never	1	2	3	4	5	6	Always
Got informed on how things were handled in other departments of my organisation.	Never	1	2	3	4	5	6	Always
Spent time identifying my department's weaknesses.	Never	1	2	3	4	5	6	Always
Kept an eye on identifying errors/problems/impracticalities on the way day to day tasks were performed within my organisation.	Never	1	2	3	4	5	6	Always

These statements concern behaviours used to promote an innovative idea within your workplace. How often you have engaged in the following behaviours within the last year?

Identified influential individuals/groups within the organisation.	Never	1	2	3	4	5	6	Always
Spent time identifying the right people to get involved.	Never	1	2	3	4	5	6	Always
Spent time identifying the necessary resources.	Never	1	2	3	4	5	6	Always
Spent time planning how resources could be obtained.	Never	1	2	3	4	5	6	Always
Made sure that benefits were greater than the costs of the implementation.	Never	1	2	3	4	5	6	Always
Made sure that the idea aligned to the organisation's strategy.	Never	1	2	3	4	5	6	Always
Spent time identifying how the idea provided a competitive advantage to the organisation.	Never	1	2	3	4	5	6	Always

Attention check! I will make sure to read the questions correctly and answer 'Always' to this question.	Never	1	2	3	4	5	6	Always
Identified potential sources of conflict and resistance within the organisation.	Never	1	2	3	4	5	6	Always
Modified the idea to be more appealing to influential individuals/groups.	Never	1	2	3	4	5	6	Always
Modified the idea based on the evaluation of my coworkers' skills and knowledge.	Never	1	2	3	4	5	6	Always
Modified the idea based on the evaluation of the availability of the necessary resources.	Never	1	2	3	4	5	6	Always
Modified the idea based on the cost – benefit evaluation.	Never	1	2	3	4	5	6	Always
Incorporated into the idea aspects that colleagues brought to the table and haven't been thought of.	Never	1	2	3	4	5	6	Always
Took into account colleagues' reasoned criticism regarding the approach taken.	Never	1	2	3	4	5	6	Always

These statements are about how you might promote an innovative idea. How often you have engaged in the following behaviours within the last year?

Enthusiastically promoted the innovation's advantages.	Never	1	2	3	4	5	6	Always
Pushed constantly for innovation.	Never	1	2	3	4	5	6	Always
Initiated an open discussion regarding the proposed innovation.	Never	1	2	3	4	5	6	Always
Involved as many people as possible into the discussion	Never	1	2	3	4	5	6	Always
Expressed strong conviction about the innovation	Never	1	2	3	4	5	6	Always
Expressed confidence in what the innovation can do.	Never	1	2	3	4	5	6	Always
Shared the vision of the innovative potential.	Never	1	2	3	4	5	6	Always
Tailored the idea to fit different audiences.	Never	1	2	3	4	5	6	Always
Pushed the idea with determination even if people did not find it appealing in the first place.	Never	1	2	3	4	5	6	Always
Evaluated co-workers' reactions and accordingly altered the style adopted.	Never	1	2	3	4	5	6	Always
Evaluated co-workers reactions and accordingly integrated new perspectives into the original idea.	Never	1	2	3	4	5	6	Always
Evaluated how the promotion attempts were perceived by co-workers and accordingly adapted the chosen strategy.	Never	1	2	3	4	5	6	Always

The following statements are about getting support within the organisation for an innovative idea. How often you have engaged in the following behaviours within the last year?

Produced documented cost and benefit estimations, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Framed the new idea as an opportunity, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Presented a detailed implementation plan, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Obtained the support of backers/customers, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Outlined potentially positive organisational/financial outcomes, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Persisted when superiors were unconvinced/hesitant.	Never	1	2	3	4	5	6	Always
Did not give up when superiors provided negative feedback.	Never	1	2	3	4	5	6	Always
Provided examples to demonstrate the feasibility of the plan, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Evaluated the selling strategy and came up with different approaches, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Modified the idea to address scepticism, to gain my boss's support.	Never	1	2	3	4	5	6	Always
Took into account the management’s perspective, and integrated their counter-proposals into the original idea, to gain their support.	Never	1	2	3	4	5	6	Always

These statements are about persuading skilled and knowledgeable co-workers to support and participate into the implementation [the transformation of an idea into a new product, service, or procedure] of an innovative idea.

How often you have engaged in the following behaviours within the last year?

Promised that the change would not be disruptive, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Spent time addressing my colleagues’ fears/objections, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always

Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Persisted in the face of adversity, so as to get skilled and knowledgeable co-workers on board	Never	1	2	3	4	5	6	Always
Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Reassured co-workers that they had the necessary skills/knowledge to participate to the implementation of the innovative idea.	Never	1	2	3	4	5	6	Always
Asked for help in exchange of future favours, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Asked the co-workers of interest to point out areas of potential improvement, so as to get them on board.	Never	1	2	3	4	5	6	Always
Adapted the selling approach to make it more appealing, when skilled and knowledgeable co-workers remained hesitant.	Never	1	2	3	4	5	6	Always
Re-evaluated the idea, when skilled and knowledgeable co-workers remained hesitant.	Never	1	2	3	4	5	6	Always
Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.	Never	1	2	3	4	5	6	Always

These statements concern how you might plan the implementation of an innovative idea. How often you have engaged in the following behaviours within the last year?

Set clear objectives regarding the intended outcomes of the implementation process.	Never	1	2	3	4	5	6	Always
Identified the most important steps within the overall project.	Never	1	2	3	4	5	6	Always
Distributed the workload based on individual competencies.	Never	1	2	3	4	5	6	Always
Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.	Never	1	2	3	4	5	6	Always
Made appropriate allocation of the available resources.	Never	1	2	3	4	5	6	Always
Devised a new implementation strategy when the allocated resources were limited.	Never	1	2	3	4	5	6	Always

The following statements concern how you might have transformed innovative idea into a new product/service/procedure. How often you have engaged in the following behaviours within the last year?

Piloted the innovation.	Never 1 2 3 4 5 6 Always
Continually assessed whether the implementation efforts were bringing results.	Never 1 2 3 4 5 6 Always
Took risks so as to assess the appropriateness of the approach.	Never 1 2 3 4 5 6 Always
Kept co-workers/superiors informed about the progress of the implementation process.	Never 1 2 3 4 5 6 Always
Showed appreciation for team members' efforts.	Never 1 2 3 4 5 6 Always
Demonstrated persistence in the face of short term problems.	Never 1 2 3 4 5 6 Always
Treated unpredicted difficulties as an opportunity to improve the original idea.	Never 1 2 3 4 5 6 Always
Treated unpredicted difficulties as an opportunity to improve skills and knowledge.	Never 1 2 3 4 5 6 Always
Continually thought of alternative solutions that could have made the implementation more feasible.	Never 1 2 3 4 5 6 Always
Changed the implementation strategy when it was not working.	Never 1 2 3 4 5 6 Always

The following questions aim to assess the outcomes of your innovative efforts within the last year.

My innovative idea was transformed into a customer focused product.	Never 1 2 3 4 5 6 Always
My innovative idea was transformed into a customer focused service.	Never 1 2 3 4 5 6 Always
My innovative idea was transformed into a new procedure that changed, to some degree, the way things were done within my organisation.	Never 1 2 3 4 5 6 Always

The following questions are about your general tendency to engage in innovative work behaviour.
Within the last year how often have you.....

Thought of new ideas?	Never 1 2 3 4 5 6 Always
Had ideas about how things might be improved?	Never 1 2 3 4 5 6 Always
Found new ways of doing things?	Never 1 2 3 4 5 6 Always

Attempted to get support from others for your ideas?	Never 1	2	3	4	5	6	Always
Tried to get approval for improvements you suggested?	Never 1	2	3	4	5	6	Always
Got involved in persuading others to adopt your proposals for doing things differently?	Never 1	2	3	4	5	6	Always
Had your ideas implemented?	Never 1	2	3	4	5	6	Always
Had your suggestions for improvements adopted?	Never 1	2	3	4	5	6	Always
Had your proposals for doing things differently carried out?	Never 1	2	3	4	5	6	Always

Demographics

Gender: Male ☐ Female ☐

Age: ....

Level of Education:

☐ No schooling ☐ Secondary to age 15/16

☐ Secondary to age 18 ☐ Non-university higher education

☐ Bachelor degree ☐ MSc/PhD

Employment Status:

☐ Unemployed ☐ Employed (Part-time)

☐ Employed (Full-time) ☐ Self-employed

Occupational Group:

☐ Professional/Senior manager ☐ Junior manager

☐ Other white collar/Service ☐ Skilled worker

☐ Semi/Unskilled worker ☐ Other

How many years have you worked in your current job? ....

End of Survey

Thank you for your time!!

Appendix

Appendix 2: Study 2 Survey. Self-report, English version

First and foremost, I deeply appreciate your interest in participating in my study! I am currently undertaking my PhD in Organisational Psychology at the University of Manchester.

The purpose of this study is to develop and test a model of Innovative Work Behaviour. Innovative Work Behaviour entails the sequence of actions/behaviours aimed at producing, promoting, and implementing an innovative idea. Furthermore, it is of interest to identify whether employees' individual differences, and workplace characteristics influence the frequency that innovative work behaviours are manifested.

Your participation is voluntary. You may refuse to take part in the research or exit the survey at any time. The survey should take approximately 15-20 minutes to complete and instructions are provided before each section.

Access to results is restricted to the researchers involved (myself and supervisor Dr. David Hughes) and none of the information will be disclosed to any third parties. No one will be able to identify you or your answers.

If you have any questions or wish to obtain feedback on the results of the study please contact: ioannis.kratsiotis@postgrad.mbs.ac.uk.

Thank you very much for your time and help. Without you this research would not be possible. Thank you!

By completing the present questionnaire you give your informed consent of agreement that you wish to participate in this research project, and that your answers will be used for research purposes exclusively.

Section 1.

Please read carefully the following before answering the question below

Innovative work behaviour are those activities that aim to produce innovative outcomes (e.g., new product, new service, new workplace procedures). Innovative outcomes are not exclusively about ground-breaking changes but include "minor" improvements in existing products, in organisational processes, or in how you do your work.

	YES	NO
Have you been actively involved in any activities aimed at producing an innovative outcome within the last year?		

Please use the rating scale below to indicate how often you have engaged in the following behaviours within the last year.

Wondered how things could be improved.	Never 1 2 3 4 5 6 Always
Searched out new working methods, techniques, or instruments.	Never 1 2 3 4 5 6 Always
Kept myself informed about new concepts/insights within my field.	Never 1 2 3 4 5 6 Always
Kept myself informed about new developments in other organisations.	Never 1 2 3 4 5 6 Always
Kept myself informed about new developments within my organisation.	Never 1 2 3 4 5 6 Always
Spent time identifying my department's weaknesses.	Never 1 2 3 4 5 6 Always

These statements concern activities used to promote an innovative idea within your workplace. How often you have engaged in the following behaviours within the last year?

Spent time identifying the right people to get involved.	Never 1 2 3 4 5 6 Always
Spent time planning how resources could be obtained.	Never 1 2 3 4 5 6 Always
Spent time identifying how the idea provided a competitive advantage to the organisation.	Never 1 2 3 4 5 6 Always
Identified potential sources of conflict and resistance within the organisation.	Never 1 2 3 4 5 6 Always
Modified the idea to be more appealing to influential individuals/groups.	Never 1 2 3 4 5 6 Always
Modified the idea based on the evaluation of the availability of the necessary resources.	Never 1 2 3 4 5 6 Always

These statements are about how you might promote an innovative idea. How often you have engaged in the following behaviours within the last year?

Enthusiastically promoted the innovation's advantages.	Never 1	2	3	4	5	6	Always
Initiated an open discussion regarding the proposed innovation.	Never 1	2	3	4	5	6	Always
Expressed confidence in what the innovation can do.	Never 1	2	3	4	5	6	Always
Pushed the idea with determination even if people did not find it appealing in the first place.	Never 1	2	3	4	5	6	Always
Evaluated co-workers' reactions to my idea and accordingly altered the style adopted.	Never 1	2	3	4	5	6	Always
Evaluated co-workers reactions and then integrated new perspectives into the original idea.	Never 1	2	3	4	5	6	Always

The following statements are about getting support within the organisation for an innovative idea. How often you have engaged in the following behaviours within the last year?

Produced documented cost and benefit estimations, to gain my boss's support.	Never 1	2	3	4	5	6	Always
Presented a detailed implementation plan, to gain my boss's support.	Never 1	2	3	4	5	6	Always
Obtained the support of backers/customers, to gain my boss's support.	Never 1	2	3	4	5	6	Always
Outlined potentially positive organisational/financial outcomes, to gain my boss's support.	Never 1	2	3	4	5	6	Always
Persisted when superiors were unconvinced/hesitant.	Never 1	2	3	4	5	6	Always
Took into account the management's perspective, and integrated their counter-proposals into the original idea, to gain their support.	Never 1	2	3	4	5	6	Always

These statements are about persuading skilled and knowledgeable co-workers to support and participate into the implementation [the transformation of an idea into a new product, service, or procedure] of an innovative idea.

How often you have engaged in the following behaviours within the last year?

Framed the idea positively, so as to get skilled and knowledgeable co-workers on board.	Never 1	2	3	4	5	6	Always

Consulted widely to increase engagement, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Spent time addressing my colleagues' fears/objections, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Presented the personal benefits of the proposed change, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Displayed enthusiasm when my colleagues remained unconvinced, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Asked for support from superiors, so as to get skilled and knowledgeable co-workers on board.	Never	1	2	3	4	5	6	Always
Incorporated the skilled and knowledgeable co-workers' perspectives into the idea in order to persuade them to get on board.	Never	1	2	3	4	5	6	Always

These statements concern how you might plan the implementation of an innovative idea. How often you have engaged in the following behaviours within the last year?

Set clear objectives regarding the intended outcomes of the implementation process.	Never	1	2	3	4	5	6	Always
Distributed the workload based on individual competencies.	Never	1	2	3	4	5	6	Always
Made sure that each individual had the necessary skills/knowledge to fulfil the task at hand.	Never	1	2	3	4	5	6	Always
Made appropriate allocation of the available resources.	Never	1	2	3	4	5	6	Always
Devised a new implementation strategy when the allocated resources were limited.	Never	1	2	3	4	5	6	Always

The following statements concern how you might have transformed innovative idea into a new product/service/procedure. How often you have engaged in the following behaviours within the last year?

Continually assessed whether the implementation efforts were bringing results.	Never	1	2	3	4	5	6	Always
Took risks so as to assess the appropriateness of the approach.	Never	1	2	3	4	5	6	Always
Kept co-workers/superiors informed about the progress of the implementation process.	Never	1	2	3	4	5	6	Always

Showed appreciation for team members' efforts.	Never 1 2 3 4 5 6 Always
Treated unpredicted difficulties as an opportunity to improve the original idea.	Never 1 2 3 4 5 6 Always
Continually thought of alternative solutions that could have made the implementation more feasible.	Never 1 2 3 4 5 6 Always

Section 2.

Please read the following statements and rate to what extent you agree or disagree.

I plan my own work.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I can choose the methods to use in carrying out my work.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I can decide how to go about getting my job done.	Strongly disagree 1 2 3 4 5 6 Strongly agree
My leader/supervisor shows sincere interest whenever I come up with an idea	Strongly disagree 1 2 3 4 5 6 Strongly agree
My leader/supervisor reacts enthusiastically to my creative thoughts.	Strongly disagree 1 2 3 4 5 6 Strongly agree
My leader/supervisor supports me when I want to improve things.	Strongly disagree 1 2 3 4 5 6 Strongly agree
My leader/supervisor is someone you can count on, even when you initiate something unsuccessful.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I actively attack problems	Strongly disagree 1 2 3 4 5 6 Strongly agree
Whenever something goes wrong, I search for a solution immediately	Strongly disagree 1 2 3 4 5 6 Strongly agree
Whenever there is a chance to get actively involved, I take it.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I take initiative immediately even when others don't.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I use opportunities quickly in order to attain my goals.	Strongly disagree 1 2 3 4 5 6 Strongly agree
Usually I do more than I am asked to do.	Strongly disagree 1 2 3 4 5 6 Strongly agree
I am particularly good at realising ideas.	Strongly disagree 1 2 3 4 5 6 Strongly agree

Here are two personality characteristics that may or may not apply to you. Please indicate the extent to which you agree or disagree with each statement.

I see myself as open to new experiences, complex	Strongly disagree 1 2 3 4 5 6 Strongly agree
I see myself as conventional, uncreative	Strongly disagree 1 2 3 4 5 6 Strongly agree

The following questions are about your general tendency to engage in innovative work behaviour.
Within the last year how often have you.....

Paid attention to issues that were not part of your daily work?	Never	1	2	3	4	5	6	Always
Wondered how things could be improved?	Never	1	2	3	4	5	6	Always
Searched out new working methods, techniques or instruments?	Never	1	2	3	4	5	6	Always
Generated original solutions for problems?	Never	1	2	3	4	5	6	Always
Found new approaches to execute tasks?	Never	1	2	3	4	5	6	Always
Made important organizational members enthusiastic for innovative ideas?	Never	1	2	3	4	5	6	Always
Attempted to convince people to support an innovative idea?	Never	1	2	3	4	5	6	Always
Systematically introduced innovative ideas into work practices?	Never	1	2	3	4	5	6	Always
Contributed to the implementation of new ideas?	Never	1	2	3	4	5	6	Always
Put effort in the development of new things?	Never	1	2	3	4	5	6	Always

Demographics

Gender: Male ☐ Female ☐

Age: ....

Level of Education:

☐ No schooling

☐ Secondary to age 15/16

☐ Secondary to age 18

☐ Non-university higher education

☐ Bachelor degree

☐ MSc/PhD

Profession: ....

How many years have you worked in your current job? ....

Please provide your **unique ID code**. This should consist of the first initial of your surname followed by your date and month of birth in four digit format. (e.g., G1706)

....

Please remember to share this unique ID code with your supervisor to quote when they complete the survey.

End of Survey

Thank you for your time!!

Appendix 3: Study 2 Survey. Supervisor rated, English version

First and foremost, I deeply appreciate your interest in participating in my study! I am currently undertaking my PhD in Organisational Psychology at the University of Manchester.

The purpose of this study is to develop and test a model of Innovative Work Behaviour. Innovative Work Behaviour entails the sequence of actions/behaviours aimed at producing, promoting, and implementing an innovative idea. Furthermore, it is of interest to identify whether employees' individual differences, and workplace characteristics influence the frequency that innovative work behaviours are manifested.

Your participation is voluntary. You may refuse to take part in the research or exit the survey at any time. The survey should take approximately 2 minutes to complete and instructions are provided before each section.

Access to results is restricted to the researchers involved (myself and supervisor Dr. David Hughes) and none of the information will be disclosed to any third parties. No one will be able to identify you or your answers.

If you have any questions or wish to obtain feedback on the results of the study please contact: ioannis.kratsiotis@postgrad.mbs.ac.uk.

Thank you very much for your time and help. Without you this research would not be possible. Thank you!

By completing the present questionnaire you give your informed consent of agreement that you wish to participate in this research project, and that your answers will be used for research purposes exclusively.

Please provide your unique **ID code**, this should have been provided by the team member who asked you to complete this survey..

Please carefully read the following.

Innovative work behaviours are those activities that aim to produce innovative outcomes (e.g., new product, new service, new workplace procedures). Innovative outcomes are not exclusively about groundbreaking changes but include "minor" improvements in existing products, in organisational processes, or in how you do your work.

To the best of your knowledge, has the employee who asked you to fill in this survey....

	YES	NO	N/A
Transformed his/her innovative ideas into customer focused **product/s?**			
Transformed his/her innovative ideas into customer focused **service/s?**			
Transformed his/her innovative idea into new **procedure/s** that changed, to some degree, the way things were done within your organisation.			

The following questions enquire about your employee's general tendency to engage in innovative work behaviour. Within the last year how often has your employee.....

Paid attention to issues that were not part of his/her daily work?	Never	1	2	3	4	5	6	Always
Wondered how things could be improved?	Never	1	2	3	4	5	6	Always
Searched out new working methods, techniques or instruments?	Never	1	2	3	4	5	6	Always
Generated original solutions for problems?	Never	1	2	3	4	5	6	Always
Found new approaches to execute tasks?	Never	1	2	3	4	5	6	Always
Made important organizational members enthusiastic for innovative ideas?	Never	1	2	3	4	5	6	Always
Attempted to convince people to support an innovative idea?	Never	1	2	3	4	5	6	Always
Systematically introduced innovative ideas into work practices?	Never	1	2	3	4	5	6	Always
Contributed to the implementation of new ideas?	Never	1	2	3	4	5	6	Always
Put effort in the development of new things?	Never	1	2	3	4	5	6	Always

End of Survey. Thank you for your time!!

Appendix 4: Study 2 Survey. Self-report, Greek version

Πρώτα από όλα, εκτιμώ βαθύτατα το ενδιαφέρον σας να συμμετάσχετε στην έρευνά μου, η οποία διεξάγεται στο πλαίσιο της διδακτορικής μου διατριβής στο Πανεπιστήμιο του Μάντσεστερ.

Ο σκοπός αυτής της μελέτης είναι να αναπτύξω και να εξετάσω ένα μοντέλο Καινοτόμου Εργασιακής Συμπεριφοράς. Η Καινοτόμος Εργασιακή Συμπεριφορά εμπεριέχει την αλληλουχία των ενεργειών/συμπεριφορών οι οποίες αποσκοπούν να παράξουν, να προωθήσουν, και να υλοποιήσουν μία καινοτόμα ιδέα. Επιπλέον, η παρούσα έρευνα αποσκοπεί στο να εξετάσει το κατά πόσον διάφορα ατομικά χαρακτηριστικά, και χαρακτηριστικά του εργασιακού χώρου επηρεάζουν την συχνότητα εκδήλωσης των Καινοτόμων Εργασιακών Συμπεριφορών.

Η συμμετοχή στην έρευνα είναι εθελοντική. Μπορείτε να αρνηθείτε να λάβετε μέρος, η να αποχωρήσετε ανά πάσα στιγμή. Το ερωτηματολόγιο χρειάζεται περίπου 15-20 λεπτά να συμπληρωθεί και παρέχονται οδηγίες πριν από κάθε ενότητα.

Πρόσβαση στα αποτελέσματα θα έχουν μόνο οι εμπλεκόμενοι ερευνητές και καμία από τις παρεχόμενες πληροφορίες δε θα παραχωρηθεί σε τρίτα άτομα. Κανείς δε θα μπορέσει να αναγνωρίσει εσάς ή τις απαντήσεις σας.

Εάν έχετε οποιαδήποτε ερώτηση ή επιθυμείτε να ενημερωθείτε για τα αποτελέσματα της έρευνας μπορείτε να επικοινωνήσετε μαζί μου στο ακόλουθο e-mail:

ioannis.kratsiotis@postgrad.mbs.ac.uk

Σας ευχαριστώ πολύ για τον χρόνο και τη βοήθειά σας. Χωρίς εσάς αυτή η έρευνα θα ήταν αδύνατο να πραγματοποιηθεί.

Ενότητα 1.

Παρακαλώ διαβάστε προσεκτικά την παρακάτω περιγραφή της καινοτόμου διαδικασίας πριν απαντήσετε τις ερωτήσεις.

Ως καινοτόμος εργασιακή συμπεριφορά ορίζονται οι δραστηριότητες που στοχεύουν στο να παράξουν καινοτόμα αποτελέσματα (π.χ. ένα καινούριο προϊόν, μία καινούρια υπηρεσία, ή καινούριες εργασιακές διαδικασίες). Κατά τη διάρκεια αυτής της διαδικασίας το άτομο αναγνωρίζει μία έλλειψη, μία ευκαιρία, ένα πρόβλημα ή μία κατάσταση η οποία θα μπορούσε να βελτιωθεί στον εργασιακό χώρο, έπειτα δημιουργεί ιδέες και λύσεις και δουλεύει προς την κατεύθυνση της υλοποίησης της καινοτόμας ιδέας με σκοπό να προκαλέσει σε κάποιο βαθμό μία επωφελή αλλαγή. Είναι σημαντικό να τονιστεί ότι τα καινοτόμα αποτελέσματα δεν χρειάζεται να είναι αναγκαστικά ρηξικέλευθες αλλαγές, αλλά μπορεί να είναι μικρές βελτιώσεις σε υπάρχοντα προϊόντα, σε εσωτερικές διαδικασίες, η στον τρόπο που κάνεις την δουλειά σου (π.χ. ένας νέος και λιγότερο χρονοβόρος τρόπος αρχειοθέτησης).

	ΝΑΙ	ΟΧΙ
Έχεις ενεργά εμπλακεί σε οποιεσδήποτε δραστηριότητες που είχαν ως σκοπό να παράγουν ένα καινοτόμο αποτέλεσμα κατά τον τελευταίο χρόνο;		

Παρακαλώ διαβάστε τις ακόλουθες προτάσεις και απαντήστε κυκλώνοντας την κατάλληλη απάντηση.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Αναρωτήθηκα για το πώς τα πράγματα θα μπορούσαν να βελτιωθούν.	Ποτέ 1 2 3 4 5 6 Πάντα
Αναζήτησα καινούριες μεθόδους εργασίας, τεχνικές ή εργαλεία.	Ποτέ 1 2 3 4 5 6 Πάντα
Διατήρησα τον εαυτό μου ενημερωμένο σχετικά με νεες ιδέες/προσεγγίσεις εντός του τομέα εξειδίκευσής μου.	Ποτέ 1 2 3 4 5 6 Πάντα
Διατήρησα τον εαυτό μου ενημερωμένο σχετικά με νέες εξελίξεις σε άλλους οργανισμούς.	Ποτέ 1 2 3 4 5 6 Πάντα
Διατήρησα τον εαυτό μου ενημερωμένο σχετικά με νέες εξελίξεις εντός του οργανισμού μου.	Ποτέ 1 2 3 4 5 6 Πάντα
Αφιέρωσα χρόνο ώστε να εντοπίσω τις αδυναμίες του τμήματός μου.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις αφορούν συμπεριφορές που εκδηλώνονται πριν την προώθηση της καινοτόμου ιδέας στον εργασιακό χώρο.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Αφιέρωσα χρόνο ώστε να εντοπίσω τους κατάλληλους ανθρώπους να αναμειχθούν.	Ποτέ 1 2 3 4 5 6 Πάντα
Αφιέρωσα χρόνο ώστε να σχεδιάσω το πώς οι υλικοί/ανθρώπινοι πόροι θα μπορούσαν να αποκτηθούν.	Ποτέ 1 2 3 4 5 6 Πάντα
Αφιέρωσα χρόνο ώστε να εντοπίσω το πώς η ιδέα παρείχε ένα συγκριτικό πλεονέκτημα στον οργανισμό.	Ποτέ 1 2 3 4 5 6 Πάντα
Εντόπισα πιθανές εστίες σύγκρουσης και αντίστασης εντός του οργανισμού.	Ποτέ 1 2 3 4 5 6 Πάντα
Τροποποίησα την ιδέα ώστε να γίνει πιο ελκυστική σε άτομα/ομάδες που ασκούν επιρροή.	Ποτέ 1 2 3 4 5 6 Πάντα
Τροποποίησα την ιδέα βάσει της εκτίμησης της διαθεσιμότητας των απαραίτητων πόρων.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις έχουν να κάνουν με το πως θα μπορούσατε να προωθήσετε μία καινοτόμα ιδέα.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Προώθησα τα πλεονεκτήματα της καινοτόμου ιδέας με ενθουσιασμό.	Ποτέ 1 2 3 4 5 6 Πάντα
Ξεκίνησα με πρωτοβουλία μου μία ανοιχτή συζήτηση σχετικά με την προτεινόμενη καινοτομία	Ποτέ 1 2 3 4 5 6 Πάντα
Εξέφρασα την σιγουριά μου σχετικά με το τι μπορεί να προσφέρει η συγκεκριμένη καινοτομία.	Ποτέ 1 2 3 4 5 6 Πάντα
Προώθησα την καινοτόμο ιδέα με αποφασιστικότητα ακόμη και αν οι άλλοι δεν την έβρισκαν εξαρχής ελκυστική.	Ποτέ 1 2 3 4 5 6 Πάντα
Αξιολόγησα τις αντιδράσεις των συναδέλφων μου ως προς την ιδέα μου και αναλόγως προσάρμοσα τον επιλεγμένο τρόπο προσέγγισης.	Ποτέ 1 2 3 4 5 6 Πάντα
Αξιολόγησα τις αντιδράσεις των συναδέλφων μου και έπειτα ενσωμάτωσα νέες οπτικές στην αρχική ιδέα.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις έχουν να κάνουν με το πως θα μπορούσατε να κερδίσετε την στήριξη του οργανισμού εργασίας ως προς την καινοτόμο ιδέα σας.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	

Παρήγαγα μια εμπεριστατωμένη εκτίμηση του κόστους – οφέλους, ώστε να εξασφαλίσω την στήριξη του αφεντικού/διευθυντή μου.	Ποτέ 1 2 3 4 5 6 Πάντα
Παρουσίασα ένα λεπτομερές πλάνο υλοποίησης, ώστε να εξασφαλίσω την στήριξη του αφεντικού/διευθυντή μου.	Ποτέ 1 2 3 4 5 6 Πάντα
Διασφάλισα την στήριξη υποστηρικτών/πελατών, ώστε να εξασφαλίσω την στήριξη του αφεντικού/διευθυντή μου.	Ποτέ 1 2 3 4 5 6 Πάντα
Περιέγραψα τις δυνητικές θετικές οργανωτικές/οικονομικές επιπτώσεις/αποτελέσματα, ώστε να εξασφαλίσω την στήριξη του αφεντικού/διευθυντή μου	Ποτέ 1 2 3 4 5 6 Πάντα
Επέμεινα όταν οι ανώτεροί μου δεν είχαν πειστεί/ παρέμειναν σκεπτικοί.	Ποτέ 1 2 3 4 5 6 Πάντα
Έλαβα υπόψην την οπτική γωνία της διοίκησης, και ενσωμάτωσα τις αντιπροτάσεις τους στην αρχική ιδέα, ώστε να εξασφαλίσω την στήριξή τους.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις αφορούν το πώς μπορείτε να πείσετε τους συνεργάτες με ικανότητες και γνώσεις ώστε να στηρίξουν και να συμμετάσχουν στην υλοποίηση της καινοτόμου ιδέας σας.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Διατύπωσα την ιδέα τονίζοντας τα θετικά της σημεία, ώστε να διασφαλίσω την συνεργασία των συνεργατών με ικανότητες και γνώσεις.	Ποτέ 1 2 3 4 5 6 Πάντα
Συμβουλεύτηκα ευρέως για να ενισχύσω την δέσμευση ως προς την ιδέα μου, ώστε να διασφαλίσω την συνεργασία των συνεργατών με ικανότητες και γνώσεις.	Ποτέ 1 2 3 4 5 6 Πάντα
Αφιέρωσα χρόνο στο να αντιμετωπίσω τους φόβους/ενστάσεις των συναδέλφων μου, ώστε να διασφαλίσω την συνεργασία των συνεργατών με ικανότητες και γνώσεις.	Ποτέ 1 2 3 4 5 6 Πάντα
Παρουσίασα τα ατομικά οφέλη της προτεινόμενης αλλαγής, ώστε να διασφαλίσω την συνεργασία των συνεργατών με ικανότητες και γνώσεις.	Ποτέ 1 2 3 4 5 6 Πάντα
Επέδειξα ενθουσιασμό όταν οι συνάδελφοί μου παρέμειναν μη πεπεισμένοι, ώστε να διασφαλίσω την	Ποτέ 1 2 3 4 5 6 Πάντα

συνεργασία των συνεργατών με ικανότητες και γνώσεις.	
Ζήτησα την στήριξη των ανωτέρων, ώστε να διασφαλίσω την συνεργασία των συνεργατών με ικανότητες και γνώσεις.	Ποτέ 1 2 3 4 5 6 Πάντα
Ενσωμάτωσα στην ιδέα τις οπτικές γωνίες των συνεργατών με ικανότητες και γνώσεις, ώστε να διασφαλίσω τη συνεργασία τους.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις αφορούν το πώς θα μπορούσατε να σχεδιάσετε την υλοποίηση της καινοτόμου ιδέας.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Έθεσα σαφείς στόχους σχετικά με τα επιθυμητά αποτελέσματα της διαδικασίας υλοποίησης της ιδέας.	Ποτέ 1 2 3 4 5 6 Πάντα
Διένειμα τον όγκο εργασίας βάσει των ατομικών ικανοτήτων του καθενός.	Ποτέ 1 2 3 4 5 6 Πάντα
Βεβαιώθηκα ότι το κάθε άτομο είχε τις απαραίτητες ικανότητες/γνωσεις ώστε να εκπληρώσει την εργασία που του είχε ανατεθεί.	Ποτέ 1 2 3 4 5 6 Πάντα
Έκανα τον κατάλληλο διαμοιρασμό των διαθέσιμων πόρων.	Ποτέ 1 2 3 4 5 6 Πάντα
Ανέπτυξα μία καινούρια στρατηγική υλοποίησης όταν οι διαθέσιμοι πόροι ήταν περιορισμένοι.	Ποτέ 1 2 3 4 5 6 Πάντα

Οι ακόλουθες προτάσεις αφορούν το πως θα μπορούσατε να μετατρέψετε μία καινοτόμα ιδέα σε ένα καινούριο προϊόν/υπηρεσία/διαδικασία.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Αξιολογούσα συνεχώς το αν οι προσπάθειες υλοποίησης έφερναν αποτελέσματα.	Ποτέ 1 2 3 4 5 6 Πάντα
Πήρα ρίσκα ώστε να αξιολογήσω την καταλληλότητα της προσέγγισης.	Ποτέ 1 2 3 4 5 6 Πάντα
Διατηρούσα τους συνεργάτες/ανώτερους ενημερωμένους σχετικά με την πρόοδο της διαδικασίας υλοποίησης της ιδέας	Ποτέ 1 2 3 4 5 6 Πάντα
Έδειχνα την εκτίμησή μου για τις προσπάθειες των μελών της ομάδας.	Ποτέ 1 2 3 4 5 6 Πάντα
Αντιμετώπισα τις απροσδόκητες δυσκολίες σαν μία ευκαιρία να βελτιώσω την αρχική ιδέα.	Ποτέ 1 2 3 4 5 6 Πάντα
Σκεφτόμουν συνεχως εναλλακτικές λύσεις που θα έκαναν την υλοποίηση πιο εφικτή.	Ποτέ 1 2 3 4 5 6 Πάντα

Ενότητα 2.

Παρακαλώ διαβάστε τις ακόλουθες προτάσεις και δηλώστε το βαθμό στον οποίο συμφωνείτε ή διαφωνείτε.

Εγώ σχεδιάζω/προγραμματίζω τη δουλειά μου.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Μπορώ να επιλέξω τις μεθόδους που θα χρησιμοποιήσω όταν εκτελώ την εργασία μου.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Μπορώ να αποφασίσω το ποια προσέγγιση θα ακολουθήσω για να γίνει η δουλειά μου.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Ο διευθυντής/προϊστάμενός μου δείχνει ειλικρινές ενδιαφέρον όποτε σκαρφίζομαι μία ιδέα.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Ο διευθυντής/προϊστάμενός μου αντιδρά με ενθουσιασμό στις δημιουργικές μου σκέψεις.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Ο διευθυντής/προϊστάμενός μου με στηρίζει όταν θέλω να βελτιώσω πράγματα.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Ο διευθυντής/προϊστάμενός μου είναι κάποιος που μπορείς να βασιστείς πάνω του, ακόμη και όταν ξεκινάς κάτι που τελικά αποτυγχάνει.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Αντιμετωπίζω τα προβλήματα με ενεργητικότητα.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Όποτε κάτι πάει στραβά, ψάχνω αμέσως για μία λύση.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Όποτε υπάρχει μία ευκαιρία να εμπλακώ ενεργά με κάτι, την αρπάζω.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Παίρνω την πρωτοβουλία αμέσως ακόμα και όταν οι άλλοι δεν το κάνουν.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Αξιοποιώ τις ευκαιρίες γρήγορα ώστε να πραγματοποιήσω τους στόχους μου.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Συνήθως κάνω περισσότερα από όσα μου έχουν ζητηθεί.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα
Είμαι ιδιαιτέρως καλός/ή στο να υλοποιώ ιδέες.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα

Παρακάτω παρουσιάζονται κάποια χαρακτηριστικά προσωπικότητας τα οποία μπορεί να ισχύουν για εσάς ή όχι. Παρακαλώ διαβάστε τις παρακάτω προτάσεις και κυκλώστε την απάντηση που υποδεικνύει το πόσο συμφωνείτε ή διαφωνείτε με την κάθε πρόταση.

Βλέπω τον εαυτό μου ως ανοιχτό σε νέες εμπειρίες, περίπλοκο.	Διαφωνώ απόλυτα	1	2	3	4	5	6 Συμφωνώ απόλυτα

Βλέπω τον εαυτό μου ως συμβατικό, μη εφευρετικό.	Διαφωνώ απόλυτα 1 2 3 4 5 6 Συμφωνώ απόλυτα

Οι παρακάτω προτάσεις αφορούν την γενική σας τάση να εμπλέκεστε σε καινοτόμες εργασιακές συμπεριφορές.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδηλώσατε τις παρακάτω συμπεριφορές	
Έδινα σημασία σε ζητήματα που δεν ήταν μέρος της καθημερινής μου δουλειάς.	Ποτέ 1 2 3 4 5 6 Πάντα
Αναρωτιόμουν για το πώς τα πράγματα θα μπορούσαν να βελτιωθούν.	Ποτέ 1 2 3 4 5 6 Πάντα
Αναζητούσα καινούριες μεθόδους εργασίας, τεχνικές ή εργαλεία.	Ποτέ 1 2 3 4 5 6 Πάντα
Δημιούργησα πρωτότυπες λύσεις για προβλήματα.	Ποτέ 1 2 3 4 5 6 Πάντα
Βρήκα νέους τρόπους να εκτελώ τα καθήκοντα.	Ποτέ 1 2 3 4 5 6 Πάντα
Έκανα σημαντικά στελέχη του οργανισμού να ενθουσιάζονται για καινοτόμες ιδέες.	Ποτέ 1 2 3 4 5 6 Πάντα
Προσπάθησα να πείσω άλλους ανθρώπους να στηρίξουν μία καινοτόμα ιδέα.	Ποτέ 1 2 3 4 5 6 Πάντα
Συστηματικά εισήγαγα καινοτόμες ιδέες σε εργασιακές πρακτικές.	Ποτέ 1 2 3 4 5 6 Πάντα
Συνεισέφερα στην υλοποίηση καινούριων ιδεών.	Ποτέ 1 2 3 4 5 6 Πάντα
Κατέβαλα προσπάθεια για την ανάπτυξη καινούριων πραγμάτων.	Ποτέ 1 2 3 4 5 6 Πάντα

Δημογραφικά Στοιχεία

Φύλο : Αρσενικό ☐ Θηλυκό ☐

Ηλικία:....................

Εκπαιδευτικό επίπεδο:

☐ Καμία εκπαίδευση

☐ Απόφοιτος/η Γυμνασίου

☐ Απόφοιτος/η Λυκείου

☐ Ανώτερη μη Πανεπιστημιακή Εκπαίδευση

☐ Απόφοιτος/η ΑΕΙ/ΑΤΕΙ

☐ Κάτοχος Μεταπτυχιακού/Διδακτορικού

Επάγγελμα:...

Πόσα χρόνια εργάζεστε στην τωρινή σας δουλειά; ....

Παρακαλώ παρέχετε τον μοναδικό **κωδικό αναγνώρισής σας ή το όνομά σας**. Ο κωδικός πρέπει να αποτελείται από το αρχικό γράμμα του επιθέτου σας ακολουθούμενο από την ημερομηνία και τον μήνα γέννησης σας (π.χ. Π1706)

....

Να θυμηθείτε να μοιραστείτε τον κωδικό σας με τον διευθυντή/ προϊστάμενό σας ώστε να τον παραθέσουν όταν αυτοί συμπληρώνουν την έρευνα.

Τέλος ερωτηματολογίου

Σας ευχαριστώ για το χρόνο που διαθέσατε!

Appendix 5: Study 2 Survey. Supervisor rated, Greek version

Πρώτα από όλα, εκτιμώ βαθύτατα το ενδιαφέρον σας να συμμετάσχετε στην έρευνά μου, η οποία διεξάγεται στο πλαίσιο της διδακτορικής μου διατριβής στο Πανεπιστήμιο του Μάντσεστερ.

Ο σκοπός αυτής της μελέτης είναι να αναπτύξω και να εξετάσω ένα μοντέλο Καινοτόμου Εργασιακής Συμπεριφοράς. Η Καινοτόμος Εργασιακή Συμπεριφορά εμπεριέχει την αλληλουχία των ενεργειών/συμπεριφορών οι οποίες αποσκοπούν να παράξουν, να προωθήσουν, και να υλοποιήσουν μία καινοτόμα ιδέα. Επιπλέον, η παρούσα έρευνα αποσκοπεί στο να εξετάσει το κατά πόσον διάφορα ατομικά χαρακτηριστικά, και χαρακτηριστικά του εργασιακού χώρου επηρεάζουν την συχνότητα εκδήλωσης των Καινοτόμων Εργασιακών Συμπεριφορών.

Η συμμετοχή στην έρευνα είναι εθελοντική. Μπορείτε να αρνηθείτε να λάβετε μέρος, η να αποχωρήσετε ανά πάσα στιγμή. Το ερωτηματολόγιο χρειάζεται περίπου 3 λεπτά να συμπληρωθεί και παρέχονται οδηγίες πριν από κάθε ενότητα.

Πρόσβαση στα αποτελέσματα θα έχουν μόνο οι εμπλεκόμενοι ερευνητές και καμία από τις παρεχόμενες πληροφορίες δε θα παραχωρηθεί σε τρίτα άτομα. Κανείς δε θα μπορέσει να αναγνωρίσει εσάς ή τις απαντήσεις σας.

Εαν έχετε οποιαδήποτε ερώτηση ή επιθυμείτε να ενημερωθείτε για τα αποτελέσματα της έρευνας μπορείτε να επικοινωνήσετε μαζί μου στο ακόλουθο e-mail:

ioannis.kratsiotis@postgrad.mbs.ac.uk

Σας ευχαριστώ πολύ για το χρόνο και τη βοήθεια σας. Χωρίς εσάς αυτή η έρευνα θα ήταν αδύνατο να πραγματοποιηθεί.

Παρακαλώ συμπληρώστε τον **κωδικό** ή το **όνομα** που σας παρείχε το άτομο εκ μέρους του οποίου συμπληρώνετε αυτό το ερωτηματολόγιο..

Παρακαλώ διαβάστε προσεκτικά την παρακάτω περιγραφή της καινοτόμου διαδικασίας πριν απαντήσετε τις ερωτήσεις.

Η καινοτόμος εργασιακή συμπεριφορά ορίζεται ως οι δραστηριότητες που στοχεύουν στο να παράξουν καινοτόμα αποτελέσματα (π.χ. ένα καινούριο προϊόν, μία καινούρια υπηρεσία, ή καινούριες εργασιακές διαδικασίες). Κατά τη διάρκεια αυτής της διαδικασίας το άτομο αναγνωρίζει μία έλλειψη, μία ευκαιρία, ένα πρόβλημα ή μία κατάσταση η οποία θα μπορούσε να βελτιωθεί στον εργασιακό χώρο, έπειτα δημιουργεί ιδέες και λύσεις και δουλεύει προς την κατεύθυνση της υλοποίησης της καινοτόμας ιδέας με σκοπό να προκαλέσει σε κάποιο βαθμό μία επωφελή αλλαγή. Είναι σημαντικό να τονιστεί ότι τα καινοτόμα αποτελέσματα δεν χρειάζεται να είναι αναγκαστικά ρηξικέλευθες αλλαγές, αλλά μπορεί να είναι μικρές βελτιώσεις σε υπάρχοντα προϊόντα, σε εσωτερικές διαδικασίες, η στο τρόπο που κάνεις την δουλειά σου (π.χ. ένας νέος και λιγότερο χρονοβόρος τρόπος αρχειοθέτησης).

Σύμφωνα με όσα γνωρίζετε έχει το άτομο εκ μέρους του οποίου συμπληρώνετε αυτό το ερωτηματολόγιο

	ΝΑΙ	ΟΧΙ
Μετασχηματίσει τις καινοτόμες ιδέες του σε προϊόντα προσανατολισμένα στον πελάτη;		
Μετασχηματίσει τις καινοτόμες ιδέες του σε υπηρεσίες προσανατολισμένες στον πελάτη		
Μετασχηματίσει τις καινοτόμες ιδέες του σε καινούριες διαδικασίες που άλλαξαν κατα κάποιο βαθμό τον τρόπο που γίνονται τα πράγματα στον οργανισμό εργασίας μου.		

Οι παρακάτω προτάσεις αφορούν την γενική τάση του ατόμου εκ μέρους του οποίου συμπληρώνετε αυτό το ερωτηματολόγιο να εμπλέκεται σε καινοτόμες εργασιακές συμπεριφορές.

Κατά τον τελευταίο χρόνο πόσο συχνά εκδήλωσε τις παρακάτω συμπεριφορές	Ποτέ 1 2 3 4 5 6 Πάντα
Έδινε σημασία σε ζητήματα που δεν ήταν μέρος της καθημερινής του δουλειάς.	Ποτέ 1 2 3 4 5 6 Πάντα
Αναρωτιόταν για το πως τα πράγματα θα μπορούσαν να βελτιωθούν.	Ποτέ 1 2 3 4 5 6 Πάντα
Αναζητούσε καινούριες μεθόδους εργασίας, τεχνικές ή εργαλεία.	Ποτέ 1 2 3 4 5 6 Πάντα
Δημιούργησε πρωτότυπες λύσεις για προβλήματα.	Ποτέ 1 2 3 4 5 6 Πάντα
Βρήκε νέους τρόπους να εκτελεί τα καθήκοντα.	Ποτέ 1 2 3 4 5 6 Πάντα

Έκανε σημαντικά στελέχη του οργανισμού να ενθουσιάζονται για καινοτόμες ιδέες.	Ποτέ	1	2	3	4	5	6	Πάντα
Προσπάθησε να πείσει άλλους ανθρώπους να στηρίξουν μία καινοτόμα ιδέα.	Ποτέ	1	2	3	4	5	6	Πάντα
Συστηματικά εισήγαγε καινοτόμες ιδέες σε εργασιακές πρακτικές.	Ποτέ	1	2	3	4	5	6	Πάντα
Συνείσφερε στην υλοποίηση καινούριων ιδεών.	Ποτέ	1	2	3	4	5	6	Πάντα
Κατέβαλε προσπάθεια για την ανάπτυξη καινούριων πραγμάτων.	Ποτέ	1	2	3	4	5	6	Πάντα

Τέλος ερωτηματολογίου

Σας ευχαριστώ για το χρόνο που διαθέσατε!

Appendix 6: Ethical Approval form

UNIVERSITY OF MANCHESTER

ALLIANCE MANCHESTER BUSINESS SCHOOL

Ethical Approval for Research Involving Adults Able to Give Informed Consent

This template allows Alliance Manchester Business School to provide ethical approval for research projects that comply with its terms and conditions. It should be used only for research projects conducted by academic members of staff and their students.

This template covers research that:

- Involves only participants who are non-vulnerable adults who are able to give informed consent,
- Will obtain informed consent from all participants,
- Does not involve physically invasive procedures,
- Does not involve activities that pose a significant risk of causing physical harm or more than mild discomfort,
- Does not involve activities that pose a significant risk of causing psychological stress or anxiety,
- Does not require participants to take part in activities that pose a significant risk of having an adverse effect on their personal well-being (e.g. physical and psychological health), social well-being (e.g. social standing, social connectedness) or economic well-being (e.g. employment, employability, professional standing),
- Does not involve collecting or revealing data that enables individuals, groups or organizations to be identified in such a way that they could experience significant negative effects on their personal, social or economic well-being, and
- Does not involve activities that pose a significant risk of harming the researcher(s).

This template does not cover research that:

- Involves data from NHS patients,
- Involves data relating to NHS staff that is not limited to non-sensitive questions about their professional role, and
- Involves users of other UK Health Department services.

For details, see the University's guide to applying to an NHS Research Ethics Committee.

How to use this template

Please answer the questions that follow, which are based on the University's research ethics requirements. Please read through the questions before you start to fill in the form – this will prevent you wasting time in cases where the template does not cover your project. In such cases, your project must be referred to the University Research Ethics Committee for review – please contact the MBS Research Support Office (ambsethics@manchester.ac.uk) or the University's Research Ethics Office (research.ethics@manchester.ac.uk) for information. Once you have completed the template, please send your completed form, including all supporting documents (e.g. consent form, participant information sheet, advertisements), to ambsethics@manchester.ac.uk. Once your documents have been reviewed, you will receive notification of ethical approval, including an approval reference number.

1 ADMINISTRATIVE INFORMATION				
Principal investigator details				
1.1.1. Title	Mr			
1.1.2. First name	Ioannis			
1.1.3. Last name	Kratsiotis			
1.1.4. Is this a student project (i.e. completed as part of a degree qualification)?	☒ Yes		☐ No	
	[If yes, then please state degree programme and provide supervisor details]			
	Degree (e.g. MSc in Marketing):		PhD Organisational Psychology	
	Supervisor name:		Dr. David Hughes	
	Supervisor email address:		david.hughes-4@manchester.ac.uk	
1.1.5. Qualifications	BSc Psychology, MSc Psychological Research Methods, MSc Organisational Psychology, 2nd year PhD student.			
1.1.6. Division	PMO			
1.1.7. Email address	Ioannis.kratsiotis@postgrad.mbs.ac.uk			
1.1.8. Telephone	07511398628			
1.2. Are other staff or students involved in the project?	☐ Yes		☒ No	
	[If yes, then please insert names and email addresses below]			
	Name		Email address	
	Name		Email address	
	Name		Email address	
	Name		Email address	
	Name		Email address	
	Name		Email address	
2 RESEARCH PROJECT DETAILS				
2.1. Title of project	Examining Innovative Work Behaviour at a stage-focused level.			
2.2. What is the principal research question, in lay terms?	Examination of the factorial structure of a newly developed multidimensional model of Innovative Work Behaviour.			
2.3. When will the data collection take place?	Start date	06/12/2016	End date	31/01/2017

3	**RESEARCH DESIGN**	
3.1. How have the quality and suitability of the research design and methods been assessed ? (Please select at least one option)		
☒	Independent internal review (i.e. review by academic colleagues independent of the research project but at the University of Manchester)	
☐	Independent external review (i.e. review by methodological/technical expert, research centre/research group or commercial organization not at the University of Manchester)	
3.2. Are the research design and methods appropriate? (Please select)		
☒	The design and methods of the study are appropriate for the question(s) being asked and the researcher(s) has addressed potential threats to validity, accuracy and/or integrity.	
3.3. How many people will participate in the research, in total?		
	800	
3.4. How was the number of participants decided? (Please select at least one option)		
☒	Statistical sampling. The sample size is large enough to provide adequate power for appropriate statistical tests, e.g. concerning statistical significance, effect size, and confidence intervals.	
☐	Theoretical sampling. The number of participants is estimated to provide sufficient data such that further increases would likely yield no significant additional insights concerning the topic under investigation.	
☐	Purposive sampling. The number of participants is based on access to the subject group most appropriate for answering the research question(s) under investigation (e.g. critical case sampling, key informant sampling, or snowball sampling).	
☒	Convenience sampling. The number of participants is based on selection of the most accessible subject group, to control costs in terms of time, effort or other resources.	
	IF CONVENIENCE SAMPLING IS SELECTED, THEN YOU MUST ALSO AGREE TO THE FOLLOWING CONDITION:	
	☒	Convenience sampling is appropriate because the research is exploratory in nature and/or the conclusions to be drawn from the data will not be threatened by issues concerning selection bias, generalizability, sampling error, and/or statistical power.

4 RISKS FOR PARTICIPANTS		
4.1. Does the research involve physically invasive procedures?	☐ Yes	☒ No
4.2. Does the research involve physical testing?	☐ Yes	☒ No
4.3. Does the research involve the use of psychological tests for clinical purposes?	☐ Yes	☒ No
IF YES TO 4.1, 4.2 OR 4.3, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
4.4. Does the research involve the use of psychological tests for non-clinical purposes?	☐ Yes	☒ No
IF YES, THEN GO TO 4.4.1. IF NO, THEN GO TO 4.5.		
4.4.1. The use of non-clinical psychological tests can pose ethical risks because collecting psychological data might cause anxiety or distress to participants if those data are revealed to the participant or to others. Please confirm that: (you must select all)		
☐	The researcher(s) have undertaken any mandatory training necessary to use the test(s) appropriately and has the knowledge and skills required to implement effectively each of the tests to be administered.	
☐	The researcher(s) will abide by regulations and restrictions relating to the use of the tests to be administered.	
☐	The researcher(s) will store test materials and results securely and ensure that no unauthorised person has access to them.	
☐	The researcher(s) will ensure that test takers understand why the tests will be used and will protect the welfare and dignity of test takers when administering, scoring and interpreting the tests.	
☐	The researcher(s) will ensure that they provide test takers with any agreed feedback about the results in a form that explains clearly the implications of the results and is in a style appropriate to the test takers' level of understanding.	
4.5. Is it likely that taking part in the research will cause significant levels of embarrassment, distress or anxiety for participants?	☐ Yes	☒ No
IF YES, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
4.6. Is it likely that taking part in the research will cause significant levels of fatigue for participants?	☐ Yes	☒ No
IF YES, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
4.7. Does the research require participants to take part in activities that pose a significant risk of having an adverse effect on their personal well-being (e.g. physical and psychological health), social well-being (e.g. social standing, social connectedness) or economic well-being (e.g. employment, employability, professional standing)?	☐ Yes	☒ No
IF YES, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		

5 RESEARCH METHODS, DATA PROTECTION AND CONFIDENTIALITY			
5.1. Does the research involve any of the following methods? Please select all that apply.			
	Interviews	☐ Yes	☒ No
	Focus groups	☐ Yes	☒ No
	Surveys/questionnaires	☒ Yes	☐ No
	Field observation (including participant observation)	☐ Yes	☒ No
	Ethnography	☐ Yes	☒ No
	Visual methods	☐ Yes	☒ No
	Case study	☐ Yes	☒ No
	Social network analysis	☐ Yes	☒ No
	Other qualitative methods (e.g. discourse analysis, interaction analysis, conversation analysis)	☐ Yes	☒ No
	Online or electronic methods (e.g. netnography, textual analysis of digital sources)	☐ Yes	☒ No
	Laboratory experiments	☐ Yes	☒ No
	Field experiments	☐ Yes	☒ No
5.2. Does the research involve collecting personal data?		☐ Yes	☒ No
IF NO, THEN GO TO 5.4. IF YES, THEN YOU MUST ALSO AGREE TO THE FOLLOWING FOUR CONDITIONS:			
	☐	The researcher(s) will obtain informed consent from the individuals whom the personal data is about for their personal data to be collected and used for the purposes of the research.	
	☐	All personal data will be kept securely. It will be stored on secure University network storage and not on PC hard drives or any kind of portable storage device (e.g. laptop, USB storage, removable hard drives) unless the file or device is encrypted.	
	☐	The data will be stored for a minimum of five years. If this is a student project, the supervisor or a permanent member of staff will act as custodian of the data.	
	☐	The data will not be transferred to other individuals or parties outside the members of the research team listed above.	
5.3. Does the research involve collecting *sensitive* personal data?		☐ Yes	☒ No
	IF YES, THEN YOU MUST ALSO AGREE TO THE FOLLOWING FOUR CONDITIONS:		
	☐	The researcher(s) will obtain informed consent from the individuals whom the personal data is about for their personal data to be collected and used for the purposes of the research.	
	☐	Sensitive records will be kept separately in a locked drawer or filing cabinet. Electronic sensitive data will be stored on secure University network storage and not on PC hard drives or any kind of portable storage device (e.g. laptop, USB storage, removable hard drives) unless the file or device is encrypted.	
	☐	The data will be stored for a minimum of five years. If this is a student project, the supervisor or a permanent member of staff will act as custodian of the data.	

	☐	The data will not be transferred to other individuals or parties outside the members of the research team listed above.

5.4. Will the research involve socially sensitive topics?	☐ Yes	☒ No
IF YES, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
5.5. Will the research allow others to identify individuals, groups or organizations that participated in the research (e.g. from publishing, reporting or transferring data)? This includes using direct quotations from respondents or naming individuals, groups or organizations that take part.	☐ Yes	☒ No

	IF YES, THEN YOU MUST ALSO AGREE TO ALL OF THE FOLLOWING THREE CONDITIONS:	
	☐	The researcher(s) will tell participants explicitly how the data will be used, including that they may be identified from the data.
	☐	The researchers will gain informed consent from participants to collect identifying data, including explicit consent for audio and/or visual recording.
	☐	The researchers will gain informed consent from participants to use identifying data in research outputs (i.e. reports, articles, recordings), including direct quotations.

5.6. Is there a significant likelihood that the research will uncover activities or events that should be reported to the authorities? This includes illegal or potentially harmful activities.	☐ Yes	☒ No
IF YES, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		

6 CONSENT		
6.1. Will the researcher(s) obtain informed consent to take part in the research from all participating individuals?	☒ Yes	☐ No
IF YES, THEN GO TO 6.2. IF NO, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
6.2. How will consent be obtained?	☒ In writing	☐ Orally
IF IN WRITING, GO TO 6.2.1, IF ORALLY, GO TO 6.2.2		

6.2.1.You must select the following three options.		
	☒	The researcher(s) will provide an information sheet to all persons invited to take part that explains in concise and clearly understandable terms: (a) who is conducting the research, (b) why it is being conducted (including the true purpose of the research), (c) why they have been asked to take part, (d) what it requires of them (including the amount of time they will be required to commit and what they will have to do), (e) what will happen to the data they provide, (f) whether and how their anonymity and confidentiality will be maintained, and (g) that their participation is voluntary and they are free to withdraw at any time without detriment.
	☒	The researcher(s) will ensure that participants sign/mark a consent form to indicate that they have received sufficient information about the research and are happy to take part.
	☒	All Information sheet(s) and consent form(s) to be used are attached.
		PLEASE ATTACH ALL INFORMATION SHEETS AND CONSENT FORMS.
6.2.2. You must select the following three options.		
	☐	The researcher(s) will explain in concise and clearly understandable terms to all persons invited to take part: (a) who is conducting the research, (b) why it is being conducted (including the true purpose of the research), (c) why they have been asked to take part, (d) what it requires of them (including the amount of time they will be required to commit and what they will have to do), (e) what will happen to the data they provide, (f) whether and how their anonymity and confidentiality will be maintained, and (g) that their participation is voluntary and they are free to withdraw at any time without detriment.
	☐	The researcher will ensure that oral consent is recorded or witnessed.
	☐	Scripts for providing participant information and gaining consent are attached.
		PLEASE ATTACH ALL SCRIPTS FOR PROVIDING PARTICIPANT INFORMATION SHEETS AND GAINING CONSENT.

6.3. Will the researchers give participants at least 24 hours to decide whether or not to take part in the research?	☒ Yes	☐ No
IF NO, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
7 RISKS FOR PARTICIPANTS		
7.1. Are participants from any of the following groups?		
NHS patients	☒ No	☐ Yes

Children under 18	☒ No	☐ Yes
Adults with learning difficulties	☒ No	☐ Yes
Adults who have a terminal illness	☒ No	☐ Yes
Adults with mental illness	☒ No	☐ Yes
Adults with dementia	☒ No	☐ Yes
Adults in care homes	☒ No	☐ Yes
Adults or children in emergency situations	☒ No	☐ Yes
Prisoners or criminals	☒ No	☐ Yes
Young offenders	☒ No	☐ Yes
Users of illegal drugs or illegal substances	☒ No	☐ Yes
IF YES TO ANY OF THE ABOVE, THEN THIS PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		
Persons who could be considered to have a particularly dependent relationship with the researcher(s), e.g. students taught or examined by the researcher, clients of the researcher(s).	☒ No	☐ Yes
	IF YES, THEN GO TO 7.1.1. IF NO, THEN GO TO 7.2	

7.1.1. Please confirm that the researchers will avoid coercion of any dependant participants and take special steps for this purpose.	☒	Yes, the researcher(s) will ensure that there is no coercion to participate in the study and will take special steps to ensure that participants are made explicitly aware of their rights to choose not to take part and to withdraw, without repercussion.
7.2. What are the inclusion criteria for participants?	☒	Participants will be included only if they have experiences and/or characteristics relevant to the research question being investigated.
		YOU MUST SELECT THIS BOX TO INDICATE COMPLIANCE WITH THE TERMS OF THE TEMPLATE.
7.3. What are the exclusion criteria for participants?	☒	Participants will be excluded only when they do not have experiences or characteristics relevant to the research question(s) being investigated.
		YOU MUST SELECT THIS BOX TO INDICATE COMPLIANCE WITH THE TERMS OF THE TEMPLATE.

7.4. How will participants be approached and recruited? (Please select all that apply)	
☒	The researcher(s) will approach participants directly and will: (a) provide sufficient information to enable informed consent, (b) not pursue non-responders beyond two reminders, and (c) maintain the anonymity and confidentiality of responders and non-responders.
☒	The researcher(s) will approach participants indirectly via a third party and the third party will: (a) provide sufficient information to enable informed consent, (b) not pursue non-responders beyond two reminders, and (c) maintain the anonymity and confidentiality of responders and non-responders.
☐	Participants will be recruited using an advertisement or equivalent communication (e.g. posters, flyers, block email, social media invitations/announcements/pages) and the researcher(s) will ensure that any and all information: (a) is not coercive, (b) is limited to information that prospective participants need to determine their eligibility and interest,

	(c) does not state or imply a favourable outcome or other benefit beyond what is outlined in the participant information sheet and does not emphasize payments/inducements, using means such as large or bold type, and (d) contains information that is accurate, honest and socially responsible regarding who is conducting the research, its purpose, risks/benefits, requirements of taking part, contact details for further information.
	IF THE PRECEDING OPTION IS SELECTED, THEN YOU MUST ATTACH COPIES OF ANY AND ALL ADVERTISEMENTS TO BE USED FOR RECRUITMENT.

7.5. Will participants receive payment or other incentive for taking part in the research?

☒ No	☐ Yes, but the payments and/or incentives provided will not be sufficiently coercive to over-ride freely given consent, taking into account the financial status of the participants targeted. Specifically, the sums involved will only cover reasonable out of pocket expenses (e.g. travel expenses), reasonable recompense for time given to take part in the study, and/or will be in the form of a prize draw.

8 RISKS FOR RESEARCHER(S)

8.1. Where will data collection take place (please select one)?

☐	In a university building on campus.	
	IF SELECTED, THEN YOU MUST ALSO AGREE TO THE FOLLOWING CONDITION:	
	☐	The researcher(s) has reviewed the school's risk assessment for office environments.
	OR	
☒	Off-campus at a private building or institutional setting (e.g. the premises of a work organization, participants' place of work or private residence) or in a public space (e.g. a high street) in the UK that poses no significant risk to the safety and well-being of participants and researchers.	
	IF SELECTED, THEN YOU MUST ALSO AGREE TO THE FOLLOWING CONDITION:	
	☒	The researcher(s) has reviewed the school's risk assessment for off-site work in the UK.
	OR	
☐	Off-campus at a private building or institutional setting (e.g. the premises of a work organization, participants' place of work or private residence) or in a public space (e.g. a high street) in a safe international setting which poses no significant risk to the safety and well-being of participants and researchers.	
	IF SELECTED, THEN YOU MUST ALSO AGREE TO THE FOLLOWING CONDITION:	
	☐	The researcher(s) has reviewed the school's risk assessment for off-site work in low risk overseas destinations.

8.2. Will any of the researchers be required to collect data alone in an off-campus setting?

☒ No	☐ Yes	
IF YES, THEN YOU MUST ALSO AGREE TO THE FOLLOWING CONDITION:		
☐	The researcher(s) will comply with the University's Guidance on Lone Working, including use of recommended controls (e.g. a 'buddy system'). When required to collect data alone in a community setting (including participants' residences, workplaces or public setting), researchers will undertake a risk assessment for community based working.	

9	CONFLICTS OF INTEREST		
	9.1. Do any of the researchers have any direct personal involvement (e.g. financial interests, share-holdings, personal relationships, etc.) in an organisation involved in sponsoring, funding or guiding the research that may give rise to a possible conflict of interest	☒ No	☐ Yes
	9.2. Is any organization directly involved in sponsoring, funding or guiding the research that may give rise to a possible conflict of interest?	☒ No	☐ Yes
	IF YES TO 9.1 OR 9.2, THEN YOUR PROJECT IS NOT COVERED BY THE TEMPLATE AND MUST BE REFERRED TO THE UNIVERSITY RESEARCH ETHICS COMMITTEE.		

10	CONFIRMATION OF APPLICATION	
	10.1. I confirm that I have answered the above questions accurately.	
	Signature of applicant: (Electronic signature required)	
	Name of applicant:	Ioannis Kratsiotis
	Post of applicant:	PhD student
	10.2. If this is a student project, then the supervisor must confirm that they have approved the application.	
	Supervisor's signature: (If applicable)	
	Supervisor's post: (If applicable)	Dr. David J. Hughes, Lecturer in Organisational Psychology

This version approved by University of Manchester Research Ethics Committee January 2016.

Appendix 6: Measurement Invariance Syntax

Note: The same syntax was used for both the sex and country grouping variables.

```
TITLE:  Configural model
DATA: FILE IS "C:\Users\Ioann\Desktop\INVARIANCE.txt";
VARIABLE:
  NAMES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6
  AUT1-AUT3 SS1-SS4 PI1-PI7 TR1-TR3 PIJR1-PIJR5 PSD1-PSD5 EXTR1 EXTR2
  AGR1 AGR2 CONS1 CONS2 EMSTAB1 EMSTAB2 OPEN1 OPEN2 SMS1-SMS5 STR1-STR5
  IWB1-IWB10 IWBS1-IWBS10 OUTP OUTS OUTPR PROF GENDER AGE EDUC TENURE ENorGR;
  USEVARIABLES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6;
  CATEGORICAL ARE ALL;
 MISSING ARE ALL (999);
 GROUPING IS GENDER (1 = MALES 2 = FEMALES);
MODEL:
! Factor loadings are free except the marker variables
   OE BY  OE1@1 OE2-OE6 ;
    SA BY SA1@1 SA2-SA6;
    CH BY CH1@1 CH2-CH6 ;
    OA BY OA1@1 OA2-OA6;
    RA BY RA1@1 RA2-RA7;
    IS BY IS1@1 IS2-IS5;
    IF BY IF1@1 IF2-IF6;
     ! One threshold in each item are constrained across groups
    ! One additional threshold in the marker variable are constrained across groups
    [OE1$1] (t1); [OE1$2] (t2); [OE1$3];
    [OE2$1] (t3); [OE2$2]; [OE2$3];  [OE2$4];
    [OE3$1] (t4); [OE3$2]; [OE3$3]; [OE3$4]; [OE3$5];
    [OE4$1] (t5); [OE4$2]; [OE4$3]; [OE4$4]; [OE4$5];
    [OE5$1] (t6); [OE5$2]; [OE5$3]; [OE5$4];
    [OE6$1] (t7); [OE6$2]; [OE6$3]; [OE6$4];
```

[SA1$1] (t8); [SA1$2] (t9); [SA1$3]; [SA1$4]; [SA1$5];

[SA2$1] (t10); [SA2$2]; [SA2$3]; [SA2$4]; [SA2$5];

[SA3$1] (t11); [SA3$2]; [SA3$3]; [SA3$4]; [SA3$5];

[SA4$1] (t12); [SA4$2]; [SA4$3]; [SA4$4]; [SA4$5];

[SA5$1] (t13); [SA5$2]; [SA5$3]; [SA5$4]; [SA5$5];

[SA6$1] (t14); [SA6$2]; [SA6$3]; [SA6$4] ; [SA6$5];

[CH1$1] (t15); [CH1$2] (t16); [CH1$3]; [CH1$4]; [CH1$5];

[CH2$1] (t17); [CH2$2]; [CH2$3]; [CH2$4]; [CH2$5] ;

[CH3$1] (t18); [CH3$2]; [CH3$3]; [CH3$4]; [CH3$5] ;

[CH4$1] (t19); [CH4$2]; [CH4$3]; [CH4$4]; [CH4$5];

[CH5$1] (t20); [CH5$2]; [CH5$3]; [CH5$4]; [CH5$5] ;

[CH6$1] (t21); [CH6$2]; [CH6$3]; [CH6$4]; [CH6$5];

[OA1$1] (t22); [OA1$2] (t23); [OA1$3]; [OA1$4]; [OA1$5];

[OA2$1] (t24); [OA2$2]; [OA2$3]; [OA2$4] ; [OA2$5];

[OA3$1] (t25); [OA3$2]; [OA3$3]; [OA3$4]; [OA3$5];

[OA4$1] (t26); [OA4$2]; [OA4$3]; [OA4$4]; [OA4$5];

[OA5$1] (t27); [OA5$2]; [OA5$3]; [OA5$4]; [OA5$5];

[OA6$1] (t28); [OA6$2]; [OA6$3]; [OA6$4]; [OA6$5];

[RA1$1] (t29); [RA1$2] (t30); [RA1$3]; [RA1$4]; [RA1$5];

[RA2$1] (t31); [RA2$2]; [RA2$3]; [RA2$4]; [RA2$5];

[RA3$1] (t32); [RA3$2]; [RA3$3]; [RA3$4]; [RA3$5];

[RA4$1] (t33); [RA4$2]; [RA4$3]; [RA4$4]; [RA4$5];

[RA5$1] (t34); [RA5$2]; [RA5$3]; [RA5$4] ; [RA5$5] ;

[RA6$1] (t35); [RA6$2]; [RA6$3]; [RA6$4]; [RA6$5] ;

[RA7$1] (t36); [RA7$2]; [RA7$3]; [RA7$4]; [RA7$5];

[IS1$1] (t37); [IS1$2] (t38); [IS1$3]; [IS1$4]; [IS1$5];

[IS2$1] (t39); [IS2$2]; [IS2$3]; [IS2$4]; [IS2$5];

[IS3$1] (t40); [IS3$2];[IS3$3]; [IS3$4] ; [IS3$5];

[IS4$1] (t41); [IS4$2]; [IS4$3]; [IS4$4]; [IS4$5];

[IS5$1] (t42); [IS5$2]; [IS5$3]; [IS5$4]; [IS5$5];

[IF1$1] (t43); [IF1$2] (t44); [IF1$3]; [IF1$4]; [IF1$5];

```
   [IF2$1] (t45); [IF2$2]; [IF2$3]; [IF2$4]; [IF2$5];
   [IF3$1] (t46); [IF3$2]; [IF3$3]; [IF3$4]; [IF3$5];
   [IF4$1] (t47); [IF4$2]; [IF4$3]; [IF4$4]; [IF4$5];
   [IF5$1] (t48); [IF5$2]; [IF5$3]; [IF5$4]; [IF5$5];
    [IF6$1] (t49);  [IF6$2]; [IF6$3]; [IF6$4];   [IF6$5];
 ! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
! Factor mean of the first group are fixed to zeros
[OE@0]; [SA@0]; [CH@0]; [OA@0]; [RA@0]; [IS@0]; [IF@0];
 ! Unique variances of the all groups are fixed as 1
OE1@1; OE2@1; OE3@1; OE4@1; OE5@1; OE5@1; OE6@1;
SA1@1; SA2@1; SA3@1; SA4@1; SA5@1; SA5@1; SA6@1;
CH1@1; CH2@1; CH3@1; CH4@1; CH5@1; CH5@1; CH6@1;
OA1@1; OA2@1; OA3@1; OA4@1; OA5@1; OA5@1; OA6@1;
RA1@1; RA2@1; RA3@1; RA4@1; RA5@1; RA5@1; RA6@1; RA7@1;
IS1@1; IS2@1; IS3@1; IS4@1; IS5@1;
IF1@1; IF2@1; IF3@1; IF4@1; IF5@1; IF6@1;
MODEL FEMALES:
! Factor loadings are free except the marker variables
  OE BY  OE1@1 OE2-OE6 ;
   SA BY SA1@1 SA2-SA6;
   CH BY CH1@1 CH2-CH6 ;
   OA BY OA1@1 OA2-OA6;
   RA BY RA1@1 RA2-RA7;
   IS BY IS1@1 IS2-IS5;
```

```
  IF BY IF1@1 IF2-IF6;
! One threshold in each item are constrained across groups
 ! One additional threshold in the marker variable are constrained across groups
   [OE1$1] (t1); [OE1$2] (t2); [OE1$3];
  [OE2$1] (t3); [OE2$2]; [OE2$3];  [OE2$4];
  [OE3$1] (t4); [OE3$2]; [OE3$3]; [OE3$4]; [OE3$5];
  [OE4$1] (t5); [OE4$2]; [OE4$3]; [OE4$4]; [OE4$5];
  [OE5$1] (t6); [OE5$2]; [OE5$3]; [OE5$4];
  [OE6$1] (t7); [OE6$2]; [OE6$3]; [OE6$4];
  [SA1$1] (t8); [SA1$2] (t9); [SA1$3]; [SA1$4]; [SA1$5];
  [SA2$1] (t10); [SA2$2]; [SA2$3]; [SA2$4]; [SA2$5];
  [SA3$1] (t11); [SA3$2]; [SA3$3]; [SA3$4]; [SA3$5];
  [SA4$1] (t12); [SA4$2]; [SA4$3]; [SA4$4]; [SA4$5];
  [SA5$1] (t13);  [SA5$2]; [SA5$3]; [SA5$4]; [SA5$5];
  [SA6$1] (t14); [SA6$2]; [SA6$3]; [SA6$4] ; [SA6$5];
  [CH1$1] (t15); [CH1$2]  (t16); [CH1$3]; [CH1$4]; [CH1$5];
  [CH2$1] (t17); [CH2$2]; [CH2$3]; [CH2$4]; [CH2$5]  ;
  [CH3$1] (t18); [CH3$2]; [CH3$3]; [CH3$4]; [CH3$5]  ;
  [CH4$1] (t19); [CH4$2]; [CH4$3];  [CH4$4]; [CH4$5];
  [CH5$1] (t20); [CH5$2]; [CH5$3]; [CH5$4]; [CH5$5] ;
  [CH6$1] (t21); [CH6$2]; [CH6$3]; [CH6$4]; [CH6$5];
  [OA1$1] (t22); [OA1$2]  (t23); [OA1$3]; [OA1$4]; [OA1$5];
  [OA2$1] (t24); [OA2$2]; [OA2$3]; [OA2$4] ; [OA2$5];
  [OA3$1] (t25); [OA3$2]; [OA3$3]; [OA3$4]; [OA3$5];
  [OA4$1] (t26); [OA4$2]; [OA4$3]; [OA4$4]; [OA4$5];
  [OA5$1] (t27); [OA5$2]; [OA5$3]; [OA5$4]; [OA5$5];
  [OA6$1] (t28); [OA6$2]; [OA6$3]; [OA6$4]; [OA6$5];
  [RA1$1] (t29); [RA1$2]  (t30); [RA1$3]; [RA1$4]; [RA1$5];
  [RA2$1] (t31); [RA2$2]; [RA2$3]; [RA2$4]; [RA2$5];
  [RA3$1] (t32); [RA3$2]; [RA3$3]; [RA3$4]; [RA3$5];
  [RA4$1] (t33); [RA4$2]; [RA4$3]; [RA4$4]; [RA4$5];
```

```
   [RA5$1] (t34); [RA5$2]; [RA5$3]; [RA5$4] ; [RA5$5]  ;
   [RA6$1] (t35); [RA6$2]; [RA6$3]; [RA6$4]; [RA6$5]  ;
   [RA7$1] (t36); [RA7$2]; [RA7$3]; [RA7$4]; [RA7$5];
   [IS1$1] (t37); [IS1$2]  (t38); [IS1$3]; [IS1$4]; [IS1$5];
   [IS2$1] (t39); [IS2$2]; [IS2$3];  [IS2$4]; [IS2$5];
   [IS3$1] (t40); [IS3$2];[IS3$3]; [IS3$4] ; [IS3$5];
   [IS4$1] (t41);  [IS4$2]; [IS4$3]; [IS4$4]; [IS4$5];
   [IS5$1] (t42); [IS5$2];  [IS5$3]; [IS5$4];  [IS5$5];
   [IF1$1] (t43);  [IF1$2]  (t44);  [IF1$3]; [IF1$4]; [IF1$5];
   [IF2$1] (t45); [IF2$2]; [IF2$3]; [IF2$4]; [IF2$5];
   [IF3$1] (t46); [IF3$2]; [IF3$3]; [IF3$4]; [IF3$5];
   [IF4$1] (t47); [IF4$2]; [IF4$3]; [IF4$4]; [IF4$5];
   [IF5$1] (t48); [IF5$2]; [IF5$3]; [IF5$4]; [IF5$5];
    [IF6$1] (t49);  [IF6$2]; [IF6$3]; [IF6$4];   [IF6$5];
! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
  ! Factor mean of the second group are free
   [OE*]; [SA*]; [CH*]; [OA*]; [RA*]; [IS*]; [IF*];
   ! Unique variances are free in the second group.
 OE1*; OE2*;  OE3*; OE4*;  OE5*; OE6*;
 SA1*; SA2*;  SA3*; SA4*;  SA5*; SA6*;
 CH1*; CH2*;  CH3*; CH4*;  CH5*; CH6*;
 OA1*; OA2*;  OA3*; OA4*;  OA5*; OA6*;
  RA1*; RA2*;  RA3*; RA4*;  RA5*; RA6*; RA7*;
   IS1*; IS2*;  IS3*; IS4*;  IS5*;
```

```
 IF1*; IF2*;  IF3*; IF4*;  IF5*; IF6*;
 ANALYSIS: TYPE IS GENERAL;   ESTIMATOR IS WLSMV;  ITERATIONS = 5000;
 CONVERGENCE = 0.00005;  PARAMETERIZATION = THETA;
 SAVEDATA: DIFFTEST=CONFIGURAL.dat;
OUTPUT:  STDYX MODINDICES (ALL);
```

TITLE: **Metric model**

```
DATA: FILE IS "C:\Users\Ioann\Desktop\INVARIANCE.txt";
VARIABLE:
 NAMES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6
 AUT1-AUT3 SS1-SS4 PI1-PI7 TR1-TR3 PIJR1-PIJR5 PSD1-PSD5 EXTR1 EXTR2
 AGR1 AGR2 CONS1 CONS2 EMSTAB1 EMSTAB2 OPEN1 OPEN2 SMS1-SMS5 STR1-STR5
 IWB1-IWB10 IWBS1-IWBS10 OUTP OUTS OUTPR PROF GENDER AGE EDUC TENURE ENorGR;
 USEVARIABLES ARE  OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6;
 CATEGORICAL ARE ALL;
MISSING ARE ALL (999);
GROUPING IS GENDER (1 = MALES 2 = FEMALES);
MODEL:
! Factor loadings are constrained across groups
   ! except the marker variables, which are fixed.
   OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
   SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
   CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
   OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
   RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
   IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30);
   IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);
    ! One threshold in each item are constrained across groups
   ! One additional threshold in the marker variable are constrained across groups
      [OE1$1] (t1); [OE1$2] (t2); [OE1$3];
```

[OE2$1] (t3); [OE2$2]; [OE2$3]; [OE2$4];

[OE3$1] (t4); [OE3$2]; [OE3$3]; [OE3$4]; [OE3$5];

[OE4$1] (t5); [OE4$2]; [OE4$3]; [OE4$4]; [OE4$5];

[OE5$1] (t6); [OE5$2]; [OE5$3]; [OE5$4];

[OE6$1] (t7); [OE6$2]; [OE6$3]; [OE6$4];

[SA1$1] (t8); [SA1$2] (t9); [SA1$3]; [SA1$4]; [SA1$5];

[SA2$1] (t10); [SA2$2]; [SA2$3]; [SA2$4]; [SA2$5];

[SA3$1] (t11); [SA3$2]; [SA3$3]; [SA3$4]; [SA3$5];

[SA4$1] (t12); [SA4$2]; [SA4$3]; [SA4$4]; [SA4$5];

[SA5$1] (t13); [SA5$2]; [SA5$3]; [SA5$4]; [SA5$5];

[SA6$1] (t14); [SA6$2]; [SA6$3]; [SA6$4] ; [SA6$5];

[CH1$1] (t15); [CH1$2] (t16); [CH1$3]; [CH1$4]; [CH1$5];

[CH2$1] (t17); [CH2$2]; [CH2$3]; [CH2$4]; [CH2$5] ;

[CH3$1] (t18); [CH3$2]; [CH3$3]; [CH3$4]; [CH3$5] ;

[CH4$1] (t19); [CH4$2]; [CH4$3]; [CH4$4]; [CH4$5];

[CH5$1] (t20); [CH5$2]; [CH5$3]; [CH5$4]; [CH5$5] ;

[CH6$1] (t21); [CH6$2]; [CH6$3]; [CH6$4]; [CH6$5];

[OA1$1] (t22); [OA1$2] (t23); [OA1$3]; [OA1$4]; [OA1$5];

[OA2$1] (t24); [OA2$2]; [OA2$3]; [OA2$4] ; [OA2$5];

[OA3$1] (t25); [OA3$2]; [OA3$3]; [OA3$4]; [OA3$5];

[OA4$1] (t26); [OA4$2]; [OA4$3]; [OA4$4]; [OA4$5];

[OA5$1] (t27); [OA5$2]; [OA5$3]; [OA5$4]; [OA5$5];

[OA6$1] (t28); [OA6$2]; [OA6$3]; [OA6$4]; [OA6$5];

[RA1$1] (t29); [RA1$2] (t30); [RA1$3]; [RA1$4]; [RA1$5];

[RA2$1] (t31); [RA2$2]; [RA2$3]; [RA2$4]; [RA2$5];

[RA3$1] (t32); [RA3$2]; [RA3$3]; [RA3$4]; [RA3$5];

[RA4$1] (t33); [RA4$2]; [RA4$3]; [RA4$4]; [RA4$5];

[RA5$1] (t34); [RA5$2]; [RA5$3]; [RA5$4] ; [RA5$5] ;

[RA6$1] (t35); [RA6$2]; [RA6$3]; [RA6$4]; [RA6$5] ;

[RA7$1] (t36); [RA7$2]; [RA7$3]; [RA7$4]; [RA7$5];

[IS1$1] (t37); [IS1$2] (t38); [IS1$3]; [IS1$4]; [IS1$5];

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   [IS2$1] (t39); [IS2$2]; [IS2$3];  [IS2$4]; [IS2$5];
   [IS3$1] (t40); [IS3$2];[IS3$3]; [IS3$4] ; [IS3$5];
   [IS4$1] (t41);  [IS4$2]; [IS4$3]; [IS4$4]; [IS4$5];
   [IS5$1] (t42); [IS5$2];  [IS5$3]; [IS5$4];  [IS5$5];
   [IF1$1] (t43);  [IF1$2]  (t44);  [IF1$3]; [IF1$4]; [IF1$5];
   [IF2$1] (t45); [IF2$2]; [IF2$3]; [IF2$4]; [IF2$5];
   [IF3$1] (t46); [IF3$2]; [IF3$3]; [IF3$4]; [IF3$5];
   [IF4$1] (t47); [IF4$2]; [IF4$3]; [IF4$4]; [IF4$5];
   [IF5$1] (t48); [IF5$2]; [IF5$3]; [IF5$4]; [IF5$5];
    [IF6$1] (t49);  [IF6$2]; [IF6$3]; [IF6$4];   [IF6$5];
! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
! Factor mean of the first group are fixed to zeros
[OE@0]; [SA@0]; [CH@0]; [OA@0]; [RA@0]; [IS@0]; [IF@0];
 ! Unique variances of the all groups are fixed as 1
OE1@1; OE2@1; OE3@1; OE4@1; OE5@1; OE5@1; OE6@1;
SA1@1; SA2@1; SA3@1; SA4@1; SA5@1; SA5@1; SA6@1;
CH1@1; CH2@1; CH3@1; CH4@1; CH5@1; CH5@1; CH6@1;
OA1@1; OA2@1; OA3@1; OA4@1; OA5@1; OA5@1; OA6@1;
RA1@1; RA2@1; RA3@1; RA4@1; RA5@1; RA5@1; RA6@1; RA7@1;
IS1@1; IS2@1; IS3@1; IS4@1; IS5@1;
IF1@1; IF2@1; IF3@1; IF4@1; IF5@1; IF6@1;
MODEL FEMALES:
   ! Factor loadings are free except the marker variables
  OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
```

```
  SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
  CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
  OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
  RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
  IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30) ;
  IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);
 ! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
  ! Factor mean of the second group are free
   [OE*]; [SA*]; [CH*]; [OA*]; [RA*]; [IS*]; [IF*];
   ! Unique variances are free in the second group.
 OE1*; OE2*;  OE3*; OE4*;  OE5*; OE6*;
 SA1*; SA2*;  SA3*; SA4*;  SA5*; SA6*;
 CH1*; CH2*;  CH3*; CH4*;  CH5*; CH6*;
 OA1*; OA2*;  OA3*; OA4*;  OA5*; OA6*;
  RA1*; RA2*;  RA3*; RA4*;  RA5*; RA6*; RA7*;
   IS1*; IS2*;  IS3*; IS4*;  IS5*;
   IF1*; IF2*;  IF3*; IF4*;  IF5*; IF6*;
  ANALYSIS: TYPE IS GENERAL;  ESTIMATOR IS WLSMV; ITERATIONS = 5000;
   CONVERGENCE = 0.00005; PARAMETERIZATION = THETA;
  DIFFTEST=CONFIGURAL.dat;
SAVEDATA: DIFFTEST=METRIC.dat;
OUTPUT:  STDYX MODINDICES (ALL);
```

```
TITLE:  Scalar model
DATA: FILE IS "C:\Users\Ioann\Desktop\INVARIANCE.txt";
VARIABLE:
  NAMES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6
  AUT1-AUT3 SS1-SS4 PI1-PI7 TR1-TR3 PIJR1-PIJR5 PSD1-PSD5 EXTR1 EXTR2
  AGR1 AGR2 CONS1 CONS2 EMSTAB1 EMSTAB2 OPEN1 OPEN2 SMS1-SMS5 STR1-STR5
  IWB1-IWB10 IWBS1-IWBS10 OUTP OUTS OUTPR PROF GENDER AGE EDUC TENURE ENorGR;
  USEVARIABLES ARE  OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6;
  CATEGORICAL ARE ALL;
 MISSING ARE ALL (999);
 GROUPING IS GENDER (1 = MALES 2 = FEMALES);
MODEL:
! Factor loadings are constrained across groups
 ! except the marker variables, which are fixed.
OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
   SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
   CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
   OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
   RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
   IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30);
   IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);
   ! All thresholds are constrained across groups.
   [OE1$1] (t1); [OE1$2] (t2); [OE1$3] (t50);
   [OE2$1] (t3); [OE2$2](t51); [OE2$3](t52); [OE2$4] (t53);
   [OE3$1] (t4); [OE3$2](t54); [OE3$3](t55); [OE3$4](t56); [OE3$5](t57);
   [OE4$1] (t5); [OE4$2](t58); [OE4$3](t59); [OE4$4](t60); [OE4$5](t61);
   [OE5$1] (t6); [OE5$2](t62); [OE5$3](t63); [OE5$4](t64);
   [OE6$1] (t7); [OE6$2](t65); [OE6$3](t66); [OE6$4](t67);
   [SA1$1] (t8); [SA1$2] (t9); [SA1$3](t68); [SA1$4] (t69); [SA1$5] (t70) ;
   [SA2$1] (t10); [SA2$2] (t71); [SA2$3](t72); [SA2$4] (t73); [SA2$5] (t74) ;
   [SA3$1] (t11); [SA3$2] (t75); [SA3$3](t76); [SA3$4] (t77); [SA3$5]  (t78);
```

[SA4$1] (t12); [SA4$2] (t79) ; [SA4$3](t80); [SA4$4] (t81); [SA4$5] (t82);

[SA5$1] (t13); [SA5$2] (t83); [SA5$3](t84); [SA5$4] (t85); [SA5$5] (t86);

[SA6$1] (t14); [SA6$2] (t87); [SA6$3](t88); [SA6$4] (t89); [SA6$5] (t90);

[CH1$1] (t15); [CH1$2] (t16); [CH1$3] (t91); [CH1$4] (t92); [CH1$5] (t93);

[CH2$1] (t17); [CH2$2] (t94); [CH2$3] (t95); [CH2$4] (t96); [CH2$5] (t97);

[CH3$1] (t18); [CH3$2] (t98); [CH3$3](t99); [CH3$4] (t100); [CH3$5] (t101);

[CH4$1] (t19); [CH4$2] (t102); [CH4$3](t103); [CH4$4] (t104); [CH4$5] (t105);

[CH5$1] (t20); [CH5$2] (t106); [CH5$3] (t107); [CH5$4] (t108); [CH5$5] (t109) ;

[CH6$1] (t21); [CH6$2] (t110); [CH6$3] (t111); [CH6$4] (t112); [CH6$5] (t113);

[OA1$1] (t22); [OA1$2] (t23); [OA1$3] (t114); [OA1$4] (t115); [OA1$5] (t116);

[OA2$1] (t24); [OA2$2] (t117); [OA2$3] (t118); [OA2$4] (t119); [OA2$5] (t120) ;

[OA3$1] (t25); [OA3$2] (t121); [OA3$3] (t122); [OA3$4] (t123); [OA3$5] (t124);

[OA4$1] (t26); [OA4$2] (t127); [OA4$3] (t128); [OA4$4] (t129); [OA4$5] (t130);

[OA5$1] (t27); [OA5$2] (t131); [OA5$3] (t132); [OA5$4] (t133); [OA5$5] (t134);

[OA6$1] (t28); [OA6$2] (t234); [OA6$3] (t135); [OA6$4] (t136); [OA6$5] (t137);

[RA1$1] (t29); [RA1$2] (t30); [RA1$3] (t138); [RA1$4] (t139); [RA1$5] (t140);

[RA2$1] (t31); [RA2$2] (t141); [RA2$3] (t142); [RA2$4] (t143); [RA2$5] (t144);

[RA3$1] (t32); [RA3$2] (t145); [RA3$3](t146); [RA3$4] (t147); [RA3$5] (t148);

[RA4$1] (t33); [RA4$2] (t149); [RA4$3] (t150); [RA4$4] (t151); [RA4$5] (t152);

[RA5$1] (t34); [RA5$2] (t153); [RA5$3] (t254); [RA5$4] (t354); [RA5$5] (t155) ;

[RA6$1] (t35); [RA6$2] (t156); [RA6$3](t157); [RA6$4] (t257); [RA6$5] (t158);

[RA7$1] (t36); [RA7$2] (t159); [RA7$3] (t160); [RA7$4] (t161); [RA7$5] (t162);

[IS1$1] (t37); [IS1$2] (t38); [IS1$3] (t163); [IS1$4] (t164); [IS1$5] (t165);

[IS2$1] (t39); [IS2$2] (t166); [IS2$3] (t167); [IS2$4] (t168); [IS2$5] (t169);

[IS3$1] (t40); [IS3$2] (t170); [IS3$3] (t171); [IS3$4] (t172); [IS3$5] (t173);

[IS4$1] (t41); [IS4$2] (t174); [IS4$3] (t175); [IS4$4] (t176); [IS4$5] (t177);

[IS5$1] (t42); [IS5$2] (t178); [IS5$3] (t179); [IS5$4] (t180); [IS5$5] (t181) ;

[IF1$1] (t43); [IF1$2] (t44); [IF1$3] (t182); [IF1$4] (t183); [IF1$5] (t184);

[IF2$1] (t45); [IF2$2] (t185); [IF2$3] (t186); [IF2$4] (t187); [IF2$5] (t188) ;

[IF3$1] (t46); [IF3$2] (t189); [IF3$3] (t190); [IF3$4] (t191); [IF3$5] (t192);

[IF4$1] (t47); [IF4$2] (t193); [IF4$3] (t194); [IF4$4] (t195); [IF4$5] (t196);

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   [IF5$1] (t48); [IF5$2]  (t197); [IF5$3] (t198); [IF5$4] (t199); [IF5$5]  (t200);
   [IF6$1] (t49); [IF6$2]  (t201); [IF6$3] (t202); [IF6$4] (t203); [IF6$5] (t204) ;
 ! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
! Factor mean of the first group are fixed to zeros
[OE@0]; [SA@0]; [CH@0]; [OA@0]; [RA@0]; [IS@0]; [IF@0];
! Unique variances of the all groups are fixed as 1
OE1@1; OE2@1; OE3@1; OE4@1; OE5@1; OE5@1; OE6@1;
SA1@1; SA2@1; SA3@1; SA4@1; SA5@1; SA5@1; SA6@1;
CH1@1; CH2@1; CH3@1; CH4@1; CH5@1; CH5@1; CH6@1;
OA1@1; OA2@1; OA3@1; OA4@1; OA5@1; OA5@1; OA6@1;
RA1@1; RA2@1; RA3@1; RA4@1; RA5@1; RA5@1; RA6@1; RA7@1;
IS1@1; IS2@1; IS3@1; IS4@1; IS5@1;
IF1@1; IF2@1; IF3@1; IF4@1; IF5@1; IF6@1;
MODEL FEMALES:
   ! Factor loadings are constrained across groups
   ! except the marker variables, which are fixed.
OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
   SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
   CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
   OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
   RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
   IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30);
   IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);
```

```
! All thresholds are constrained across groups.
  [OE1$1] (t1); [OE1$2] (t2); [OE1$3] (t50);
  [OE2$1] (t3); [OE2$2](t51); [OE2$3](t52); [OE2$4] (t53);
  [OE3$1] (t4); [OE3$2](t54); [OE3$3](t55); [OE3$4](t56); [OE3$5](t57);
  [OE4$1] (t5); [OE4$2](t58); [OE4$3](t59); [OE4$4](t60); [OE4$5](t61);
  [OE5$1] (t6); [OE5$2](t62); [OE5$3](t63); [OE5$4](t64);
  [OE6$1] (t7); [OE6$2](t65); [OE6$3](t66); [OE6$4](t67);
  [SA1$1] (t8); [SA1$2] (t9); [SA1$3](t68); [SA1$4] (t69); [SA1$5] (t70) ;
  [SA2$1] (t10); [SA2$2] (t71); [SA2$3](t72); [SA2$4] (t73); [SA2$5] (t74) ;
  [SA3$1] (t11); [SA3$2] (t75); [SA3$3](t76); [SA3$4] (t77); [SA3$5]  (t78);
  [SA4$1] (t12); [SA4$2] (t79) ; [SA4$3](t80); [SA4$4] (t81); [SA4$5]  (t82);
  [SA5$1] (t13); [SA5$2]  (t83);  [SA5$3](t84); [SA5$4] (t85); [SA5$5]  (t86);
  [SA6$1] (t14); [SA6$2] (t87); [SA6$3](t88); [SA6$4] (t89); [SA6$5] (t90);
  [CH1$1] (t15); [CH1$2]  (t16); [CH1$3] (t91); [CH1$4] (t92); [CH1$5] (t93);
  [CH2$1] (t17); [CH2$2] (t94); [CH2$3] (t95); [CH2$4] (t96); [CH2$5]  (t97);
  [CH3$1] (t18); [CH3$2] (t98); [CH3$3](t99); [CH3$4] (t100); [CH3$5]  (t101);
  [CH4$1] (t19); [CH4$2] (t102); [CH4$3](t103); [CH4$4] (t104); [CH4$5]  (t105);
  [CH5$1] (t20); [CH5$2] (t106); [CH5$3] (t107); [CH5$4] (t108); [CH5$5] (t109) ;
  [CH6$1] (t21); [CH6$2] (t110); [CH6$3] (t111); [CH6$4] (t112); [CH6$5]  (t113);
  [OA1$1] (t22); [OA1$2] (t23); [OA1$3] (t114); [OA1$4] (t115); [OA1$5]  (t116);
  [OA2$1] (t24); [OA2$2] (t117); [OA2$3] (t118); [OA2$4] (t119); [OA2$5] (t120) ;
  [OA3$1] (t25); [OA3$2]  (t121); [OA3$3] (t122); [OA3$4] (t123); [OA3$5]  (t124);
  [OA4$1] (t26); [OA4$2]  (t127); [OA4$3] (t128); [OA4$4] (t129); [OA4$5]  (t130);
  [OA5$1] (t27); [OA5$2] (t131); [OA5$3] (t132); [OA5$4] (t133); [OA5$5]  (t134);
  [OA6$1] (t28); [OA6$2] (t234); [OA6$3] (t135); [OA6$4] (t136); [OA6$5]  (t137);
  [RA1$1] (t29); [RA1$2]  (t30); [RA1$3] (t138); [RA1$4] (t139); [RA1$5]  (t140);
  [RA2$1] (t31); [RA2$2]  (t141); [RA2$3] (t142); [RA2$4] (t143); [RA2$5]  (t144);
  [RA3$1] (t32); [RA3$2]  (t145); [RA3$3](t146); [RA3$4] (t147); [RA3$5]  (t148);
  [RA4$1] (t33); [RA4$2]  (t149); [RA4$3] (t150); [RA4$4] (t151); [RA4$5]  (t152);
  [RA5$1] (t34); [RA5$2]  (t153); [RA5$3] (t254); [RA5$4] (t354); [RA5$5] (t155) ;
  [RA6$1] (t35); [RA6$2]  (t156); [RA6$3](t157); [RA6$4] (t257); [RA6$5]  (t158);
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   [RA7$1] (t36); [RA7$2] (t159); [RA7$3] (t160); [RA7$4] (t161); [RA7$5]  (t162);
   [IS1$1] (t37); [IS1$2] (t38); [IS1$3] (t163); [IS1$4] (t164); [IS1$5]  (t165);
   [IS2$1] (t39); [IS2$2]  (t166); [IS2$3] (t167); [IS2$4] (t168); [IS2$5]  (t169);
   [IS3$1] (t40); [IS3$2]  (t170); [IS3$3] (t171); [IS3$4] (t172); [IS3$5]  (t173);
   [IS4$1] (t41); [IS4$2]  (t174); [IS4$3] (t175); [IS4$4] (t176); [IS4$5]  (t177);
   [IS5$1] (t42); [IS5$2] (t178); [IS5$3] (t179); [IS5$4] (t180); [IS5$5] (t181) ;
   [IF1$1] (t43); [IF1$2]  (t44); [IF1$3] (t182); [IF1$4] (t183); [IF1$5]  (t184);
   [IF2$1] (t45); [IF2$2]  (t185); [IF2$3] (t186); [IF2$4] (t187); [IF2$5] (t188) ;
   [IF3$1] (t46); [IF3$2]  (t189); [IF3$3] (t190); [IF3$4] (t191); [IF3$5]  (t192);
   [IF4$1] (t47); [IF4$2]  (t193); [IF4$3] (t194); [IF4$4] (t195); [IF4$5]  (t196);
   [IF5$1] (t48); [IF5$2]  (t197); [IF5$3] (t198); [IF5$4] (t199); [IF5$5]  (t200);
   [IF6$1] (t49); [IF6$2]  (t201); [IF6$3] (t202); [IF6$4] (t203); [IF6$5] (t204) ;
! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
  ! Factor mean of the second group are free
   [OE*]; [SA*]; [CH*]; [OA*]; [RA*]; [IS*]; [IF*];
   ! Unique variances are free in the second group.
 OE1*; OE2*;  OE3*; OE4*;  OE5*; OE6*;
 SA1*; SA2*;  SA3*; SA4*;  SA5*; SA6*;
 CH1*; CH2*;  CH3*; CH4*;  CH5*; CH6*;
 OA1*; OA2*;  OA3*; OA4*;  OA5*; OA6*;
  RA1*; RA2*;  RA3*; RA4*;  RA5*; RA6*; RA7*;
   IS1*; IS2*;  IS3*; IS4*;  IS5*;
   IF1*; IF2*;  IF3*; IF4*;  IF5*; IF6*;
```

```
  ANALYSIS:  TYPE IS GENERAL;   ESTIMATOR IS WLSMV;   ITERATIONS = 5000;
  CONVERGENCE = 0.00005;  PARAMETERIZATION = THETA;
DIFFTEST=METRIC.dat;
 SAVEDATA: DIFFTEST=SCALAR.dat;
OUTPUT:  STDYX MODINDICES (ALL);
```

TITLE: **Strict model**

```
DATA: FILE IS "C:\Users\Ioann\Desktop\INVARIANCE.txt";
VARIABLE:
  NAMES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6
  AUT1-AUT3 SS1-SS4 PI1-PI7 TR1-TR3 PIJR1-PIJR5 PSD1-PSD5 EXTR1 EXTR2
  AGR1 AGR2 CONS1 CONS2 EMSTAB1 EMSTAB2 OPEN1 OPEN2 SMS1-SMS5 STR1-STR5
  IWB1-IWB10 IWBS1-IWBS10 OUTP OUTS OUTPR PROF GENDER AGE EDUC TENURE ENorGR;
  USEVARIABLES ARE OE1-OE6 SA1-SA6 CH1-CH6 OA1-OA6 RA1-RA7 IS1-IS5 IF1-IF6;
  CATEGORICAL ARE ALL;
 MISSING ARE ALL (999);
 GROUPING IS GENDER (1 = MALES 2 = FEMALES);
MODEL:
! Factor loadings are constrained across groups
    ! except the marker variables, which are fixed.
OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
    SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
    CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
    OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
    RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
    IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30);
    IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);
     ! All thresholds are constrained across groups.
     [OE1$1] (t1); [OE1$2] (t2); [OE1$3] (t50);
    [OE2$1] (t3); [OE2$2](t51); [OE2$3](t52); [OE2$4] (t53);
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[OE3$1] (t4); [OE3$2](t54); [OE3$3](t55); [OE3$4](t56); [OE3$5](t57);

[OE4$1] (t5); [OE4$2](t58); [OE4$3](t59); [OE4$4](t60); [OE4$5](t61);

[OE5$1] (t6); [OE5$2](t62); [OE5$3](t63); [OE5$4](t64);

[OE6$1] (t7); [OE6$2](t65); [OE6$3](t66); [OE6$4](t67);

[SA1$1] (t8); [SA1$2] (t9); [SA1$3](t68); [SA1$4] (t69); [SA1$5] (t70) ;

[SA2$1] (t10); [SA2$2] (t71); [SA2$3](t72); [SA2$4] (t73); [SA2$5] (t74) ;

[SA3$1] (t11); [SA3$2] (t75); [SA3$3](t76); [SA3$4] (t77); [SA3$5] (t78);

[SA4$1] (t12); [SA4$2] (t79) ; [SA4$3](t80); [SA4$4] (t81); [SA4$5] (t82);

[SA5$1] (t13); [SA5$2] (t83); [SA5$3](t84); [SA5$4] (t85); [SA5$5] (t86);

[SA6$1] (t14); [SA6$2] (t87); [SA6$3](t88); [SA6$4] (t89); [SA6$5] (t90);

[CH1$1] (t15); [CH1$2] (t16); [CH1$3] (t91); [CH1$4] (t92); [CH1$5] (t93);

[CH2$1] (t17); [CH2$2] (t94); [CH2$3] (t95); [CH2$4] (t96); [CH2$5] (t97);

[CH3$1] (t18); [CH3$2] (t98); [CH3$3](t99); [CH3$4] (t100); [CH3$5] (t101);

[CH4$1] (t19); [CH4$2] (t102); [CH4$3](t103); [CH4$4] (t104); [CH4$5] (t105);

[CH5$1] (t20); [CH5$2] (t106); [CH5$3] (t107); [CH5$4] (t108); [CH5$5] (t109) ;

[CH6$1] (t21); [CH6$2] (t110); [CH6$3] (t111); [CH6$4] (t112); [CH6$5] (t113);

[OA1$1] (t22); [OA1$2] (t23); [OA1$3] (t114); [OA1$4] (t115); [OA1$5] (t116);

[OA2$1] (t24); [OA2$2] (t117); [OA2$3] (t118); [OA2$4] (t119); [OA2$5] (t120) ;

[OA3$1] (t25); [OA3$2] (t121); [OA3$3] (t122); [OA3$4] (t123); [OA3$5] (t124);

[OA4$1] (t26); [OA4$2] (t127); [OA4$3] (t128); [OA4$4] (t129); [OA4$5] (t130);

[OA5$1] (t27); [OA5$2] (t131); [OA5$3] (t132); [OA5$4] (t133); [OA5$5] (t134);

[OA6$1] (t28); [OA6$2] (t234); [OA6$3] (t135); [OA6$4] (t136); [OA6$5] (t137);

[RA1$1] (t29); [RA1$2] (t30); [RA1$3] (t138); [RA1$4] (t139); [RA1$5] (t140);

[RA2$1] (t31); [RA2$2] (t141); [RA2$3] (t142); [RA2$4] (t143); [RA2$5] (t144);

[RA3$1] (t32); [RA3$2] (t145); [RA3$3](t146); [RA3$4] (t147); [RA3$5] (t148);

[RA4$1] (t33); [RA4$2] (t149); [RA4$3] (t150); [RA4$4] (t151); [RA4$5] (t152);

[RA5$1] (t34); [RA5$2] (t153); [RA5$3] (t254); [RA5$4] (t354); [RA5$5] (t155) ;

[RA6$1] (t35); [RA6$2] (t156); [RA6$3](t157); [RA6$4] (t257); [RA6$5] (t158);

[RA7$1] (t36); [RA7$2] (t159); [RA7$3] (t160); [RA7$4] (t161); [RA7$5] (t162);

[IS1$1] (t37); [IS1$2] (t38); [IS1$3] (t163); [IS1$4] (t164); [IS1$5] (t165);

[IS2$1] (t39); [IS2$2] (t166); [IS2$3] (t167); [IS2$4] (t168); [IS2$5] (t169);

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   [IS3$1] (t40); [IS3$2]  (t170); [IS3$3] (t171); [IS3$4] (t172); [IS3$5]  (t173);
   [IS4$1] (t41); [IS4$2]  (t174); [IS4$3] (t175); [IS4$4] (t176); [IS4$5]  (t177);
   [IS5$1] (t42); [IS5$2] (t178); [IS5$3] (t179); [IS5$4] (t180); [IS5$5] (t181) ;
   [IF1$1] (t43); [IF1$2]  (t44); [IF1$3] (t182); [IF1$4] (t183); [IF1$5]  (t184);
   [IF2$1] (t45); [IF2$2]  (t185); [IF2$3] (t186); [IF2$4] (t187); [IF2$5] (t188) ;
   [IF3$1] (t46); [IF3$2]  (t189); [IF3$3] (t190); [IF3$4] (t191); [IF3$5]  (t192);
   [IF4$1] (t47); [IF4$2]  (t193); [IF4$3] (t194); [IF4$4] (t195); [IF4$5]  (t196);
   [IF5$1] (t48); [IF5$2]  (t197); [IF5$3] (t198); [IF5$4] (t199); [IF5$5]  (t200);
   [IF6$1] (t49); [IF6$2]  (t201); [IF6$3] (t202); [IF6$4] (t203); [IF6$5] (t204) ;
! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
! Factor mean of the first group are fixed to zeros
[OE@0]; [SA@0]; [CH@0]; [OA@0]; [RA@0]; [IS@0]; [IF@0];
 ! Unique variances of the all groups are fixed as 1
OE1@1; OE2@1; OE3@1; OE4@1; OE5@1; OE5@1; OE6@1;
SA1@1; SA2@1; SA3@1; SA4@1; SA5@1; SA5@1; SA6@1;
CH1@1; CH2@1; CH3@1; CH4@1; CH5@1; CH5@1; CH6@1;
OA1@1; OA2@1; OA3@1; OA4@1; OA5@1; OA5@1; OA6@1;
RA1@1; RA2@1; RA3@1; RA4@1; RA5@1; RA5@1; RA6@1; RA7@1;
IS1@1; IS2@1; IS3@1; IS4@1; IS5@1;
IF1@1; IF2@1; IF3@1; IF4@1; IF5@1; IF6@1;
MODEL FEMALES:
   ! Factor loadings are constrained across groups
   ! except the marker variables, which are fixed.
  OE BY OE1@1 OE2 (f1) OE3 (f2) OE4 (f3) OE5 (f4) OE6 (f5);
```

```
SA BY SA1@1 SA2 (f6) SA3(f7) SA4(f8) SA5(f9) SA6(f10);
CH BY CH1@1 CH2(f11) CH3(f12) CH4(f13) CH5(f14) CH6(f15) ;
OA BY OA1@1 OA2(f16) OA3(f17) OA4(f18) OA5(f19) OA6(f20);
RA BY RA1@1 RA2(f21) RA3(f22) RA4(f23) RA5(f24) RA6(f25) RA7(f26);
IS BY IS1@1 IS2(f27) IS3(f28) IS4(f29) IS5(f30);
IF BY IF1@1 IF2(f31) IF3(f32) IF4(f33) IF5(f34) IF6(f35);

! All thresholds are constrained across groups.
 [OE1$1] (t1); [OE1$2] (t2); [OE1$3] (t50);
[OE2$1] (t3); [OE2$2](t51); [OE2$3](t52); [OE2$4] (t53);
[OE3$1] (t4); [OE3$2](t54); [OE3$3](t55); [OE3$4](t56); [OE3$5](t57);
[OE4$1] (t5); [OE4$2](t58); [OE4$3](t59); [OE4$4](t60); [OE4$5](t61);
[OE5$1] (t6); [OE5$2](t62); [OE5$3](t63); [OE5$4](t64);
[OE6$1] (t7); [OE6$2](t65); [OE6$3](t66); [OE6$4](t67);
[SA1$1] (t8); [SA1$2] (t9); [SA1$3](t68); [SA1$4] (t69); [SA1$5] (t70) ;
[SA2$1] (t10); [SA2$2] (t71); [SA2$3](t72); [SA2$4] (t73); [SA2$5] (t74) ;
[SA3$1] (t11); [SA3$2] (t75); [SA3$3](t76); [SA3$4] (t77); [SA3$5]  (t78);
[SA4$1] (t12); [SA4$2] (t79) ; [SA4$3](t80); [SA4$4] (t81); [SA4$5]  (t82);
[SA5$1] (t13); [SA5$2]  (t83);  [SA5$3](t84); [SA5$4] (t85); [SA5$5]  (t86);
[SA6$1] (t14); [SA6$2] (t87); [SA6$3](t88); [SA6$4] (t89); [SA6$5] (t90);
[CH1$1] (t15); [CH1$2]  (t16); [CH1$3] (t91); [CH1$4] (t92); [CH1$5] (t93);
[CH2$1] (t17); [CH2$2] (t94); [CH2$3] (t95); [CH2$4] (t96); [CH2$5]  (t97);
[CH3$1] (t18); [CH3$2] (t98); [CH3$3](t99); [CH3$4] (t100); [CH3$5]  (t101);
[CH4$1] (t19); [CH4$2] (t102); [CH4$3](t103); [CH4$4] (t104); [CH4$5]  (t105);
[CH5$1] (t20); [CH5$2] (t106); [CH5$3] (t107); [CH5$4] (t108); [CH5$5] (t109) ;
[CH6$1] (t21); [CH6$2] (t110); [CH6$3] (t111); [CH6$4] (t112); [CH6$5]  (t113);
[OA1$1] (t22); [OA1$2] (t23); [OA1$3] (t114); [OA1$4] (t115); [OA1$5]  (t116);
[OA2$1] (t24); [OA2$2] (t117); [OA2$3] (t118); [OA2$4] (t119); [OA2$5] (t120) ;
[OA3$1] (t25); [OA3$2]  (t121); [OA3$3] (t122); [OA3$4] (t123); [OA3$5]  (t124);
[OA4$1] (t26); [OA4$2]  (t127); [OA4$3] (t128); [OA4$4] (t129); [OA4$5]  (t130);
[OA5$1] (t27); [OA5$2] (t131); [OA5$3] (t132); [OA5$4] (t133); [OA5$5]  (t134);
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   [OA6$1] (t28); [OA6$2] (t234); [OA6$3] (t135); [OA6$4] (t136); [OA6$5]  (t137);
   [RA1$1] (t29); [RA1$2]  (t30); [RA1$3] (t138); [RA1$4] (t139); [RA1$5]  (t140);
   [RA2$1] (t31); [RA2$2]  (t141); [RA2$3] (t142); [RA2$4] (t143); [RA2$5]  (t144);
   [RA3$1] (t32); [RA3$2]  (t145); [RA3$3](t146); [RA3$4] (t147); [RA3$5]  (t148);
   [RA4$1] (t33); [RA4$2]  (t149); [RA4$3] (t150); [RA4$4] (t151); [RA4$5]  (t152);
   [RA5$1] (t34); [RA5$2]  (t153); [RA5$3] (t254); [RA5$4] (t354); [RA5$5] (t155) ;
   [RA6$1] (t35); [RA6$2]  (t156); [RA6$3](t157); [RA6$4] (t257); [RA6$5]  (t158);
   [RA7$1] (t36); [RA7$2] (t159); [RA7$3] (t160); [RA7$4] (t161); [RA7$5]  (t162);
   [IS1$1] (t37); [IS1$2] (t38); [IS1$3] (t163); [IS1$4] (t164); [IS1$5]  (t165);
   [IS2$1] (t39); [IS2$2]  (t166); [IS2$3] (t167); [IS2$4] (t168); [IS2$5]  (t169);
   [IS3$1] (t40); [IS3$2]  (t170); [IS3$3] (t171); [IS3$4] (t172); [IS3$5]  (t173);
   [IS4$1] (t41); [IS4$2]  (t174); [IS4$3] (t175); [IS4$4] (t176); [IS4$5]  (t177);
   [IS5$1] (t42); [IS5$2] (t178); [IS5$3] (t179); [IS5$4] (t180); [IS5$5] (t181) ;
   [IF1$1] (t43); [IF1$2]  (t44); [IF1$3] (t182); [IF1$4] (t183); [IF1$5]  (t184);
   [IF2$1] (t45); [IF2$2]  (t185); [IF2$3] (t186); [IF2$4] (t187); [IF2$5] (t188) ;
   [IF3$1] (t46); [IF3$2]  (t189); [IF3$3] (t190); [IF3$4] (t191); [IF3$5]  (t192);
   [IF4$1] (t47); [IF4$2]  (t193); [IF4$3] (t194); [IF4$4] (t195); [IF4$5]  (t196);
   [IF5$1] (t48); [IF5$2]  (t197); [IF5$3] (t198); [IF5$4] (t199); [IF5$5]  (t200);
   [IF6$1] (t49); [IF6$2]  (t201); [IF6$3] (t202); [IF6$4] (t203); [IF6$5] (t204) ;
! Factor variance/covariance are free across groups
 OE*; SA*; CH*; OA*; RA*; IS*; IF*;
 OE WITH SA*; OE WITH CH*; OE WITH OA*; OE WITH RA*; OE WITH IS*; OE WITH IF*;
 SA WITH CH*; SA WITH OA*; SA WITH RA*; SA WITH IS*; SA WITH IF*;
 CH WITH OA*; CH WITH RA*; CH WITH IS*; CH WITH IF*;
 OA WITH RA*; OA WITH IS*; OA WITH IF*;
RA WITH IS*; RA WITH IF*;
IS WITH IF*;
  ! Factor mean of the second group are free
   [OE*]; [SA*]; [CH*]; [OA*]; [RA*]; [IS*]; [IF*];
! Unique variances are fixed to 1 (equal to the first group)
OE1@1; OE2@1;  OE3@1; OE@1;  OE5@1; OE6@1;
```

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SA1@1; SA2@1;  SA3@1; SA4@1;  SA5@1; SA6@1;
CH1@1; CH2@1;  CH3@1; CH4@1;  CH5@1; CH6@1;
OA1@1; OA2@1;  OA3@1; OA4@1;  OA5@1; OA6@1;
 RA1@1; RA2@1;  RA3@1; RA4@1;  RA5@1; RA6@1; RA7@1;
  IS1@1; IS2@1;  IS3@1; IS4@1;  IS5@1;
  IF1@1; IF2@1;  IF3@1; IF4@1;  IF5@1; IF6@1;

ANALYSIS: TYPE IS GENERAL;  ESTIMATOR IS WLSMV;  ITERATIONS = 5000;
CONVERGENCE = 0.00005;  PARAMETERIZATION = THETA;
DIFFTEST=SCALAR.dat;
OUTPUT:  STDYX MODINDICES (ALL);
```