Exploring the outcomes of innovation setbacks and failure: How setbacks and failure impact the well-being, innovative work behaviour and motivation of innovators

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Declaration of Authorship

I, Amy Redmond, hereby declare that this thesis and all work presented within it is entirely my own. Where I have consulted the work of others, this is clearly stated and referenced.

Signed

A l Redmond

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## Abstract

Innovation is considered fundamental to the success of organizations and to the growth of whole economies. However, the path to innovative success is rarely straightforward. Innovative projects are plagued by uncertainty, risk and frequent setbacks and failures. Given the importance of innovation and the high setback and failure rates of innovative projects, it is surprising how little is understood about the outcomes of innovation setbacks and failures for innovators. Using a mixed methods approach, employing a longitudinal survey study and qualitative interviews, this thesis focused on three main aims.

The first aim of this thesis was to further understanding of the outcomes of innovation setbacks and failures, with particular consideration of the impact of innovation setbacks and failures on well-being, innovative work behaviour and motivation. This was explored using a longitudinal survey. Data was gathered from six participating organizations operating in a variety of sectors; finance, new technology, applications development, and consultancy (Time 1 N = 651, Time 2 N = 401). Results revealed that innovation setbacks and failures were negatively associated with well-being, innovative work behaviour, and intrinsic motivation and identified regulation.

The second aim of this thesis was to further understanding of why some innovators suffer negative outcomes of innovation setbacks and failures while others experience neutral or positive outcomes. This was explored through moderation analysis of the survey data. Resilience, supervisor feedback, and learning from setbacks and failure were all found to moderate the effects of innovation setbacks and failures on some or all of the outcome variables, well-being, innovative work behaviour and motivation.

The third aim of this thesis was to provide a more robust understanding and more nuanced description of the meanings of setbacks and failures within the innovation context. This was achieved through analysis of 22 qualitative interviews which revealed three different levels of setbacks and failure; ‘normal setbacks’, ‘more serious setbacks’ and ‘emotive failures’. Each were characterized by different features which set them apart from one another.

This research provides a novel understanding of the psychological outcomes of innovation setbacks and failure, offers insights into moderating factors which have the potential to impact outcomes. Finally, this research offers a new qualitative perspective in relation to the meanings, features, links and impact of setbacks and failures on innovative employees and projects.

# Chapter 1: Introduction to thesis

## Introduction

This chapter will act as an introduction to the thesis with six main functions. Firstly, it presents the overarching aims of the thesis. Secondly, it presents a background to the research, providing an overview of relevant literature and discusses the clash between the importance of innovation and the likelihood of setbacks and failure. Thirdly, this chapter provides justification for the current research with reference to a number of limitations of previous research and discusses the contributions that the current research makes to the field of innovation research and to more general management literature. These contributions are further summarised for ease of reference. Fourth, it provides validation for the need to understand setbacks and failure as potential outcomes of innovation specifically rather than assuming that setbacks and failure research within other domains can be applied to the field of innovation. Fifth is the inclusion of a model that provides a pictorial synopsis of the current research. Finally, an overview of subsequent chapters is provided with a brief outline of their content.

## Aims of the thesis

The first aim of this thesis is to further understanding of the outcomes of innovation setbacks and failures for innovators, with particular consideration of the impact of innovation setbacks and failures on well-being, innovative work behaviour and motivation of innovators working within innovation teams. In exploring these relationships, this thesis will bridge gaps in previous innovation literature which have tended to focus on innovation as the dependent variable with little consideration of the outcomes of innovation (Janssen, Vliert & West, 2004). Previous research has also tended to circumvent the issue of setbacks and failure within the innovation process, meaning that the outcomes of innovation setbacks and failure have been largely unexplored. This thesis aims to provide theoretical arguments for, and to test empirically, the relationship between innovation setbacks and failures and well-being, innovative work behaviour and motivation.

The second aim of this thesis is to further understanding of why some innovators suffer negative outcomes of innovation setbacks and failures while others experience neutral or positive outcomes. This relates to a limitation in research identified by Janssen et al (2004) who called for studies to investigate why some individuals enjoy the benefits of innovation while others endure the costs. This thesis aims to respond to this call by considering and empirically testing factors which may moderate the relationship between innovation setbacks/failure and outcomes.

Thirdly, this thesis aims to provide a more robust understanding and more nuanced description of the meanings and impact of setbacks and failures within the innovation context. In order to fully understand the impact that setbacks and failures may have on psychological outcomes, it is important to also understand what the terms ‘setbacks’ and ‘failures’ really mean within the innovation context. The need to address this issue emerged as a result of the findings of survey studies relating to the first two aims of this thesis which indicated a need for greater clarification through research of the meanings of setbacks and failures in the innovation context.

## Background to research and contributions

Innovation may be defined as the intentional introduction and adoption of an idea or behaviour which is new to the organization, and which results in beneficial outcomes (Hage, 1980; West & Farr, 1990). The importance of innovation cannot be overstated. With innovation comes the possibility of advancement, economic prosperity (West & Farr, 1990), competitive advantage (Sung, Cho & Choi, 2011) and the progression of knowledge that can bring about changes of significant value to organizations or in some cases, the population as a whole (West & Farr, 1990). Indeed, evidence suggests that national economies that have shown the fastest growth were those most adept at innovation (Walton & Rockoff, 2005).

Innovation is often thought of in terms of major change or big-impact new projects, but there are opportunities for innovation in everything organizations do, big or small (Kaafarani & Stevenson, 2011). In reality, most organizations do not aim to innovate on a grand, world-altering scale, but on a more local, specific level (Kaafarani & Stevenson, 2011). To most organizations, innovation represents a basic business function that is needed in order to ensure the long-term survival of the organization (e.g. Amabile, 1988; Kanter, 1988; Mumford, 2000). Whatever the scale, type and impact of an innovation, from impressive advances in medicine and technology, to small process changes; organizations, their employees, their customers and the economies within which they operate need innovation as a means of responding proactively to external and internal needs for change (Anderson & King, 1991), and as a means of identifying and implementing solutions to problems both old and new (Anthony, 2012). As Anthony (2012, p.30) notes, innovation must be “everyone’s business”, because without innovation, even highly successful companies are not capable of moving forward. Without innovation there is only stagnation, repetition and an inability to keep up with the competition.

Research that advances understanding in the innovation field therefore, is a vital source of knowledge for organizations that are keen to find ways of maximizing their innovation potential. Researchers in the organizational sciences have responded with a plethora of studies and reflections on the initiation, adoption and diffusion of innovation (Kimberley, 1981) and factors which may facilitate or inhibit innovation (Anderson et al, 2004; Janssen et al, 2004). While much of this research has been highly relevant and useful to organizations in their quest for innovation, our understanding of innovation is still incomplete. There are at least five gaps in research which this thesis aims to address.

The first, and perhaps most significant weakness is that innovation research has focused almost exclusively on the determinants of innovation, largely ignoring the outcomes of innovation (Janssen et al, 2004, Shepherd et al, 2013; West & Farr, 1990). Driven by a desire to help organizations maximize their innovation potential, most research has considered innovation as the dependent variable and has treated the outcomes of innovation as an afterthought, often presenting them in black and white terms, as profits versus loss, or success versus failure (Anderson et al, 2004). Innovation research generally gives the impression that innovation ends abruptly at some fixed end-point without consequence for the individuals involved (Amabile, 1988; Anderson et al, 2004). This of course is inaccurate, and the current research aims to contribute to the field of innovation by positioning innovation as the independent variable, and exploring the impact of innovation experiences on psychological outcomes; well-being, motivation and innovative work behaviour.

Although numerous studies have hinted at a range of impacts that innovation may have upon psychological processes (e.g. Bunce & West, 1996) and outcomes at the individual and group level (e.g. Anderson & King, 1991), very few studies have explicitly set out to test innovation as the independent variable. This thesis proposes that the outcomes of innovation are worthy of greater consideration, because the outcomes, whether positive or negative, do have consequences for individual and team innovators and for the organization as a whole, but at present, we do not fully understand what these consequences are or how they might be appropriately managed (e.g. Agrell & Gustafson, 1996; Bunce &West, 1996; Janssen, 2004). After all, it is people, not processes who push forward the innovation despite setbacks and challenges (Angle, 2000; in Van De Ven et al, 2000, p. 135; Kingdon, 2012). This research explores three psychological outcomes; well-being, motivation and innovative work behaviour, which, to my knowledge, have not been researched previously as dependent variables with innovation setbacks as the independent variable, thereby contributing vital new knowledge in this field. The first contribution therefore made by the current thesis is to position innovation as the independent variable and to explore the psychological outcomes of innovation thereby offering vital new knowledge and empirical evidence to the field of innovation research.

The second gap in innovation research to date is that, for the most part, innovators are expected to continuously innovate, often working on multiple projects simultaneously, and, almost certainly, or at least ideally, moving on to another innovative project once one has concluded (Katz, in Van de Ven et al, 2000, p. 136). As such, researching individual innovative projects in isolation from the wider innovation context as most previous innovation research has tended to do, is unlikely to provide a complete picture of the processes and the psychology involved in innovation. As Engwall (2003) suggested in his research which linked projects to their history and context, “no project is an island” (p. 780). The current thesis argues that this reasoning may also be applied to innovative projects. There has been a tendency in previous innovation research to focus on specific aspects of the innovation process in isolation, such as a penchant in innovation research to use the terms ‘creativity’ and ‘innovation’ somewhat synonymously (Anderson et al, 2004; King & West, 1987). As a result, a number of authors have called for more research which focuses on innovation as a complete, holistic process which consists of a number of distinct stages (Baer, 2012; Kanter, 2000; King & West, 1987; Scott & Bruce, 1994). The current research therefore contributes by exploring innovation as a complete process whereby the experiences of each stage may inform the next, and where outcomes of one project may impact future projects. This is in line with the Langley (1999) paper, which argued that in order to understand complex organizational phenomenon and events, such as innovation, they must be studied as a complete process that considers how sequences of events evolve over time. In addition, current innovative projects are likely to be influenced by past innovative experiences, and in order to capture this, the current research starts in the middle of innovation projects and explores what comes next. This represents the second novel contribution delivered by this thesis.

The third weakness of current innovation research, is a failure to address the fact that the costs of innovation are often high. There are costs associated with lost revenue, lost time, and a potential for harm to innovators’ reputations where failure occurs. The importance of innovation is clear, but the path to successful innovation is rarely straightforward and the reality of innovation is that with it comes uncertainty (Venkartarman et al, 1990), significant challenges and difficulties (Kanter, 2000; Horibe, 2001), the potential for harm to innovators (Huhtala & Parzefall, 2007; Valikangas et al, 2009) and highly variable or risky returns (Cannon & Edmondson, 2001; Moenkemeyer et al, 2012). Setbacks may be defined as a problem that makes progress difficult or success less likely (Kumar et al, 1996), and failure may be defined as the termination of a project which has fallen short of meeting its’ goals (Kutsch & Maylor, 2011). Taken together, the considerable challenges faced by innovators means that the likelihood of setbacks and failure is high (McGrath, 1999). It is very difficult to predict with any level of accuracy the chances of failure of an innovation project, with estimates of innovation failure ranging from 40% to 90% (Harkema, 2003; Janssen, 2004; Valikangas et al, 2009). The large variations in estimates of failure rates are likely to be the result of highly variable risk, complexity, and uncertainty involved with different types of innovation projects, with, for example, large scale, radical innovations being far more prone to failure than smaller, incremental innovations (Damanpour, 1996b). This will be discussed in greater detail in Chapter 3.

Whether one is inclined to take the more optimistic or more pessimistic view of innovation failure, what is clear is that when one embarks on an innovation project, the chances of success are not stacked in your favour (e.g. Shepherd & Cardon, 2009; Sminia, 2003). The lack of research into innovation setbacks and failure may in part be the result of a tendency in human nature to seek out positives rather than negatives (Tezuka, 1997), or it may be that the importance of innovation has led researchers to focus on the potential benefits rather than the negatives of a process which plays such a key role in organizational success and survival (Janssen et al, 2004). Whatever the reason for this current research deficit, it is clear that as a result of the lack of research focusing on innovation setbacks and failure, there is very little evidence relating to the potential outcomes of innovation setbacks and failure for individuals involved in the innovation process (Moenkemeyer et al, 2012). Given that research in this area within the innovation literature is sparse, it is necessary to look to general literature on failure for clues as to the potential outcomes of innovation setbacks and failure. This general literature indicates that emotional responses to setbacks and failure are usually negative (Brunstein & Gollwitzer, 1996; Huhtala & Parzefall, 2007) and that these negative emotions can persist over time which may adversely impact well-being (Brunstein, 2000). Evidence also suggests that even successful innovations can lead to stress responses (Janssen, 2004). It would not seem unreasonable to assume that if successful innovation can result in negative outcomes for innovators then problematic or failed innovations may have even more harmful effects. Given this potential for harm, gaining clearer insights through research into the outcomes of innovation setbacks and failure seems an important area of study which will provide valuable new research contributions.

Setbacks and failure then, are both under-researched concepts, but arguably setbacks are an area with an even greater dearth of research knowledge failure. It is a well-accepted fact that setbacks are common, normal even, within the innovation process and as such, it is surprising that there exists, to my knowledge, no research which explores setbacks within the context of innovation. What are the different types of setbacks experienced by innovators? How do setbacks differ from failures? And what are the outcomes of setbacks for innovators? These are all questions which the current thesis aims to explore and in doing so will contribute new empirical evidence to the field of innovation research. This represents the third contribution to existing research offered by the current thesis.

Fourth, evidence indicates that people experience failure differently with some suffering harmful effects while others remain relatively intact (Shepherd & Cardon, 2009). We assume that the same varied effects can be seen following innovation failure and setbacks. This indicates a need to explore which variables moderate the relationship between innovation setbacks and failures and outcomes. Janssen et al (2004) called for research into why individual innovators sometimes enjoy the benefits and at other times pay the costs for their role in innovation. This thesis aims to respond to this call and contributes to the field by exploring factors that may moderate the effects of innovation failure on outcomes, with particular attention paid to the outcomes of well-being, innovative work behaviour and motivation. The moderator variables included in the analysis are resilience, normalization of failure, supervisor feedback, level of investment, and learning from setbacks and failure. Most of these variables have been explored in some way in the innovation research context previously such as resilience (Moenkemeyer, 2011), supervisor feedback (Pradhan et al, 2017; West & Bogers, 2013), normalization of failure (Shepherd & Cardon, 2009) and learning from failure (Shepherd, 2003; Shepherd et al, 2011). However, they have never been explored as moderators of the relationship between innovation setbacks and failures and outcomes, and therefore the current research provides an entirely novel exploration of these factors within the innovation context thereby contributing significantly to this field. This is the fourth contribution made by the current thesis.

Finally, given the lack of research that considers setbacks and failures within innovation projects, as discussed above, there is a related deficiency in definitions of setbacks and failure in the innovation context. The current research contributes by providing more concise definitions, and may also pave the way for the identification of potential methods for reducing negative outcomes, such as poor well-being and reduced motivation. This is the fifth contribution made by the current research.

In summary, over recent years, authors have come to question the innovativeness of innovation research. There have been calls for greater focus on innovation as the independent variable (Anderson et al, 2004), research designs which allow the study of innovation as a complete process (Anderson et al, 2004; Langley, 1999) and more studies which consider the outcomes of innovation in terms of benefits and costs to individuals (Janssen et al, 2004). Innovation is absolutely essential to business success and as such, organizations require many of their employees to be involved in innovation without clear understanding of how their involvement may impact them. There is evidence that indicates that innovation may impact psychological processes such as well-being (Bunce & West, 1996) and motivation (West & Altink, 1996) but such relationships are far from clear and require further investigation. This thesis aims to respond to these calls by considering the psychological outcomes of innovation setbacks and failures on innovators with particular focus on the impact of innovation setbacks and failure on well-being, innovative work behaviour and motivation. It will also explore factors which are expected to moderate the relationship between innovation failure and outcomes. This research aims to help to protect innovators from harm while also pointing towards ways of improving the innovative potential of organizations.

## A summary of contributions made by the current research:

Five key contributions that the current research delivers were discussed in sections 1.3 above. These contributions are summarized below:

**Contribution one:** To position innovation as the independent variable rather than the dependent variable, and in doing so to provide new evidence relating to three proposed outcomes of innovation setbacks and failures; well-being, innovative work behaviour and motivation.

**Contribution two:** This research contributes new knowledge to the field of innovation by exploring innovation as a cyclical process, rather than a stand-alone project, where current and past innovation experiences potentially impact future innovative behaviours.

**Contribution three:** Novel empirical evidence is presented which explores setbacks and failures within the innovation context and in doing so addresses a number of previously under-researched questions. What are setbacks within the innovation process? How do setbacks differ from failures? How do setbacks and failures impact outcomes?

**Contribution four:** This research presents new evidence relating to why some innovators experience negative outcomes of failure, while others experience positive or neutral outcomes.

**Contribution five**: This thesis provides a more concise definition and more nuanced description of setbacks and failures within the innovation context.

## Why focus on innovation setbacks and failure specifically?

It seems important at this point to address the question of why there is a need to research *innovation* setbacks and failure specifically? There are a number of reasons for this. Firstly, innovation is a unique process and setback and failure research conducted around processes such as organizational change may not be applicable to innovation. For example, West & Farr (1990, p.11) point out that “…all innovation in organizational terms is change. But not all change is innovation.” Innovation changes are desired whereas organizational changes can be undesirable such as the laying off of staff because of a fall in customer demand. In addition, change, unlike innovation, can be routine involving nothing new such as seasonal changes to staffing in restaurants or shops. As such, even failure research, which focuses on a closely aligned concept like change, may not be applicable to innovation.

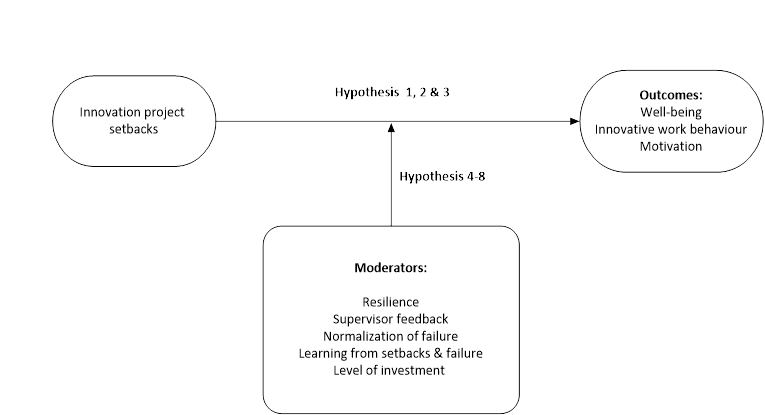
Secondly, another factor that makes innovation unique is that it often begins to take shape in an uncertain environment where solutions are needed in order to minimize or eradicate problems or irregularities (West, 2002). Innovation is often borne out of a pressing need for change (Kanter, 1988) which is less likely to be the case with other, more routine work-related projects and tasks which do not carry same needs and sense of urgency. In this sense, innovations, from their very beginnings are cultivated in an environment that is uncertain and often highly stressful (Anderson et al, 2004). Given that uncertainties or problems are usually the trigger for innovation, it could be argued that the failure of an innovation could have a much greater impact than the failure of a more routine task, not least because innovation failure may deepen the severity of the original problem (Huhtala & Parzefall, 2007) for example where resources have been utilized but the original problem still exists.

This research focusses on setbacks and failure rather than success, because factors relating to innovation success have been the focus of a significant body of research to date, whereas setbacks and failure within the innovation context have received limited research focus (Janssen et al, 2004). Therefore, a focus on setbacks and failures provides much needed contributions to the innovation research field. There is a significant and perturbing deficit in research relating to setbacks and failure across all domains within the organizational sciences. As argued, setbacks and failure are not well conceptualized or well understood phenomenon (Moenkemeyer et al, 2012; Tezuka, 1997), especially when compared to the phenomenon of success. No great advances have been made in this area in the past decade. As such, any research which advances knowledge relating to setbacks and failure is potentially important.

## Model showing the predicted outcomes of innovation setbacks and failure

In order to highlight the aims of this thesis, and as a means of presenting pictorially the predicted relationships between innovation setbacks and failure and well-being, innovative work behaviour and motivation Figure 1 is presented below. This figure is the framework which guides the current research. “Innovation project setbacks and failures” is referred to as “Innovation project setbacks” within this model.

Figure 1: Theoretical framework diagram: Predicted relationships between innovation project setbacks and failures, outcomes variables and moderators

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## Explanation of model

The model in Figure 1 represents the outcomes of innovation failure, and shows predicted relationships between innovation project setbacks, moderator variables, and the outcomes of well-being, innovative work behaviour and motivation. The model shows hypothesis paths which guide this thesis.

The leftmost box of Figure 1 represents innovation project setbacks, where at the extreme end of the setback scale sits failures and at the other end of the comparative scale sits success.

At the rightmost side of the figure sits the potential outcomes of innovation project setbacks; well-being, innovative work behaviour and two dimensions of motivation; identified regulation and intrinsic motivation. These factors were modelled as outcomes rather than mediators because existing evidence indicates that these psychological outcomes may change directly in light of innovative experiences. This evidence will be discussed in detail in Chapter 4 below. In a similar vein, the moderator variables were included as such, because existing evidence indicated that these variables may buffer the effects of setbacks and failure on outcomes.

The box in the middle of the diagram represents variables which this thesis predicts moderates the relationship between innovation project setbacks and outcomes. These moderator variables are: resilience, supervisor feedback, normalization of failure, level of investment, and learning from setbacks and failure.

The variables feedback, normalizing failure, resilience and learning from setbacks and failure have been selected for two reasons. Firstly, because a small number of relatively recent separate studies provided some evidence to indicate that there may be relationships between these factors and outcomes of failure, although this research tended to be within general rather than innovation specific literature. This previous research will be discussed in detail in Chapter 5. These relationships have never been studied together, and neither have they been studied in an innovation specific context. Therefore, the inclusion of these moderator variables is expected to produce valuable and novel findings, which it is hoped will contribute significantly to the innovation field. Secondly, these variables have been selected because they represent a mixture of perceived management (supervisor feedback, learning from failure; level of investment), psychological (resilience) and perceived organizational level (normalization of failure) factors, none of which alone could adequately explain how the complex relationship between innovation failure and outcomes are moderated. Learning from failure is gaining recognition in general literature relating to work as a key factor which moderates the relationship between failure and outcomes (i.e. Ariño & De la Torre, 1998; Carmeli & Gittell, 2009; Coelho & McClure; 2005), and may add substantially to arguments relating to the second aim of the thesis; to understand why some individuals suffer negative outcomes of innovation failure, while others experience positive or neutral outcomes. However, arguments and evidence in the field of innovation, organizational psychology and management relating to the relationship between learning from failure and failure outcomes, have been based largely on assumptions and lack academic rigor (Cope, 2003). Learning from failure therefore is a factor which has been under-researched empirically, and there is a need for research particularly in the innovation field which explores how learning from setbacks and failure moderate outcomes.

The remainder of this thesis explores evidence and theory relating to each aspect of this framework in detail. The aim of this thesis is to present arguments which back up the proposed relationships presented in the above framework.

## Overview of subsequent Chapters:

Chapter 2 begins by introducing innovation, with a discussion of definitions of innovation followed by a section that explains the differences between innovation and creativity. The overall aim of this chapter is to clarify the definition of innovation assumed by the current thesis and to set out the differences between innovation and other organizational projects and tasks. Next, chapter 2 considers that innovation projects vary by scope and size, as either radical or incremental. Also discussed in this chapter are the differences between types of innovation project; product, process, organizational and marketing innovation. Subsequent to this is a section that explores how different types of innovation role vary. The role of innovation teams and individuals are discussed, with specific focus on the role of entrepreneurs and innovation champions. This chapter is important to meeting the aims of this thesis because it presents evidence that highlights the fact that in innovation, one size does not fit all, and yet a noted downfall of previous research is that it has tended not to distinguish between types of innovation and innovation roles (Ceylan, 2013). This chapter therefore helps to identify the types of innovation and role of particular interest to the current thesis, notably innovations carried out by individuals working within teams.

Chapter 3 discusses process models of innovation, with particular focus on Kanter’s (2000) four stage model of the innovation process. The overall aim of this chapter is to discuss the idea that while innovation is very important to the overall success of organizations, the process itself is fraught will problems, challenges, uncertainty and risk which taken together mean that innovation projects are more likely to fail than other organizational projects and tasks. Each stage of the innovation process based on Kanter’s (2000) model is discussed in detail, and the problems, risks and potential challenges at each stage are discussed as are the related outcomes of setbacks and failure. This chapter positions innovation failure as an important topic for further study and explores why innovation projects may be so prone to failure.

Chapter 4 explores the positive and negative outcomes of innovation setbacks and failure. It begins by attempting to define ‘setbacks’ ‘failure’, and conversely, ‘success’. Subsequently, evidence relating to the well-being, innovative work behaviour and motivational outcomes of setbacks and failure is explored, with reference to evidence from general as well as innovation specific literature. This chapter contributes to the aims of this thesis by introducing evidence that there may be significant well-being, innovative work behaviour and motivational outcomes associated with innovation setbacks and failure. This chapter also presents hypotheses in relation to the material discussed.

Chapter 5 presents evidence relating to factors which it is believed may moderate the relationship between innovation failure, well-being, innovative work behaviour and motivational outcomes. Six different moderating factors are discussed: supervisor feedback, normalization of failure, resilience, learning from failure, and level of investment. Evidence is presented relating to how these factors may moderate the relationship between innovation setbacks and failure and outcomes. This chapter is key to the second aim of this thesis which is to understand why some individuals experience harm while others experience neutral or positive outcomes of innovation setbacks and failure. Hypotheses are presented in this chapter in relation to the evidence discussed.

Chapter 6 discusses the methodology and procedure employed in the study; survey measures used in the longitudinal surveys are presented and discussed as are the results of a survey pilot study. Ethical considerations are discussed. Finally, details of participant demographics, and participant organisations are presented.

Chapter 7 provides quantitative analysis results including correlation analysis, synchronous effects regression modelling, lagged analysis and moderation analysis. This chapter provides analysis aimed at answering the first two aims of this thesis. Synchronous effects regression models demonstrate that innovation setbacks are significantly negatively related to all outcome variables; well-being, innovative work behaviour and two dimensions of motivation (identified regulation and intrinsic motivation). Moderation analysis reveals that moderator variables resilience, supervisor feedback and learning from setbacks and failure moderate the relationship between innovation setbacks (main) and some or all outcome variables.

Chapter 8 discusses the results of qualitative interviews and provides results of thematic analysis of interview data. This chapter meets the third aim of this thesis which is to provide a more nuanced description and understanding of innovation setbacks and failures in the context of innovation. In this chapter, evidence is presented which demonstrates that innovation setbacks and failures occur at three different levels; ‘normal setbacks’, ‘more serious setbacks’ and ‘real failures’. Different features of each level are presented and discussed along with Illustrative supporting evidence.

Chapter 9 provides a synopsis of conclusions and a discussion, including limitations of the research, implications for practice and directions for future research.

## Summary

Chapter 1 introduced the main aims of this thesis and provided justification for this research which explores psychological outcomes of innovation, considers factors which moderate the relationship between innovation project setbacks/failures and outcomes, and provides a more nuanced description of setbacks and failures within the innovation context. This chapter introduced a model which forms the basis of the research and outlines the format of the remainder of this thesis, providing a roadmap for how this research unfolds towards its final conclusions. Chapter 2 next, provides detailed exploration of the innovation process in order to give context to this research.

# Chapter 2: What is innovation?

## Introduction

One of the aims of this thesis, as stated in the previous chapter, is to further understanding of the outcomes of innovation project setbacks and failures; factors which previous research has tended to circumvent within innovation literature. This chapter will begin to address this aim, firstly, by providing a discussion of definitions of innovation in order to clarify what is meant by the term ‘innovation’ generally and in the context of this thesis. Secondly, the differences between innovation and creativity are discussed. This is important because the terms are often used interchangeably in research papers. However, as will be discussed below and in subsequent chapters, innovation and creativity are very different processes, with arguably very dissimilar setbacks and failure outcomes.

## Definitions of innovation

West (1990, p. 309) defines innovation as “…the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures new to the relevant unit of adoption, designed to significantly benefit the individual, the group or wider society.” This definition is widely accepted by innovation researchers (Anderson et al, 2004) and definitions of innovation tend not to deviate a great deal from West’s (1990) stance. Some researchers use slightly different terminology or provide less detail, such as Hage’s (1980) definition of innovation as the adoption of an idea or behaviour that is new to the organization.

As was discussed in Chapter 1, it is important that innovation is recognized as a process consisting of a number of distinct phases rather than being represented as a simple one-off process of creativity. As such, a definition presented by Baregheh, Rowley & Sambrook (2009, p. 1334) is noteworthy because of its specific reference to innovation as a multi-stage process, and because it was generated through content analysis of innovation definitions which have appeared in scholarly publications over the past few decades. They define innovation as:

*“Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.”*

While the current thesis argues that the above definition is very useful there is still not, at present, a common consensus regarding how to define innovation (Baregheh et al, 2009; Johannessen et al, 2001). This lack of consensus is problematic because it undermines understanding of innovation (Baregheh et al, 2009). However, authors do generally agree on a number of important points about innovation that distinguish it from other organizational processes.

The first point upon which definitions tend to agree is that innovation involves newness (Slappendel, 1996). For example, Zaltman et al (1973, p. 10) defined innovation as “any idea, practice, or material artefact perceived to be new by the relevant unit of adoption.” ‘Newness’ is arguably the key facet of innovation (Johannessen et al, 2001). It doesn’t follow however, that an innovation must be an entirely new product or process; often an innovation is just one novel part of a pre-existing product or process (i.e. West & Farr, 1989). Further, key to West and Farr’s definition is that an idea need only be new to the group, organization or role into which it is being introduced for it to be considered innovative.

Secondly, innovation is intentional. Unlike other organizational tasks or processes such as change, which can be accidental, innovation is always planned. For example, organizational changes can occur which are unintentional such as the need to make redundancies because of a downturn in profits, whereas innovation projects are always embarked upon intentionally (West & Farr, 1990)

Third, often when we think of innovation, high tech products are usually what spring to mind, but as West and Farr point out in their definition, the innovation of processes and procedures are also common. In fact, the innovation of processes and procedures is far more widespread within organizations than the innovation of products (Cheng & Van de Ven, 1996).

Fourth, innovation must be a social or public process (King & West, 1987), meaning that changes that affect only the individual as opposed to a wider social group would not be considered innovation.

The final point of importance is that the intention behind an innovation is always that it will produce something beneficial. It does not necessarily follow that the outcomes of innovation are always positive (Abrahamson, 1991), as will be discussed later, but the intention at least is that the application of the novel idea will bring about benefits for individuals, the organization or the wider society.

The West and Farr definition provides us with a clear understanding of what innovation is and clarifies the ways in which it is distinguishable from other organizational process. It is a well-accepted definition of innovation and for these reasons, when referring to ‘innovation’ in this thesis, it is with the West and Farr definition in mind.

The above review of innovation definitions serves as a reference point for the remainder of this thesis and provides clarification of what this thesis considers to constitute an ‘innovation’. Conversely, the next section briefly discusses common misconceptions about what innovation is, namely with reference to research which positions creativity as tantamount to innovation.

## The differences between innovation and creativity

In any discussion of innovation definitions, it seems appropriate to include some consideration of the differences between innovation and creativity, not least because the two terms are often used interchangeably (King & West, 1987). Creativity concerns the production of ideas that are both novel and useful (Amabile, 1996; Oldham & Cummings, 1996), whereas the focus of innovation is on turning those ideas into reality and as such, innovation has a stronger focus on the application of novelty and is therefore more interested in the realization of ideas (Anderson et al., 2004).

The distinction between innovation and creativity is important because there has been a tendency in previous innovation research to focus largely on the creative aspects of the innovation process. Although most studies recognise that innovation is comprised of both creativity (idea generation) and the implementation of those ideas, research is frequently published which fails to distinguish between the two processes either conceptually or empirically (Baer, 2012; Scott & Bruce, 1994; Sung, Cho & Choi, 2011). As a result of this failure to adequately distinguish between idea generation and innovation, the two terms are often used as synonyms for one another (Baer, 2012). This is unfortunate given that, in reality, the two processes are markedly different and the conversion of creative ideas into implementation and use (i.e. innovation) is much more complicated than creativity itself (Baer, 2012). As such, the use of the term ‘innovation’ to describe a process of idea generation, not only contributes to a lack of clarity in terms of what is meant by ‘innovation’, but it also paints an impression of innovation as a simplified process which largely consists of coming up with good ideas. This, of course, is not true. Idea generation or creativity, is just the first stage of a much longer and more complex process of innovation (which will be discussed in detail in Chapter 4), and while idea generation is key to the process, the stages that follow it are equally important in determining the degree of success or failure of an innovation (i.e. West & Farr, 1990).

This thesis considers innovation as an entire process, taking into account the different tasks, challenges and aims of each phase of the innovation process. This thesis also proposes that innovation projects should not be researched as singular processes, and that instead, each project should be considered in terms of the wider innovation context in which they take place, where previous innovation experiences are likely to impact future innovative performance. Research of this type which considers innovation from a more holistic perspective addresses calls from previous authors for more research of this kind (Anderson et al, 2004; Janssen et al, 2004).

The above exploration of definitions of innovation and creativity has aimed to demonstrate the unique factors that make a process innovative. We see from these definitions that innovation includes a number of factors that make it both an inimitable process and a potentially challenging one.

The next section (2.4) considers different types of innovation and how innovative roles vary. The inclusion of this chapter aims to highlight how different types of innovation and different roles may involve different challenges and activities. Also discussed is how innovation outcomes may vary by role and type.

## Types of innovation

It is important at this point to distinguish between different types of innovation. The definitions discussed in section 2.2 above imply that anything that meets the required conditions of ‘newness’ may be considered innovative. However, innovation can take many different forms, and definitions such as those discussed above do not adequately distinguish between different sizes, scopes and types of innovations. Just as innovation definitions tend to be somewhat vague, so too is much of the innovation research in terms of issues such as what constitutes an innovation, what is new, how new and new to whom (Johannessen et al, 2001)? Indeed, one of the central problems in innovation research and practice is that no two projects are the same, meaning that it is difficult to make generalisations between studies (Johannessen et al, 2001). Innovation comes in many different shapes and sizes, and different innovations may require very different activities, levels of commitment, and may also bring about diverse changes to the organizations or markets into which they are introduced (i.e. Ceylan, 2013; Damanpour, 1996a). As Damanpour (1996b) notes, while all innovations bring about change, the extent of that change is not equal for all innovations. A small process innovation for example will require far less work and is likely to make a much smaller impact on an organization than a major technological innovation.

The following section therefore discusses different types of innovation and considers how different innovation types may have varied outcomes. Firstly, broad innovation types are discussed with a review of the distinction between radical and incremental innovation.

### Radical vs. incremental innovation

The classification of innovations as either radical or incremental relates to the degree of change that the innovation is intended to bring about. The differences between radical and incremental innovations have some important implications for the current research. Firstly, radical innovations may be expected to have markedly different outcomes following failure than incremental innovations given that, for the former, the workload is generally heavier, the level of personal investment higher and the challenges greater (West & Farr, 1990). These differences may arguably result in dissimilar outcomes following failure. To my knowledge, research does not currently exist which considers how failure outcomes differ for radical and incremental innovations. The current research aims to include measures within the design which will allow for comparison of failure outcomes of radical and incremental innovations, thereby contributing to this field. This is discussed in more detail in the methodology Chapter 6 (6.4.5).

Classifying an innovation as either radical or incremental tends to be based more on intuition than on predefined measures or definitions (Dewar & Dutton, 1986). To compound the difficulties involved with adequately classifying innovation is the fact that only two extremely broad classifications exist within popular literature with which to label an innovative project. Recent research by Szekely and Strebel (2013) however, calls for an additional innovation classification to be considered, what they term ‘game-changing innovation’. They describe game changing innovation as profound changes to practices, structures or even the aims of a business. Game changing innovation classification is not however, a middle-ground classification sitting between radical and incremental. Instead it offers an alternative for classifying the type of innovation, given that radical innovation definitions tend to be product orientated, and Szekely and Strebel (2013) argue the need for a classification which encompasses large-scale transformations which are not related to new products.

How then, is it possible to determine whether an innovation sits within the radical, incremental or some undefined middle ground category? Researchers and theorists in this area tend to argue that radical innovations have a larger impact in terms of change than incremental innovations. Radical innovations capture the imagination (Baregheh et al, 2009), introduce fundamental changes, and are characterized by a high degree of newness and significant departure from current practices (i.e. Ansari & Krop, 2012; Bers & Dismukes, 2012; Moosmayer & Koehn, 2011). Radical innovations tend to bring about the creation of large amounts of new knowledge, which can be beneficial to an organization regardless of the ultimate success or failure of an innovation (Moosmayer & Koehn, 2011). Radical innovations can transform organizations and industrial landscapes (Ansari & Krop, 2012) and are considered absolutely crucial to the economic growth of organizations and economies as a whole (Bers & Dismukes, 2012). However, because of the newness of radical innovations and the degree of change that may come with them, radical innovations are highly uncertain (Groenewegen & Langen, 2012), have a much greater risk of failure (Damanpour, 1996b), require very significant investments and are often met with setbacks in the form of resistance during their implementation (Frost & Egri, 1991).

Incremental innovations on the other hand constitute limited changes and involve minor adaptations or small improvements to existing products or processes (Gatignon et al, 2002). While incremental innovations are unlikely to create substantial new knowledge or revenue to the extent that radical innovations can, they are a necessary means of keeping organizations competitive and up to date with market changes (Moosmayer & Koehn, 2011). Incremental innovations are, not surprisingly, far more commonplace than radical innovations, are associated with a lower degree of uncertainty and risk and are less likely to be resisted during their implementation and are therefore likely to suffer fewer setbacks (Damanpour, 1996b). They are also less likely to result in failure than radical innovations (Ceylan, 2013; Damanpour, 1996a).

The next section addresses another factor which may set one innovation apart from another, and that is the question of ‘who innovates?’. Larger, particularly radical and product innovations are likely to require the combined efforts of a dedicated innovation team. Incremental or small process innovations, on the other hand, may be carried out by individuals working relatively autonomously. The distinction between the different ways of working is an important one, because the dynamics of working as part of a team or as an individual may have a significant impact on how an innovative process is experienced by those working on it and may also moderate setback and failure outcomes. In later Chapters (4 and 5) it will be argued that the social dynamics of the experience of failure may have a significant impact on the outcomes of that failure. As such it is important to distinguish between different approaches to innovation (team work and individual work). The current research focuses on individuals working within teams and the project role features as a moderator variable under the broader title ‘level of investment’. Therefore, exploring different innovative roles is key to understanding the current findings.

The next section considers in turn the role of the individual innovator, innovative teams, innovation champions and also explores the differences between individual innovators and entrepreneurs.

## The innovators: Individuals, groups and organizations

The question of ‘who innovates?’, is an important consideration for the current research since an innovation may take different forms, be prone to different challenges and have different outcomes depending on who is innovating. This section therefore considers research relating to each type of innovator as innovation role is included in quantitative results analysis (Chapter 7) as a potential moderator of the relationship between innovation setbacks/failure and outcomes, under the broader term ‘level of investment’.

### Innovative individuals

At the individual level, innovation is usually sparked by a problem or incongruity within that individual’s role (Kanter, 2000). These issues can lead to stress responses (Anderson et al, 2004) and innovation is the means by which the individual aims to address the problems and restore feelings of stress or unease to acceptable levels. At the individual level, innovations may serve to benefit only the individual (Janssen et al, 2004) although as was discussed in Chapter 2, in defining innovation, it is generally agreed that innovations, by their nature, should aim to benefit to the group, organization or wider society (West & Farr, 1990).

The formation of innovative ideas by individuals ultimately depends upon the creativity level of the individual (Tewari, 2011). However, as discussed in Chapter 2 above, in order to progress beyond creativity and into the realm of innovation, creative ideas must be developed. Amabile (1996) argues that individual innovators must possess three key components. Firstly, the ability to think *creatively* in order to form new ideas for meeting identified problems*.* Secondly, she argues that individual innovators must possess the *knowledge* necessary to understand and identify ways of overcoming problems, and third, innovators must have the *motivation* to pursue the innovative idea. As will be argued in more detail below (Chapter 3), innovation is an extremely challenging process. Some may argue that individual innovation contains even greater challenges given the need to overcome every stage and obstacle presented by the innovation process without the help and support of a team who are working towards the same goal (Janssen, 2003). However, it could also be argued that an individual is unlikely to embark on an innovation as grand in scale as those attempted by a group since large scale innovation efforts are highly unlikely to be achievable by a sole innovator, given that large scale innovations, for example radical product innovations, usually require the input of numerous different people in different roles if they are to stand any chance of success (Gerbert et al, 2003; Van de Ven, 1986). In this sense then, innovations carried out by individuals may be far more likely to be relatively minor process or administrative innovations, a point which empirical evidence tends to support (i.e. West & Farr, 1990; Janssen et al, 2004).

It is perhaps important at this point to reiterate the differences between creativity and innovation as discussed in Chapter 2, section 2.3, because, whereas an individual may come up with and propose a radically, large-scale innovative idea, it is unlikely that that idea can be realized without the concerted efforts of a larger team (Gerbert et al, 2003). An explanation for this may be that creativity is a relatively solitary process and there is evidence to suggest that most successful ideas are generated by individuals rather than by groups (Janssen, 2004), thereby making idea generation highly conducive to individuals working relatively autonomously. Conversely, the subsequent aspects of the innovation process (namely the coalition building, idea realization and transfer/diffusion stages) are highly reliant on social interaction and the involvement of others (Van de Ven, 1986). Therefore, high levels of autonomy may not sit comfortably with the implementation aspects of the innovation process. This is because, regardless of an individual’s resolve and ability to perform, the opportunity to act is still required, and opportunity is often governed by circumstances and factors beyond the individuals’ control (Janssen, 2003). As such, individual innovators are far more likely to be involved with incremental innovations than with grander radical innovations. That said, there are exceptions to this rule, and this exception comes in the form of entrepreneurs; individuals who are occasionally capable of achieving great things relatively independently. In the next section, we discuss entrepreneurs, and the differences between entrepreneurs and innovators.

### Entrepreneurs

Entrepreneurial and innovative activities are often discussed interchangeably. However, entrepreneurs may have some markedly different characteristics to innovators. Entrepreneurs are generally highly self-motivated, perseverant and optimistic people (i.e. Coelho & McClure, 2005) and while many innovators may share these traits, others may innovate, not simply because they are self-motivated to do so, but because there is a pressing need to address a work-related problem or incongruity (Mone et al. 1998). Therefore, innovators differ from entrepreneurs in that they are often required to innovate as part of their role, while entrepreneurs tend to be largely self-motivated (Jayawarna et al, 2013). In addition, innovators are more likely than entrepreneurs to work as part of a team (Lassen et al, 2006), meaning that there may be a greater social impact of setbacks and failure for innovators (Janssen, 2003). For example, where innovation damages relationships with co-workers and reputation, this has been found to have a negative impact on emotions and well-being (i.e. Janssen, 2003; Rasulzada & Dackert, 2009). Therefore, while both innovation and entrepreneurship may share the same focus, namely creating something novel, the actual process, experience and outcomes of innovation may differ for entrepreneurs compared to innovators. Entrepreneurs are not the focus of the current research, and this description is included for clarification purposes to distinguish between entrepreneurs and innovators. The current research focusses largely on individuals working within innovation teams and will be discussed in the next section.

### Innovative teams

As discussed above, innovations, particularly large scale or radical innovations, are rarely the result of a lone innovator, but instead tend to involve the cooperation of numerous individuals (Janssen et al, 2004). Organizations over recent years have shown a tendency to prefer projects (both innovative and otherwise) to be completed by groups rather than by individuals (Nijstad & De Dreu, 2002). Evidence indicates that projects may benefit from team work because of the varied perspectives and diverse skill sets that a number of individuals may bring to them (Diaz-Garcia & Gonzalez-Moreno, 2013). Levine and Moreland (1990) found that groups tended to outperform individuals on a number of tasks including problem solving and decision making, although empirical evidence in this area, particularly with regards the effectiveness of group decision making, receives mixed results (Nijstad & De Dreu, 2002). However, in innovation projects specifically, working in teams may protect individuals from the stress, conflict and performance decrements associated with innovation failure, because the responsibility for the project is shared and, as such, the impact of setbacks or failure on any one individual may not be as great as the impact of setbacks or failure on individual innovators (Janssen et al, 2004). There is also a pragmatic reason for innovating in teams, and that is that while individuals may be better at creativity, teams may be better at innovation (Nijstad & De Dreu, 2002).

While teams appear to offer the greatest opportunities for successful innovations, as well as preferable outcomes following setbacks and failure, innovation teams are often highly complex because of the numerous interactions between multiple factors which may predict innovative success (West, 2002). These factors include for example, level of information, group communication, perceptions of equity, expectations of benefits, and perceived social pressure (Monge et al, 1992). This is far from an exhaustive list of factors which may influence innovative team effectiveness. While a discussion of the numerous factors which may impact innovation team effectiveness is beyond the scope of the current research, it is important to note that while outcomes of team innovation may be preferable regardless of whether the innovation is considered a success or a failure, the process of managing a team innovation may be extremely challenging and often fraught with difficulties.

Responsibility for managing the challenges involved with team innovations usually lies with an ‘innovation champion’. The innovation champion is the individual with overarching responsibility for managing the innovation team and the innovation process (i.e. Horibe, 2001; Howell, Shea and Higgins, 2005)

### The innovation champion

Innovation champions are individuals who actively pursue and promote new ideas with the intention of applying them and making these ideas a reality (Howell et al, 2005). One of the moderator factors to be included in regression analysis is innovator role (lead or non-lead) under the umbrella ‘level of investment’. The reason for including this as a moderator is to explore whether those in a lead role (i.e. champions) are impacted more significantly by setbacks and failures compared to those in a non-lead role. The current research is most interested in members of innovation teams and innovation champions because these are arguably the most prolific innovators within organizations, tasked with the most challenging, radical innovations. Therefore, in selecting suitable participants for both the quantitative and qualitative research, every effort was made to include innovative team members and innovation champions as the majority of respondents.

A ‘champion’ may be an individual innovator, or, as is usually the case, they work as part of a larger team, taking on the bulk of the responsibility for an innovative project (Horibe, 2001). Champions are key to innovation success because without them, new ideas would be likely to remain dormant, never to be developed beyond the idea stage (Frost & Egri, 1991). When a champion is effective he or she can keep an innovative idea alive by mobilizing support for the innovation and by forming alliances with critical individuals (Walter et al, 2011).

However, the role of the champion is a challenging one, because in order to turn an idea into a successful innovation, champions must be prepared to fight bureaucratic, social and political barriers (Horibe, 2001), often risking their popularity and standing within an organization (Horibe, 2001; Janssen, 2003). This can be a very stressful process (Huhtala & Parzefall, 2007), particularly for innovative individuals who are often characterized by their desire to work autonomously (Van de Ven, 1986; Janssen, 2004). However, certain aspects of the innovation process are highly reliant on social interaction and the involvement of others (Van de Ven, 1986), high levels of autonomy may not sit comfortably with this phase of the innovation process. The innovation process will be discussed in detail in Chapter 3 below.

It is clear that innovation champions are key to the success of innovative teams and projects. It is not surprising therefore that most research assumes a view of champions as ‘innovation heroes’, but there is evidence to suggest that not all behaviours displayed by champions are necessarily beneficial to an organization (Walter et al, 2011). As Horibe (2001) points out, it takes a certain type of person to assume the role of innovation champion. They are often risk takers and dissenters, keen to disagree with authority, and prone to disrupting the status quo (Kelley & Lee, 2010) and while key to innovation success, champions can be very difficult to manage and often clash with senior management (Horibe, 2001). However, without them, it is unlikely that innovations would progress much beyond the idea generation stage.

In conclusion, innovation champions are necessary to the success of innovative projects, and while some may be difficult to manage, the determination, risk taking and dissent behaviours may be necessary to innovative success (Horibe, 2001). This will be discussed in greater detail in Chapter 3, which looks at the challenges involved with the innovation process. Importantly to the aims of the current thesis, innovation champions may bear the brunt of the workload, responsibility and answerability for an innovative project, and as a result, setbacks and failure outcomes may be felt more strongly by champions than by other members of an innovation team. As such innovation role (level of investment) is likely to moderate the relationship between innovation setbacks and failures and outcomes. This will be discussed in greater detail in Chapter 5.

## Section Conclusions

Consideration of how individuals and groups of individuals may perform differently during the course of an innovation project is important to addressing the aims of the current research for a number of reasons. Firstly, evidence discussed above indicates that the experience of innovation may vary from person to person. For example, champions may suffer more negative outcomes following a failure than an individual working as part of the team who has less responsibility for overall project outcomes and is less invested. Secondly, the scale of an innovative project is likely to differ depending on who is innovating, with individual innovators less likely to undertake radical or large-scale innovation projects than innovation teams. This knowledge was important in forming a plan for who should participate in the research and is also a factor in the moderator variable ‘level of investment’.

The next chapter goes beyond definitions of innovation and unravels the process of innovation stage by stage. This is important to meeting the aims of this thesis because in order to present a realistic picture of the outcomes of innovation setbacks and failure, it is necessary first to fully understand what the process of innovation entails from beginning to end, and to explore how different activities conducted at each phase may contribute to setbacks and failure of an innovation and, in turn, the outcomes of those setbacks and failures. As was discussed in Chapter 1, researching innovation as a complete, stage by stage process addresses recognized gaps in previous innovation research, and may also allow for the collection of more robust, representative innovation data (Langley, 1999). The next chapter therefore, in detailing each stage of the innovation process provides evidence necessary to this thesis both in terms of clarifying what the different stages of the innovation process entail, and also in terms of illuminating for the purposes of the methodology chapter, how innovation may be studied as a complete process within the wider innovation context.

# Chapter 3: Unpacking the innovation process

## Introduction

This chapter aims to present a detailed description of the innovation process, by exploring the tasks, actions and potential challenges to be faced by innovators at each stage of the innovation journey. Focusing mainly on Kanter’s (2000) four stage model of innovation this chapter will consider how challenges and problems faced at each stage may contribute to innovation setbacks and failures. The potential outcomes of innovation failure at each stage of the process are considered.

Chapter 3 contributes to meeting the aims of this thesis in a number of ways. Firstly, it uncovers the inherent challenges of the innovation process, revealing that innovation success is difficult to achieve while the potential for setbacks and failure is an ominous presence at every stage of the process. This chapter also provides evidence of the challenges within the innovation process that can lead to setbacks and failure and points towards justification for the aims of this thesis. Exploration within this chapter of the process of innovation reveal it to be, in general, a long, challenging, unpredictable and often stressful process. Evidence is presented that indicates links between substantial challenges faced by innovators throughout the innovation processes and their possible impact on well-being, innovative work behaviour and motivation. Finally, this chapter highlights the importance of studying innovation as a complete process rather than limited focus on specific stages in isolation as previous research has had a tendency to do (i.e.; Baer, 2012; King & West, 1987; Scott & Bruce, 1994).

This chapter therefore aims to provide insight into the activities, challenges and difficulties likely to be faced by innovators during the innovation journey, with the hope that evidence presented will reveal at least three insights which are key to meeting the aims of this thesis. Firstly, it presents evidence which suggests that innovation setback and failure rates are, as predicted, likely to be high. Secondly, it considers evidence with regards likely challenges at each stage in an innovation process which may contribute to setbacks and failures and discusses how these challenges may impact outcomes. Thirdly, this chapter considers and presents evidence with regard tasks involved and effort expended on innovation projects and considers how this level of investment and effort may impact well-being, innovative work behaviour and motivational outcomes should the project suffer serious setbacks or fail.

## The Innovation Process

Almost exclusively, authors conceptualize and model innovation as a process consisting of a number of phases. Process models provide a detailed description of the complex developmental processes underlying an innovation (Sung, Cho & Choi, 2011). They are an important aspect of innovation research because they consider the many different tasks involved in the innovation process and allow, in the context of this thesis, to consider how these different tasks may impact outcomes. How innovation is represented in these models in terms of the stages required to successfully navigate the process varies, largely depending on the type of innovation being studied. Generic models can be highly simplified, seeing innovation as consisting of as few as two stages, i.e. idea generation – idea implementation (i.e. Baer, 2012), whereas new product development centric models are usually much more complex such as Jones & Stevens (1999) eight stage model of innovation (idea generation – idea screening – concept testing – marketing strategy development – business analysis – product development – market testing – commercialization).

The consideration of innovation as a complete process is often overlooked in research, which frequently gives the impression of innovation as taking shape as a process of generation and diffusion, with some kind of ‘black box’ of activity in the middle (Hung, 2004). Of course, the reality of innovation is that it is a lengthy process with each stage informing and determining the outcome of the next (Kanter, 2000), and process models of innovation attempt to clarify and map this process.

Perhaps the most well-regarded of these is Kanter’s (1988; 2000) four stage model of innovation. Kanter’s framework, despite its longevity, is considered to be by far the most comprehensive process model of innovation (Manral, 2011), and therefore forms the basis of the process approach to innovation employed in the current thesis.

The first stage of Kanter’s model is idea generation, which involves coming up with new ideas. The next phase is coalition building, which involves rallying support and required resources for the idea. Third is idea realization and innovation production during which the idea is developed into a reality and lastly transfer or diffusion is the culmination of innovation at which point it is transferred to those who will use it or it is embedded into organizational culture (Kanter, 2000). Kanter sees these stages of the innovation process as carried out with the intention of meeting organizational goals in novel ways but she notes that innovation rarely takes shape in a controlled, structured way. Kanter agrees to some extent with other writers who argue that innovation can be random, chaotic and occasionally reliant on lucky breaks but she also argues that most organizations do strive to actively stimulate and produce innovation. Innovation then, according to Kanter, rarely takes shape in a rigidly controlled and structured environment and is generally more ‘organic’ or even ‘wild’, but she argues that, at the very least, an innovation must progress through all four phases in order to have even a chance of success.

Perhaps because of its high regard, critiques of Kanter’s (1988; 2000) model of innovation are relatively sparse. One exception is Manral (2011), who both critiqued and offered suggestions for modifications to Kanter’s framework. Manral’s main criticism of Kanter’s model was that it places too much emphasis on structural features of the organization as predictors of innovation and too little consideration is given to human factors, specifically the role that managerial characteristics play in how the innovation process unfolds. Manral (2011) suggests the inclusion in Kanter’s model of a multi-dimensional construct referred to as ‘managerial-mindset’. Managerial mindset is hypothesized to facilitate a number of key tasks within the innovation process and makes the manager more of a focal point for understanding the innovation process. This seems an important point, particularly to the current thesis, which sees managerial factors, in particular normalization of failure and feedback as moderating innovation setback and failure outcomes. Manral’s (2011) proposed amendments to Kanters’ model are therefore duly noted. While the current thesis broadly follows Kanters’ process framework, it overcomes Manral’s critique by also focusing heavily on human factors that potentially impact innovative projects. Despite their critique however, Manral (2011, p. 577) maintains that Kanter’s framework is by far the most complete model of innovation because of its “…ability to predict the major tasks in the innovation process using the diverse structural features and social patterns within an organization.” This confirms the appropriateness of referring largely to Kanter’s framework in the current thesis when referencing the innovation process.

Other more recent models have generally agreed with the basic principles of Kanter’s framework with some minor adjustments. For example, Damanpour and Schneider (2006) present innovation on a phase framework consisting of initiation – adoption – implementation. In this model, initiation refers to activities involved with recognizing a need and the generation of ideas to meet that need. At this stage, the innovation is first presented to organizational members and its adoption is proposed. The adoption stage refers to the decision to use the innovation as the best possible course of action for meeting the identified need. Finally, implementation is the transition stage between the decision to adopt and the realization and use of the innovation (Sung, Cho & Choi, 2011).

Van de Ven and Rogers (1986, p.638) argued that a suitable innovation model must go beyond “stage-to-stage conception of the innovation process, to a dynamic, continuous conception of change over time.” This stance is certainly in line with the thinking of the current thesis which sees innovation as cyclical process where previous innovative experiences have an impact on subsequent innovative behaviours. Whether or not process models of innovation incorporate this philosophy of innovation as a continuous process is somewhat debatable, but such models are certainly in agreement with the notion that innovation is non-sequential and that the process is often characterized by discontinuous activities (Anderson et al, 2004; Kanter, 1988; Van de Ven et al, 2000). This is an important point because it illustrates the fact that there is often the need to return to previous phases, or to go ‘back to the drawing board’ when problems are encountered, which in turn triggers a need to once again obtain ‘buy in’ from others with regards to the new ideas generated as a result of problems or failures (Kanter, 2000; Jain, 2010). The frequent need to revisit previous phases during an innovation project is an important consideration because it highlights the unpredictability and unplanned nature of innovation (Kanter, 2000; Sung, Cho & Choi, 2011), and hints at the impact that the pursuit of innovation may have on the well-being of innovators (Janssen, 2004). Previous phases must frequently be revisited as unexpected issues arise (Damanpour & Schneider, 2006). This is an important consideration because the current stage of an innovative project may not represent the level of investment, given that stages are often revisited. With this in mind, to get a more accurate gauge of level of investment, the amount of time spent on the project is used as a measure of investment. The discontinuous nature of innovation also means that an innovator may be involved in multiple innovation processes at one time (Scott & Bruce, 1994), meaning that the innovation often brings with it a substantial workload. Taken together, the unpredictability and work intensity of innovation makes it likely that the innovator will experience some level of stress as a result of even successful innovations (Janssen, 2003). This point is an important consideration given that this thesis aims to explore the outcomes of innovation setbacks and failure which includes exploring the impact on well-being as a potential outcome.

Given that this thesis aims to further understanding of the outcomes of innovation failure, it seems important to consider how tasks and difficulties experienced at different stages of the innovation process may impact the success and failure of innovation and the outcomes thereafter. For this reason, the next section will explore each stage of the innovation process, largely with reference to Kanters’ framework, and will consider how failure outcomes may differ at each stage. Later analysis does not specifically include the stage of the project because innovation is a non-linear process where stages may be revisited multiple times and as such, a measure of stage would not be appropriate. Instead, other factors such as project role, importance of project and time spent on project are included as measures of level of investment. However, it is important to discuss the different stages of innovation in order to provide context for the theoretical underpinnings of this research.

## Innovation challenges stage by stage

### Phase Zero: the antecedents of innovation

It seems prudent in any paper which aims to explore innovation as a complete process, to include some consideration of the antecedents and driving forces of innovation, as the driving forces of innovation provide context and help to explain why setbacks and failures are so prominent in the innovation process. This is also in line with the aim of this paper to see innovation as a cyclical process where previous innovation experiences impact future innovative behaviours.

Phase models such as Kanter’s (2000) see the starting point of innovation as idea generation, or the activation of an employee or employees to seize and act upon a new opportunity or idea. However, it could be argued that innovation begins before the generation of an idea and that it is the development of a need that comes first (Kajmakoska & Leber, 2010). This is an important consideration because there is evidence to suggest that the antecedents or driving forces of an innovation may play an important role in the way the innovation develops and its eventual outcomes (Mone et al. 1998)

Broadly speaking, the antecedents of innovation may be divided into two distinct categories, negative and positive driving forces. Evidence indicates that the majority of innovations are triggered by negative events (Cameron, 1983; Mone et al. 1998). As Nicholson (1990) pointed out, it takes the shock of trauma or failure to bring many organizations to the brink of new ways of thinking about themselves. Mone et al. (1998) agree with this stance and suggest that problems and poor performance create a gap between actual and desired results which forces managers to begin searching for solutions to bridge these gaps. During the course of this search, solutions to needs may be identified and this may be the spark that ignites the first phase of the innovation process. Evidence strongly supports this position because a number of studies have indicated that, with the exception perhaps of highly entrepreneurial individuals, most people continue to work in tried and tested ways unless necessity requires them to alter the way in which they do things (King, 1990). Although repetition of familiar patterns and ways of doing things is safe, it destroys the possibility of innovation, and it often takes a negative event to force employees into action and to promote change (Anthony, 2012; Janssen, 2004). That said, given the risks associated with innovation, in many instances, it probably wouldn’t be wise for innovation to be attempted where there was no obvious need to do so. Innovation is, after all, unpredictable, controversial and in competition with alternative courses of action (Kanter, 1988) and more likely than not to result in failure (Janssen et al, 2004). It is most common therefore, that the process of generating creative ideas is sparked by work related problems or unexpected or unwelcome changes within the organization or the market within which it operates.

Anderson et al (2004) argue that such problems or irregularities result in psychological stressors that cause an elevated state of arousal in those affected. It is this state of arousal that may trigger coping mechanisms in the individual whereby they may attempt to adapt themselves or their work environments in order to deal with the changing requirements of their work, and to reduce the anxiety triggered by problems (King, 1990). As discussed in Chapter 3, this point may be particularly salient to individual innovators. This is also relevant because if setbacks and failures impact well-being, this may in turn have an impact on subsequent innovative activities.

There is also a theoretical basis for the argument that negative events may stimulate innovation. Prospect theory (Kahneman & Tversky, 1984) posits that decision makers facing losses will tend to be more risk taking while decision makers enjoying profits will be more risk averse. This stance is in line with research which suggest that innovation may be most likely to take shape in uncertain or tumultuous environments (Kanter, 1988).

That is not to say however, that the driving forces behind innovation are always negative. There are also many examples of positive factors which stimulate innovation. Many of the most successful organizations have a carefully constructed organizational culture which supports and nurtures innovation (King, 1990; Samli, 2012). Indeed, for most organizations, the ideal scenario would be for innovation to occur continuously as an intrinsic part of everyday working life rather than as a hasty reaction to problems. There are many companies that achieve this and reap the rewards as a result. Organizations which have a culture where innovation is an inherent part of what they do, generally have systems in place which support and nurture the innovation process (king, 1990; Samli, 2012). The combination of factors which make an organization ‘innovative’ vary from company to company. Such organizations may have in place innovation laboratories, dedicated facilities for encouraging innovative behaviour and supporting the innovation process (Lewis and Moultrie, 2005); they may have high levels of job autonomy, fair rewards and equity and procedural justice perceptions (King, 1990; Janssen, 2004; Ramamoorthy et al. 2005); excellent communication (Monge et al, 1992); and supportive leadership (Pieterse et al, 2010) to name but a few factors.

However, although some organizations have successfully created a truly innovative culture, evidence clearly indicates that the vast majority of organizations innovate as a response to stimuli from the external environment (Damanpour & Schneider, 2006), and that in general such stimuli are made up of negative pressures and demands. Whatever triggers an innovation, be it a supportive organizational culture, a problem, incongruity or an emerging trend, it seems likely that the type of antecedent could have a bearing on the outcomes of innovation and innovation failure. Very little research exists in this area, but it seems likely that failure following innovation driven by negative factors could result in more manifestly negative outcomes than innovation driven by positive factors. This is because innovation in response to a negative driving force or problem which fails may deepen the severity of the original problem (Huhtala & Parzefall, 2007). As such, consideration of the antecedents of innovation is important to meeting the aims of this thesis since without some understanding of the antecedents of innovations, it may be difficult to fully understand the outcomes of subsequent failed innovations. Having considered the antecedents and driving forces of innovation, we now move on to what is generally accepted as the first phase of an innovation process: idea generation.

### Phase One: Idea Generation

Following a problem, irregularity, opportunity or some other positive or negative driving force, an innovation may begin to take shape with the establishment of a need. This sparks into being the first of Kanter’s four stages of innovation: idea generation. During this phase, a new opportunity that could be of benefit to the organization or wider society is recognized and this triggers an employee or employees into meaningful action (Kanter, 2000). In Kanter’s view, the idea generation stage must go beyond simply thinking about something novel and must also involve purposeful action aimed at bringing the idea past the stage where it is merely an idea and to the point where others are also aware of it. At this point, according to Kanter, a novel idea has the potential to develop into an innovation.

The main tasks during this phase involve, firstly, generating new ideas through the identification of needs (Kanter, 2000). To be considered ‘creative’ and therefore potentially innovative, new ideas about products, services or procedures must be both novel and theoretically useful to the organization (Zhou & Shalley, 2003). The second key task at this stage involves getting relevant others to appreciate the value of the ideas (Van de Ven, 1986) and pay attention to the innovative idea (Nonaka, 1991).

However, not everyone is proficient at generating creative ideas (e.g. Amabile, 1996), and there has been a great deal of research that has attempted to identify factors which support, enhance or diminish creativity (Shalley et al, 2004). In recent years, research has revealed a number of contextual and personal characteristics that seem to be important for the generation of ideas (e.g. Axtell et al, 2000; Frese et al, 1999). These include, personality; for example, Feist (1998) demonstrated that openness to experience generally related positively to creativity. Personal characteristics such as self-efficacy (i.e., the extent to which individuals believe they have the ability to accomplish task speciﬁc goals and objectives) appear to be positively related to creativity (Axtell et al, 2000; Redmond et al, 1993). Contextual factors such as autonomy (Axtell et al, 2000) and job complexity (Hackman & Oldham, 1980; West & Farr, 1990) have also been found to play a key role in the generation of creative ideas. Shalley et al (2004) in their review of personal and contextual determinants of creativity, found that empirical evidence supported the long-held belief that more complex jobs enhance employees’ enthusiasm for their work and that this enthusiasm fosters creativity. Shalley et al (2004) also found that relationships with supervisors played a key role in levels and quality of creativity, with supportive, non-controlling leadership being a key factor in boosting employees’ creativity.

It is clear that numerous factors interact to determine an individual’s creative abilities (Shalley et al, 2004), which makes the creativity process a difficult one to control. While contextual factors can, to a certain extent, be managed, personal characteristics cannot. As such, while there is often a strong social pressure to endorse creativity (Mueller et al, 2012) and, as discussed above, often a pressing need, the generation of ideas often do not flow freely or come naturally. As such, the idea generation phase comes with a number of potential challenges.

#### Idea generation: Potential sources of setbacks and failures

The first of these challenges relates to the antecedents of innovation. As was discussed in section 3.3.1 above, innovation is often triggered by unexpected or unwelcome events, and there is often a relatively urgent need to innovate in order to overcome the problems created by such events (Mone et al. 1998). The time pressure to generate ideas is often a major contributor to their failure (Amabile et al, 2002). Amabile et al in an extensive diary study, produced evidence that strongly supports the idea that people become less creative when they are under time pressure to generate creative ideas. That is of course not to say that people are never creative under the pressure of time. Indeed, Amabile et al found that where the urgency was meaningful, such as when those involved understood why it was crucial to work quickly, it was possible for people to produce valuable creative ideas. However, in most cases, creativity was hampered by time pressure which does not bode well for innovative products which often require the idea generation phase to be expedited (Horibe, 2001; Kanter, 2000).

The second of these challenges involves the ability to identify needs. Evidence indicates that the most common issues behind innovation setbacks and failures are not ‘technical’ problems but a misidentification of user need (Sung, Cho & Choi, 2011), which results in the development of an innovation which either does not adequately meet the needs of its users or is simply not desirable to users (Kanter, 2000).

The third common challenge at this stage involves constructing effective ways to meet needs, or put more simply, coming up with sound new ideas. On the face of it, coming up with good ideas seems relatively simple, but the proliferation of research into creativity hints at the difficulties that organizations have with coming up with good new ideas (West, 2002).

The fourth consideration at the idea generation phase relates to a point made by Johannessen et al (2001). Their research indicated that in terms of networking it may be the weak-ties rather than the strong-ties that prove to be the vital source of novel or unique information required for innovative ideas to be generated. This is an important point. It makes sense that those people who we interact with on a regular basis are less likely to, out of the blue, provide new information that will be the source of a new innovation. This therefore indicates the need for much wider networking for ideas to be successfully generated and as such, silo-working may contribute to setbacks and failures in so much as it may diminish opportunities for the development of good ideas.

The fifth major challenge at this stage is centred around getting relevant others to pay attention to the new idea. People are often reluctant to change (Baer, 2012) and, as such, are often also unenthusiastic about paying attention to new ideas that, if introduced, will bring with them inevitable changes. The idea generation phase of innovation therefore requires individuals who are well connected with others in the organization (Baer, 2012), and who are adept networkers (Kanter, 2000). However, this need for connectivity can be at odds with the innovators who are often ‘outsiders’ (Kanter, 2000), or dissenters (Horibe, 2001) who have a tendency towards autonomous working (Janssen, 2003). In addition, managers and top executives who are in the position to endorse the development of an innovation may be reluctant to because the inherent uncertainty of innovation means that they cannot accurately predict costs and benefits and this mismatch between the requirements of innovators and the resistance of others within the organization may cause serious setbacks and may contribute to innovation setbacks and failures (Mone et al. 1998).

Finally, it is well accepted that one of the major problems with innovation is that good ideas often remain undeveloped (Anderson & King, 1991). There are a number of potential reasons for this: complacency, lack of resources, lack of ‘buy in’ from relevant others, bureaucracy, or, perhaps most commonly fear of failure (Anderson et al, 1990). The possibility of setbacks and failure lurks in the background at every phase of the innovation process, so much so that a potentially sound innovation can fail before it has even really begun.

Taken together, the challenges at the idea generation stage of the innovation process make setbacks and failure relatively likely although the impact of failure at this stage may not be as great as it could be at subsequent stages because the level of investment is not as high. The likelihood of ideas not progressing beyond the idea generation phase is well documented (Baer, 2012) and there are a number of reasons why ideas may fail to progress. Of course, many ideas do not progress simply because they are not good ideas, but sound ideas also fail to move forward. This may be because of the reluctance and resistance of relevant others (i.e. Mone et al. 1998), a deficit of required resources (Kanter, 2000), or simply a lack of aspiration to act upon the idea (Baer, 2012; Janssen, 2004). As Baer (2012) demonstrated in his recent study into creativity implementation, the generation of creative ideas often does not lead to their realization. Since “ideas are useless unless used” (Levitt, 1963, p. 79), innovators must go far beyond the task of idea generation and must progress to the next stage of innovation: coalition building.

### Phase Two: Coalition Building

Kanter’s second phase of the innovation process, coalition building, is arguably the most challenging. During this phase, alliances must be formed and the idea must be actively sold to those who have the power to approve its progression. This process is differentiated from the latter idea generation phase because although both require communication and networking with others, the coalition building phase must involve much more decisive action than the previous. Formal buy in must be achieved here, with allocation of necessary resources and affirmative agreement that the innovation will be actively pursued (Kanter, 2000). In order to rally the level of support required for the innovation to proceed, the innovative idea must be effectively sold to those with the power back the project. Evidence indicates that the effectiveness of this process regularly determines the success or failure of an innovation because without the support and backing of influential people, the innovation is almost certainly unable to progress beyond this point (Damanpour & Schneider, 2006).

Evidence suggests that whereas personal and job variables are key to the idea generation phase of the innovation process, organizational factors may be more important at the coalition building and latter phases. For example, Axtell et al (2000) found that participation in decision making and support for innovation emerged as the most powerful predictors of whether an innovation would progress beyond the idea generation phase. In a similar vein, Baer (2012) found that creative ideas were most likely to be realized when innovators were skilled networkers or had successfully obtained ‘buy-in’ from significant others. Such findings add substance to the long-standing assertion that coalition building and latter phases of innovation rely heavily on social and political relationships (Van de Ven, 1986). This need for ‘power relationships’ adds a level of difficulty beyond that seen at the idea generation phase.

#### Coalition building: Potential sources of setbacks and failures

There are a number of significant challenges that make this phase of the innovation process difficult, and often prone to setbacks and failure (Kanter, 2000; Damanpour & Schneider, 2006), most of which relate to the complexities involved with harnessing and managing the relationships required to further the innovation. Setbacks and failure will be defined and discussed in detail subsequently in Chapter 4 (4.2).

The first issue relates to the differences between those orchestrating the innovation and those sponsoring it. As Damanpour & Schneider (2006) note, the most influential people affecting innovation within organizations are often top executives as they make important decisions about factors such as resource allocation. However, it is not usually the top executives who are responsible for the execution of an innovation project. This responsibility often lies with an innovation champion, and top executives and innovation champions can often find themselves at odds with one another (Horibe, 2001), as was discussed in Chapter 2 (2.5).

From a management point of view then, the coalition stage of the innovation process can be extremely challenging, and for this reason many innovations may fail or suffer significant setbacks at this hurdle, where the ideas and motivations of a champion and those of senior management struggle to find common ground. The coalition building phase is not only challenging from a management perspective however, it may also be very difficult from the point of view of the innovator, or innovation team. Where innovators are able to successfully overcome obstacles at this stage and successful coalitions are built, the stakes are still high. Where an innovator has put their reputation on the line in order to sell an innovative idea, subsequent failure could have harmful effects both to the well-being and the reputation of the innovator (Huhtala & Parzefall, 2007).

It is also worth noting here the different success factors at this stage compared to the idea generation phase. As noted above, evidence suggests that autonomous working is key to the idea generation stage of the process (Axtell et al, 2000), but it may be detrimental to the coalition building phase. Therefore, innovators are required to navigate a potentially difficult shift in their approach to work in order to progress through this stage of the process.

The final and perhaps most common issue at this and other stages of the innovation process is that with new ideas comes a substantial degree of uncertainty and as a result these ideas are often met with a large dose of scepticism and hesitation (Baer, 2012; Wolfe, 1995). It therefore takes a great deal of determination (Janssen, 2004), single-mindedness (Horibe, 2001), social and political prowess (Van de Ven, 1986), the ability to actively sell an idea to resistant others (Janssen, 2003), and often a certain degree of dissent (Horibe, 2001) to keep an innovation alive. Crucial decisions such as the allocation of budget become contentious because innovative ideas are novel and therefore often fairly ambiguous. This means that the multiple people who are often called upon to make such decisions may have differing perspectives with regards the merit of the idea (Green et al, 2003). Overcoming such difficulties is therefore dependent on the ability of the innovator to sway thinking in the desired direction.

The need to overcome social barriers to innovation is an issue that is present throughout the entire innovation process and can create problems that may regularly result in the failure of an innovation project. The matter of overcoming resistance of others may also have implications for the outcomes of innovation. In order to successfully navigate the path of resistance, innovators must resolutely challenge the status quo (Horibe, 2001), and may cause harm to their reputation in the process (Janssen, 2003). This harm may be an unintended outcome of innovation whether the innovation is a success or a failure.

The pursuit of innovation may also have implications and outcomes for the wider organizational culture. Nemeth (1997, p. 59) suggested that “creativity and innovation may require a culture different from that which encourages cohesion and loyalty.” This paints a rather menacing picture of the culture of innovation and creates a quandary for organizations which must try to balance the necessity for innovation against the need to nurture a positive organizational culture.

In summary, the significant challenges involved with the coalition building phase of the innovation process highlight the need for research to do more to distinguish between creativity and innovation. The success of an innovation is largely dependent on having a substantial amount of power and backing behind it and as such the coalition building phase is absolutely fundamental to innovation success. Innovation setbacks and failures are often characterized by inadequate support and resources and resistance amongst key players (Janssen et al, 2004: Kanter, 2000), which may result in an increased likelihood of setbacks and failures at the coalition building phase. As such this is an extremely key but fragile aspect of the innovation process which can make or break innovations.

### Phase Three: Idea realization and innovation production

Upon successfully navigating the coalition building phase, an innovation may progress onto the next stage: idea realization and innovation production. Here, a working team is assembled for the purposes of transforming the idea into a tangible product (either physical or intellectual), (Kanter, 2000). Where technical or product innovations are concerned, idea realization and innovation production often take place in R&D teams (Jones, & Stevens, 1999). These are groups which are wholly devoted to developing and producing innovative ideas (Kumar et al, 1996). These groups may be internal or external and may be set up temporarily for the purposes of producing a one-off innovation or may be permanently in place to produce current and future innovations (Kanter, 2000). These teams are often quite separate from the more operational management aspects of the innovation process which, in itself, may cause issues, as will be discussed in the subsequent section. Of course, the tasks involved here are greatly varied across organizations and product types (as was discussed in Chapter 2), but there are a number of common challenges that all innovations may face at this stage.

#### Idea realization and innovation production: Potential sources of setbacks and failures

The first issue is that a change in tact from the previous stages is required. Whereas the idea generation and coalition building phases are largely reliant on social interaction, the idea realization and production phases may be more successful when worked on by teams in relative isolation so as not to distract from the task at hand (Kanter, 2000). Therefore, having obtained buy-in and resources from relevant others, it may now be necessary for those others to remain relatively distant from the innovation project. This of course does not always happen. Having committed themselves to an innovation, some managers may continue to seek out involvement in the project (Saripalle, 2012). However, evidence indicates that during development, unnecessary involvement from managers may hamper innovative efforts (Horibe, 2001). The team must of course continue to procure information and resources from others within the organization and must also continue to update others on progress (Gladstein & Caldwell, 1984), but this must be a delicately managed process, ensuring relevant information flows remain while minimizing distraction caused by those who are prone to interfering with the project (Kanter, 2000). This is an intricate balancing act which is often difficult to manage (Samli, 2012), and which can lead to innovation setbacks (Horibe, 2001).

The second potential issue during this phase relates to the longevity of the project. The length of time that it takes to complete an innovation project can vary greatly, but most progress over months or even years (Kanter, 2000). The idea realization-innovation production stage is typically the most time consuming of the innovation stages (Kanter, 2000) and this can create challenges both in terms of the resource utilization over time (both human and financial resources) and may also create problems because of staff turnover as the months and years progress (Tzabbar, 2014). Given that, as discussed above, the development of innovation projects often requires teams to work in relative isolation, the loss of one of these team members can be devastating to the project because upon leaving they may take with them knowledge that is essential to the success of the innovation (Guidice et al, 2009).

The third issue which is often particularly salient during the idea realization –innovation production stage relates to uncertainty. Innovation, by its nature is extremely unpredictable (Kanter, 1988) and innovators frequently have to make highly intuitive judgments and choose the best out a number of alternative courses of action (Huhtala & Parzefall, 2007). As a result, things very often do not go according to plan. Unanticipated problems (Drach-Zahavy et al, 2004), bureaucratic delays (Kanter, 2000) and changes in direction may result in a need to revisit previous stages in order to generate new ideas to overcome issues or may result in the abandonment of the innovation altogether, all of which may impact psychological outcomes for team members working on the project.

### Phase Four: Transfer and diffusion

If an innovation is successfully navigated through the challenges of the previous stages, next comes the final of Kanter’s four stages, transfer and diffusion. This is the culmination of the innovation project where the new innovative product is transferred to its end users or embedded into organizational practice (Kanter, 2000). The ultimate aim of the transfer and diffusion process is that the new innovation is accepted by its target users or customers (Boehner & Gold, 2012). This requires careful communication and marketing to relevant parties (Al-Zyadaat et al, 2012) and involves the participation and involvement of a larger number of individuals than previous phases (Kanter, 2000).

#### Transfer and diffusion: Potential sources of setbacks and failures

“…he who innovates will have for his enemies all those who are well off under the existing order of things and only lukewarm supporters in those who might be better off under the new.” Niccolo Machiavelli, The Prince

This stage, like others before it, presents a number of challenges and potential pitfalls. At this stage, the innovation should be fit for purpose but its success is still far from guaranteed (Choi & Chang, 2009). As Klein & Knight (2005) noted, the reason why most organizations fail to benefit from an innovation is not due to failure of the innovation per se, but because of implementation failure. This is because the success of the innovation in the final stage is reliant on the willingness of users to accept the innovation, because it is at this stage that the innovation must impact directly upon the social system of the organization and vice versa (King, 1990). However, users often resist innovations because the introduction of something new challenges the status quo and are often reluctant to change to new ways of doing things or adopt new products (Shane et al, 1995). This is particularly the case for process innovations in more bureaucratic organizations where employees tend to adhere to an established power structure (Swedberg, 2000). When a new innovation is introduced, those who prospered under the previous system are likely to oppose it, and even for those who may flourish under the new system, still the innovation may only garner tepid support (Horibe, 2001).

Organizational inertia, or a reluctance or failure to change, can also be a barrier to innovation diffusion (Gilbert, 2005). Gilbert sees inertia as divisible into two distinct categories; resource rigidity which is a failure to change the way resources are invested, and routine rigidity which is a failure to change organizational processes that utilize those resources. Innovation requires flexibility in organizational routines and processes (Shane et al, 1995), but employees often feel comfortable working in prescribed ways, following tried and tested methods of doing things (King, 1990). Miller (1990) argues that embedded cultural and structural forces often impede innovation because they buttress traditional methods and act as barriers to new ideas and practices.

Transfer and diffusion of innovation is an uphill battle which often ends in failure because of users’ resistance to adopt the innovation or because of organizational inertia which results in a reluctance to change. The disappointment associated with the failure of a project which has been progressed, with great effort and expenditure through the stages of innovation, only to fail at the final hurdle must be palpable. However, because of the lack of research which considers the outcomes of innovation, particularly the outcomes of setbacks and failure, we can only surmise at what impact this may have on individuals involved in the process. The current research therefore aims to provide much needed evidence with regards such outcomes.

## Chapter Discussion

This stage by stage review of the process of innovation clearly demonstrates that anyone embarking on an innovation journey faces numerous obstacles and challenges along the way. From the difficulties involved with coming up with sound new ideas in the idea generation phase, the issues around forming alliances during coalition building, to dealing with unexpected problems while realizing and producing ideas. Ultimately, it seems that even ideas that make it through to the point where they are tangible, useable products or processes may still not result in success because of resistance of users to adopt new products and processes. It is clear then, that innovation, while absolutely necessary to organizational success, is a very challenging process which can place a huge burden on both the organization and the individuals involved in the innovation.

This review of the different stages of innovation has aimed to achieve a number of functions. Firstly, to expand on the definition of innovation by considering the tasks involved and challenges faced at each stage of the innovation process. This is important for a number of reasons. There are numerous examples of previous research which do not attempt to distinguish between the terms ‘idea generation/creativity’ and ‘innovation’ thereby giving the impression that the two processes are one and the same (Baer, 2012). This is problematic since the above review has highlighted that while idea generation has its own set of challenges, innovators must face not only these but also the considerable difficulties of the later stages of innovation, and as such, there is a clear case for research to consider innovation as a complete process; something that the current research aims to do.

Secondly, this chapter has highlighted the very real issues involved with innovation and provides evidence as to why setback and failure rates may be so high. It also begins to hint at the outcomes that may result from failure at each of the different stages of the process. Innovation setbacks and failure will be explored in depth in Chapter 4.

Thirdly, the current chapter paints a fairly uninviting picture of the process of innovation. However, it is important to reiterate the importance of innovation to business success. Innovation must be encouraged, but the potential impact on those individuals involved should no longer be ignored (Janssen, 2003; Janssen et al, 2004). Although relatively little research exists that explores the impact of innovation on individuals, the above review of the tasks involved in different stages of the process highlights not only why setbacks and failure rates in innovation are so high, but it also indicates how difficult and potentially stressful even successful innovations can be, which lends credence to the thinking of this thesis, that involvement in an innovation which suffers setbacks or which fails could have consequences for innovators in terms of their well-being, innovative work behaviour and motivation.

# Chapter 4: Setbacks and failures in the innovation process and their relationship to psychological outcomes

## Introduction

The failure rates of innovation projects are very high; arguably higher than for non-innovative projects (Moenkemeyer et al, 2012; Shepherd et al, 2013), and yet very little is understood about the psychological outcomes of innovation failure (Janssen et al, 2004). In addition, setbacks are generally accepted as par for the course in innovation projects and yet there has been to date very little research which considers setbacks in terms of their impact on the innovation process and the relationship between setbacks and outcomes. This chapter explores theoretical and empirical evidence relating to setbacks and failure both in innovation and general research fields and considers the relationship between innovation setbacks and failure and three outcomes: well-being, innovative work behaviour and motivation. Hypotheses are presented in line with relevant theory and evidence.

The previous chapter explored the complexity and challenges of the innovation process. It discussed the factors which may contribute to innovation setbacks and failure as the process unfolds and explored how these factors may impact outcomes should failure occur. Chapter 4 considers setbacks and failure in greater depth with the intention of addressing the aims of this thesis by considering a number of key questions. Firstly, what are the potential outcomes of innovation setbacks and failure for individual innovators? Secondly, is there empirical evidence to support the notion that innovation setbacks and failure may be related to the well-being, innovative work behaviour and motivation of innovators?

In order to address these questions, Chapter 4 will begin by exploring in greater depth what is meant by the terms setbacks and failure and will also attempt to define success. Discussion of these conceptualizations of success and setbacks and failure will reveal that failure and success are not opposite concepts, and that previous failures may have a significant impact on future successes and vice versa. This section provides theoretical arguments as to why ‘failure’ is so stigmatized by society, and ‘success’ so coveted. Explanations are also explored as to why setbacks and failure are generally associated with negative outcomes.

The following section provides a review of literature which explores the potential outcomes of setbacks and failure generally, and innovation setbacks and failure specifically, with particular reference to well-being, innovative work behaviour and motivational outcomes. This review reveals that there are numerous potential outcomes of setbacks and failure, both for the individual and the wider organization. Empirical evidence indicates that while immediate outcomes of setbacks and failure tend to be negative, in certain circumstances, these outcomes can take on a more positive leaning. This review of existing research into setback and failure outcomes confirms that research and empirical evidence relating to innovation setbacks and failure outcomes are currently limited. Before embarking on a review of empirical evidence, it is important first to define setbacks, failure and success.

## Defining ‘setbacks’, ‘failure’ and ‘success’

### What are setbacks?

Setbacks are by definition “something that happens that delays or prevents a process from developing” (Cambridge Dictionary). Kutsch and Maylor (2011) defined setbacks as a problem that makes progress more difficult or success less likely. To my knowledge, there has been no prior attempt to define setbacks within the innovation context which is surprising given that research often tends to assume the presence of setbacks within innovation, more so perhaps than in other organizational processes. Cooper and Edgett (2009) for example estimate that over fifty percent of all new product launches are late to market, which suggests the occurrence of setbacks within these processes. Quinn and Guile (1988: 131) highlighted the prevalence of setbacks in the innovation process when he talked about “…the many soul-wrenching disappointments and setbacks major innovation always seems to encounter.” Other researchers also assume the presence of setbacks within the innovation process. For example, Leung et al (2010) explored the relationship between role stress and innovative performance, and conjectured that innovative projects involved a relatively high level of stress due to the preponderance of setbacks inherent in the process, but without specifically defining those setbacks.

There appears to be a general consensus amongst researchers that setbacks are more prevalent in innovation projects than in other organizational projects (i.e. DeMeyer et al, 2002; Horibe, 2001; Kingdon, 2012). Why might this be the case? One likely explanation is that innovation is by its nature uncertain. Reducing levels of uncertainty have been found to reduce risks in projects and in turn minimize setbacks (Perminova et al, 2008). However, innovation by its nature requires innovators to venture into previously unchartered territory, meaning that innovation naturally carries with it relatively high levels of uncertainty. As such, this level of uncertainty may also make planning in innovations more difficult than other types of project (Kanter, 1988) and good levels of planning are generally felt to protect against project setbacks (Pinto & Prescott, 1990). It is not surprising then, that setbacks are rife in innovative projects, so much so that they are generally accepted as being par for the course in innovation. Given the frequent presence of setbacks in innovation projects, there is a clear need to explore how setbacks affect psychological outcomes for innovators, and this thesis aims to achieve this and in doing so shed further light on this largely unexplored but frequently present factor within innovation projects.

Given the generally accepted presence of setbacks within the innovation process, it is surprising that there has been very little research to date which explores setbacks within an innovation context. Van de Ven (1986, p. 595) highlighted the prevalence of issues within the innovation process and argued that innovators can feel that they are “…always working on the same problem in somewhat different contexts, but mostly without results”. In the 30 years since Van de Ven’s article was published however, very little additional research has been done to explore setbacks in an innovation context. One rare example of innovation research which focusses specifically on setbacks was Cumming (1998) who explored pressures within the innovation process and how these pressures might contribute to setbacks and later failures. He described setbacks as ‘noise’, which are parameters within the innovation system which are difficult or impossible to control and which, if not managed, can lead to ‘error states’ or failures. Cumming found the dominant sources of internal ‘noise’ to be waning support for the innovation, excessive pressure placed on innovators to achieve success, and financial concerns caused by spiralling costs. External ‘noise’ included changes to the environment within which the innovation is positioned, altered customer requirements and political issues. Dornblaser et al, (2000, in Van de Ven et al, 2000, p. 213) also found evidence of the presence of setbacks in the innovation process, although this was an unexpected outcome of their research rather than a planned attempt to study setbacks specifically. In their qualitative study involving innovation managers and resource controllers, which focused specifically on successes and failures in innovative projects they found setbacks to be commonplace within innovation projects. Setbacks such as unobtainable targets, over commitment to spurious courses of action, and poor planning and communication were repetitive features within their interview data. They also found that ‘sugar-coating’ problems and misinterpretation of links between different factors within the process could have a direct impact on failure outcomes.

Given the lack of research which considers innovation setbacks and project setbacks more generally, the search was widened to include other terms in relation to projects such as ‘challenges’, ‘deviations’ ‘errors’ and ‘variations’. These searches resulted in the following points of interest. Hallgren (2007) for example explores the prevalence of deviations from planned expectations within projects, which he argues, if not managed properly, can result in negative project outcomes. Hallgren proffers two significant findings. Firstly, he suggests that the point of no return is often the catalyst for addressing deviations from project plans, and, secondly, deviations do not tend to follow formal procedures largely because of the pressure to act resulting from the point of no return scenario. Applied to an innovation setback scenario, Hallgren’s findings would suggest that innovation setbacks are likely to be addressed only after they have escalated beyond the point of no return, and often without following formal procedures for dealing with such setbacks. Van Oorschot et al (2013) would largely agree with Halgren’s findings. Their longitudinal case study aimed to answer the question of “Why does it take teams so long to realize a project is in trouble and should be terminated?” They found that the complexity of projects meant that multiple sources of information were often incorrectly understood, and that this interpretation meant that project teams risked falling into a ‘decision trap’ whereby they over-extended resources at the current phases to the detriment of latter phases. Therefore, setbacks were a commonplace and serious problem within the semiconductor company in which the study took place, and these setbacks, they argued, reduced the likelihood of project success. The above accounts give a fairly striking image of setbacks as present, somewhat chaotic and potentially hazardous to innovation project outcomes. Whether this image is grounded in the reality of innovative projects will be explored in Chapters 7 and 8 as part of the quantitative and qualitative analysis.

Recent research relating to errors and error management carried out by Metcalfe (2017) suggests an alternate view of setbacks and their impact on outcomes. Metcalfe’s research into factors associated with learning from errors suggests that rather than being unwelcome obstacles to meeting a goal, errors may instead have a beneficial impact on outcomes. Her review of empirical evidence in the field of error theory and management indicates that learning from errors rather than avoiding them may result in improved overall performance, particularly where corrective feedback is given along with analysis of the reasoning process which resulted in the error. These findings are an important consideration because during the process of learning a new skill, error avoidance tends to be the preferred teaching approach (Metcalfe, 2017). In a similar vein, the planning process for innovative projects tends to be constructed in such a way that the likelihood of errors are purposefully diminished (Schultz et al, 2013) but Metcalfe’s analysis suggests that error avoidance may have a negative impact on eventual outcomes where corrective feedback is provided following errors. Her view is potentially applicable to management of errors within innovative projects, as demonstrated by Sosna et al (2010). Their case study research found that an organization which took a trial-and-error approach to implementing a major new innovation, benefitted from rich learning as well as high-growth and were able to significantly outperform their competitors, suggesting therefore that embracing and learning from errors in the innovation process rather than avoiding them may result in beneficial long-term outcomes.

Error theory research is closely tied to other findings which suggest a potentially positive impact of setbacks on outcomes where certain moderating factors are in place. For example, setbacks and failures have been found to be necessary for learning (Shepherd & Cardon, 2009), as well as for building resilience (Connor & Davidson, 2003) and may therefore have a positive impact on future outcomes of innovative projects. These relationships are explored in more detail in Chapter 5 which considers potential moderators in the relationship between innovation setbacks and psychological outcomes.

In summary, the evidence presented above suggests that setbacks may be an inherent part of the innovation process and that in poorly managed contiditions, setbacks may be closely linked to failure. However, error theory suggests that errors and setbacks have the potential to result in positive outcomes, particularly where constructive feedback and learning takes place. These potential relationships will be explored in more detail in the next chapter which considers the potential moderating effects of a number of variables including supervisor feedbacks and learning. Next failure, the second independent variable of interest to this thesis, is defined and explored by considering relevant research.

### What is failure?

Much like innovation setbacks, surprisingly little research exists which empirically explores the phenomenon of failure (McGrath, 1999; Morris et al, 1994). This is both surprising and worrisome given the importance of overcoming, learning from, and recovering from failure as a means of ensuring ongoing business success (McGrath, 1999; Shepherd et al, 2013). It is a complex phenomenon to study, and the difficulties begin at the point of defining and agreeing what constitutes a failure. Section 4.2.2 begins with an exploration of failure definitions within the general literature, and Section 4.2.3 below explores *innovation failure* specifically.

Despite a dearth of empirical research in this area, failure is an outcome that everyone will experience at some point in their working lives. Whether minor, or catastrophic, failure is generally felt to be undesirable, so much so in fact, that it often provokes feelings of fear and anxiety (Carmeli & Gittell, 2009). The sense of anxiety and fear often associated with failure may come about because failure is so much at odds with the optimism that is generally felt at the commencement of a project (Kutsch & Maylor, 2011). Organizations embark on new projects with hopefulness and thoughts of success driving them forwards. In the idea generation phase, over-optimism usually means that risk-taking is enthusiastically encouraged and championed (Cannon & Edmondson, 2001; Kutsch & Maylor, 2011), and resources are pumped into projects in an attempt to maximize the potential for success (McGrath, 1999). However, enthusiasm for risk-taking usually wanes rather dramatically in the light of failure, perhaps in part because of the crushing blow that failure deals to the optimism of the project team, but also because of a cultural stance which sees losing as shameful (Tezuka, 1997). March and Shapira (1987) observed that risk-taking that results in failure is unwelcome and as a result, individuals have a tendency to aim for success and avoid failure. It is not surprising therefore, that in many organizational cultures the emphasis is on avoiding failure at all costs (Follette & Jacobson, 1987), and although organizations are beginning to recognize the importance of addressing and learning from failure (Coelho & McClure, 2005), others may find it more difficult to put a positive slant on what is essentially an unwelcome outcome.

However, while failure is generally associated with negative connotations, the concept is not entirely straightforward. While failure is in general considered to be undesirable, failure outcomes are complex and not necessarily always negative. For example, failure is often linked to learning which is seen as the vehicle through with failures may be turned into future successes (i.e. Coelho & McClure, 2005; Cope, 2003; Shepherd & Cardon, 2009). This adds to the complexity in terms of conceptualizing failure given the differing views of researchers with regards circumstances under which failure is destructive, and circumstances under which it is productive (McGrath, 1999).

However, a number of definitions do exist which allow some clarification of what is meant by failure, both generally and in the context of the current thesis. Given how diverse failure can be, definitions must be broad in order to capture the wide range of potential failure scenarios. As such, failure may be defined as a deviation from anticipated or desired results (Cannon & Edmondson, 2001). This type of definition can encompass a wide range of failures and suggests that a failure may result in a change of course but not necessarily a termination of the project. McGrath’s (1999, p. 15) definition views failure in relation to goals: “An innovation or initiative can be said to have failed when it is terminated as a consequence of actual or anticipated performance below a critical threshold. In other words, failure is the termination of an initiative that has fallen short of its goals.”

Carmeli and Gittell (2009, p.711) define organizational failure as “...disruption that prevents the completion of an organizational task or achieving a desired organizational end.” This definition is in agreement with McGrath’s stance on failure to a certain extent, but the language used is less suggestive of failure as necessarily being the absolute end-point of a project. The language used gives a glimmer of hope that success can still be achieved but with changes to the original plan.

It is clear from the above discussion and definitions of failure that it is a difficult phenomenon to describe in a way that is universally applicable. However, there are a number of common features within these definitions. Firstly, failure appears to involve pre-defined goals or tasks which have not been achieved. This suggests that in order to determine whether something has failed, it must be possible to compare actual versus planned performance on a given task. Secondly, definitions of failure tend to hint at performance deficits as being relatively serious as opposed to minor deviations from planned goals, such as McGrath’s suggestion of failure being represented by performance which is below a ‘critical threshold’. This is an important point because it distinguishes failure from setbacks. While setbacks can be problematic and cumulative, unlike failure, they do not necessarily denote the termination of a project.

In addition, failure can take many different forms. For example, it could be an attitudinal (i.e. difficult employee to work with) or a behavioural (i.e. an employee who doesn’t perform well) phenomenon (Morris et al, 1994). Morris et al also point out that in terms of measuring and quantifying failure there is an issue around how to best represent it, whether qualitatively (i.e. negative work behaviours) or quantitively (i.e. amount of lost revenue). Failure may also be temporal in that there will usually be a deficit in performance for a period of time before failure is actually deemed to have occurred (i.e. Khrone et al, 2002). Also, with the temporal factor in mind it has been argued that people may remain resolute in the face of initial failures, but as failure experiences pile up, feelings of helplessness may ensue (Shepherd et al, 2013).

Adding to the complexity of conceptualizing the phenomenon, failures can include for example, both avoidable and unavoidable outcomes (Cannon & Edmondson, 2001). The source of a failure can be interpersonal such as issues arising from communication errors or conflict (Janssen, 2003) or the failure can result from technical issues (Valikangas et al, 2009). In addition, failures vary greatly in their magnitude from the minor to the catastrophic. Failure may also be substantially affected by situational factors such as the state of the economy, the work environment, organizational changes, market conditions and an almost limitless list of other potential factors (Morris et al, 1994).

The above points highlight the difficulties involved in researching failure because of the many different forms that a failure may take. Another problem with defining failure is that it is a highly subjective phenomenon, often very much determined by individual perceptions (Phitidis, 2013). As Phitidis (2013) points out, failure to one individual may represent the disappointing end of a project, but to another it may represent new opportunities. The subjective nature of failure means that success and failure parameters need to be set before a project commences so that success and failure within that project are measurable and manageable (Connell et al, 2001). This is an important point for consideration in terms of methodology, in that it is necessary to identify success, setbacks and failure parameters and measures in order to identify the point at which an innovation has failed or suffered setbacks. This point will be discussed in greater depth in the methodology Chapter 6.

The setting of pre-defined success and failure parameters within projects also helps to ensure that failures are not exacerbated by individuals who persist with a losing course of action (Staw & Ross, 1987). This issue is often referred to as ‘escalation of commitment’. Having invested a great deal of time and resource into an innovation project, it is often the case that innovative individuals or teams hold onto an innovation that is clearly destined for failure (e.g. Sivanathan et al, 2008). The problem with escalation of commitment is that, when the underperforming innovation is eventually abandoned, escalation deepens the severity of the failure by compounding the original problem. Escalation of commitment also results in greater expenditure of time and resources on a project that ultimately fails(Staw & Ross, 1987). It could be argued then that when escalation of commitment occurs, setbacks are compounded and subsequent failures may be more severe. This is an important point to note, because escalation of commitment is a particularly prominent issue in innovation because of the high levels of investment, time and effort which are often required in innovation projects, particularly radical innovations which make the decision to abandon the project unwelcome (Singer, 1990).  *Innovation* failure specifically will be explored in more detail in the next section.

### What is *Innovation* Failure?

Issues with measurement and definition of failure are as persevering in the innovation literature as they are in other organizational fields. Because of limited research which explores innovation failure there have been few attempts made at defining it. One exception is Kumar et al (1996) who define innovation failure as the decision to deliberately terminate or substantially change an innovation project prior to its realization. Chapter 3 of this thesis explored the process of innovation and showed it to be a challenging one where the need to revisit previous stages and make changes was a common necessity. It is interesting therefore to note that such changes, where substantial, may be considered failures according to the above definition of innovation. It is also worth noting, when considering definitions of innovation failure, that there appears to be an inclination in research to avoid use of the term failure and to instead use other synonymous terms. The terms ‘Project termination’, ‘project abandonment’ and ‘failure’ often seem to be used synonymously and as such, we will also consider definitions of project termination and project abandonment.

Firstly, references in innovation literature to the term ‘project termination’, are generally referring to the termination of a project due to unacceptably low performance as defined by organizational goals (Shepherd et al, 2013). This definition is not dissimilar from definitions of failure, however, there are instances where ‘project termination’ may be used in different contexts. For example, in project management literature, the term project termination is often used to describe both the process of winding up a project following its successful completion, and the process of reviewing the project following its failure (Hormozi, 2000).

The term ‘project abandonment’ on the other hand, is only used to describe the end of a project which has not reached its goal and is therefore more synonymous with the term failure. In line with consideration of terminology relating to innovation failure, Cope (2011) also notes that in defining innovation failure it is important not to confuse failure with business closure, which may occur due to factors such as retirement, the pursuit of other activities or, in innovation, to pursue more potentially lucrative ideas. A venture has failed, Cope (2011) argues, only when it has fallen short of its goals and fails to meet stakeholder expectations. Cope also argues that failure is underscored by a loss of capital and an inability to ‘make a go of it’.

The term ‘project termination’ tends to be used more frequently than ‘failure’ in innovation research regardless of the scope, importance and scale of the project at the time that it is terminated. This tendency to use the term ‘project termination’ rather than failure is possibly an attempt at lessening the impact of what is an unwelcome outcome. The term failure has highly negative connotations (Carmeli & Gittel, 2009) and therefore, as a management technique, it may make sense to use a term that does not carry such negative associations. The next section discusses the alternative end on the failure/setback scale, namely, success.

### The relationship between success and failure

Any research that is interested in failure must also consider success, which, of course, is the ultimate aim of any organizational project whether innovative or otherwise. With reference to organizational tasks, success can be defined as the attainment of goals (Cozijnsen et al, 2000). Success is, of course, highly desirable. It leads to sought-after psychological states such as satisfaction, confidence, feelings of competence, and may result in enhanced motivation and performance (Grant et al, 2008). Success makes the effort expended, the risks taken and the resources used, worthwhile, whereas failure results in losses and is often perceived to render the process worthless (Tezuka, 1997). It is not surprising therefore that many innovative organizations, teams and individuals have a tendency to seek success while avoiding failure.

However, there are researchers who believe that success can also result in long term negative outcomes (i.e. Grant et al, 2008; McGrath, 1999; Tezuka, 1997). Levitt and March (1988) for example suggest that previous success in the application of a new process or technology can result in an organization’s unwillingness to adopt a new one, even when the new one is likely to perform better than the previous. In this respect success can cause complacency and ambivalence towards future innovations. Grant et al (2008) referred to this as ‘fat cat syndrome’, whereby previous successes lead to complacency and a stubborn tendency to do things in ways that proved successful in the past. In this sense then, previous success can become the killer of ongoing innovation.

With regards innovation, one may expect to find that innovative success results in only positive outcomes. While this assumption is, on the whole, likely to be true, there may be exceptions. As discussed in the previous chapter, innovation brings with it change, and trauma is well recognized as a potential outcome of organizational change (e.g. Stuart, 1996; McKnight & Thompson, 1990). Trauma is a term often associated with emotional responses to events such as war, natural disasters or crime, but Stuart (1996) posits that responses to change within organizations can be so strong that those involved often report it as a traumatic event. As such, while success is desirable, it is important to note that the outcomes of success can be undesirable, particularly in processes like innovation where considerable changes are likely to occur.

The above review of the pros and cons of success is not an attempt to suggest that success should not be aspired to. Of course, success must be the ultimate objective of any project. Cannon and Edmondson (2001) highlight that success and failure are not diametrically opposed outcomes of innovation, but they are intrinsically linked, particularly if we view innovation as an ongoing, cyclical process where future innovations are shaped by past successes and failures, as this thesis does. In a similar vein, Morris, LaForge and Allen, (1994, P. 12) note “...failure is more difficult to define and identify than success, and is more situational. Degrees of success are possible, while failure captures an entire range of performance below some minimum standard”. The general consensus amongst researchers is that failure is not the exact opposite of success, because just as there can be varying levels of success, there may also be varying degrees of failure (Carmeli & Gittell, 2009). For example, a salesperson can still be productive even though targets have been missed, in which sense, a certain degree of success has been achieved. Conversely, a team attempting to bring a new computer chip to market will only achieve success if their product works perfectly; anything other than that may be considered a failure.

While the focus of the current research is on innovation failure, it is important to note that even seemingly successful projects can breed failures of sorts. For example, Nelson’s (2005) study of 72 large IT projects asked participants to provide retrospective accounts of the success or failure of projects that they had worked on. He found that some projects, which on paper appeared to be a success, that is they were delivered on time and within budget, were retrospectively considered a failure because they had not been fully adopted by the target users. Similarly, Nelson founds instances of projects which may be considered ‘failures’ due to issues during the development process, but which retrospectively were considered to have had some measure of success due to learning which occurred or other unexpected positive outcomes.

A detailed exploration of positive and negative outcomes of success is beyond the scope of the current research but is noted here for two reasons. Firstly, it highlights the difficulties with defining failure, and predicting its outcomes since success does not always result in positive outcomes just as failure may not always result in negative outcomes. The above evidence points towards a need to consider both the potential negative and positive outcomes of failure. Secondly, given that the current research views innovation as a process consisting of a number of different stages, it is worth noting in light of the above evidence that successes during the process may in fact be catalysts for failure, and this knowledge may help in the later analysis of data. The qualitative analysis section of this thesis (Chapter 8) aims to provide some much-needed clarity to the field by describing more nuanced descriptions of setbacks and failures in the innovation process.

### Section Conclusions

To conclude, a number of different terms are often used to describe setbacks and failure, and this may be in part a means of creating some distinction between degrees and severity of projects which suffer difficulties or have to be abandoned. However, use of different terms to describe the phenomenon of setbacks and failure may also be indicative of the stigma that society places on things going wrong or failing and as such the use of different terms may serve to lessen the impact of the experience of setbacks and failure.

It seems important to understand the meanings of the different terminologies in order to clarify what is meant by the term failure in the context of the current thesis. This thesis, when referring to the term failure, or project termination, focuses primarily on the definition provided by McGrath (1999, p.14): *“An innovation or initiative can be said to have failed when it is terminated as a consequence of actual or anticipated performance below a critical threshold. In other words, failure is the termination of an initiative that has fallen short of its goals.”* The varying levels, and descriptions of failure and the fact that individuals may perceive failure differently are also duly noted. However, in the context of the current thesis, particularly in terms of methodology considerations, we consider failure to denote the absolute end point of a project which has had to be abandoned short of its goals. The consideration of failure as the unwelcome end point of an innovation project also serves to demarcate it from setbacks, which this thesis considers to exist on a scale between success and failure, where problems or deviations from the plan make success less likely (Kutsch & Maylor, 2011)

The evidence discussed above clearly shows that there is a need for greater clarity in terms of definitions of setbacks and a failure, particularly within the context of innovation. This indicates that the third aim of this thesis, to provide a more robust understanding and more nuanced description of the meanings and impact of setbacks and failures within the innovation context is a worthy one. This aim will be addressed through thematic interview analysis in Chapter 8. The following section explores empirical evidence related to outcomes of setbacks and failure with particular consideration of the main dependent outcome variables of interest to the current thesis: well-being, innovative work behaviour and motivation.

## The Outcomes of Setbacks and Failure

Literature and research that addresses the outcomes of failure are surprisingly sparse, and in terms of innovation failure, rarer still (Moenkemeyer et al, 2012). In general, the focus of research is not on the outcomes of setbacks and failure, but on the prevention of setbacks and failure (Arino & de la Torre, 1998). However, given the prevalence of setbacks and failure within innovation projects, and the fact that their prevention is often not possible, further research into setbacks and failure outcomes is desperately needed (Janssen et al, 2004). The limited research into failure outcomes that does exist, points towards numerous potential consequences of failure such as emotional responses that resemble grief, motivational outcomes and positive outcomes such as opportunities for learning. These will be discussed in detail in subsequent sections. Such research, while sparse, points towards the significant value of studies such as the current research, which explores setback and failure outcomes in greater depth (Janssen et al, 2004; Valikangas et al, 2009). The first section explores the relationship between setbacks/failure and well-being outcomes.

## The relationship between innovation project setbacks and failures and well-being

Well-being has spiked interest from researchers in recent years, both because of its importance as a factor in establishing and maintaining happiness (Roberts & Cooper, 2011) and also due to increasing evidence that well-being is closely tied to productivity and success (Robertson & Cooper, 2011). This highlights the importance of one of the aims of this thesis, namely to understand the relationship between innovation setbacks and failure and well-being. Given the importance now placed on well-being as a key to positive work behaviours understanding the outcomes of experiences which may harm well-being seem vital. This section will begin with a discussion of what is meant by the term ‘well-being’ and will then go on to discuss evidence relating to the relationship between setbacks and failure and well-being.

### What is ‘well-being’?

Affective well-being is generally considered to be the core of mental health (Ryff & Keyes, 2005), with its measurement focused on the subjective judgments made by individuals with regards to how psychologically well or unwell they feel (Warr, 1987; Warr, 1990). Bradburn (1969, p. 9) offered a definition of psychological well-being, proposing that “…an individual will be high in psychological well-being in the degree to which he has an excess of positive over negative affect and will be low in well-being in the degree to which negative affect predominates over positive.”

While the above is a generally well accepted definition of well-being, Parfit (1984) noted that researchers’ perspectives on well-being may generally be divided into three different accounts. The first school of thought may be referred to as objective list accounts, whereby it is argued that well-being is at its peak when an individual’s personal, psychological and material needs are met (i.e. Sen, 1999). It may be argued that each of these needs can be impacted when an individual experiences innovation setbacks or failure. For example, personal needs may be affected if conflict with co-workers occurs as a result of setbacks or failure (i.e. Janssen, 2003); psychological needs may be impacted if an individual experiences negative emotions due to problems or failures within the project (i.e. Shepherd, 2003; Shepherd et al, 2011); and material needs may be affected if setbacks or failure results in financial loss for the individual such as through failure to attain performance related bonuses (i.e. Carmeli & Gittel, 2009), or due to spiralling costs in the case of setbacks.

The second school of thought with regards well-being may be referred to as preference satisfaction. This is a largely economic stance on well-being which views an individual’s well-being as improving the more he or she gets what they want (Odle-Dusseau et al, 2012). The relationship between innovation and well-being in this context assumes that the success of an innovation project is something that the individual wants to attain, and failure therefore means that some of those ambitions may not be met.

Thirdly, the mental states view of well-being sees an individual’s well-being improving in light of experiences being perceived more positively by the individual (Diener et al, 1999). From the point of view of innovation then, one may expect that the attainment of innovative goals may lead to positive experiences whereas the failure to meet innovative goals may result in more negative experiences and a decline in well-being. Included within the mental states stance is the popular subjective well-being approach (Diener, 2006). Subjective well-being (SWB) is interested in how individuals evaluate and experience their own lives, both positively and negatively. These subjective experiences include both cognitive judgements (i.e. assessments of how well we are doing on a project, or whether others like us), and affective reactions and states (i.e. emotional responses to experiences). Diener (2006) notes that SWB is about much more than happiness. It is an umbrella term that can capture a whole range of experiences and affective responses to those experiences. Subjective well-being and emotion are closely aligned concepts (Diener, 2006). For example, where negative emotions endure over time, these emotions can take shape as affective experiences which can have a strong impact on well-being (Shepherd, 2003; Shepherd et al, 2013).

There has been a great deal of debate regarding the value of each of these accounts of well-being (Dolan & Metcalf, 2012). However, the SWB approach is favoured by many psychologists (Dolan & Metcalfe, 2012), not least because there exists a plethora of valuable research as well as reliable methods for collecting meaningful data on SWBs (Stiglitz et al, 2009). Importantly from the point of view of the current study, SWB measures are adept at capturing not only positive well-being but also instances of negative well-being. Given that the current study is interested in the outcomes of setbacks and failure, we would expect to see some negative associations between setbacks/failure and well-being, and, as such, it is important that in talking about well-being we are referring to an approach that is able to incorporate and measure negative as well as positive well-being. For the remainder of this thesis then, when referring to well-being, it is with the subjective well-being approach in mind, unless otherwise stated.

### The relationship between setbacks and failure and well-being: Existing evidence

Understanding the relationship between innovation and employee well-being is an important area for study as it has rarely been the subject of research to date (Rasulzada & Dackert, 2009). Where research in this area does exist, it generally assumes a positive relationship between creativity and well-being (Rasulzada & Dackert, 2009), suggesting that the experience of creativity may produce a positive state and that engaging in creativity might affect well-being in a positive way (Csikszentmihalyi, 1999). Additionally, other existing evidence suggests that there may be an alternative direction of causality, whereby positive moods facilitate creative behaviour, and evidence has been produced which indicates that positive mood states results in greater creative output compared to neutral or negative mood states (Amabile et al, 2005; To et al, 2012). Work by Madrid et al (2014) supports this relationship. They found that positive mood was strongly associated with innovative work behaviour, leading them to suggest that organizations with practices in place to facilitate positive affect may be more effective in fostering innovation. Existing evidence therefore suggests that creativity and innovative behaviour may be positively impacted by mood, and that engagement in creative tasks may in turn have a positive impact on well-being. However, as discussed above, innovation and creativity are not the same, and innovation is often far more difficult and stressful than the creativity process on its own. As such, the relationship between well-being and innovation and well-being and creativity are likely to be markedly different. In addition, the relationship between innovation setbacks and failure and well-being remains uncharted and, as is the assertion of the current thesis, greater understanding of this area is likely to produce valuable contributions to the field.

While there is a clear scarcity of research into the relationship between innovation failure and well-being, some research has been conducted which, although not carried out with the explicit aim of exploring well-being outcomes of innovation setbacks and failure, has nonetheless produced some relevant findings. While there exists limited research which has examined well-being within an innovation context, a relatively large amount of research has been conducted which explores factors associated with work and their impact on well-being in the more general organizational literature. Although such research does not explore the relationship between innovation setbacks/failure and well-being specifically, it may be possible to make some related summations based on this evidence.

Below are presented evidence from both innovation and general literature which points towards a link between innovation project setbacks and failure and well-being outcomes. Six factors are discussed which indicate a link between these variables and provide support for the argument that this is a worthwhile area of research. The first of these factors is the role of negative emotion associated with project setbacks and failures, and how negative emotions may, as a result, impact well-being.

Firstly, evidence is presented which indicates that setbacks and failure may result in negative emotions which are linked to a decline in well-being. Short-term negative emotions are unlikely to be harmful, but more persevering negative emotions such as may be felt when numerous setbacks are experienced or when a project fails, may take shape as affective reactions which can harm well-being (Payne & Cooper, 2001; Shepherd, 2003; Shepherd et al, 2013). Moldenhauer-Salazar and Valikangas (2008), for example, presented a case study of a major innovation failure at Sun Microsystem which supports this argument. They conducted after-the-fact interviews with staff who had worked on the failed project (a low-cost PC), in order to gather detailed information with regards the factors and experiences of individuals leading up to and following the failure. Analysis of this interview data indicated that the failed innovation had a significant impact on the well-being of individuals involved. The results of the study indicated the occurrence in some individuals of what the researchers called ‘innovation trauma’; an inability to innovate on future projects due to the almost crippling discontent experienced as a result of previous innovation failures (Moldenhauer-Salazar & Valikangas, 2008; Valikangas et al, 2009). Moldenhauer-Salazar and Valikangas (2008) produced evidence that individuals who had worked on the failed product reported feeling an overwhelming sense of personal devastation and loss, feelings which could be closely equated to feelings of grief, emotions which manifested as a decline in well-being. This is not surprising given that when an innovation fails innovators may lose much more than the achievement of an innovative goal. They may also lose part of their collective or individual identity formed during the course of the project; they may lose their emotional bond to the innovation and they may lose personal relationships as the project team is redistributed (Shepherd & Kuratko, 2009).

In addition, setbacks and failure within the innovation process are likely to lead to perceptions of underperformance, and research has noted that perceived underperformance can lead to feelings such as shame (Mcgregor & Elliot, 2005). *Shame* is considered to be one of the most distressing emotions that an individual can experience (Payne & Cooper, 2001). Shame can often result in the self-defensive motivation to withdraw from social groups (Gausel et al, 2012), or to hide, cover-up or avoid (e.g. Iyer et al, 2007; Lickel et al, 2005). Shame can also result in feelings of hopelessness (Payne & Cooper, 2001). Such affective responses are likely to be linked to a decline in well-being.

The idea that innovators may suffer a decline in well-being following innovation failure is also in line with the research on grief responses to failure by Shepherd and Kuratko (2009), and Shepherd and Cardon (2009). Shepherd and Kuratko (2009) argue that grief responses are particularly salient to the innovation process because innovators and entrepreneurs are often highly committed to, and passionate about their projects and therefore are more likely to display symptoms of grieving following the failure of their innovation. While most people are resilient and have the capacity for generative experiences and positive emotions following grief (Bonanno, 2006), grief can have a hugely negative impact on well-being in the form of depression (Payne & Cooper, 2004; Bonanno, 2006); stress, distress and stress-related illnesses (Bonanno, 2006). While grief is probably a rare outcome of failure in a work setting, evidence such as Shepherd (2003), Shepherd and Cardon, (2009), and Shepherd and Kuratko (2009) suggest that there is the potential for individuals to experience such outcomes following failure, meaning that extreme emotional outcomes are therefore worthy of consideration. Grief is, unsurprisingly, often associated with a decline in well-being (Kawada et al, 2011; Zisook & Scuchter, 2001), and as such, the experience of grief over the failure of an innovative project may be expected to show a related decline in well-being.

Secondly, and closely linked to emotion related research is evidence which explores stress, workload, burn-out and their relationships with well-being. A number of researchers have explored the relationship between stressors at work and well-being (i.e. Schulte & Vainio, 2010; Von MacKensen & Morfeld, 1999) and various studies have produced evidence to suggest that work-related stressors impair well-being (i.e. DeLange et al, 2003; Von MacKensen & Morfeld, 1999). In Chapter 3 of this thesis, evidence was discussed which highlighted the challenges and potential stressors which innovators may face on their path to even successful innovations. Innovation requires the pursuit of novelty and involves high levels of uncertainty which can increase stress levels, and above a certain level, stress has been found to be associated with a decline in well-being (Cowan et al, 2011). As such, innovation project setbacks that result in high levels of stress may result in a decline in well-being. Evidence was also presented above which indicates that failure may produce stress responses (Bonanno, 2006). It may therefore be realistic to surmise that when the pursuit of innovation results in setbacks or failure, these experiences may constitute a stressor which in turn may result in a decline in well-being. While these relationships have not been researched in the context of innovation setbacks or failure to date, the current research aims to bridge this gap.

Closely linked to the research on the links between stress and well-being is research relating to burn-out and high workloads. Huhtala and Parzefall (2007) for example, suggest that engaging in innovative behaviour can have a relatively enduring impact on innovator well-being and in particular ‘burn-out’. Working on innovative projects is generally considered to be associated with high workloads (i.e. Fokkema et al, 2013; Kanter, 1988; Janssen et al, 2004), and high workload has been linked by various studies to burnout (i.e. Koeske & Koeske, 1989; Van Droogenbroek et al, 2014). Burnout is a “persistent negative, work-related state of psychological exhaustion” (Van Droogenbroek et al, 2014, p. 100). Burnout occurs as a result of a misfit between personal motivations and aims of individuals and actual experiences at work (Schaufeli & Enzmann, 1998). Burnout usually occurs when an individual is exposed to stressors over a long period of time, and is characterized by physical and mental exhaustion, diminished interest in one’s career and a decline in professional efficacy (Hatinen et al, 2007). Huhtala and Parzefall (2007) reviewed existing evidence in order to develop a conceptual framework of the relationship between job-demands, resources, employee well-being and innovativeness. They argued that innovation and burnout can be related in two distinct ways. Firstly, burnout, caused by stressors in an individual’s wider role, can reduce an individual’s ability and proclivity to innovate. Secondly, and more key to the current thesis, is their suggestion that the pursuit of innovation can itself, result in burnout, particularly where an innovative project is challenging or encountering setbacks. Huhtala and Parzefall’s (2007) framework therefore suggests that the relationship between innovation and well-being may be bi-directional. This is important from the point of view of the current thesis which aims to explore innovation as a cyclical process, because it suggests that not only may innovation result in a decline in well-being, but that if low levels of well-being continue, this may impact ongoing and future innovative efforts.

Innovation, as has already been established, is usually a long, risky and arduous process. As such, innovation is likely to result in high and demanding workloads for the innovators which the innovator must attempt to navigate in the midst of uncertainty and often while dealing with conflict from co-workers, and setbacks within the process. This environment, Huhtala and Parzefall (2007) argue, makes innovation more likely to result in burnout than other organizational tasks, and subsequent failure of the innovation may only compound issues of stress and burnout.

The links between burnout and well-being in the innovation context therefore, are linked to this misfit between what individuals are motivated to achieve and what they are actually able to achieve. Setbacks within innovation projects often result in increased workload, which in turn creates a mismatch between goals and actual achievement which it is argued may result in burnout (Fan et al, 2014; Parker et al, 2012). It is possible then, that the high work load associated with setbacks in innovative projects may be related to a decline in well-being.

This leads onto the third factor to be discussed which explores the relationship between work goals and well-being. By definition, the pursuit of innovation involves the attainment (or otherwise) of a number of pre-defined goals (Kanter, 2000), and as such, evidence relating to the relationship between failure to attain goals and well-being is applicable here. A number of researchers have found evidence of links between goal attainment and well-being. For example, Christiansen et al (1999) found evidence to suggest that perceived progress towards goals was associated with higher levels of well-being and that, conversely, perceived failure to attain goals was associated with decreased levels of well-being. In a similar vein, Santos et al (2012) found that two factors which significantly predicted well-being were relationships and the perceived attainment of work and personal goals. With reference to the current thesis therefore, one may expect failure to attain innovative goals (as may be the case where serious setbacks occur or where an innovation fails) to be associated with a decline in well-being.

The fourth factor to be discussed in terms of the relationship between innovation project setback and failures and well-being outcomes relates to the impact of innovation on work relationships. Relationships at work are believed to have a significant impact on well-being. As was discussed in previous Chapters 3 and 4, failure can have a significant impact on relationships with co-workers (i.e. Tezuka, 1997), and recent research suggests that the impact of failure on relationships at work may be particularly salient for those working on innovation projects (i.e. Janssen, 2003; Shepherd et al, 2013). The impact of setbacks on relationships at work have not to date been explored empirically, but it may be assumed that setbacks also impact relationships with co-workers since it is the run up to the failure (and setbacks) as much as the failure itself that takes its toll on relationships at work. For example, Cowan, Sanditov & Weehuizen (2011) found that high levels of stress caused by project setbacks could spill over to others within and outside the project team and could cause a breakdown in social relations, which in turn could impact the well-being not only of the project leader but of others within the organization. This process of spill-over of emotions associated with stress is often referred to as contagion (Hatfield et al, 1994).

One possible explanation for why innovation has a potentially greater impact on relationships than other work-related activities may be that, as discussed in more detail in Chapter 3, the pursuit of innovation often causes conflict (Janssen, 2003) and can require employees to make changes which are often unpopular (Kanter, 2000). While little evidence exists which explicitly explores the relationship between innovation setbacks and failure on relationships with co-workers and supervisors, there has been some research which presents possible arguments as to how innovative relationships may impact outcomes. For example, Janssen (2003) found that innovative employees paid a price for their involvement in innovative projects and that price was often conflict and less satisfactory relationships with co-workers. If the mere pursuit of innovation can have a negative impact on relationships, we could surmise that such outcomes are exacerbated when an innovation fails, given the added issues such as wasted resources and loss of face which may compound breakdowns in relationships (Horibe, 2001). Previous Chapters (3 & 4) have explored evidence relating to the idea that conflict is often associated with the pursuit of innovation (i.e. Janssen, 2003; Horibe, 2001). Given that conflict may be present during many stages of the innovation process, it may also be present at the point of failure and is more likely during stressful setback situations. Dijkstra et al (2004), in a study of nursing staff at a geriatric hospital, found that conflict was negatively associated with well-being. This research is supported by other findings which have found a relationship between conflict and negative aspects of well-being including psychological strain (Shirom & Mayer, 1993) and burnout (Hatinen et al, 2007). As such, where innovation and innovation failure results in conflict, this may have an associated negative impact on well-being.

Evidence also exists that demonstrates that positive relationships may have a positive impact on well-being, and as such, the converse may be true, that negative relationships have a negative impact. For example, a number of studies have found evidence to suggest that positive relationships with supervisors and co-workers decrease the likelihood of experiencing negative well-being states such as stress and burn out (Melamed et al, 2006; Prottas, 2013; Towler & Stuhlmacher, 2013). It could be surmised based on this evidence, that if failure results in diminished relationships with supervisors and co-workers, this could in turn have a negative impact on well-being. Based on the above evidence, in instances where innovation setbacks and failure result in poor relationships at work, we may expect to see an associated decline in well-being.

The fifth body of evidence to draw on to explore why innovative projects may be more likely than other organizational activities to result in a decline in well-being relates to the well accepted importance of innovation. As noted in Chapter 3 (3.3.1) above, successfully innovating is often imperative to the success of organizations and, as such, individuals are generally required to innovate on an ongoing basis rather than one-off projects (McGrath, 1999). Due to the high failure rates associated with innovation projects, innovators are likely to experience higher number of failures than non-innovators. Shepherd et al (2013) argue that the negative emotions associated with the experience of repeated setbacks or failures are cumulative and that as setback or failure experiences amass the emotional and well-being consequences associated with these experiences worsen. This may offer another potential explanation for another aim of this thesis which is to consider why some individuals suffer negative outcomes of failure while others experience neutral or beneficial outcomes.

Finally, the relationship between setbacks and failure and well-being may to a certain extent, depend on perceptions relating to those setbacks and failures. As will be discussed in greater detail below, the attributions that individuals make for the causes of the setback or failure play a substantial role in the responses to and impact of that setback or failure. For example, a number of studies have found that the perception of injustice over a certain event may result in a decline in well-being (Elovainio et al, 2002; Tepper, 2001). Therefore, where an individual feels a sense of injustice following a setback or failure (i.e. where he or she feels that the responsibility for the failure has been incorrectly apportioned), this may result in a decline in well-being.

## Section summary

The evidence presented above supports the proposition that a relationship exists between innovation project setbacks and failures and well-being. Innovation is an inherently challenging process and setbacks and failure are an ominous presence. These setbacks and failures may lead to negative emotions, a breakdown in relationships at work, stress, high workloads, burnout, and the inability to attain goals all of which may impact the well-being of innovators. Janssen et al (2004) highlighted the need for greater focus on innovation outcomes in research and by considering the impact of innovation setbacks and failure on well-being, the current research will respond to that need, and the evidence discussed above clearly illustrates that there may indeed be a relationship between innovation setbacks/failure and well-being outcomes.

## hypothesis one

The evidence presented in the above section leads to the presentation of the following hypothesis

**Hypothesis 1: Innovation project setbacks and failures are negatively associated with well-being**

The next section of this thesis explores the relationship between innovation failure and innovative work behaviour outcomes. This research is important because organizations require individuals to be constantly innovating in order to remain competitive (i.e. Davila et al, 2006; Shepherd et al, 2013) and when innovative work behaviours are compromised this makes it difficult for organizations and individuals within them to reach their innovative potential. The current thesis therefore also considers research which explores the relationship between innovation failure and motivation.

## The relationship between innovation project setbacks and failures and innovative work behaviour

### What is innovative work behaviour?

Innovative work behaviour may be defined as the generation, promotion and realization of innovative ideas aimed at improving or benefiting role performance, the group or the wider organization (Janssen, 2000). Innovative work behaviours (IWBs) are coveted by employers, who view them as key to the effective functioning and long-term survival of organizations (i.e. Janssen, 2000; Janssen, 2004; Scott & Bruce, 1994; Shanker et al, 2017). Given that one of the aims of the current thesis is to understand how setbacks and failures impact ongoing innovative efforts, it was important to consider innovative work behaviours as one of the outcome variables, because it is the utilization of these behaviours that make ongoing innovative efforts possible and a change in IWBs as a result of setbacks and failures could potentially be problematic for organizations. As such, understanding the relationship between setbacks, failures and IWB is key to understanding how setbacks and failures may impact cyclical, continuous innovation.

Theory surrounding IWB is focused far more on behaviour than process, based on the idea that processes don’t innovate, people do (Amabile, 1996; Devloo et al, 2016; Kingdon, 2012; 2016; Janssen, 2000). In this sense, although IWB and process models (such as those described previously in Chapter 3) share some common ground, they can be distinguished from each other because IWB is interested in motivated behaviours which propel individuals through the innovative process rather than considering the process itself (Amabile, 1996; Janssen, 2000). The other important point that distinguishes IWB from process models of innovation is that many of these behaviours, particularly in non-innovation specific roles, are largely discretionary and outside the scope of prescribed job descriptions and expectations (De Jong & De Hartog, 2010; Ramamoorthy et al, 2005). With this in mind, IWBs are arguably more difficult to manage than conventional work-related behaviours given that their discretionary nature means that they sit outside of the management techniques employed for non-discretionary behaviours. In essence, employees with high levels of IWB are more likely to enhance their working environment through innovation and are also more likely to adopt innovative improvements introduced by others (Bos-Neheles et al, 2017). IWBs therefore are extremely important to the continued functioning and ongoing progression of organizations. It follows that the importance of IWB to the long-term survival of organizations combined with the challenges in managing these behaviours means that a greater understanding of the impact of innovation setbacks and failures on IWB outcomes is likely to be of benefit to the innovation field and is key to the current research. The following section therefore explores relevant theory and empirical evidence with regards the relationship between setbacks and failures and IWB.

### The relationship between setbacks and failure and innovative work behaviour: Existing evidence

Although research to date has not specifically considered the relationships between innovation setbacks and failure and IWB outcomes, empirical evidence does exist that points to a link between these variables.

Firstly, there is empirical evidence in relation to factors associated with setbacks which appears to impact IWB. For example, Montani et al (2014) found that planning was a significant moderator of the relationship between learning goal orientation and IWB, whereby, as planning improved, IWB increased, particularly for those with high learning goal orientations. Evidence indicates that innovation setbacks are often associated with poor planning (Mumford et al, 2008; Song et al, 2011). The findings of Montani and colleagues would suggest therefore that where setbacks related to poor planning occurred, this may result in a decline in IWB, particularly for those with high learning-goal orientations.

Secondly, previous authors have argued that there are clear links between employee engagement and IWB, and that a decline in engagement can result in innovation setbacks and failures. As Euchner (2012, p.9), noted, “The engagement of others is important not just because they bring essential knowledge or resources or influence to bear. It is important because innovation requires commitment, and people commit fully only to a future that they can help create.” This sentiment is in line with those of Agarwal et al (2011) who, in an extensive survey study, found that IWB was positively correlated with work engagement. A number of other studies have found that some factors associated with innovation setbacks such as uncertainty (Huang et al, 2017), negative feedback (Besieux, 2017) and conflict (Sonnentag et al, 2013) are negatively related to employee engagement. Therefore, where setback factors result in a decline in work engagement, this may result in a decline in IWB.

Thirdly, evidence points towards a potential link between innovation project setbacks and failures and IWB, where basic needs satisfaction mediates the relationship (Devloo et al; 2015). Past research has generally espoused the view of innovation as an entirely positive endeavour, seeing IWB as a vehicle through which individuals’ basic needs for autonomy, competence and relatedness are channelled (Deci & Ryan, 2000) and can be satisfied (Shalley et al, 2004). This view of IWB as inherently positive is grounded in the wholly accepted idea that innovation is essential for business success (i.e. Amabile, 1988; Scott & Bruce, 1994), and the links between IWB and its links to intrinsic motivation and satisfaction of basic needs is fairly well established (i.e. Collins & Amabile, 1999; Grant & Berry, 2011). However, such research rarely takes into account the setbacks and failures that individuals are likely to experience in the course of an innovative project. I argue, that when setbacks and failures are taken into account, the IWB outcomes may be less favourable. Devloo et al (2015), provide some evidence in support of this view. Their research was conducted at an innovation boot camp, attended by product design and engineering students in order to improve their innovation and entrepreneurial skills within their chosen fields. Devloo et al (2015) found positive effects of IWB on basic needs satisfaction, when measured the day after the innovation camp. However, when repeated, cross-lagged, measures were carried out the following day, they found that the impact of IWB on basic needs satisfaction had become negative. They conducted follow up interviews in an attempt to explain their findings which led them to posit that social interactions and disagreements amongst innovative teams had led to a delayed decline in IWB and basic needs satisfaction. Therefore, the relationship between IWB and basic needs satisfaction may be positive when the innovation is perceived as successful, but negative where setbacks and failures are involved, because failure is at odds with the attainment of needs satisfaction.

A decline in IWB in the face of setbacks and failures may also be linked to the types of innovative behaviours that individuals are engaged in. For example, in an exploratory case study of fire service employees Bos-Nehles et al (2017) found that while ideas and creativity activities appeared to flourish amongst fire service employees, the next stages of the innovation process, promoting and realizing those ideas were where most setbacks occurred. Individuals often felt that their ideas didn’t have adequate support to be taken forward or that ideas from more senior employees were given priority. Bos-Nehles et al found that these setbacks were associated with a decline in IWBs amongst those employees who reported these setback experiences. One potential explanation for this finding may be that IWB is largely considered to be voluntary and requires willingness on the part of employees to engage in innovative behaviours (Dorenbosch et al, 2005). It is perhaps for this reason that a number of researchers have found a preponderance of activity related to idea generation type behaviours but IWB often sees a decline when promotion and realization behaviours are required (Bos-Nehles et al, 2017). The generation of ideas is often an enjoyable and exciting phase of the innovation process (Kingdon, 2012), which individuals are more likely to engage in voluntarily and willingly. However, promotion and realization behaviours are more challenging, and individuals are more likely to encounter setbacks when engaged in these behaviours than when they are creating ideas (Kanter, 2000; Janssen et al, 2004; Huhtala & Parzefall, 2007), and these challenges may make individuals less likely to engage voluntarily in these activities. It is well accepted that IWB is often extremely demanding of time and resources and requires individuals to engage in complex activities often without sought after outcomes being realized (Axtell et al, 2000). These challenges, paired with the likelihood of setbacks and failure may make it difficult for individuals to maintain the energy and enthusiasm required to carry out IWBs (Devloo et al, 2016). As such, especially following repeated setbacks and failures, a decline in IWB following setbacks and failures seems likely. Devloo et al (2016), argue that this decline in IWBs of employees may have considerable implications for ongoing innovative endeavours in organizations.

The challenges and complexity of innovation may also have a bearing on work-life conflict for individuals engaged in IWBs. Abstein and Spieth (2014) found that work-life conflict was negatively related to IWB, in so much as, while work-life conflict increased, IWB decreased. This is interesting given that innovation, with its high work-load, uncertainty and demands on people’s time has been found to increase levels of work-life conflict (Janssen, 2003; Janssen et al, 2004) particularly during challenging periods within the innovation process (Kanter, 2000). This therefore would suggest that the relationships between IWB and work life conflict are cyclical, that the challenges placed on individuals during innovative projects increase work-life conflict, which in turn has the potential to decrease IWB. Understanding the impact of setbacks and failures on IWB is important therefore as a means of gaining a better understanding both of the short-term consequences of setbacks and failures as well as the longer term, more far reaching consequences.

Above I discussed the links between setbacks and IWB under the assumption that as setbacks increase and move closer towards failure the impact of those setbacks also increases to negatively impact IWB. But what does empirical evidence tell us about the relationship between failure specifically and IWB? The brief answer is, very little. However, the main links between failure and IWB appear to be related to failure as an antecedent of innovative work behaviour, where an organizational failure or a failure in a previous project ignites the spark for a new innovation, thereby triggering IWBs (Drucker, 1985). This would suggest that failure may be related to an increase in IWB, although you would expect to see a time lag in this instance, between the failure of the previous project and the beginning of a new one. This therefore doesn’t help with the prediction of levels of IWB immediately following an innovation failure, but it does suggest that in terms of ongoing innovation, failure measured with a time-lag may see an increase in future IWB. Analysis of longitudinal data in Chapter 7 of the current thesis permits some analysis of this issue through analysis of immediate versus lagged associations.

## Section Summary

It is generally assumed that IWBs are positive behaviours which are to be enthusiastically encouraged within organizations. The current research strongly supports that view. However, exploration of previous empirical evidence indicates that maintaining high levels of IWB throughout the challenges that are inherent in the innovation process may be difficult. IWB is generally voluntary and requires willingness on the part of the employee to participate in innovative behaviours. However, while aspects of IWB such as creativity may be relatively easy to maintain, the more complex behaviours such as promotion and realization of ideas are likely to be more difficult to maintain. Successful innovations it seems result in high levels of IWB, whereas projects which are perceived as less successful (i.e. they have encountered setbacks or failures), may see a decline in IWB linked to disengagement, lack of enthusiasm and a depletion of basic needs.

## hypothesis two:

The evidence discussed above leads to the presentation of the second hypothesis:

**Hypothesis 2: Innovation project setbacks and failures are negatively associated with innovative work behaviour**

The following section explores the relationship between innovation setbacks and failures and motivational outcomes.

## Setbacks, failure and Motivational outcomes

### What is motivation?

Work motivation may be defined as the psychological processes that direct, energize, and maintain action toward a job, task, role, or project (Kanfer, 2009). Motivation then, is the process or behaviour that propels individuals into action in order to attain their goals (Spasova, 2012). The general consensus amongst researchers is that an individual’s level of motivation is largely dictated by intrinsic factors and not simply the pursuit of material goods and money (Stone, Deci & Ryan, 2009). In addition, ability and environmental factors are also considered key factors in influencing motivational behaviour and performance (Mitchell & Daniels, 2003).

### The relationship between motivation and innovation

What then, of the relationship between motivation and innovation? As has been established in previous sections of this thesis, innovation is the foundation of organizational success. However, one isolated innovative success is not enough to ensure the ongoing success of an organization. To ensure continued success, organizations must be able to sustain continued innovative efforts and offerings (Shepherd et al, 2013), and this means that their employees must be motivated to innovate. Katz (in Van de Ven et al, 2000, p. 136) argued that organizations require their employees to display motivated behaviour in three ways; firstly, to remain loyal to the organization; secondly, to reliably perform their required duties and thirdly, to perform spontaneous innovative tasks to ensure organizational growth in areas that the organization is unable to predict at the time of hiring them. Katz’s stance is dated, but just as relevant today as it was in 1964. However, sustaining levels of motivation to spontaneously innovate is arguably the biggest challenge facing organizations because it is very difficult to pre-plan future innovative needs.

As Angle (2000, in Van de Ven et al, 2000) posits, innovative behaviour is, by its nature, motivated behaviour. However, given the high setback and failure rates of innovative projects, with ongoing innovative efforts may come multiple setbacks and failures, and individuals’ motivation to persist with innovation in light of these experiences may be compromised (Shepherd et al, 2013; Shepherd, 2003). However, with the exception of recent ground-breaking work by Shepherd and colleagues, the relationship between setbacks/failure, motivation and other innovation outcomes has been largely unexplored.

Over the years, there has been some interest in the effects of motivation on what is often considered the first stage of innovation; creativity. Amabile's (1988) componential theory of creativity positioned intrinsic rather than extrinsic motivation as the crucial channel through which social context could impact creativity. Others have also argued that individuals who carry forward an innovation need not only the requisite knowledge and skills relevant to the innovation (Huhtala and Parzefall, 2007), but they also need to be intrinsically motivated. Some argue that it is intrinsic motivation that drives the individual to persevere in the face of challenges which are inherent in innovation (Georgsdottir & Getz, 2004). However, studies relating to what motivates individuals to innovate have produced inconsistent results, and some researchers question how adequately the intrinsic/extrinsic dichotomy can explain the complexities involved in creativity and other complex work behaviours such as innovation (Gagne & Deci, 2005). Apart from research into the effects of motivation on creativity, there has been very little research into the effects of motivation on subsequent stages of innovation. As discussed earlier, it is arguably other phases of the innovation process such as idea promotion and championing which are the most challenging and the most likely to present problems for the innovators (i.e. Kanter, 2000), particularly given the greater likelihood of failure at the coalition building and latter phases. As such, it could be argued that it is in these latter phases that we are most likely to see these challenges affecting individuals’ motivation. A lack of research in this area means that at present, there is little understanding of what motivates people to promote and champion innovation even when the odds of success seem stacked against them. Most, if not all innovators, will have faced significant problems and failures over the course of an innovation project. Gaining better understanding of what motivates these individuals to continue to behave innovatively, and what factors cause people to disengage from innovation in light of problems seems key to being able to improve the chances of future innovation. As discussed above, one factor which underpins many innovation projects is the demanding nature of the work and the potential for champions to suffer stress and burnout as a result of innovation, particularly where failure occurs (Janssen et al, 2004; Huhtala & Parzefall, 2007) and therefore, maintaining high levels of motivation may be challenging.

Given the importance of innovation to the viability of organizations, and the need for employees to continue to innovate despite previous setbacks and failures, it seems important to understand how the outcomes of failure impact individual’s motivation. This therefore forms one of the main aims of this thesis, namely, to understand the relationship between innovation setbacks and failure and motivation. In doing so, it is hoped that this thesis will present ground-breaking research which considers innovation as a cyclical process, rather than simply exploring innovation as a one-off project as previous research has tended to do.

As such, the following sections consider previous research which has explored the relationships between project setbacks and failures and motivational outcomes. Evidence is presented from the innovation field and also from more general organizational literature.

### The relationship between setbacks and failure and motivational outcomes: Existing evidence

Research into the impact of setbacks and failure on motivational outcomes has been inconsistent, with some findings suggesting that motivation is reduced as a result of setbacks and failure, while other results suggest an increase in motivation following such challenges. In addition, it is also possible that low motivation may lead to setbacks and failures rather than the converse relationship. While previous research has established a link between setbacks/failure and motivation, the direction of this relationship is unclear. Below I consider all arguments and use the most compelling evidence to model the hypothesised causal direction.

To begin with an example of evidence of harm to motivation for example, Brunstein and Gollwitzer (1996) demonstrated that failure often resulted in feelings of pessimism and in turn, a reduction in motivation to persist in the face of challenges. In a similar vein, other researchers have presented evidence which suggests that failure, particularly when it is attributed to internal causes, results in reduced motivation and a reduction in persistence (Grant & Dweck, 2003; Nurmi et al, 2003). There is also evidence to suggest that the negative impact of failure on motivation may not be fleeting. Hormozi et al (2000) suggest that following the failure of a project, motivation and productivity can show signs of decline for several years.

However, conversely, evidence also exists which suggests that setbacks can result in increased motivation. For example, Follette and Jacobson (1987) found that students who had performed badly in an examination made subsequent plans to increase the level of study for future exams and were therefore more motivated to succeed following unwelcome outcomes, suggesting therefore that the relationship between setbacks/failure and motivation may not always be negative. This may be related to Atkinson’s (1957) theory on achievement motives, which would expect to see that as setbacks increase, motivation should also increase because humans have a natural ‘fear of failure’. Atkinson (1957, p.360) defines fear of failure as “the capacity or propensity to experience shame upon failure.” He argues that individuals vary in their levels of ‘fear of failure’, and it may be the variation in these levels that accounts for the disparity of findings relating motivation to setbacks and failure.

Why might results be so varied in terms of the impact of setbacks and failure on subsequent motivation? One reason for the inconsistency in findings may be that failure can have a range of diverse effects on people’s subsequent behaviour (Brunstein & Gollwitzer, 1996). Mikulincer (1989) for example, suggested that performance decrements following failure may be a consequence of failures which are out of the individual’s control, resulting in feelings of helplessness and a drop in subsequent performance levels. In a similar vein, Hormozi (2000) found that under conditions in which individuals were included in the decision-making process that resulted in the cancellation of a project, productivity was less likely to show signs of decline thereafter, possibly because involvement in the decision-making process bestowed on them a certain degree of control over the situation.

Another school of thought posits that the motivational outcomes of setbacks and failure may be dependent on the way in which individuals interpret and attribute causes of setbacks and failure. The attribution of causes of failure has long been seen as a key component in explaining motivation following failure. Where failure is attributed to innate ability, failure signals that ability is lacking which can create a ‘helpless’ response (Shepherd et al, 2013). Feelings of helplessness often result in a decline in motivation as individuals seek to end their involvement in activities associated with the failure (Weiner & Kukla, 1970). On the other hand, Weiner & Kukla (1970) assert that individuals may attribute failure to lack of planning or effort rather than innate ability. In this scenario, they argue that individuals may remain motivated on future similar projects because they believe that they may be able to master the required skills with more effort and better planning. Evidence such as this may help to explain why some individuals remain motivated following innovation failure while others become demotivated.

Research byDweck and Leggett (1988) also provide some interesting evidence in terms of how people may perceive and respond to setbacks and failure, which may help to explain why some individuals feel motivated following poor performance while others feel demotivated. They suggested that people may be either entity or incremental theorists. Entity theorists prefer to set themselves performance goals whereas incremental theorists feel more comfortable with learning goals. Elliott and Dweck (1988) suggested that because poor performance implies information in regard to where one stands on a given talent or skill, for entity theorists, it becomes associated with learned helplessness responses. However, incremental theorists view setbacks and failure differently and recognise the valuable feedback that accompanies setbacks and failure, which therefore becomes associated with increased efforts in a bid to master challenges. Such evidence suggests that the way in which individuals respond to setbacks and failure may be at least to some extent be dependent on individual differences. In line with this thinking is the idea that individuals differ in terms of their motivation orientations. Elliot and Fryer (2008) suggests that individuals differ in the way in which they conceptualize the goals that they wish to achieve and that they may be either *approach or avoidance* orientated. Those with an approach motivation are driven by a desire to achieve personal growth and develop competence, whereas avoidance motivated individuals are driven by a desire to avoid failure, protect resources, and fulfil their obligations. Wanberg et al (2012) suggest that individuals high in avoidance motivation are more likely to display helpless responses following failure, and that as failure experiences accumulate, these individuals become less motivated to repeat similar activities. Therefore, following innovation setbacks and failure, particularly if similar failures have been experienced in the past, individuals with an avoidance motivation may be less likely to be motivated to perform innovative behaviours.

It may also be useful to consider other schools of thought which point towards an understanding of factors that may impact setbacks and failure outcomes. For example, drawing on Expectancy theory (i.e. Atkinson, 1964) which sees motivation as outcome expectation x valence (expected utility) of the desired outcome, we might predict that if setbacks or failure impairs outcome expectations then motivation may be affected which in turn may affect future performance. In a similar vein, Bandura (1997) suggested that a person’s sense of self-efficacy directly relates to effort expenditure on a task. Presumably, if setbacks and failure affect a person’s self-efficacy then motivation on subsequent tasks may also be affected. On the other hand, people who possess a strong sense of self efficacy that is unaffected by setbacks and failure are more likely to persist and maintain performance standards.

It is also necessary to consider other factors of particular interest to the current thesis and their relationship with motivation. Burnout and stress in particular have received attention in terms of their relationship with motivation. Stress and burnout are well document aspects of the innovation process which often result from the uncertainty and high workload caused by setbacks and failures within the process (Bunce & West, 1996; Janssen, 2004; Leung et al, 2010). Therefore, under such circumstances, these individuals are unlikely to be motivated to engage in similar activities in the near future. We may surmise therefore, that when setbacks and failure results in extreme instances of negative well-being such as stress and burnout, a decline in motivation to perform similar activities in the near future may also be expected.

Although limited, there is also some evidence from the innovation field which points towards a relationship between innovation setbacks and failure and motivation. In section 4.4.2 above, innovation trauma was discussed in terms of the potential for innovation issues and failures to have an emotional impact on individuals involved. Valinkangas et al (2009) also produced evidence that innovation trauma resulting from extreme setbacks or failure may have a negative impact on motivation. They suggested that innovation trauma inhibits the emotional and personal drive that is necessary to embark on subsequent attempts at innovation. They also found that the de-motivational effects of innovation trauma could spread to those who had not been involved in the failed project. Valinkangas et al suggested that individuals suffering from innovation trauma could bring to new projects a “culture of failure” which could negatively impact the motivation of others around them. According to the findings of Valikangas et al (2009) then, serious setbacks and failure within the innovation process can limit the motivation of individuals, teams or at times, entire organizations. This research therefore indicates that there may be a negative association between innovation setbacks and failure and subsequent motivation to innovate.

In a similar vein, Moenkemeyer et al (2012) found evidence to suggest that failure may reduce an individual’s motivation to innovate on future projects. They found that following failure, individuals sometimes became more risk averse; they were prepared to take some risks but not on new projects where outcomes were highly uncertain. Cardon & McGrath (1999) found evidence to support this in their study of entrepreneurs, the results of which indicated that those who made innate ability attributions for a failure were more likely to feel helpless and tended to self-select out of future entrepreneurial activities.

This finding is in line with those of Groth and Peters (1999), who’s study produced evidence to suggest that fear was the factor which was most likely to create a barrier to creativity. Fear of failure may be particularly problematic on innovation projects, firstly, because failure rates of innovation projects are generally high (McGrath, 1999), and secondly because as was discussed above, setback experiences on innovative projects are likely to be cumulative given the likelihood of setbacks and failures of innovation projects (Shepherd et al, 2013). It is possible therefore, that innovators may be more fearful of failure than individuals working on non-innovative projects. Fear of failure has been found to result in decreased motivation (Hunter, 2012), and, as such it is possible therefore that following failure, individuals may become more fearful of failure therefore making it less likely that they will be motivated to innovate in the future.

Another study which points towards the impact of innovation setbacks and failure on motivation to innovate was conducted by Amabile et al (2005). Their daily diary study examined the relationship between affect and creativity at work. They found that positive affect related positively to creativity, leading them to conclude that positive affect is a prerequisite of creativity. They also argue that positive affect stimulates feelings which are conceptually similar to those involved with intrinsic motivation (Deci & Ryan, 1985). Therefore, they argue that positive affect may have a positive relationship with creativity because those feelings which result in positive affectivity may also enhance an individual’s intrinsic motivation to innovate. Conversely, it could be argued that negative affectivity could result in a depletion of intrinsic motivation, and in turn may lower creativity. Therefore, setbacks and failures which result in negative affectivity may also have lowered intrinsic motivation therefore making subsequent creativity less likely.

Another possibility to consider in the relationship between setbacks/failure and motivation is that low motivation may result in setbacks and failure rather than the converse relationship. Little research currently exists which seeks to specifically explore this directional relationship. However, innovation is known to require high levels of self-directed behaviour (Angle, 2000; in Van de Ven et al, Horibe, 2001). As such, you may expect motivation to be a pre-requisite for embarking on an innovative project and as such, where a lack of motivation to engage with innovation exists, you may expect to see not failures perhaps, but a total lack of innovation and inaction. This possibility was reflected in a paper by Ben-Zadok and Gale (2001) in their review of a US state innovation that collapsed. They suggested that the failure of the innovation resulted from the inaction of pockets of local government to implement the policy; those who were required to act in order to secure the success of the policy were not motivated to do so which resulted in the breakdown of the project. While this finding is noted, it is probably not applicable to smaller scale innovation projects where fewer people are involved, and their involvement assumes a certain degree of motivation to innovate. As such, scenarios where a lack of motivation results in innovation failure are probably relatively rare.

Although the above evidence indicates that innovation setbacks and failure may result in reduced motivation to innovate, more general evidence relating to motivation following setbacks and failure discussed above showed outcomes and findings to be highly varied and inconsistent. Of course, it would be ludicrous to suggest that setbacks and failure always resulted in an inability to innovate in the future, indeed popular press frequently cite examples of individuals such as Steve Jobs or Richard Branson whose previous failures later provided the impetus for incredible success. Research has long indicated that the ability to persist despite setbacks and failures separates successful from unsuccessful entrepreneurs in the long run (Cardon & McGrath, 1999). Indeed, literature cites examples of entrepreneurs who credit lessons learned from previous failures as playing a major role in current successes (Caggiano, 1996). However, because of a lack of research which explores innovation setback and failure outcomes, it is currently unclear why levels of motivation vary following failure, and as such, one of the aims of this thesis is to further understanding of why some innovators suffer negative outcomes of innovation failure while others experience more neutral or positive outcomes.

## Section summary

Evidence suggests that there is a clear relationship between project setbacks, failure and motivational outcomes, although there is little consensus with regards the direction of the relationship. Evidence, particularly within the available innovation literature, is more heavily weighted towards a negative impact of setbacks and failure upon motivation, while some general literature also indicates that there can be positive motivation outcomes resulting from setbacks and failure. Levels of perseverance, as well as goal types, and locus of control may all moderate this relationship. Evidence indicates that the more severe the setback or failure the greater the level of harm, loss of control, innovation trauma, stress, negative affectivity and risk aversion. Therefore, as the seriousness of setbacks increase towards failure you would expect to see a greater decline in motivation. Intrinsic motivation appears key to innovative behaviour, not least because innovation is often largely self-directed (Angle, 2000; in Van de Ven et al), and therefore requires individuals to be intrinsically motivated in so much as effective innovators will often carry out innovative activities because they find such tasks interesting and satisfying (Gagne & Deci, 2005). In the context of the current research therefore, the most relevant type of motivation upon which to base measures was intrinsic type motivated behaviours, which are governed by personal interest in the task (Cerasoli et al, 2014). Gagne et al’s (2014) Multidimensional Work Motivation Scale (MWMS) provides a measure which aims to capture the full range of motivational behaviours across six dimensions. This measure will be described in detail in the measures section Chapter 6 (6.4.3). Of particular interest to the current research are two dimensions captured within the MWMS. Firstly, identified regulation which involves motivated behaviour which is governed by a sense of personal importance where the activity is pursued relatively autonomously and in line with personal goals (Gagne et al, 2014). Secondly, intrinsic motivation involves carrying out activities almost purely for enjoyment of the task itself (Gagne et al, 2014). Both intrinsic motivation and identified regulation appear to be closely aligned with the types of behaviours and attitudes that appear to motivate employees to engage in innovative tasks despite the associated challenges and for this reason, subsequent measures of motivation focus on these dimensions of motivation specifically.

## hypothesis three

Based on the evidence discussed above, the following hypothesis follows:

**Hypothesis 3: Innovation project setbacks and failures are negatively associated with intrinsic motivation and identified regulation**

It should be noted that while the above hypothesis states a direct relationship, the arguments presented earlier indicate that the relationship may be nuanced and conditional upon other factors. It is therefore important to consider potential moderators of these relationships as will be discussed in Chapter 5 below and analysed in Chapter 7.

## Chapter Discussion

Research in the innovation field has tended to circumvent the issue of setbacks and failure within the innovation process (Janssen et al, 2004), which is particularly worrying given that findings, certainly from outside the field of innovation, indicate that setbacks and failure have the potential to affect employees in a sustained and detrimental way (Moenkemeyer, 2011; Valikangas et al, 2009). The tendency in research to neglect the outcomes of innovation setbacks and failure (Moenkemeyer, 2011; Valikangas et al, 2009) is particularly problematic in innovation research given the high failure rates of innovation projects, the possible cumulative effects of innovation setbacks (Shepherd et al, 2013) and the importance of innovation as a means of ensuring sustained organizational success (Shepherd et al, 2013). Therefore, developing further understanding of the outcomes of innovation setbacks and failure are even more crucial than other organizational processes because of the importance placed on innovation and the high setbacks and failure rates associated with it.

The aims of this chapter were to answer a number of questions key to meeting the aims of this thesis. Firstly, this chapter aimed to address what the potential outcomes of innovation setbacks and failure for individual innovators are. In answer to this question, the evidence reviewed here suggests that there are potentially significant well-being, innovative work behaviour and motivational outcomes of setbacks and failure, which have the potential to affect individuals, teams and the wider organization. The potential gravity of some of these outcomes highlights the importance of research such as this that explores setback and failure outcomes. While outcomes of setbacks and failure are generally negative, the above literature review provides arguments that the view of success as wholly positive and failure as wholly negative may not always be accurate. In addition, there may be positive outcomes of failure.

This chapter also aimed to begin addressing the question of what impact the outcomes of innovation setbacks and failure may have on an individuals’ and organizations’ ability to innovate in the future. Research indicates that while setbacks and failure can result in future positive outcomes, ultimately the outcomes of setbacks and failure are usually negative. Negative outcomes related to well-being, IWB and motivation include factors such as negative emotions, learned helplessness, risk aversion, stress, burnout and withdrawal from future tasks. However, there are also many examples of individuals who experience innovation setbacks and failures and suffer few if any negative outcomes and go onto innovate successfully. It is likely therefore that other factors are at play which moderate the relationship between innovation project setbacks and failures and outcomes, as will be discussed in the next chapter.

# Chapter 5: Moderating variables in the relationship between innovation setbacks and failure and well-being, IWB and motivation

## Introduction

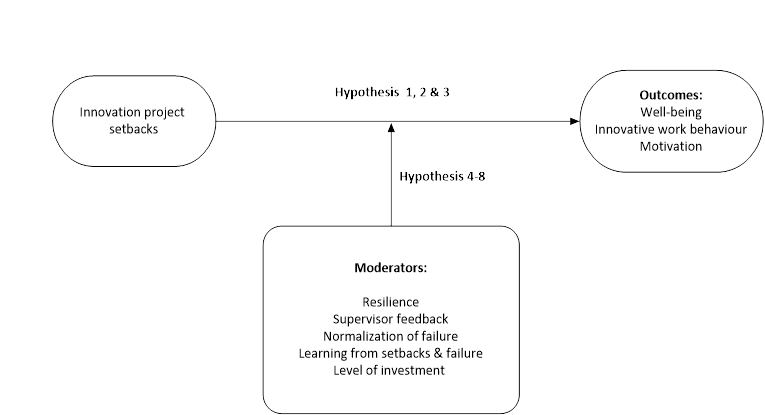
Earlier chapters have explored the complexities of the innovation process and have revealed potential reasons why failure rates in innovation may be so high. The previous Chapter 4 discussed potential outcomes of innovation setbacks and failure, in line with the aims of this thesis which are to further understanding of the outcomes of innovation setbacks and failure for innovators, with particular consideration of the impact of innovation setbacks and failure on the well-being, innovative work behaviour and motivation of innovators.

Chapter 5 aims to address the second aim of this thesis which is to further understanding of why some innovators suffer negative outcomes of innovation failure while others experience more positive or neutral outcomes. Cardon & McGrath (1999, p. 1) posed the question; “…why is it that some individuals appear to emerge from failing situations with enthusiasm and ambition intact while others simply give up?”. This thesis aims to address this question which remains largely unanswered by research to date, particularly in the field of innovation.

In order to achieve this, the current chapter explores five moderating factors which empirical evidence indicates may have an impact on the relationship between innovation failure and well-being, innovative work behaviour and motivational outcomes. These factors are *resilience, supervisor feedback, normalization of failure, learning from setbacks and failure* and *level of investment*. They have been selected because they have received some interest in recent years as factors which may help to explain why individual outcomes of setbacks and failure and other undesirable events may vary. They have never been studied in unison before, and so contribute an important new perspective on collective factors which may moderate the outcomes of innovation failure. They have also been selected because they represent moderating factors across psychological, organizational and management domains. It is argued that none of these domains could adequately explain the complex and varied relationships between innovation setbacks and failure and outcomes independently, but taken together, they may provide a much richer explanation of why setbacks and failure outcomes vary across individuals. In addition, factors normalization of failure and supervisor feedback have solid theoretical, and in some cases empirical, grounds for their relationship with learning from failure. Learning from failure is gaining recognition as a key factor which moderates the relationship between failure and outcomes, but arguments and evidence relating to this relationship have be based largely on assumptions and lack academic rigor (Cope, 2003). Learning from failure therefore is a factor which has been under-researched empirically, and there is a need for research which explores how other variables such as those to be explored in the current study may moderate the relationship between learning from failure and failure outcomes.

Figure 1 below is a pictorial representation of the research model, the same that appears in Chapter 1, presented here for ease of reference. Moderator variables appear in the middle box, while the independent variable (Innovation project setbacks) appear in the left most box and dependent variables (well-being, IWB, and motivation variables) appear in the rightmost box. Predicted moderating effects of each variable are discussed in subsequent sections.

Figure 1: Theoretical framework diagram: Predicted relationships between innovation project setbacks and failures, outcomes variables and moderators



## Resilience as a moderator of the relationship between innovation project setbacks and failures and outcomes

The first factor which is expected to moderate the outcomes of innovation setbacks and failure is resilience. Research into resilience in the context of innovation is relatively (Moenkemeyer, 2011). However, it has gained some recognition in the field of innovation recently as a factor which may contribute to the outcomes of innovation setbacks and failure, particularly as a factor which may be critical in moderating innovative efforts following setbacks and failure (Moenkemeyer, 2011; Moenkemeyer et al, 2012).

In an organizational context, resilience may be defined as “project members potential to positively adjust (or even grow) after a setback” (Moenkemeyer et al, 2012, p. 627). In clinical literature, the term ‘resilience’ is generally used to describe the process of adapting to adversity (Griffiths & West, 2013), whereas, ‘resiliency’ is often considered to be a relatively stable personality trait which influences the outcomes of setbacks and adversity (Richardson, 2002), although some prefer to see resilience as a construct which can be developed over time (i.e. Luthans et al, 2006; Masen, 2001). A resilient individual therefore is expected to have the attributes that facilitate the ability to adjust and cope with adverse or stressful experiences, whereas conversely, someone low in resilience may struggle to cope with adverse events such as failure, which in turn may result in distress or negative emotions (Griffith & West, 2013, Masten, Best & Garmezy; 1990). Resilience therefore is expected to moderate the relationship between innovation setbacks and failure and outcomes in so much as those low in resilience would be expected to show a steeper decline in psychological outcomes compared to those with high resilience.

While research into resilience in organizational settings is currently sparse, findings of Moenkemeyer et al, (2012) point towards the importance of resilience in overcoming the negative outcomes of innovation setbacks and failure. To the knowledge of the current researcher, Moenkeymeyer et al’s research is the first of its kind, and as such, very little other evidence exists which has explored the idea that resilience moderates innovation setbacks and failure outcomes. However, Moenkeymeyer et al’s findings are compelling, and suggest that resilience is a suitable factor to consider as a potential moderator of innovation setback and failure outcomes. Resilience is also arguably an appropriate factor to include as a potential moderator in this research, because innovation setbacks and failure are deemed to be a traumatic trigger event (Moenkeymeyer et al, 2012; Valikangas, et al, 2009), and one of the factors which it is argued may moderate the outcomes of ‘traumatic trigger events’ is resilience (Moenkeymeyer et al, 2012). The work of Moenkeymeyer and others is discussed below in relation to evidence which indicates how resilience may moderate well-being, IWB and motivational outcomes following setbacks and failure.

There is considerable debate within literature around whether resilience is a stable trait or whether it is a state which is changeable in light of experience. The current research takes a relatively neutral stance on this debate, and while I accept the work of trait theorist who argue that untrained, resilience is relatively stable across experiences and adversity variations (i.e. Hu et al, 2015; Karairmak & Figley, 2017), arguments and evidence which demonstrate that under certain conditions resilience can be trained are also pervasive (i.e. Ramey et al, 2017; Robertson et al, 2015). Therefore, after careful consideration of available evidence and theory, the current thesis takes the view that without intervention resilience is a relatively stable trait, while also recognizing that it may also be possible, under the right circumstances such as through targeted training, to enhance levels of individual resilience.

## Resilience as a moderator of well-being outcomes

As discussed above, resilience is generally believed to play a moderating role in the relationship between adversity or stress and its outcomes in that the process of resilience intervenes following adversity to allow the individual to bounce back once the stressful period has passed (Griffith & West, 2013). When resilience occurs, an individual would be expected to recover from an adverse experience and return to their former state of relative well-being (Carver; 1998). Luthar et al (2000) propose two conditions as critical to the notion of resilience. Firstly, is the exposure to significant threat or adversity, and second, the ability to positively adapt despite experiencing adversity. When resilience is low, positive adaptions to negative or traumatic events are expected to be more difficult, meaning that negative well-being outcomes become more likely (Masten, Best & Garmez, 1990).

One of the aims of this thesis is to understand why some individuals suffer more negative outcomes of setbacks and failure than others. Moenkemeyer et al (2012) would suggest that an individual’s ability to recover emotionally from failed or challenging innovations lies in their Innovator Resilience Potential (IRP). According to Moenkemeyer et al, an individual’s potential to recover from the emotional trauma of innovation failure depends upon their ability to recover from adversity while also maintaining their personal innovativeness and the strength to deal with future setbacks. They suggest that an individuals’ IRP is determined by six factors – self-efficacy, outcome expectancy, optimism, hope, self-esteem and risk propensity. It is, they suggest, varying levels of these factors which determine whether an individual will weather the emotional storm of setbacks and failure and become motivated to engage in future innovation projects, or whether their experiences will cause them to disengage from future innovative activities.

With the exception of Moenkeymeyer et al (2012), very little evidence exists which explores failure as the traumatic trigger event which may stimulate the resilience – adaptation process. However, research from other more general fields which indicates the moderating effect of resilience on the well-being outcomes of traumatic events may provide some useful evidence for consideration.

For example, a couple of studies have found psychological resilience to be negatively related to distress in college students (Beasley, Thompson & Davidson, 2003; Mathias & Leci, 1999). Such studies lend credence to the idea that resilience may moderate well-being outcomes of negative events. In a study which explored well-being more generally, Griffith and West (2013), found that when resilience training improved resilience competencies, soldiers showed enhanced well-being following stressful events compared to their well-being following stressful events prior to the resilience training. There may be some controversy over this finding, since many see resilience as a relatively stable trait, and therefore not capable of changing though training. However, Griffith and West argue that it is possible to adapt through training, an aspect of cognition related to resilience whereby individual’s display irrational beliefs following a traumatic event which cause them to misinterpret events thereby making coping and adaptation difficult. It is argued that training which dislodges these negative cognitive biases improves resilience (Reivich et al, 2011). The improvements in well-being following resilience training may be linked to evidence which suggests that following a negative event, resilience may moderate emotional outcomes (Ong et al, 2006). A number of authors have found evidence to suggest that following an adverse event, resilience triggers coping mechanisms which lessens negative emotions and increases the likelihood of individuals experiencing positive emotions (Ong et al, 2006; Charney, 2004; Tugade & Frederikson, 2004). In turn, positive emotions have been found to enhance well-being (i.e. Frederikson, 2000). As such, resilience training which enhances resilience competencies such as in the study by Griffith and West (2013) may have led to improved well-being because of a positive impact of resilience on emotion following a stressful event.

## Resilience as a moderator of innovative work behaviour outcomes

As discussed above, Moenkemeyer et al (2012) noted the important links between innovation project setbacks and resilience. Moenkemeyer et al’s (2012, p. 627) views on the importance of resilience in innovation projects specifically stem from the idea that setbacks and failure are a common part of innovating and that “…after such setbacks, it is vital to maintain or even strengthen project members’ innovative capabilities for subsequence innovation projects.”

Resilience then, may have particularly close links to IWBs compared to other work behaviours because of the increased frequency of setbacks and failures that individuals may encounter as a part of their innovative endeavours (Amabile et al, 2002). In addition, the requirement for them to ‘bounce back’ and continue to innovate despite experiencing setbacks and failures makes high levels of resilience even more key to the effective functioning of innovators (Shepherd & Kuratko, 2009). In the last decade evidence has begun to emerge to suggest that setbacks and failures may have negative and at times detrimental effects on innovators (Doyle et al, 2017; Shepherd et al, 2009; Shepherd et al, 2009; Valikangas et al, 2009). Therefore, resilience and the ability to bounce back following setbacks and failures may be particularly important in moderating levels of IWB in innovators and protecting them from harmful outcomes.

Most relevant literature focuses on the relationship between failure, resilience and subsequent work performance, with little focus on setbacks specifically. This thesis views setbacks and failure as similar constructs but with varying degrees of severity, and as such, failure literature may, to some extent, also be applicable to setbacks. Most relevant research in this area has tended to focus predominantly on entrepreneurs rather than innovators. As discussed above, entrepreneurs share many of the same traits as innovators although they tend to work more independently and are often self-employed while innovators are more likely to work in teams as part of a wider organization. However, given the fact that both entrepreneurs and innovators are working innovatively, entrepreneurial research is valid here. Shepherd and colleagues have been the most prolific researchers in this area. Shepherd et al (2011) found that entrepreneurs with the strongest coping orientations more effectively healed the ‘wounds’ of failure and suffered shallower wounds than those with less effective coping mechanisms. Singh et al (2007) also found that coping strategies were important for learning and recovering from failures. Shepherd and Cardon (2009) argued that self-compassion, a factor closely aligned to resilience, is a key factor in grief recovery and learning following project failure. Doyle et al (2017) suggested that resilient individuals were likely to have more effective coping strategies which enhanced learning and self-recovery following innovation failures. These findings suggest therefore that resilience may be an important moderator in the relationship between setbacks/failures and IWB and based on this evidence one would expect to find that those higher in resilience display higher levels of IWB following setbacks and failure compared to those low in resilience.

Recent research however suggests that the relationship between resilience and IWB may not be quite so straightforward. Doyle et al (2017) provide evidence which suggests that levels of resilience may have threshold effects in terms of innovative recovery post failure. Their qualitative study focused on 11 entrepreneurs following an innovation failure. They found that while entrepreneurs did display ‘resilience’, they found that stability in their levels of resilience was more important in their ability to re-engage with innovation following failure than high levels of resilience. This finding may be explained by considering the frequency with which innovators have to deal with setbacks and failures. It is possible that emotional highs and lows are counter-productive and that innovators instead learn to stabilize their coping mechanisms throughout the process. Stable levels of resilience throughout the highs and lows of the innovation process may therefore be the most effective means of managing the emotions associated with it and ensuring ongoing effective innovation. Doyle et al (2017) still posit that resilience is very important in recovery from failures. Their findings add greater credence to the construct approach to resilience which sees resilience as a state that can be developed over time (Luthans et al, 2006; Masten, 2001) as opposed to the trait approach which sees resilience as something that people either do or do not possess (Bonanno, 2012).

## Resilience as a moderator of motivational outcomes

To the knowledge of this author very little research exists which considers how resilience may moderate motivational setbacks and failure outcomes. Even general research which explores the relationship between resilience and motivation is sparse. One exception is, again, the recent work of Moenkemeyer (2011) and Monekemeyer et al (2012). They suggest that resilience may be fundamental to innovative team member’s motivation to innovate following a setback or failure.

As discussed above, Moenkemeyer et al (2012) developed a construct that they termed Innovation Resilience Potential (IRP). The IRP construct includes factors which they propose enables the recovery from an adverse event (innovation failure) and also the potential to cope with failure and maintain personal innovativeness following failure. Moenkemeyer (2011) argues that resilience may moderate innovation failure outcomes in two ways. Firstly, that resilience influences the outcomes of a failure, and secondly that experiences accrued during the adverse event (failure) may also influence an individual’s Innovator Resilience (IR), thereby altering that individual’s functioning on future similar tasks. As such, Moenkemeyer (2011, p.2) defines IR as “the potential for positive functioning for the accomplishment of innovative tasks after a professional setback and for better coping with future setbacks.”

Moenkemeyer et al (2012) used a case study of a failed large-scale innovation project to empirically test their theory that resilience moderates the relationship between project termination and subsequent motivation to embark on innovative projects. Results supported their theory but to date, it has not been tested empirically by any other researchers.

## Section summary

We may be able to draw a number of conclusions relating to the moderating effect of resilience on the relationship between resilience and innovation setback and failure outcomes based on the above literature. Firstly, in terms of the current model, one may expect individuals high in resilience to recover more quickly from the negative emotions associated with innovation failure compared to those lower in resilience. Resilience may also moderate the relationship between innovation failure and motivation to innovate, with those higher in resilience being more likely to learn from the failure and more motivated to innovate again in the future. If follows then that another possibility is that individuals higher in resilience may be more likely to experience subsequent innovation success following a failure than those lower in resilience. Resilience may also buffer the effects of setbacks and failure on IWB by stimulating coping mechanisms and helping individuals to heal the wounds associated with setbacks and failures.

## Hypothesis Four

Individual hypotheses are presented for each moderator variable and as such, based on the evidence presented in the sections above, the following hypothesis follows:

**Hypothesis 4: Resilience moderates the negative relationship between innovative project setbacks/failures and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high resilience the relationship is less negative than for those with low resilience.**

The next moderating factor that we will explore is supervisor feedback.

## Normalization of failure as a moderator of innovation setback and failure outcomes

Normalization of failure is a management technique whereby the extraordinary (i.e. failure) is rendered ordinary (Ashforth & Kreiner, 2002; Shepherd et al, 2011). In order to understand how normalization of failure may moderate the relationship between innovation setbacks and failure and outcomes, it is important first to understand how the process of normalization unfolds.

Normalization involves diffusing or reframing negative emotions associated with failure (Ashforth & Kreiner, 2002). *Diffusing* involves attempts at dissipating negative emotions in order to lessen their impact. This might be achieved in a number of ways such as through humour (i.e. through the use of jokes; “It was a rubbish idea anyway”), weakening the impact of the failure (i.e. by indicating that responsibility for the failure is shared, or by discussing other, more serious failures thereby minimizing the relative importance of the current one). Ashforth and Kreiner (2002) note that social relationships and perceived support are absolutely essential to the diffusion method of normalization, because without the types of relationships where humorous exchanges can take place, diffusion of the negative emotion may not be possible.

Secondly, *reframing* involves providing differing accounts of the situation so that the interpretation of the situation may be less dire (Ashforth & Humphrey, 1995). For example, in an innovation failure situation, a manager may focus attention on the positive outcomes of the failure such as what has been learned as a result, thereby reducing the negative associations with the failure and in turn, diminishing negative emotional responses.

Ashforth and Kreiner (2002) propose that two additional techniques should also be considered as methods of normalization; *adaptation* and *ritualism*. These may be particularly salient in terms of normalizing failure. Adaptation refers to the process through which reactions to adverse events such as failure are reduced. Ashforth and Kreiner (2002) argue that this may be achieved through the process of habituation whereby repeated exposure to stimuli reduces its impact. In an organizational setting, this may be achieved by open discussion about all failures that occur within that organization. Therefore, when individuals experience failures of their own, the exposure to previous failures of others may have resulted in habituation thereby normalizing their emotional response to that failure.

Finally, *ritualism* refers to consistent behaviours and approaches that the organizational culture employs for dealing with specific situations (Ashforth & Kreiner, 2002). Ritualism in an organizational setting may provide comfort and reassurance because individuals come to expect and predict the outcomes associated with specific events such as failure (Ashforth & Kreiner, 2002). This reduces uncertainty and helps to counteract the negative outcomes of adverse experiences. Therefore, if an organization has a ‘ritualized’ ways of dealing with failure which is part of the culture and visible for all to see, this should lead to predictability in terms of the organization’s responses to failure and would be expected to help to normalize failure thereby reducing negative emotional outcomes (Shepherd et al, 2011).

### Normalization of failure as a moderator of well-being outcomes

Normalization of failure may have close ties to well-being, via its impact on emotion. The development of this technique finds its origins in the commonly held view that negative emotions, particularly strong ones such as anxiety and anger can have harmful long-term implications such as performance deficits (i.e. Weiss & Cropanzano, 1996) or well-being (Maslach, 1982). Proponents of normalization therefore argue that approaches which regulate the experience of negative emotion may help to negate the harmful outcomes associated with them, thereby reducing the likelihood of well-being being negatively impacted by strong negative emotions (Ashforth & Kreiner, 2002). Where emotions are ‘normalized’, this means that attempts are made to diffuse or reframe negative emotions following an unpleasant experience in order to preserve the emotional status quo and avoid the harmful outcomes of negative emotions associated with poor well-being, such as stress and burnout (Ashforth & Humphrey; 1995). In terms of failure then, organizations which aim to normalize failure have in place norms and routines which point towards failure as commonplace (Shepherd et al, 2009), with the aim of regulating the occurrence of undesirable negative emotions following failure. Where failure is normalized therefore, it would be expected to be less likely to have a significant personal impact on an innovative individual therefore reducing negative emotions and rendering negative well-being outcomes less likely. As such, the current research predicts that normalization of failure moderates well-being outcomes in so much as those low in normalization of failure show a steeper decline in well-being as setbacks and failure increase compared to those higher in normalization of failure.

### Normalization of failure as a moderator of IWB outcomes

The high setback and failure rates associated with innovation projects make normalization of failure a particularly important consideration in innovation projects, more so perhaps than other work-related endeavours. In addition, high failure rates teamed with the need for innovators to re-engage with innovation and continue to display high levels of IWB following setbacks and failures (Doyle et al, 2017; Shepherd et al, 2011) makes normalization of failure a potentially important and powerful management tool. These factors alone point towards normalization of failure as a possible moderator of the relationship between innovation setbacks and failures and IWB outcomes.

A number of scholars in recent years have presented evidence to suggest that innovation can evoke negative emotional responses in innovators, particularly where there are setbacks and failures involved (Cardon et al, 2012; Choi et al, 2011). For example, Orla and Shepherd (2015), in a multiple case study of innovation failures, found that almost without exception, those leading the innovation suffered negative emotions as a result of the failure, although the outcomes of these negative emotions differed depending on coping and sense making strategies. In a similar vein, Vuori and Huy (2016), conducted a qualitative study of Nokia following its demise from a position of market-leader. They found evidence of significant negative emotions displayed by top and middle level management, and that this negative emotion took shape as affective reactions which were akin to fear. This fear resulted in inaction and a decline in ongoing innovative work behaviour. The role of normalization of failure as a management tool is to reduce the negative impact of emotions using the techniques described in section 5.7 above (Asforth & Kreiner, 2002). In situations such as the Nokia case study presented by Vuori and Huy (2016), the use of normalization of failure techniques may have reduced the experience of negative emotions which in turn would be expected to buffer the effects of negative emotions on IWB outcomes. Shepherd et al (2011) presented evidence in support of this proposition. They found that those who perceived failure within their organization to be highly normalized displayed significantly lower levels of negative emotion than those who perceived low levels of normalization of failure within their organizations. Similarly, Orla and Shepherd (2015) found that cognitive strategies similar to normalization of failure, which focused attention on the failure and encouraged learning were helpful in reducing levels of negative emotions following failure. The above evidence therefore provides some theoretical support for the argument that normalization of failure may moderate the relationship between setbacks and failure and IWB outcomes.

To my knowledge, no research currently exists which explores the relationship between normalization of failure and innovation setbacks. The current research aims to bridge that gap, with the assumption that high levels of normalization of setbacks should result in improved levels of IWB following innovation setbacks.

### Normalization of failure as a moderator of motivational outcomes

One view of the moderating effect that normalization of failure may have on motivation to innovate may be drawn from more general literature. A body of research exists which suggests that, as normalization of failure proponents suggest, the way in which an organization responds to a failure may moderate the relationship between setbacks and failure and their outcomes. For example, evidence suggests that individuals or firms that penalize those held responsible for failure are likely to hamper future innovative and entrepreneurial efforts motivation to innovate (McGrath, 1999). Cardon and McGrath (1999) agree with this stance and suggest that when organizations penalize failure, those not involved in the project or innovation avoid the cost of failing but are aware of the penalties that others have suffered and therefore their own involvement in innovation may seem like an unappealing prospect. This, they argue, not only harms the reputation of innovators involved in the failed innovation but it also threatens future innovations as individuals seek to avoid association with subsequent innovation projects in order to protect themselves against failure and subsequent rebuke and are therefore less motivated to innovate. This suggests therefore that normalization of failure, which reduces the possibility of employees perceiving their organization as punishing failure, may have a positive moderating effect on motivation following failure, team or organization-wide.

However, evidence in this area is somewhat inconsistent. While normalizing failure may be an important tool for lessening negative emotional reactions to failure and enhancing opportunities for learning as discussed in the previous section, Shepherd and Kuratko (2009) also note that there is a downside to normalizing failure. They argue that normalizing failure may hamper future motivation, because in reducing the potential for negative emotional responses to failure, the level of commitment, drive to succeed and motivation in future innovative projects may also be reduced. This is closely linked to research discussed in Chapter 4 (4.9.3) above, which suggested that under certain circumstances, failure actually increased motivation to perform subsequent similar tasks (Follette & Jacobson, 1987; Cardon & McGrath, 1999). In light of the potential for normalization of failure to have a positive moderating effect on emotion and well-being, but a negative moderating effect on motivation, Shepherd & Kuratko (2009) and Shepherd et al (2011) suggest that instead of normalizing failure organizations should develop support mechanisms tailored to help individuals regulate and manage their emotions relating to the project failure while also learning from that failure and developing the drive to succeed on future projects.

The weight of evidence suggests a positive effect of normalization of failure on motivation, although there is some evidence of a negative effect, particularly in the longer term. The current thesis therefore notes the strongest available evidence and proposes a relationship whereby normalization of failures moderates the relationship between setbacks/failure and motivation with low levels of normalization of failure showing a steeper decline in motivation following setbacks and failure compared to those higher in normalization of failure.

## Section summary

Based on the above literature review, we may be able to draw a number of conclusions in relation to how normalization of failure may moderate the relationship between innovation failure and outcomes.

Firstly, in organizations where failure is normalized in order that failure may be viewed as an ordinary, run of the mill outcome of new projects, more regulated emotional responses would be expected compared to organizations where there is no culture of normalizing failure (Shepherd & Kuratko, 2009) and this is expected to enhance well-being and IWB following setbacks and failure. In organizations with a strong culture of normalizing failure, emotional responses to failure may be expected to be less negative, less extreme (i.e. grief), and less likely to be sustained over long periods of time allowing individuals the opportunity to recover levels of well-being and re-engage with innovative work behaviours.

The predicted moderating effects of normalization on motivation to innovate are less clear. However, strong negative emotions such as grief (Shepherd & Kuratko, 2009: Shepherd et al, 20011; Shepherd et al, 2013) and affective well-being responses to negative emotions such as stress and burnout (Huhtala & Parzefall, 2007) may hamper motivation, in which sense, a reduction in negative emotions through normalization of failure may help to improve subsequent motivation to innovate. However, some degree of negative emotion following failure has been found to be helpful in motivation to perform similar tasks in the future (i.e. Badovick, 1990; Badovick et al, 1992). That said, innovation is a particularly emotive process and failure of innovative projects have been found to have a considerable negative emotional impact (Shepherd et al, 2009). Therefore, given the degree of emotions involved, normalization of failure would be unlikely to eradicate negative emotions associated with failure entirely.

## Hypothesis Five

Based on the evidence presented in the sections above, the following hypothesis follows:

**Hypothesis 5: Normalization of failure moderates the negative relationship between innovative project setbacks/failure and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees in organizations with high normalization of failure the relationship is less negative than for those with low normalization of failure.**

The next moderating variable to be discussed is supervisor feedback.

## Supervisor feedback as a moderator of innovation setback and failure outcomes

The next factor to be explored which it is argued may be an important moderator of well-being, IWB and motivational outcomes of setbacks and failure, is feedback. Bos-Nehles et al (2017) argue that the role of the supervisor in improving innovative work behaviours amongst employees cannot be overstated. This idea is supported by the work of Damanpour and Schneider (2009) who found that leaders who were pro-innovation and had innovative mindsets and leadership styles, significantly enhanced the adoption and implementation of innovative ideas within their work groups. When employee performance does not meet required standards or when projects face unanticipated challenges, it is generally considered important for them to understand the reasons why this may be the case (Weiner, 1985b), so that they may learn from setbacks and failure (Shepherd, 2003) improve their future performance (Hareli & Weiner, 2002) and gain better understanding of their own capabilities (Hareli & Hess, 2008). Feedback from others is often the conduit through which this may be achieved (Zikmund-Fisher, 2004). Whether formal or informal, evidence indicates that feedback may play an important role in the outcomes of setbacks and failure (Hareli & Hess, 2008).

While the current research is interested in the moderating effects of feedback, consideration of evidence which explores the direct effects of feedback on outcomes is useful given that certain positive or negative behaviours and performance often prompt feedback. The popular view of the relationship between feedback and emotional outcomes suggests that, in general, negative feedback results in negative emotions (i.e. Nowack, 2009; Smither, London, & Reilly, 2005). In a similar vein, research generally suggests that negative feedback is associated with a decline in motivation whereas positive feedback produces the opposite outcomes (i.e. Thomas Li-Ping & Sarsfield-Baldwin, 1991). However, a more detailed examination of the literature reveals that the relationship between feedback and well-being, IWB and motivational outcomes may not be that clear cut.

In reality, evidence relating to the effects of feedback on well-being and motivation tend to produce very varied results (Kluger & DeNisi, 1996; Locke & Latham, 2002). Kluger and DeNisi (1996) for example, in their meta-analysis of feedback research, found that fewer than 50 percent of feedback interventions improved performance, while over one third of feedback interventions actually decreased performance. Steelman et al (2004) found that negative feedback, rather than resulting in negative outcomes, was related more strongly to positive behaviours. They found that when negative feedback was perceived to accurately reflect performance, feedback recipients were likely to seek out additional feedback, were more motivated to use the feedback and were also more satisfied with the feedback, compared to those who had received positive feedback. In order to make predictions in terms of how feedback may moderate failure outcomes therefore, it is important to consider evidence relating to how different forms of feedback may impact well-being, IWB and motivational related outcomes differently. We therefore review evidence relating to feedback factors which appear to have the greatest impact on well-being, innovative work behaviour and motivational outcomes. It is noted that some of the evidence presented below considers feedback as having a direct rather than a moderating effect upon outcomes. It will be noted when this is the case.

## Supervisor feedback as a moderator well-being outcomes

Prior to providing feedback to an employee involved in a failed project, managers must make decisions with regards to the main causes of a failure. These may be referred to as causal attributions. Evidence exists which suggests that the type of causal attributions made and communicated to employees may impact emotional outcomes.

For example, Hareli and Hess (2008) found that causal attributions in explanations for failure given during feedback were closely linked to the elicitation of hurt feelings, anger, shame and guilt. Their research was based on Weiner’s (1985a, 1986) theoretical framework, and considers there to be three dimensions of perceived causes of failure. Firstly, locus of causality, referring to whether causes are internal or external to the individual. Secondly, controllability, whether the causes were controllable or uncontrollable, and finally, stability, whether the causes were varying or unvarying over time. They found evidence to support their view that the information conveyed during feedback with regards the causal attributions that the feedback givers had made for the failure determined the extent of hurt feelings and negative emotions displayed following the feedback. For example, where feedback implied that causes attributed to the failure were internal (i.e. the individual was responsible) and stable (i.e. the internal characteristics which caused the failure are not likely to change over time), this type of feedback was likely to lead to strong feelings of hurt, anger, shame and guilt. On the other hand, feedback communication which suggested external, unstable causes was much less likely to result in strong displays of emotions such as anger, shame and guilt. Interestingly, Hareli and Hess (2008) found no relationship between perceived validity of the managers’ causal attributions and the emotional response to it. Therefore, what the feedback giver perceived to be the cause of the failure was more pertinent to individuals than whether they felt the interpretation was valid.

It may be fair to say that conveying setback or failure related feedback to subordinates is generally an unwelcome task (Gaddis et al, 2004). As Larson (1986) noted, leaders often feel uncomfortable about providing negative feedback because of the expectation that it may result in unpleasant reactions from feedback recipients. As such, leaders often delay giving this type of feedback until the performance has fallen so far below tolerable thresholds, that feedback is no longer avoidable (Gaddis et al, 2004). Therefore, leaders giving setback or failure feedback may be more likely to display emotions such as anger and disgust than leaders who are giving more favourable feedback (Baron, 1990). It could be argued therefore that feedback relating to setbacks or failure is more likely to amplify negative outcomes than other more positive feedback because of the emotions displayed by leaders. A study by Gaddis et al (2004) produced evidence to support this in their research which found that negative leader affect displayed during feedback was more likely to result in performance deficits than feedback given by leaders displaying more positive affect. To conclude, it is likely that following setbacks and failure, feedback which is perceived more negatively is likely to moderate the relationship between setbacks/failure and well-being outcomes whereby those who perceive the feedback received as lower quality are likely to show a steeper decline in well-being following setbacks and failure compared to those how give better quality feedback ratings. As such perceived quality of supervisor feedback seems key and an appropriate measure was selected on this basis as will be discussed in more detail in Chapter 6 (6.4.4) below.

## Supervisor feedback as a moderator of innovative work behaviour outcomes

Supervisors appear to play an important role in fostering high levels of innovative work behaviour in their teams and in the wider organization (Alpkan et al, 2010; Bystead & Jespersen, 2014). One of the management practices that has been found to impact IWB outcomes is quality of the feedback administered to individuals relating to their innovative performance (Bystead & Jespersen, 2014). Feedback is particularly salient in respect to IWB for a number of reasons. Firstly, performing IWBs often means stepping into unknown territory because of the uncertainty associated with innovations. As such, feedback from supervisors signals whether the decisions that they are making are supported and this acts to reduce the uncertainty involved with making complex decisions in an ambiguous environment (Battistelli et al, 2013). Secondly, given the frequent setbacks that individuals are likely to encounter during innovative projects, feedback provides regular opportunities to learn from those setbacks and create solutions for dealing with them (Cheng & Van de Ven, 1996). Thirdly, innovative projects are often described as being chaotic or out of control (Cheng & Van de Ven, 1996; De Meyer et al, 2002), and feedback has been found to allow individuals to regain or enhance control over their work performance (Hackman & Oldham, 1980). Therefore, following setbacks and failure, effective feedback may moderate outcomes by acting as a tool for enhancing levels of control and may therefore be expected to have a positive impact on IWB.

There exists some empirical evidence to support the view that supervisor feedback enhances IWB. For example, in a survey of public and private employees, Batisteli et al (2013) found that feedback significantly moderated the relationship between resistance to change and innovative performance, where strong feedback resulted in higher levels of IWB in both low and high resistance to change groups. This finding led Batistelli and colleagues to argue that it is possible to enhance IWBs even in employees who have a strong tendency to resist change, if appropriate feedback is provided about innovative activities.

Although empirical evidence relating supervisor feedback to innovative work behaviour is currently fairly sparse, available evidence does demonstrate a likely link, and as such exploring supervisor feedback as a potential moderator of the relationship between innovation setbacks and failure and IWB outcomes seems prudent. The effectiveness and quality of the feedback appears to be key and as such a feedback measure was selected which aims to assess overall quality of supervisor feedback. This will be discussed in more detail in Chapter 6 (6.64).

## Supervisor feedback as a moderator of motivational outcomes

Causal attributions communicated through feedback may impact motivational outcomes following setbacks and failure. For example, evidence suggests that feedback that focuses on things that individuals can change, rather than attributing causes to static dispositional attributes may result not only result in more positive emotions but may also increase future performance and motivation (Kaymaz, 2011; Smith & Ellsworth, 1985).

However, when feedback indicates that failure is attributed to a deficit in *innate ability*, feelings of helplessness may ensue (Henderson & Dweck, 1990; Thomas & Mathieu, 1994; Williams et al., 2000). Evidence indicates that when people feel helpless, they are more likely to ‘fear failure’, with associated modifications to behaviour which aim to minimize the risk of failure such as avoiding challenging or risky tasks, and reduced motivation to perform tasks associated with the failure (Silver et al, 2006; Thomas & Mathieu, 1994). In addition, helpless responses are also likely to result in a reduced ability to learn from failure (Dweck & Leggett, 1988; Nicholls, 1984). However, on the other hand, when feedback indicates *lack of effort* as the attributed cause of failure, individuals may respond by redoubling effort in order to master the skills required to achieve their goals. This is often referred to as a ‘mastery’ orientated attribution (Dweck & Leggett, 1988). Individuals who make mastery attributions are often found to be more motivated following failure because they remain optimistic about their ability to achieve a certain goal and maintain their effort even in the face of repeated setbacks or failures (Dweck & Leggett, 1988).

Therefore, the content of the feedback may be an important factor in determining the moderator effects of feedback on motivation following setbacks and failures, where for example, as discussed above, feedback which focusses on factors that individuals can change rather than things that they cannot, should improve levels of motivation following setbacks and failure. This may be closely linked to the quality of feedback provided by supervisors. In theory, supervisors who are more adept at providing feedback should through experience, understand the nuances in feedback giving and tailor their approach following setbacks and failures so that the moderating effect of the feedback is such that it has a positive impact on motivation. Steelman et al (2004) refer to the overall quality and context of feedback within an organization as the ‘feedback environment’. They developed the ‘Feedback Environment Scale’, which aims to measure the overall effectiveness of supervisor feedback by focusing on a number of different constructs which together aim to measure the overall quality of supervisor feedback. These constructs are: source credibility, feedback quality, feedback delivery, favourable and unfavourable feedback, feedback availability, and promotes feedback seeking. Evidence indicates that even when providing unfavourable feedback such as feedback that may be related to setbacks or failures, if measures of the feedback environment are high (indicating high quality feedback), then motivation is also likely to remain higher (Rosen et al, 2006; Steelman et al, 2004). This indicates that following setbacks and failures, quality of feedback should moderate the relationship between setbacks/failures and outcomes in so much as high quality feedback should be related to a less steep decline in motivation following setbacks and failures. With this in mind, a shortened version of the Feedback Environment Scale developed by Rosen et al (2006) was used in the current research.

## A note on team level and co-worker feedback

The above review has focused on supervisor feedback. However, in the course of this research, the potential impact of team-level and co-worker feedback was also considered. The importance of team-work and the support of co-workers during the challenging process of innovation is undeniable. Indeed support, not just from managers but from a wider social network has been found to be a key factor in the success of innovations (i.e. Nelson et al, 2010). In terms of feedback, employees receive feedback from multiple sources, including not just managers but also other team members and co-workers, and there is evidence to suggest that successful feedback outcomes are the result of quality, credible feedback from multiple sources (Steelman et al, 2004). With this in mind, the original approach to the current research was to include measures of both supervisor and co-worker feedback and the original pilot study survey contained both of these measures. However, following piloting it was clear from participant feedback that the survey was too long and too time consuming for participants, and that respondents found the inclusion of both measures of supervisor feedback and team level feedback to be repetitive. With this in mind, a decision was taken to remove the team-level measure from the survey and focus instead on the supervisor feedback measure. The importance of team-level feedback and support and its potential impact on outcomes is noted, and there is scope for future research which explores the relationship between team-level feedback and psychological outcomes of innovation setbacks and failure. For the purposes of the current study however, the moderating effect of supervisor feedback was deemed to be an important focus, given the challenges involved with innovation and the importance of quality supervision and management during the innovation process.

## Section summary

Research and popular rhetoric often suggests that the impact of feedback on well-being and motivational outcomes is fairly straightforward; that positive feedback produces positive well-being and motivational responses, whilst, conversely, negative feedback produces negative responses. However, the relationship between feedback and outcomes is far more complex than this. For example, a review of empirical evidence revealed some varied and inconsistent outcomes of feedback on well-being, IWB and motivation (Kluger & DeNisi, 1996). Therefore, in order to predict the moderating effect of feedback on failure outcomes, literature relating to the content of feedback and feedback style, effectiveness and quality of feedback was considered. The main conclusions reached were that following setbacks and failures, high quality feedback should reduce the negative effect of setbacks and failures on outcomes. High quality feedback would be feedback that is useful, supportive, contains both favourable and unfavourable feedback, and that there is a high level of supervisor availability (Rosen et al, 2006; Steelman et al, 2004). This type of feedback should address all of the considerations discussed above, such as if effective, the supervisor should have considered factors relating to control, should be emotionally balanced, and should be considerate when attributing the cause of the setback or failure. These findings highlighted the need to select an appropriate tool for measurement which encompassed all of these feedback quality factors and as such the ‘Feedback Environment Scale’ adapted by Rosen et al (2006) is appropriate to capture the moderating effects of feedback on outcomes. This will be discussed in greater detail in the survey measures section of Chapter 6.

## Hypothesis Six

Following on from the evidence presented in the above sections, the following hypothesis is presented:

**Hypothesis 6: Supervisory feedback moderates the negative relationship between innovative project setbacks/failure and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high supervisor feedback the relationship is less negative than for those with low supervisor feedback.**

The next section discusses the next proposed moderator variable; learning from setbacks and failure.

## Learning from setbacks and failure as a moderator of outcomes

Learning from setbacks and failure is referred to in the literature as ‘learning from failure’, and the following section will employ the generally used terminology. There exists a commonly held belief that we learn more from our failures than our success (Carmeli & Gittell, 2009; Valikangas et al, 2009). Researchers and business managers are generally in agreement with this stance and some argue that the ability to learn from failure is key to business success (e.g. Cope, 2011; Scott & Lewis, 1984; Shepherd, 2000). For example, Cope (2011) suggests that when individuals and organizations are able to learn from failure, this learning facilitates recovery and re-emergence from the negative outcomes associated with failure and promotes a renewed motivation to attempt the previously failed task again. Therefore, when organizations and individuals are able to successfully learn from failure, they may enhance their chances of future success (Green et al, 2003). Coelho & McClure (2005) go a step beyond this and suggest that “surviving firms that have learned from failure tend to be more profitable than they otherwise would have been.” (p. 17). This suggests that learning from failure can result not only in the motivation to perform again but may actually improve performance thereby making success more substantial than it might have been had the previous failure not occurred.

However, learning from failure is neither instantaneous nor automatic (Shepherd, 2003, Shepherd & Kuratko, 2003; Shepherd et al, 2009) and is never guaranteed (Shepherd & Kuratko, 2009). It has also been argued that a substantial body of literature relating to learning from failure is based largely on assumptions and lacks academic rigor (Cope, 2003). Therefore, this is an area worthy of greater investigation, and it is hoped that this thesis may help to further understanding of this currently under-researched area.

### How do we learn from failure?

The popular notion that we learn more from our failures than our successes has some grounding in theory and research. Evidence suggests that we can gain substantially more knowledge from non-routine events than from everyday events (Cope, 2003; Minniti & Bygrave, 2001). Failure, therefore, as a non-routine event is expected to provide the basis for accumulating knowledge of potentially significant value. It follows then, that individuals should be able to learn a great deal from failure. Not only can they learn about themselves and about the reasons why an innovation failed, but they may also learn about the nature of networks and relationships within their organization and the industry in which they operate (Cope, 2011). The main way in which people learn is by using feedback to revise their belief systems (Huy, 1999). Shepherd (2003) suggests that individuals are able to learn from business failure when they can use the information available about why the business failed and apply it to existing business actions and decisions. Therefore, it is expected that the previously discussed moderating variable feedback (section 5.8.) may be particularly key to learning from failure. This relationship will be discussed in more detail below.

Minniti and Bygrave (2001) describe the process of learning from setbacks and failure whereby agents (represented in their study by entrepreneurs) repeatedly engaged in uncertain, and therefore risky, activities, some of which prove to be successful and others which result in setbacks or failure. Over time agents learn from failures and repeat only actions that appeared most promising during previous efforts and discard those that resulted in failure. Minniti and Bygrave (2001) argue that previous success and failure experiences are cumulative and create a ‘bank’ of knowledge with regards to courses of action which may be prudent and imprudent when pursuing uncertain and risky activities. Research such as this is interesting with regards to the current thesis for a number of reasons. Firstly, it suggests that individuals may be more likely to achieve success if they have experienced failure in the past. Given that innovations are highly risky and prone to failure (i.e. Kanter, 2000); it could be argued that innovators are more likely than other employees to have experienced failures in the past. Therefore, innovators may be learning, not just from current setbacks and failure but may also draw on their bank of knowledge created in the aftermath of previous setbacks or failures. This indicates how important it is to consider innovation as a cyclical process where previous experiences impact future innovations.

However, as Shepherd and Kuratko (2009) note, learning from failure is not guaranteed. There are often significant barriers to learning following failure. As discussed in Chapter 5, failure, although a common outcome of innovation, carries a heavy social stigma (Cannon & Edmondson, 2005). Evidence suggests that this stigmatization can present a barrier to learning from failure by creating fear of failure and erosion of credibility (Cannon & Edmondson, 2005) which can cause individuals involved in a failure to respond in a number of ways. Some may try to cover up the setbacks or failure (Cannon & Edmondson, 2001) rendering learning from it unfeasible. Others may withdraw from their work group and from others involved in the innovation (Gausel et al, 2012). This creates a barrier to learning because learning from failure is heavily reliant upon communication and social interaction (Carmeli & Gittell, 2009). This is also closely linked to normalization of failure as discussed above and suggests that normalization of failure may enhance learning opportunities.

The relationship between setbacks and learning has not been studied previously but given that we can potentially learn from all of our experiences, understanding the relationship between setbacks, learning and outcomes seems like a worthy area for research. Dornblaser, Lin and Van de Ven (2000, in Van de Ven et al, 2000, p. 193) stumbled upon a potential relationship between setbacks and learning in their qualitative study which aimed to provide a more robust understanding of success and failure in innovation. One unexpected finding of this study was that setbacks, in the form of misinterpreted communications or incorrect judgments about the ways in which different parts of the process were connected led to misinformation and incorrect learning, which they termed ‘superstitious learning’. They found that these setbacks often contributed to later failures. With this in mind, then, understanding the relationship between setbacks, learning and outcomes seems important in terms of informing management practice in the field of innovation.

In line with one of the aims of this thesis, to understand why some individuals suffer more negative outcomes of setbacks and failure while others experience neutral or positive outcomes, we argue that the ability to learn from failure may be key. However, while some individuals and organizations accomplish learning from failure with relative ease, others are less adept at learning from failure. Just as the ability and opportunity to learn from failure varies from person to person, so too may the outcomes of learning from failure. The next sections discuss the relationship between learning from failure and failure and well-being outcomes.

### Learning from failure as a moderator of well-being outcomes

The importance of learning from failure, as discussed above, is fairly clear. What is less clear however is how learning may moderate the relationship between failure and well-being outcomes. Evidence in this area is relatively sparse. One body of evidence which points to learning as a moderator of well-being outcomes relates to the phenomenon of thriving. Evidence indicates that, following failure, some individuals not only recover from that failure, but that they go on to experience added benefits (or grow) following the failure (Carver, 1998). Aldwin et al (1996) suggests that when an individual experiences psychological and well-being decline due to an adverse event there can be a least four possible consequences. Firstly, a continued downward slide whereby the individual eventually ‘succumbs’. Secondly, with less serious outcomes but still with negative impact, the individual may survive but with impairment. The third possibility is that the individual may return to the pre-failure level of functioning meaning that recovery has taken place. The fourth possibility is that the individual may surpass pre-adversity functioning and go on to thrive (Aldwin et al, 1996; Carver, 1998). This phenomenon is often referred to as ‘thriving’ and indicates an increase in both positive emotions and well-being (Carver, 1998; Moenkeymeyer, 2011; O’Leary & Ickovics, 1995). Moenkemeyer (2011) argues that the ability to grow following a failure is absolutely essential to ensuring the sustained innovative efforts of innovators, and hence continuing the cycle of innovation. Moenkeymeyer (2011) argues that learning from failure appears to be a key factor in determining whether or not an individual will renew innovative efforts and display high levels of well-being following a failure (Moenkemeyer, 2011). Therefore, learning from failure may be an important moderating factor in understanding why some individuals experience well-being and emotional benefits of failure while others pay the costs, and points towards theoretical justification for the idea that learning from failure may be one factor which moderates the relationship between innovation setbacks/failure and outcomes whereby low levels of learning from failure are associated with a steeper decline in well-being following setbacks and failure compared to those higher in learning from failure.

### Learning from failure as a moderator of innovative work behaviour outcomes

Learning from failure has gained a considerable amount of credence as an aid to ongoing innovative efforts following innovation failures (Shepherd & Kuratko, 2009; Shepherd et al, 2011; Shepherd et al, 2014). Innovative work behaviour has three main elements; idea generation, promotion and realization, and arguably, learning from failure may be an effective moderator of each of these behavioural factors (Shepherd & Cardon, 2009).

Firstly, learning from failure provides the motivation for re-engaging with innovation and idea generating following failure as it aids grief recovery (Shepherd & Cardon, 2009; Shepherd et al, 2009). Learning and creativity have strong ties in the literature. Tahirsylaj (2012) for example found that IFF (Intelligent Fast Failure), a management tool which encourages learning from failure, was highly effective in stimulating idea generation following setbacks and failures as it demystified failure and removed the fear of repeated failure by heightening understanding of what went wrong previously, thereby allowing innovators to avoid those pitfalls in subsequent projects. In a similar vein, He et al (2016) found that learning through constructive feedback received from supervisors significantly enhanced incremental and radical creativity.

Secondly, there is also evidence to support the proposition that learning from setbacks and failure moderates the relationship between innovation project setbacks and the next behavioural dimension of IWB, idea promotion. Idea promotion largely involves engaging with individuals involved in the innovation project and also promoting the idea to potential end users (Kanter, 2000). However, setbacks and failure can result in breakdowns in communication, animosity and depleted group cohesion (Chien et al, 2012; Horibe, 2001; Janssen, 2003; Janssen et al, 2004) which hampers future idea promotion efforts. However, learning from failure has been found to soothe the relational wounds created by issues within the innovation process thereby improving idea promotion opportunities in future innovations (Shepherd & Cardon, 2009). This is because learning creates a sense of shared understanding amongst team members in relation to the setbacks and failure experienced (Farson & Keyes, 2002). Learning also helps to rebuilds trust both in the innovation process and in team members (Farson & Keyes, 2002; Tahirsylaj, 2012). Finally, learning reduces negative emotions associated with ‘blame’ by refocusing attention on future improvements rather than concentrating on past mistakes (Brown ,1999).

Third, idea realization behaviours within IWB may also be related to learning from failure and setbacks in a number of ways. Firstly, in enhancing the recovery of idea generation and promotion behaviours, it follows that reaching the final phase of the innovation process is automatically more likely as the effectiveness of the earlier phases have been enhanced through learning. In addition, realization is only possible with buy in from end users or customers and this is arguably one of the biggest potential stumbling blocks for any innovation (Damanpour & Schneider, 2006). However, experience and learning from previous issues in this area may well help innovators to traverse this difficult phase, through applying previously learned skills to new situations. Learning may also help to pre-empt such difficulties, thereby allowing upfront contingency planning to increase the chances of success in this area (Carmeli & Dothan, 2016).

Based on the above review, it seems that there is strong empirical support for the proposition that learning from failure moderates the relationship between innovation project setbacks and failures and innovative work behaviour, where higher levels of learning are associated with higher levels of IWB following setbacks and failure.

### Learning from failure as a moderator of motivational outcomes

Most research related to learning from failure has tended to focus on the measurement of performance outcomes. However, it is argued here that more research needs to be conducted which considers how motivation is affected by learning from failure, because in order to successfully perform following failure, individuals need not only the ability to act but also the motivation to do so. While the relationship between learning from failure and motivation has not been explicitly studied, there is evidence which points towards learning from failure and setbacks as a potential moderator of the relationship between innovation projects setbacks and failures and motivation.

Firstly, evidence suggests that without learning from failure, new knowledge is not created and explanations for ‘what went wrong’ do not exist (Carmeli & Gittell, 2009). When an individual is able to learn from a failure however, they may gain a clearer perspective of ‘what went wrong’ and display relevant emotional and motivational responses in line with that knowledge (Badovick et al; 1992). The relationship between emotions and motivation is far from clear-cut however, and negative emotions do not necessarily result in poor motivation as may be expected. It has been argued that following failure, learning may be key to renewed motivation to innovate because whether an individual learns good news from a personal point of view (“your performance was excellent, the failure was just bad luck.”), or bad news (“it was all your fault!”), the understanding reached through learning provides individuals with valuable information about how to proceed next time (Badovick et al,1992; Badovick, 1990; Corbett et al, 2007). Without learning from failure however, anxiety may paralyze future decision making and action, because without knowledge of ‘what went wrong’ previously the individual is faced with the fear that the same could happen again and motivation may therefore be reduced (Luscher & Lewis, 2008; Smircich & Morgan, 1982).

Learning from failure may also moderate the relationship between failure and motivation by influencing expectations of future success. Effective learning from failure enables individuals to focus on the core issues which resulted in the failure (Valikangas et al, 2009), and with this understanding comes the potential to avoid the same pitfalls in future endeavours (Corbett et al, 2007). This knowledge may enhance expectations of future success as uncertainty is diminished with the knowledge of issues that may arise and plans can be made for how to better deal with them in the future (Nash, McGregor & Prentice, 2011). The positive relationship between expectations of future success and motivation have long been established (Weiner, 1985b; Badovick et al, 1992). Therefore, it is argued that learning from failure may enhance motivation where expectations of future success are improved, but that motivation may decrease where learning either does not take place or where learning results in lowered expectations of future success.

A number of innovation studies also suggest that the experience of failure can have a positive impact on future innovative activities through learning from failure (e.g. Connell et al, 2001). Innovation failures present opportunities for learning (Green et al, 2003), and, as a result, success may be borne of failure (Shepherd & Kuratko, 2009; Shepherd et al, 2011; Shepherd et al, 2013). Although success is not an inevitable outcome of prior failure, some argue that the chances of success are greatly increased where learning from failure takes place (Shepherd & Kuratko, 2009; Shepherd et al, 2011; Shepherd et al, 2013). For example, in discussing his experiences of innovation failure, Yu (1998) reminisced that the “(failure) was devastating, and we went through all the stages of grief – denial, anger, acceptance. It was incredibly painful to the company and to me, personally. But we managed to become better as a result. It marked a real transition.” (in Dillon, 1998, p.1).

Many retrospective accounts of innovation paint a similar picture of devastating failure followed by ground-breaking success (i.e. Phitidis, 2013), and the common ground between such stories seems to be the ability to learn from failure. There has been evidence from the field of innovation which suggest that learning from failure can result in a greater likelihood of innovation success, thereby implying that these individuals become more motivated to innovate subsequent to the failure. Cannon and Edmondson (2001) for example, found that failure could result in positive and beneficial outcomes of innovation. They found that under the ‘ideal’ circumstances, previous failures can result in subsequent enhanced innovative activities. They argue that two capabilities increase the chances of learning from failure. Firstly, individuals or teams must be able and willing to take risks and secondly, they must feel able to confront failure rather than covering it up. It is under these circumstances, they argue, that learning from failure can occur and future innovation is more likely as a result. Taken together, the evidence indicates that learning from failure moderates the relationship between setbacks/failure and motivation, where higher levels of learning are associated with higher levels of motivation following innovation setbacks and failure.

## Section summary

There is clear evidence to suggest that learning from failure and setbacks may moderate the relationship between innovation project setbacks and failure and well-being, IWB and motivational outcomes.

Firstly, in terms of well-being, learning from failure may help to reduce negative emotions by helping individuals to refocus on positive learning points. This may lead to an increase in positive well-being and a state of ‘thriving’ despite previous adversity.

Secondly, learning from failure may help individuals to re-engage with IWB. Learning stimulates idea-generation, helps to heal rifts in relationships created by the setback or failure and helps to re-build trust.

Thirdly, learning may help to enhance motivation by focusing attention on what went wrong and why it went wrong, thereby ensuring that anxiety doesn’t paralyze future action.

## Hypothesis Seven

Based on the evidence discussed above, the following hypothesis is presented:

**Hypothesis 7: Learning from setbacks and failure moderates the negative relationship between innovation project set-backs/failure and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for individuals with high learning from failure the relationship is less negative than for those with low learning from failure.**

## Level of investment as a moderator of outcomes

Level of investment incorporates a number of different factors; innovation role (lead or non-lead), length of time spent on the innovative project (duration), and the percentage of time at work spent on the project. Level of investment (i.e. the amount of time, resource and emotional energy that an individual has devoted to an innovative project) is expected to be an important moderator of the relationship between innovation setbacks and failures and outcomes because those who have invested more in terms of time spent on the project, or effort expended have more to lose both emotionally and materially should it fail or suffer serious setbacks. The greater the investment, the more there is to lose and as such, projects with a greater investment are expected to have a stronger impact on outcomes than those with smaller investments of time and resources.

Evidence relating to how level of investment may moderate the relationship between innovation project setbacks and outcomes, well-being, innovative work behaviour and motivation is presented and discussed below.

### Level of investment as a moderator of well-being outcomes

There is a logical argument to be made that the greater the level of personal investment in an innovation project, the more pronounced the outcomes may be should an innovation suffer setbacks or failure. To begin this section, evidence relating to the moderating effect of role (lead or non-lead) on well-being outcomes is discussed, followed by other levels of investment constructs time spent on the project and perceived importance of the innovative project.

The innovation role is expected to moderate the relationship between innovation project setbacks and outcomes in so much as the well-being of those in a lead role are expected to be more negatively affected by setbacks and failures than those in a non-lead role. Chapter 2 (2.5.4) above discussed the role of innovation champions. Innovation champions are individuals who actively pursue and promote new ideas in order to make them a reality (Howell et al, 2005). A ‘champion’ may be an individual innovator, or, as is usually the case, they work as part of a larger team, taking on the bulk of the responsibility for an innovative project (Horibe, 2001). For the purposes of clarity and to match the measure used in the current study, the remainder of this thesis will refer to the innovation champion as the ‘project lead’.

The role of innovation project lead is often a challenging one. The innovation project lead must often place their reputation on the line by actively promoting the innovation and pushing it through despite resistance with often exists within organizations where new ideas are involved (Sergeeva, 2016). Therefore, should the innovation fail, this may harm the reputation and social standing of the project leader (Horibe, 2001) more so than non-lead team members who have been less active in promoting the project, which may result in a greater decline in well-being following setbacks and failure for those in a lead role compared to a non-lead role. Shepherd et al (2014) demonstrated this in their qualitative research of science and engineering R&D teams, in which they found that the individuals who had been most prominent in their promotion of a project reported feeling more embarrassed than non-leaders when that project later failed. In addition, the responsibility for the success of an innovative project ultimately lies with the project leader which means that should failure occur, the brunt of the blame may be placed at their feet, and where individuals feel personally responsible for a failure, this has been found to negatively impact well-being (Moldenhauer-Salazar & Valikangas; 2008; Shepherd et al, 2014).

Level of investment cannot be measured simply in terms of innovation project role however. The amount of time spent on the project and the percentage of time spent on the project relative to other tasks also denotes personal level of investment and may also moderate well-being outcomes. Evidence indicates that the impact of loss on emotional well-being is greater when what was lost was particularly important to someone (Archer, 1999), and as such, those who spend a significant amount of time on a project may hold greater personal importance regarding the success of that project than those who spend less time working on it. Shepherd et al (2014) found that the perceived importance of an innovation had a significant impact on the degree of negative emotional response displayed by individuals following failure, whereby those who perceived the project as being very important either to them personally or to the wider organization were more likely to suffer ill effects following failure than those who perceived the project as less important. It is therefore predicted that level of investment moderates the relationship between innovation project setbacks and well-being in so much as those more heavily invested (lead role, large amount of time spent working on the project) will display a stronger negative well-being outcome following setbacks than those less highly invested.

### Level of investment as a moderator of innovative work behaviour outcomes

As has previously been discussed, innovative work behaviour comprises three main components; idea generation, promotion and realization. In order to understand how level of investment may moderate the relationship between innovation project setbacks and innovative work behaviour, each of the components of IWB are considered in turn.

Firstly, idea generation has been found to be most effective where individuals have the time and mental capacity to attend to, process and reflect on new ideas (Paulus & Yang, 2000). However, high levels of investment in another project currently suffering setbacks or recently failed may interfere with the ability to process and reflect upon new ideas for a number of reasons. For example, setbacks and failures have been found to have a significant negative emotional impact on those highly invested in the innovation (Shepherd et al, 2011), and these strong negative emotions may interfere with the ability to focus on and process new ideas (Shepherd et al, 2014). In addition, dealing with the issues which may arise as a result of setbacks and failures may be a very time-consuming remit particularly for those in a lead role (Williams, 2011), and this may in practical terms make finding the time and energy to generate ideas difficult. Therefore, those more heavily invested in the innovation are expected to show a greater decline in the first component of IWB, idea generation, following innovation project setbacks.

The second component of innovative work behaviour is idea promotion, where innovators must rally support and encourage participation in the innovation. As was discussed previously in Chapter 2, in order to rally the level of support required for the innovation to proceed, the innovative idea must be proactively sold to those with the power to back the project (Kanter, 2000), and in order to promote the idea effectively, innovators must often stake their own reputations on the promise of the innovations’ potential to deliver (Shepherd et al, 2016). It is usually leaders or those most highly invested in the innovation project who would be the most active promoters of the innovation (Damanpour & Schneider, 2006). Therefore, it is also those with the most invested who have the most to lose should the project suffer serious setbacks or fail as they lose not only the project, but their reputations may also be hit. As such, the desire and ability to carry out ongoing and future idea promotion activities may be more greatly impacted by failure amongst those who were more highly invested in the project.

The same is arguably the case in relation to the third component of innovative work behaviour, idea realization. Individuals most highly invested in the failed or floundering project are likely to suffer much greater disappointments and negativity as a result of their previous efforts which may make the ability to pursue and realize future innovations, more challenging. It is predicted therefore, that high levels of investment negatively moderate the relationship between innovation project setbacks and innovative work behaviour.

### Level of investment as a moderator of motivational outcomes

This thesis also aims to explore whether level of investment moderates the relationship between innovation project setbacks and motivational outcomes. There exists some evidence to suggest that this may be the case, as will be discussed below.

The first evidence in relation to this potential moderation effect is related to the degree of loss felt by innovation team members. More highly invested individuals such as innovation leaders or those who have spent a considerable amount of time on the project are likely to place greater importance on the success of the project than those less heavily invested. As Archer (1999) notes, the greater the importance placed on something, the greater the sense of loss when one loses it. Strong negative emotions such as loss may lead to a fear of failure (Shepherd & Cardon, 2009) and fear of failure has been found to negatively impact intrinsic motivation (Castella et al, 2013). As such, level of investment would be expected to moderate the relationship between innovation project setbacks and motivation in so much as those more highly invested would be expected to show a greater decline in motivation as setbacks increase closer to the point of failure. However, it should be noted that the current research is interested not just in failure but also in setbacks, and the motivational processes are likely to be markedly different for setbacks compared to failure. For those more highly invested in the project, with more to lose as a result of failure, setbacks may in fact result in greater ‘fear of failure’ and fear of failure can be a strong motivator (Atkinson, 1957). As such, the moderating effect of level of investment on motivational outcomes may be different for setbacks compared to failures.

Another factor to consider is the differing perceptions and challenges presented by innovative projects for highly invested individuals compared to less invested individuals. Findings produced by Shepherd et al (2014) in their case study of R&D project teams, led them to argue that individuals who are highly invested in a project are often motivated not by outcomes but by pursuing and solving the challenges involved with the work itself. As such, when projects fail and the pursuit of the work is no longer an option, those most highly invested in the project may display a dip in motivation following failure due to a waning of available challenges. Should this finding be supported by the moderation analysis, it would suggest an argument in favour of quickly redeploying those highly invested in the innovation into new, challenging projects so that motivation does not diminish.

A final note in relation to evidence of the potential moderating effect of level of investment on motivation relates to differing stress levels likely to be experienced by highly invested versus less highly invested individuals. Those more highly invested in the innovation such as project leaders or individuals who have dedicated a significant degree of time to the project are more likely to suffer stress responses as a result of setbacks and failures than those less highly invested. Stress and burnout have been found to have a negative relationship with motivation (Houkes et al, 2001). One of the reasons for this may be that individuals suffering from stress and burnout tend to employ avoidance and withdrawal strategies as a means of coping (Wright & Cropanzo, 1998) meaning that their ability and motivation to innovate shows a steeper decline. With consideration of all of the available evidence in mind, while it is noted that level of investment may positively moderate the relationship between *setbacks* and motivation in some circumstances, the bulk of evidence points towards a potential negative moderating effect of the relationship between innovation project setbacks (including failures) and motivational outcomes.

## Section summary

The evidence discussed above points towards level of investment as a potential moderator of outcomes, well-being, innovative work behaviour and motivation.

Firstly, level of investment is expected to moderate well-being outcomes in so much as those more highly invested in the project are expected to be impacted more significantly and negatively in the event of setbacks and failure. Having staked their reputation on the merits of the project or having spent significant amounts of time and energy in efforts to achieve their goals, the well-being of more highly invested individuals is expected to show a sharper decline in the event of setbacks or failures compared to less highly invested individuals.

Secondly, level of investment is expected to have a similar moderating effect on innovative work behaviour. The different behavioural components of IWB are all expected to be impacted more significantly following setbacks and failures in those more highly invested in the project because of the stronger negative emotional reactions felt by highly invested individuals which may interfere with IWBs.

Thirdly, level of investment is expected to moderate the relationship between innovation project setbacks and failures and motivational outcomes. For those more highly invested, the sense of loss and heightened stress responses are expected to result in a decline in motivation following setbacks and failure.

## Hypothesis Eight

Based on the evidence discussed above, the following hypothesis is presented:

**Hypothesis 8: Level of investment in the innovation project (perceived importance, time spent on the project, and project role) moderates the negative relationship between innovation project setbacks and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees with low levels of investment the relationship is less negative than for those with high levels of investment.**

## Chapter Discussion

This chapter was aimed at addressing the second aim of this thesis, namely, to understand why some innovators suffer negative outcomes of innovation setbacks and failure while others experience more neutral or even positive outcomes of setbacks and failure. In order to address this aim, a number of factors were explored which may moderate the relationship between innovation setbacks/failure and outcomes. The evidence reviewed above suggests that setbacks and failure may not necessarily spell disaster for well-being, IWB and motivation because a number of moderating factors may buffer negative effects on outcomes.

Firstly, resilience was discussed as a factor which may allow individuals to rebound from setbacks and failure. High levels of resilience are expected to be related to higher levels of well-being, IWB and motivation following setbacks and failure because resilience reduces the experiences of negative emotion, enhances opportunities for learning and allows individuals to reframe failure experiences in a more positive light. Therefore, for those high in resilience the effects of setbacks and failure on well-being will be less severe than for those who lack resilience. Similarly, for high resilience individuals it is expected that the effects of setbacks and failure on innovative work behaviour will be less severe. And finally, highly resilient individuals are also expected to display less severe effects of setbacks and failure than those who lack resilience.

Secondly, evidence was reviewed relating to the relationship between setback and failure outcomes and supervisor feedback. Feedback allows individuals to gather information for use in future innovative efforts and also results in a perception of how others have attributed the causes of the failure. Therefore, for those who receive better quality feedback the effects of innovation project setbacks on well-being, innovative work behaviour and motivation are expected to be less severe than for those who do not receive high quality feedback.

Thirdly, normalization of failure is a management technique whereby the extraordinary is rendered ordinary. It positions failure as an everyday part of working life and is believed to lessen the negative social stigma associated with failure, thereby decreasing the negative emotions associated with it. It is believed to be an effective management tool, particularly for use in innovative projects (Shepherd et al, 2011), and the evidence discussed leads to the formulation of the following expected effects. For those who work in organizations where normalization of failure is high, the effects of innovation setbacks and failures on well-being are expected to be less acute. Similarly, high and effective normalization of failure is expected to reduce the negative impact of innovation setbacks and failure on innovative work behaviour.

Fourthly, setbacks and failure potentially provide valuable opportunities for learning, and are an essential source of knowledge for innovators. Learning from failure can provide the knowledge necessary to negate the risks associated with setbacks and failure and therefore enhance opportunities for future success. It is therefore expected, based on the evidence, that learning from setbacks and failure moderates the relationship between innovation setbacks and failures, and outcomes well-being, IWB and motivation in so much as those with high levels of learning are expected to display higher levels of well-being, IWB and motivation following setbacks and failure.

Finally, level of investment may moderate the relationship between innovation setbacks and failures and outcomes, where, the greater the level of investment, the greater the negative impact of setbacks and failures on outcomes.

# Chapter 6: Methodology

## Introduction

In order to address the hypotheses posed in the previous chapter, this research proposes a mixed methods approach using a combination of longitudinal surveys and qualitative interviews. Mixed methods research involves combining qualitative and quantitative data, in some or all of the phases of the research process (Creswell & Plano-Clark, 2011). Incorporating mixed methods into research designs is generally felt to enhance construct validity, provide a more holistic view of the phenomenon being studied, offer a richer understanding of the research questions, and is widely advocated as good research practice (Brannen, 2005; Creswell & Plano-Clark, 2011).

A mixed methods approach is particularly suited to the current study for a number of reasons. Firstly, the current research is interested in the personal and psychological outcomes of innovation project setbacks. Research suggests that while quantitative methods are useful for collecting data of this type because of the possibility of generalizing based on larger number of participants (Breakwell, Smith & Wright, 2012), quantitative approaches are weak in understanding the wider social context of people’s experiences (Creswell & Plano-Clark, 2011). Arguably, context is important in the case of the current study because the relationship between innovation setbacks and failure and its outcomes are likely to be extremely complex. As such, qualitative data will provide greater insight into the complex factors that may impact setbacks and failure outcomes and will also allow for better definitions of the two terms, while quantitative data will provide a larger data set from which generalizations may be made. Taken together, the mixed data should make it possible to form detailed and robust arguments in relation to the hypotheses.

Secondly, alone, quantitative and qualitative methods have a number of downsides. Quantitative data is often criticized for its rigidity particularly in a social research context (Onwuegbuzie & Leech, 2005), while qualitative research has issues in terms of bias introduced by researcher interpretation of information provided by participants (Corbin & Strauss, 2008). It is argued that combining the two approaches can offset the weaknesses of both (Creswell & Plano-Clark, 2011; Tashakkori & Teddie, 2003).

Thirdly, the current thesis presents fairly complex research problems. Creswell and Plano–Clark (2011) argue that when complex hypotheses and research questions are explored, the answers to them are not adequately supplied through the presentation of quantitative ‘simple numbers’ or qualitative ‘words’ alone. They argue instead that when complex questions are posed, both forms of data are necessary to provide reasoned and more sophisticated answers.

In the case of the current study, quantitative data will be collected through longitudinal surveys at two-time points containing mainly closed questions. Qualitative data will be collected through in-depth interviews with innovators. Important to the basic premise of mixed methods research is the ‘mixing’ of quantitative and qualitative data so that the two data sets are not analysed independently of each other but are instead mixed in some way so that a more complete picture of the phenomenon of interest is formed (Creswell & Plano-Clark, 2011). This is duly noted from the point of view of designing appropriate measures, the data from which may later be mixed, and this will be discussed in more detail in the analysis chapter.

The methods were selected to most appropriately match the hypotheses. Quantitative data was used for examining the strength of relationships between variables, whereas qualitative data was used to explore people’s understanding and interpretations of contested and ambiguous terms such as setbacks and failure.

### Justification for use of surveys

This research design will employ the use of a longitudinal survey, which will be described in detail in subsequent sections. As discussed above, the use of mixed methods allows researchers to combine the controllability of quantitative data with the ‘naturalness’ of qualitative research (i.e. Visser et al, 2000). In addition, there are a number of other reasons why surveys will be valuable in this particular research.

While interview studies generally involve relatively small numbers of participants, it is easier to gather larger amounts of data through survey studies, thereby making results more generalisable (i.e. Coolican, 2009). Survey data also allows for easier identification and analysis of themes within data and also makes it possible for the researcher to conduct analysis of relationships between variables (Visser et al, 2000).

Given the nature of the current research, which aims to identify how well-being and motivational responses to innovation setbacks and failure change over time and in light of other variables; surveys are expected to provide useful empirical data to compare at different points in time and will also allow for analysis of how moderator factors affect outcomes. Used in combination with data collected from interviews, it is possible to gather rich and detailed data relating to the areas of interest.

### Justification for use of qualitative interviews

It has been argued that social science research should be capable of “capturing life as it is lived” (Bolger et al, 2003, p.579), and the current research, being particularly interested in the psychological outcomes of innovation setbacks and failure, should arguably employ research methods which allow experiences to be studied in a form that has some grounding in the ‘real world’. Interviews may offer such an opportunity. Interviews also allow better understanding of individuals’ subjective experiences, by exploring ‘people’s grasp of their world’ (Ashworth, 2008, p. 4), as well as allowing the researcher to learn about relationships, experiences, and emotions (Weiss, 1994). All of these factors are of particular relevance to the current research given that the aim of the qualitative analysis is to provide a more nuanced description of the meanings of setbacks and failure from the point of view of innovators. The achievement of this aim will require an understanding of relationships, experiences and emotions, all of which are expected to effect innovators’ perceptions of setbacks and failure.

In addition, qualitative interviews provide opportunities for learning about “…the qualities and features which make a phenomenon what it is” (Coolican, 2009; pg. 333). This fits perfectly with the aim of providing a more robust definition of setbacks and failure and will allow better understanding of the qualities and features of innovation setbacks and failure thereby improving on current definitions. The following section provides a synopsis of survey measures used in the current research.

## Ethical Considerations

Ethics were carefully considered in relation to the current research and the Royal Holloway, University of London, ethical clearance process was followed. This involved discussing ethical considerations with PhD supervisors, completing relevant forms (which are available in Appendix B), and submitting these forms to supervisors for approval prior to the commencement of data collection. The following considerations which were relevant to the current research were carefully considered and followed.

### Informed consent

Informed consent was given by all participants, involved in both survey and interview data collection. Informed consent forms are available in Appendix C and D.

The following considerations were particularly relevant to the current research. The first point to note is that setbacks and failure may be a sensitive issue, but it was ethically necessary that the nature of the research and the specific focus on setbacks and failure was disclosed to all potential participants, so as not to mislead them.

The purpose and nature of the research was disclosed including the fact that one of the main interests of the research is to understand how innovation setbacks and failure may impact outcomes. Informed consent was clearly explained and it was made clear to participants that they have the right to decline involvement and withdraw from the study at any point.

### Protect from harm

The second point to note is that as research which is interested in innovation setbacks and failure, it is possible that the research would take place at a particularly stressful point in time for participants. It was therefore important that the research did not add any extra burden to the level of stress already felt by individuals, and that considerations were made that participants may be particularly vulnerable at this time

### Data protection, confidentiality, and anonymity

The third ethical considerations involve the collection of potentially sensitive data. Data may be considered sensitive because of its focus on failure, well-being and motivation. Therefore, it is important the following steps are followed:

* Respect confidentiality of participants
* Anonymize data and code data so that longitudinal data can be linked without participants being identifiable
* Safeguard records
* Given the focus on innovation, there was some concern from participating organizations about sharing proprietary information. Confidentiality was therefore guaranteed, and where relevant, non-disclosure agreements were signed by the researcher.

## Survey measures

Obtaining data which adequately captures the phenomenon of interest in the current study is entirely dependent on ensuring that the correct measures are used (i.e. Coolican, 2009). Descriptions of the measures which have been selected for each variable of interest are given below along with clear justification for their inclusion. The complete survey is available in Appendix A.

### Control variable measures

A number of control variable measures are included in the survey at time point one. These demographic measures are not included in the survey at time point two because data is collected using repeated measures and as such there is no need to collect this data twice. Justifications for the inclusion of each measure are presented below:

#### Age

While age has at times been cited as having a negative relationship with innovative behaviour (Mumford & Gustafon, 1988;), more recent research indicates that age and tenure may in fact have a neutral or positive relationship with innovative behaviour (Ng & Feldman, 2013; Scott & Bruce, 1994). With this in mind, age is included as a control measure in the current study. Age was measured using a categorized scale (18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75 or older)

#### Tenure

Tenure has been found to be an important consideration in innovation research. The longevity of employees involved in innovation may have a positive impact on their knowledge of tasks involved in the innovation process, the perceived legitimacy of their arguments relating to the innovation process and their ability to effectively manage the political process necessary to secure desired outcomes (Damanpour, 1991; Ng & Feldman, 2013). A measure of tenure is therefore included in the survey as a control. Tenure was measured using a categorized scale (1-3 years, 4-7 years, 5-10 years, 11-15 years, 15 or more years).

#### Gender and Education

Gender and education were also included as a measure to ensure that the possibility of socio-demographic differences leading to spurious results was controlled for (Janssen, 2003). Gender was measured using a simple male/female response option, and education was measured by asking the respondent to indicate their highest educational or vocational qualification to date (GCSE/O-Levels or equivalent, A-levels or equivalent, Degree, Postgraduate Degree, Other Vocational Qualification).

## Independent variable measures

### Measures of innovation project setbacks and failures

Identifying setbacks and failure in innovation projects is absolutely essential to the current study. However, setbacks and failure are renowned for being difficult to define and measure as discussed in Chapter 2. Therefore, two separate measures were employed. Firstly, a single response item measure which asked individuals about their perceptions of the current performance of the innovation, and secondly, a multi-item measure which provides more robust insight into the current performance of innovative projects.

Setbacks and failure are captured using the same measures, on the basis that low innovation project setbacks scores indicate that a project is close to successful completion whilst high innovation project setback scores indicate that a project is close to failure, with mid-range scores representing different scales of setbacks. Therefore, innovation project setbacks and failures will be referred to as “innovation project setbacks (single)” or “innovation project setbacks (multi-item)” for the remainder of the methodology chapter and within the quantitative analysis chapter.

The multi-item measure, the Project Implementation Profile (PIP) (hereafter, ‘Innovation project setbacks (multi)’) developed by Pinto and Prescott (1990) contained 14 items which aimed to measure how well a project was performing against various different parameters such as budget, time and end user acceptance.

In addition to the multi-item measure, a single item measure was included, largely as a ‘validity check’ for the innovation project setbacks (multi) measure. ‘Innovation project setbacks (single)” was a single item measure which asked respondents to indicate which of six options most closely represented the status of the innovation at present and is detailed below. Both the multi and single item measure will be described in detail below.

#### Single item innovation setbacks and failure measure

The below item was based on codings employed by Green et al (2003), in their study of factors which influence decisions to terminate innovations. The response scale to the item was considered to represent the different potential statuses of an innovation project. The item below was included for a number of reasons. Firstly, it identifies projects which are struggling and/or projects which have the possibility of failure. Secondly, it allows additional analysis of data relating to setbacks within projects and how such setbacks impact personal outcomes for innovators.

* *Which of the following most closely represents the status of the project at present?*

*Completed*

*Close to successful completion*

*Progressing well, with work still to do*

*Progressing, but with setbacks*

*Progressing badly, with the possibility of termination*

*Failed/Terminated*

Responses to this item were represented by a single number ranging from 1 to 6 depending on how well the project was perceived to be performing. Due to a low number of responses to option 5 ‘progressing badly with the possibility of termination’ in the main survey data at both time points, these responses were merged with option 4 (progressing but with setbacks) so as not to bias results. Table 6.1 below provides a breakdown of responses and percentage for each category at both time points prior to merging the final two response options.

Table 6.1: Responses by category for the Innovation Project Performance measure at Time 1 and 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Time 1 | | Time 2 | | |
| Item | N. | % of Total | | N. | % of total |
| Completed | 108 | 17% | | 25 | 6% |
| Close to successful completion | 59 | 9% | | 99 | 25% |
| Progressing well, with work still to do | 176 | 27% | | 166 | 42% |
| Progressing, but with setbacks | 292 | 45% | | 40 | 10% |
| Prog’ing badly, possibility termination | 16 | 2% | | 5 | 1% |
| Failed/Terminated | 0 | 0% | | 66 | 16% |
| Total N | 651 | 100% | | 401 | 100% |

#### Multi-item innovation project setbacks measure

For the remainder of this thesis, when referring to ‘innovation setbacks (main or other project)’ it is with reference to the multi-item measure. In addition to the single item setbacks and failure measure, project setbacks and failure was also measured using the multi-item Project Implementation Profile (PIP) which was developed by Pinto and Prescott (1990). The PIP was originally designed to monitor overall performance of projects, to allow managers to quickly and easily identify issues with projects and pinpoint the reasons for these issues. The PIP has been successfully used in the past to measure the performance of innovation projects (e.g., Behrens & Patzelt, 2016; Nerkar et al, 1996). This measure contains 14 items which aim to track the overall performance of a project. This measure has been used to successfully monitor projects, allowing researchers to track the likely success or failure of a project (Pinto & Prescott, 1990; Pinto & Mantel, 1990). Examples of items are “This project has/will come in one budget”, “I am/was satisfied with the process by which this project is/was being completed.” One additional item, added by Pinot and Mantel (1990) was also included in the current study, “Knowing what you now know about the status of the project, you would have developed this project.” All items were measured on a 7-point Likert scale ranging from strongly disagree to strongly agree which were reverse scored for analysis so that a high score indicates setbacks and failing projects.

The original PIP contains an additional 50 items which aim to measure 10 critical success factors: project mission, top management support, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, and trouble shooting. These items were not included as they were not directly relevant to the current research. Therefore, only the 14 PIP items measuring overall project performance were included in the current survey. These items were used to measure both performance on a main project (‘innovation setbacks (main)’) and performance on other innovation projects more generally (‘innovation setbacks (other)’). The 14 items for the two measures of main and other projects were computed by creating an average of the 14 items measuring each scale for the main analysis. For the sake of brevity, the label innovation setbacks (main or other) is used rather than ‘innovation setbacks *and failure’. It is assumed that high scores on the setbacks measure tend towards failure*.

The PIP is a well-regarded and comprehensively validated measure (Muller & Jugdev, 2012) which has been used in numerous studies since its creation (i.e. Zwikael et al, 2014; Pinot and Prescott (1990) note that the PIP may be used tactically depending on the specific requirements of the project and as such constructs may be measured independently such as in the case of the current research for which the focus was predominantly on measuring setbacks and failure for which the 14 item ‘project success’ construct was the most relevant.

## Dependent variable measures

### Measure of well-being

One of the main aims of the current research was to understand the impact of innovation project setbacks on the well-being of innovators. It was important therefore to carefully select an appropriate measure of well-being. Debate rages over how best to measure subjective well-being, and in line with this debate, there exist numerous tools which aim to assess well-being (Diener, 2009). For the purposes of the current study then, careful selection from the mass of available measures was very important. The scale used needed to meet a number of criteria. It needed to measure job-related well-being as opposed to more generic forms of well-being; it needed to be well tested and validated, and it needed be relatively short given the numerous other variables which were also measured in the current survey. With these factors in mind, Warr’s (1990) Affective Well-being scale was selected as the most appropriate scale for use in the current survey.

Numerous studies have utilized and tested Warr’s two-dimensional model of job related affective well-being and as a result have provided strong support and evidence in favour of its usefulness as a measure of affective well-being in the workplace (e.g. Payne & Cooper, 2001; Van Katwyk et al, 2000). Warr’s scale is considered to provide rich insight into the affective and emotional reactions to experiences on the job, which correlate well with measures of other work variables such as work pressure, job demands and role conflict (Payne & Cooper, 2001) and without being confounded by more general job satisfaction components (Van Katwyk et al, 2000).

The original scale asks participants to indicate their responses based on the “past few weeks”. For the purposes of the current study, this was altered to the “past two weeks”. This alteration was due to the need to gather data at two different intervals. Therefore, a measure of “the past few weeks” was not considered to adequately gauge affective well-being relevant to a specific failure event. Therefore, the scale used to measure affective well-being used the stem:

*“Thinking of the past two weeks, how much of the time has your job made you feel each of the following?”*

The anxiety-contentment dimension is assessed using six adjectives: *tense, uneasy, worried, calm, contented,* and *relaxed.* The depression-enthusiasm dimension is assessed with the adjectives: *depressed, gloomy, miserable, cheerful, enthusiastic,* and *optimistic.* The response scale is: *Never (1), Occasionally (2), Some of the time (3), Much of the time (4), Most of the time (5), All of the time (6).* These 12 items were reverse scored where necessary and averaged for analysis such that higher scores indicate positive affective well-being.

### Measure of innovative work behaviour

Innovative work behaviour (IWB) was measured using Scott and Bruce’s (1994) IWB measure. This measure was further validated and updated by Janssen (2000), and it was this nine-item measure which was included in both surveys at Time 1 and at Time 2. The nine items are based on Kanter’s (1988) process model of innovation and included three subsets, each containing three items, which aim to measure Kanter’s three stages of innovation; idea generation, idea promotion and idea realization. These items are believed to combine to create an overall measure of innovative behaviour and is in line with the current research which broadly follows Kanter’s process approach to innovation.

The IWB has been widely used, is well validated and is considered one of the leading measures of IWB (De Jong & Hartog, 2010; Janssen, 2000; Janssen, 2001; Montani et al, 2014). The measure contained the stem: *“How often do you engage in the following behaviours?”* the measure contains 9 items and example items include, *“Creating new ideas for difficult issues.”,* *“Acquiring approval for innovative ideas”* and *“Introducing innovative ideas into the work environment*.” The response scale is 1-7 where 1 is ‘never’ and 7 is ‘always’. These nine items were averaged prior to analysis.

### Measure of motivation

A scale developed by Gagne et al (2014) was used to measure motivation. The Multidimensional Work Motivation Scale (MWMS) was developed with the aim of providing a measure of dimensions associated with self-determination theory for use in an organizational setting. The 19 item MWMS measures six different dimensions; amotivation, extrinsic regulation – social, extrinsic regulation – material, introjected regulation, identified regulation and intrinsic motivation. As discussed in Chapter 4 (4.9.3) above, the current research focuses on only the latter two of these dimensions; identified regulation and intrinsic motivation and as such only items measuring these dimensions were included for analysis in the following quantitative chapter. The MWMS has been validated across seven languages and in nine countries and is considered one of the leading work motivation scales in use today (Fernet et al, 2015; Gagne et al, 2015; Howard et al, 2016).

The measure contained three items for identified regulation, and three items for intrinsic motivation. The stem is “*Why do you or would you put efforts into your current job?”*, with the scale 1 = “not at all”, 2 =” very little”. 3 =” a little”, 4 =” moderately”, 5 =” strongly”, 6 =” very strongly”, 7 =” completely”. Items include: “*Because I personally consider it important to put efforts in this job” (identified regulation) and “because the work I do is interesting.” (intrinsic motivation).* Items relating to identified regulation and intrinsic motivation were averaged separately for use in the main analysis.

## Moderator measures

### Resilience measure

The current study is particularly interested in resilience in terms of the ability of individuals to ‘bounce back’ from adversity, such as the experience of setbacks and failure. Two studies in recent years have reviewed available resilience measures with the conclusion that few actually measure the ability of individuals to bounce back or thrive in the face of adversity with most, instead, measuring phenomena such as, for example, ‘resilience as a personality characteristic’ or ‘resilience as a coping behaviour’ (Ahern et al, 2006; Windle et al, 2011). The exception to this rule is the Brief Resilience Scale (BRS) developed by Smith et al (2008), with the aim of producing a reliable measure for assessing resilience as the ability to bounce back or recover from stress. Credibility was lent to the appropriateness of the BRS in a study by Windle et al (2011) who reviewed 15 resilience measurement scales and found that the BRS was amongst the top three measures in terms of psychometric ratings.

The stem for these items is: “*To what extent do you agree with the following statements?”* The following are examples of items contained within the BRS: “*I tend to bounce back quickly after hard times”,* **“***I have a hard time making it through stressful events.”* The BRS consists of six items scored on a scale from 1 – 5, where 1 = “strongly disagree”, 2 = ”disagree”, 3 = ”neutral”, 4 = ”agree”, 5 = ”strongly agree”. These items were averaged for the purposes of the main analysis.

### Supervisor feedback measure

Steelman, Levy and Snell (2004) developed what they call the Feedback Environment Scale (FES). The development of this scale was in response to findings of a meta-analysis of feedback outcomes research conducted by Kluger and DeNisi (1996) which found that feedback typically only results in moderately positive outcomes and that more than 38 percent of feedback interventions actually resulted in negative outcomes. The FES then, is a scale designed with the intention of better understanding feedback processes in organizations and focuses on feedback quality.

Feedback was measured using a shortened version of Steelman et al’s (2004) Feedback Environment Scale. The original FES is comprised of two distinct 36 item scales, one measuring perceptions of supervisor feedback and the other measuring co-worker feedback. Both scales measure seven different facets relating to feedback: source credibility, feedback quality, feedback delivery, favourable feedback, unfavourable feedback, feedback availability and promotes feedback seeking. The shortened version of the scale (Dahling et al, 2012; Rosen et al, 2006) takes items from each of these seven facets, with only a minute drop in reliability across facets. Three of the subsets of items, source credibility, feedback availability and promotes feedback seeking were not included in the current measure as these facets of feedback were not directly relevant to the current hypotheses. The co-worker feedback scale was not included in the survey as this was not of particular interest to the current research and its inclusion lengthened completion time considerably. Therefore, only the supervisor scale was included which was comprised of 15 items. The average of all of these items was used in final analysis.

The stem for this measure is *“To what extent do you agree with the following statements about the feedback that you receive from your supervisor?”* Example items include: *“my supervisor is fair when evaluating my job performance”*, and *“I value the feedback that I receive from my supervisor.”* Responses were given on a 1-7 scale, where 1 is ‘strongly disagree’, and 7 is ‘strongly agree’.

### Normalization of failure measure

Normalization of failure was measured using a scale developed by Shepherd et al (2011) which aims to measure perceived normalization of failure within organizations. This scale focuses on two factors relating to perceived organizational normalization. Firstly, the extent to which employees perceive failure to be viewed as ordinary within their organization, and secondly, the extent to which employees perceive their organization as reducing the incongruity between expectations and outcomes. This measure has been used and validated in subsequent research (Friedrich & Wustenhagen, 2017). The scale contains six items, the scores for which were averaged for the main analysis.

The stem is as follows: “*To what extent do you agree with the following statements?”* and items include: *“organizational communications signal that failure is considered an ordinary occurrence”* and *“the organization takes failure in its stride.”* The response scale is 1-7, where 1 is ‘strongly disagree’ and 7 is ‘strongly agree’. The average of the six items was used in the main analysis.

### Learning from setbacks and failure measure

Learning from setbacks and failure was measured using a scale developed by Shepherd et al (2011). This scale was developed specifically to measure the construct of learning from project failure and is therefore ideal for use in the current study. This scale aims to tap two key sources of learning from failure. Firstly, “learning related to an individual’s performance” and secondly, “learning related to an individuals’ personal attributes” (Shepherd et al, 2011; p. 1239). The scale contains eight items for which average scores were calculated for use in the final analysis.

The stem is: *“Please review the following statements and rate how your personal views have changed during the period of time that has elapsed since the project suffered setbacks or failed.”* Items include: “*I am more tolerant of others’ shortcomings when it comes to projects”, “I am a more forgiving person at work”* and *“I have learned to better execute a project’s strategy.”* The response scale is 1-7, where 1 is strongly agree and 7 is strongly disagree. This item was routed depending on whether participants indicated that the projects (main and other projects) were suffering from setbacks or had failed. The average of the eight items was calculated for use in the main analysis.

### Measures of level of investment

Level of investment (LOI) consists of a number of different facets; innovation role, percentage of time spent on project and duration of project. Measures for each of these facets are detailed below. Each of the questions described below were taken forward as individual measures for use in moderation analysis.

#### Project role measure

Project role was expected to impact setback and failure outcomes. For example, research suggests that those championing the project are more likely to suffer serious outcomes following failure compared to those on the periphery of the project (Janssen et al, 2004; Huhtala & Parzefall, 2007). Therefore, the following items were included.

*“Are you leading this project?”*

The response options for this question were simply ‘yes’ or ‘no’.

#### Duration of the project measure

Participants were also asked to indicate the length of time that they had been working on the innovative project. As discussed in previous chapters of this thesis, the duration of the innovative project is an important consideration in answering the hypotheses given that emotional investment in projects has been found to increase overtime (Scott & Bruce, 1994). The outcomes of innovation setbacks and failure may be expected to be different for projects where investment of time has been longer compared to projects of shorter duration at time of failure. With this in mind, the following question was included:

*“What date was this project launched? Rough estimates are fine: MM/YYYY”*

Each response to this question was coded manually once all responses to the survey had been gathered, by calculating the number of months based on the start date of the project and the date of the survey completion. Because innovation project durations range from weeks to years, this was the most pragmatic approach for collecting this data.

#### Percentage of time measure

The percentage of time at work spent on the innovative project was measured using a single item:

*“Please indicate below approximately what percentage of your time at work is usually spent working on the project that you have described above.”*

Responses to this question were given as a percentage. Because of their differing measuring scales, and because they were measuring differing constructs, the above questions were analysed as stand-alone items.

All of the measures described above were collected in relation to the main innovation project that individuals were asked to describe early in the survey. In hindsight, it would have been useful to also collect this information in relation to other innovative projects that individuals were working on, however, this was not done due to a focus on keeping the survey as concise as possible. This is noted as a limitation of the current research.

## The differences between Time 1 and Time 2 surveys

The Table 6.2 below provides clarification of which time point survey each measure appeared in and indicates where questions were routed so that they were only answered if relevant to the respondent.

Table 6.2: Differences between Time 1 and Time 2 surveys and routings.

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure** | **Time 1** | **Time 2** | **Routed** |
| *Control Variables* | | | |
| Gender, Age, Tenure, Education | ✓ | 🗶 | 🗶 |
| *Independent Variables* | | | |
| Innovation setbacks / failures (Single item) | ✓ | ✓ | 🗶 |
| Innovation Setbacks (main) | ✓ | ✓ | 🗶 |
| Innovation Setbacks (other) | ✓ | ✓ | ✓ |
| *Dependent Variables* | | | |
| Well-being | ✓ | ✓ | 🗶 |
| Innovative Work Behaviour | ✓ | ✓ | 🗶 |
| Motivation | ✓ | ✓ | 🗶 |
| *Moderator Variables* | | | |
| Resilience | ✓ | ✓ | 🗶 |
| Supervisor Feedback | ✓ | ✓ | 🗶 |
| Normalization of Failure | ✓ | ✓ | 🗶 |
| Learning from Failure & Setbacks | ✓ | ✓ | ✓ |
| Level of Investment | ✓ | ✓ | 🗶 |

### Demographics construct coding

To serve as a reminder, and for ease of reference, Table 6.3 below provides codings for all demographic variables.

Table 6.3: Codings for all demographic variable measures

|  |  |
| --- | --- |
| Construct | Codes |
| Gender | 1 = Male  2 = Female |
| Age | 1 = 18-21  2 = 25-34  3 = 35-44  4 = 45-54  5 = 55-64  6 = 65-74  7 = 75 or older |
| Education | 1 = GCSE/O-levels or equivalent  2 = A-levels or equivalent  3 = Degree  4 = Postgraduate degree  5 = PhD  6 = Other vocational qualification |
| Nationality | 1 = UK  2 = USA  3 = Ireland  4 = Canada  5 = Other |
| Innovation experience | 1 = 1-3 years  2 = 4-7 years  3 = 7-10 years  4 = 10-15 years  5 = 15 or more years |
| Innovation type | 1 = Finance  2 = Technology/electronics  3 = IT  4 = Marketing / consulting  5 = Other |

## Pilot Study

The importance of rigorously testing questionnaires prior to live data collection is well documented (DeVaus, 2014), and, as such, the current survey was carefully tested prior to dissemination to participants. The majority of measures used were pre-designed and pre-validated, and as such the main aim of piloting for these measures was to ensure that there were no issues in terms of layout and length of the instruments and to ensure that the questions fitted the current context. However, a few items, including the single response item “innovation setbacks and failures (single item)” was designed for specific use in the current survey and as such required more detailed piloting.

The pilot study was carried out in three phases, in line with Converse and Presser’s (1986) three stage approach to pilot testing. These stages are as follows:

**Stage 1: Question development**: the main purposes of this phase of piloting are to ensure that the questions are understood, to check the necessity of items, to look for issues of item non-response and to assess whether there is any evidence of acquiescence. This stage of piloting was carried out with 18 known innovators, under what Converse and Presser (1986) describe as a ‘declared pre-test’ whereby participants were told that the questionnaire was in the development phase and were asked for feedback so that the survey could be improved. Feedback was sought specifically for the self-designed ‘innovation setbacks and failures (single item)’ measure, and other self-designed measures. Participants were asked for their views on the phrasing of these questions, and whether the range of available responses was adequate.

In terms of the questionnaire more generally, participants were asked whether they felt all items were necessary, if they didn’t respond to a specific item they were asked why this was the case, and they were asked for more general feedback about the questionnaire.

15 out of 18 participants provided feedback either over email or phone. Feedback was positive regarding the innovation setbacks and failures (single item) and other self-designed measures and, as such, no suggestions were made to change it. However, respondents generally felt that the questionnaire was too long and that it took 20-25 minutes to complete. The feeling was that, given how busy innovators’ roles generally are, a survey taking no longer than 15 minutes to complete was necessary. In addition, a number of respondents felt that the feedback section was too long and repetitive. At this stage, questions were included which related to both team feedback and supervisor feedback. Therefore, in order to answer both criticisms at once, this measure was reduced to include only supervisor feedback items which it was felt would be adequate for the purposes of the current research.

**Stage 2: Questionnaire development:** stage 2 of piloting continued to follow the steps laid out by Converse & Presser. The main aims at this stage were as follows; to check whether the questionnaire flows, to assess whether routings between questions work, to check for evidence of systematic drop-out and to check for item non-response.

Given that at this stage, further questionnaire revisions were expected, the decision was taken not to pilot the survey within participant organizations as it seemed unlikely that these responses could be used within the main analysis. Therefore, invitations to participate were posted on websites ‘CallforParticipants.com’ and ‘FindmeParticipants.com’ and respondents were offered five pounds in return for their participation. 88 participants were secured in this way. This was an undeclared pilot, so that the invitation to participate was included as it would be during the final survey, and only participants who were working on an innovative project were asked to participate.

A number of further issues with the survey arose at this phase. Firstly, a number of participants emailed me to say that they were uncomfortable with providing their email address. This posed a problem, given that the provision of the email address was my plan for both sending out the follow up survey and for matching responses. The survey was altered therefore to include a number of unique identifier questions which would allow me to match survey responses at Time 1 and Time 2 while ensuring participant anonymity. These are described in section 6.10.2 below. Secondly, there was a high level of non-response of the final two measures within the survey (33%). It seemed likely that the survey was still too long and as a result the survey was revisited to ascertain whether any further items could be removed. It was decided that a measure of ‘goal orientation’ was not necessary to the overall aims of the thesis and as such this was removed in order to shorten the length of the questionnaire.

**Stage 3: Polishing pilot test:** the main aim of final stage of pilot testing was to ensure that the changes made to the survey were effective, that routings still worked and that there was no longer such large attrition towards the end of the survey. This phase was again carried out using participants from “callforparticipants.com” and “findparticipants.com” who were offered five pounds in return for their participation. 77 participants responded to the final stage of this pilot testing phase. It was also necessary to pilot the second survey, which, although largely the same as the first, was different in some respects as a number of control items were removed in order to shorten the length of the survey. Given that it was a repeated measures methodology, it seemed unnecessary to collect the same demographic information twice. The main purposes of piloting the second survey was to ensure that the questionnaire flowed, that routings worked, and also to test the use of unique identifier codes which would later be used to match Time 1 and Time 2 responses. Therefore, included in the invitation to participate in the stage 3, Time 1 survey was an invitation to participate in the Time 2 survey. Participants were asked to email me directly if they would like to be included in the follow-up survey at a later date, and a further payment of five pounds was offered for participation. Out of the 77 original respondents, 51 also completed the follow up Time 2 survey.

Both pilot surveys Time 1 and Time 2 were re-evaluated by following DeVaus’s (2014) four-point check list which will be discussed in the pilot testing results section below. The reliability of individual items was also examined as discussed below.

## Pilot test results: Complete surveys

The final versions of both Time 1 and Time 2 surveys were evaluated following stage 3 of the pilot testing, using DeVaus’ (2014) pilot checklist which includes four mains points for consideration: flow, question skips, timing, respondent interest and attention.

### Flow

The final versions of both Time 1 and Time 2 surveys appeared to flow well. Transitions between sections were appropriate and the flow between topics was logical and easy to follow. Both surveys were checked to ensure that they included all measures necessary to be able to answer the final hypotheses.

### Question skips

The routings of questions were carefully checked to ensure that jumps between questions worked as they were intended to and that all necessary questions were visible as appropriate.

### Timing:

Completion of both surveys was once again timed to ensure that they were not too long. The Time 1 survey was expected to take 15-20 minutes to complete, while the Time 2 survey was expected to take 12-15 minutes. No further feedback was received at stage three of piloting to suggest that timing remained an issue.

### Respondent interest and attention

Results of stage three of the pilot study showed a much lower attrition rate (8%) compared to 33% at phase two of piloting. This suggested therefore that the reduction in the number of items had been sufficient to ensure that the interest and attention of respondents could be held for the duration of the survey.

The final surveys were reviewed by a PhD supervisor and it was agreed that they were ready for dissemination to the research participants. Responses to the pilot studies were not used in the main analysis.

## Pilot test results: Individual Measures

### Scale reliability

The reliability of all multi-item measures was tested in IBM SPSS using Cronbach’s alpha. All measures returned Cronbach’s alpha scores above the acceptable threshold. Particular attention was paid to the “innovation setbacks (PIP)” and “supervisor feedback” measures as these items were sections of measures which had originally included additional sections which were not relevant to the current research. Table 6.4 below provides Cronbach’s alpha scores for the two reduced item measures and the complete survey. Confirmatory factor analysis was also carried out, the results of which are presented in section 6.8 below.

Table 6.4: Cronbach’s alpha for innovation setbacks and supervisor feedback

|  |  |  |
| --- | --- | --- |
| Measure | Time 1 | Time 2 |
| No. of Respondents | N = 88 | N = 77 |
| Innovation setbacks | 0.80 | 0.82 |
| Supervisor feedback | 0.83 | 0.85 |

## Procedure & Participants – Main Study Surveys

### Survey Procedure

Longitudinal surveys were completed by the same participants at two different points in time, approximately six months apart.

Contacts within the participating organizations for the most part were sent invitations to participate via their managers (my contacts within the participating organizations) rather than providing me with email addresses as it was felt that this would improve response rates as well as ensuring anonymity. At least one, and sometimes two, reminders were sent to improve response rates. The method of dissemination, via a number of different sources at a number of different organizations, made it somewhat difficult to track the exact number of invitations to participate that were sent out via email. However, attempts were made to secure this data, and although not a precise figure, an estimated 1,300 invitations to participate were sent out in total, with a response rate at Time 1 of 730 representing a return rate of 56%. At Time 2, 489 responses were received meaning that there was an attrition rate of 33%; therefore 67% of Time 2 respondents completed the follow up survey. This rate of attrition would be considered reasonably normal for a longitudinal study (Amireault, 2014) particularly when factors such as retirement, job changes, sickness absence and maternity leave are taken into account.

### Data preparation: matching responses at Time 1 and Time 2

Time 1 and Time 2 responses were matched using a subject-generated identification code (SGIC); a method for matching survey data at two points in time while ensuring anonymity for respondents (Yurek et al, 2008). In order to generate a unique identification code for each participant, respondents were asked to provide the following information at both survey time points:

* What is the first letter of your mothers’ first name?
* What month were you born (please give a number)?
* What is the first letter of your middle name (if none use x)?
* How many brothers do you have?

Table 6.6 : Example of a subject-generated identification code (SGIC) and Question Set

|  |  |  |  |
| --- | --- | --- | --- |
| Question set stem: What is the… | Example Answers | Code Element | SGIC |
| First letter of your mothers’ first name? | A – Amy | A |  |
| Number representing the month you were born? (e.g. March 03) | 03 – March | 03 |  |
| First letter of your middle name? (if none use X) | L – Louise | L |  |
| Number of brothers? | 01 – one | 01 |  |
| A03L01 | | | |

Source: Based on Yurek et al (2008)

Once both surveys had been completed, Time 1 and 2 responses were matched using the SGIC. This was done with the help of the SPSS ‘merge files’ tool. The SPSS merge files application is sensitive to any duplicate cases or spurious entries, and as such data was checked carefully in excel prior to finally being merged. It was important that this was done carefully as properly matched Time 1 and Time 2 data was key to being able to provide valid longitudinal analysis.

The merging of cases of revealed that at Time 2, out of 489 total responses 30 participants had not provided any SGIC information and another 25 participants had provided data which did not match any of the Time 1 subject-generated codes. After this process of matching was completed, 434 Time 2 surveys were successfully matched with the first survey responses. Once data had been matched, further tests were carried out in order to deal with any missing within case data on the remaining sample as will be discussed in the next section.

### Missing within case data

Missing data can have a detrimental impact on analysis and as such the data was analysed using IBM SPSS missing data analysis, to assess whether missing data was problematic and to implement a plan for dealing with any absent data.

**Missing case data in survey Time 1**

Missing data analysis revealed that of the 730 returned surveys, 78 had answered fewer than 30% of questions, representing a within-survey dropout rate of 11%. In line with recommendations by Tabachnick and Fidell (2014), these cases were dropped from analysis leaving a total of 651 Time 1 responses (after the removal of the outlier case).

**Missing case data in the follow up survey Time 2**

Of the 434 matched responses to the Time 2 survey, IBM SPSS missing values analysis revealed that 33 cases were missing 30% or more data, representing an 8% within survey non-response rate. Again, as per recommendations, these cases were dropped from the analysis leaving a total of 401 responses to the follow up survey.

### Summary of N values following matching procedures and missing data analysis

* Time 1; N= 651
* Time 2 (that could be linked to Time 1); N= 401
* Total useable responses = 1052

### Missing values data

Following the deletion of missing cases, for the most part, survey values contained relatively few instances of missing data, not more than 3% for any variable in either survey 1 or survey 2. Currently, the most widely accepted method for dealing with missing data is to employ a technique called multiple imputation (Allison, 2001; Garson, 2015; Tabachnick & Fidell, 2014; Van Buuren, 2012). Multiple imputation uses the available data to estimate mean values for the missing data. It is considered to be a particularly useful technique, particularly for longitudinal data (Tabachnick & Fidell, 2014) and, therefore, the current data set was imputed using the IBM SPSS multiple imputation tool.

## Participants

### Participant Organizations.

This research was carried out with the help and participation of six different organizations. Three organizations specialized in financial innovations, another two in technological innovation and one smaller organization specializing in research and consultancy.

**Organization 1**

An organization specializing in trading financial products with a strong focus on producing innovative financial trading strategies. The organization employs approximately 300 people, with a head office in the USA and subsidiary offices in London, UK and Dublin, Ireland. The majority of employees are engineers, traders or software developers. (N=85, Time 1; N=66, Time 2). These respondents were sourced from a selection of teams which were identified by the contact within the organization as working on innovative projects.

**Organization 2**

A software developer specializing in the development of innovative financial products and services. The organization had 2,500+ employees with headquarters in the USA and branch offices in the UK, other European countries and Asia (N= 223, Time 1; N = 164, Time 2). As above, invitations to participate were sent to teams identified by internal contacts as working on innovative projects. This was also the case for the four participant organizations discussed below.

**Organization 3**

An extremely innovative, fast moving and progressive financial services organization which develops financial products for use in the finance industry. With headquarters in the USA and branch offices in Europe and Asia. The organization employs 2,000+ people in varying roles such as financial product development, IT, risk, administration, and innovation among others. The organization operates derivatives and futures exchanges as well as providing online trading platforms (N=28, Time 1; N=20, Time 2)

**Organization 4**

A multinational organization employing approximately 1,500 people, with a head office in the USA and subsidiary offices in Europe and Asia. The company is highly innovative, specializing in the design and implementation of breakthrough technology and solutions for the electronics industry. The organization employs engineers across a number of specialisms, analysts, project managers and designers, among other roles (N=277, Time 1; N=132, Time 2)

**Organization 5**

A UK-based phone application developer specializing in the design and production of mobile technology applications. The organization employs approximately 150 people in the UK in roles such as marketing, research, development, project management, IT and engineering (N=31, Time 1; N=12, Time 2).

**Organization 6**

A specialist consultancy which develops and implements innovative solutions for clients through research. The organization is UK based and employs approximately 20 people, some of whom are permanent employees and others employed on a contractual basis. The organization specializes in occupational psychology consulting and as such employs career psychologists as well as marketing, accounting and IT specialists (N=7, Time 1; N=7, Time 2).

### Participant Demographics

Respondents were drawn from all levels of the above organizations, although contacts within the organizations were asked to send the invitation to participate specifically to individuals and teams who were involved in some form of innovative project. This helped to ensure that responses gathered were related to innovation specifically.

In order to minimize the length of the second survey, demographical information was only gathered at the first-time point. Given that the demographical information is expected to stay pretty much the same within participants between the two-time points and given that surveys at Time 1 and Time 2 were carefully matched, it was not deemed necessary or prudent to collect this information a second time. Therefore, reported demographics at Time 2 are based on matched responses.

Table 6.7 below provides response rates and percentages for all demographic information collected in surveys at Time 1 and Time 2.

### Gender Demographics

The 651 people who responded to the original survey were predominantly male (N=500, 77%), compared to female respondents which totalled N=151, (23%.) Gender splits of respondents of the follow up survey were similar, N=304, (76%) male, and N=97 (24%) female. While every attempt was made to secure an unbiased sample, the industries from which participants were largely drawn, finance and technology, are well known to be male dominated (Johns, 2008). As such a skew towards male respondents was expected and unavoidable.

### Age Demographics

The dominant age groups for the respondents of the original survey were 25-34 (N=184, 28%), 35-44 (N=349, 54%) and 45-54 (N=70, 11%) with a small number of participants sitting in other age groupings. The follow up survey respondents tended to sit within the same age groups; 25-34 (N=135, 34%), 35-44 (N=193, 48%), 45-54 (N=45, 11%).

### Nationality

This study involved a multi-national sample of organizations and respondents, with surveys sent to participants based in the UK, USA and Ireland. The nationality of respondents of the first survey was predominantly British (N=459, 71%), with the remaining participants giving their nationality as American (N=117, 18%), Irish (N=25, 4%), Canadian (N=14, 2.3%) and ‘other’ (N=30, 5%) which included Germans, Australians, Portuguese, French, Indian, Spanish and New Zealanders. The remaining 6 respondents did not give their nationality. The follow up survey was completed by 250 (63%) British nationals, 89 (22%) Americans, 23 (6%) Irish, 11 (3%), with the remaining 6% of respondents of ‘other’ nationalities.

### Education

The majority of participants were highly educated; N=335 (52%) to degree level; N=252 (39%) to postgraduate level; N=37 (6%) to PhD level. The remaining participants reported their highest level of educational attainment as GCSE (N=5, 0.8%), A-level (N=10, 1.5%) or other vocational qualification qualifications (N=12, 1.8%). The follow up survey showed a very similar background of educational experience. N=185 (46%) listed ‘degree’ and N=180 (45%) listed ‘postgraduate degree’ as their highest educational achievement, with the remaining small number of participants falling into GCSE, A-Level or other vocational qualification categories.

### Participants’ Innovative Experience

Participants were asked, ‘for how many years have you worked in a role which has required you to be involved in innovative type activities?’ The responses to this question indicate that most respondents had a reasonably high level of experience of working in an innovative role with over 90% of both Time 1 and Time 2 respondents reporting that they had between 4 and 15+ years of innovative experience.

### Innovation type

Participants were asked to describe the type of innovation that they were currently working on. As can be seen below, finance (35% Time 1, 32% Time 2) and technology/electronics (44%, Time 1; 43% Time 2), were the most cited innovative project types.

Table 6.7 below provides a summary of demographic statistics. The next Chapter 7 provides quantitative analysis results for the survey data.

Table 6.7: Demographic variables: number of responses and percentage by category

|  | Time 1 | | Time 2 | | |
| --- | --- | --- | --- | --- | --- |
|  | N | % | | N | % |
| *Gender* | | | | | |
| Male | 500 | 76.8 | | 304 | 75.8 |
| Female | 151 | 23.2 | | 97 | 24.2 |
| Total | 651 |  | | 401 |  |
| *Age* | | | | | |
| 18-24 | 16 | 2.5 | | 8 | 2 |
| 25-34 | 184 | 28.3 | | 135 | 34 |
| 35-44 | 349 | 53.7 | | 193 | 48 |
| 45-54 | 70 | 10.7 | | 45 | 11 |
| 55-64 | 29 | 4.5 | | 19 | 5 |
| 65-74 | 2 | 0.3 | | 0 | 0 |
| Total | 650 | - | | 400 | - |
| *Nationality* | | | | | |
| British | 459 | 71.2 | | 250 | 63.1 |
| American | 117 | 18 | | 89 | 22.5 |
| Irish | 25 | 3.9 | | 23 | 5.8 |
| Canadian | 14 | 2.2 | | 11 | 2.8 |
| Other | 30 | 4.7 | | 23 | 5.8 |
| Total | 645 | - | | 396 | - |
| *Innovation experience* | | | | | |
| 1-3 years | 53 | 8.6 | | 36 | 9.4 |
| 4-7years | 206 | 33.4 | | 147 | 38.3 |
| 7-10 years | 268 | 43.5 | | 137 | 35.7 |
| 10-15 years | 63 | 10.3 | | 45 | 11.7 |
| 15 or more years | 26 | 4.2 | | 19 | 4.9 |
| Total | 616 | - | | 384 | - |
| Innovation project type | | | | | |
| Finance | 217 | 34.5 | | 126 | 32 |
| Technology/electronics | 277 | 44.1 | | 169 | 42.9 |
| IT | 83 | 13.2 | | 65 | 16.5 |
| Marketing/ Consulting | 50 | 8 | | 34 | 8.6 |
| Other | 1 | 0.2 | | 0 | 0 |
| Total | 628 | - | | 394 | - |

# Chapter 7: quantitative analysis of survey data

## Introduction

This chapter provides analysis results of the longitudinal survey data. Firstly, preliminary analysis results are discussed including tests of normal distributions, outliers, multicollinearity, missing data and confirmatory factor analysis. Secondly, the results of correlation analyses are presented and discussed. Third, the first aim of this thesis is addressed as are hypotheses one to three, through presentation and analysis of the results of synchronous effects regression models. Fourth, analysis and results of lagged regression analysis are presented which aim to offer explanations as to the timings of effects. Finally, aim two, is addressed through the results of moderation analysis.

## Preliminary Analysis

There are a number of considerations that must be taken into account prior to carrying out analysis. Firstly, confirmation is required that data is reasonably normally distributed for interval measured scales. Secondly, outliers within the data must be identified and removed in order to ensure that the overall results are not skewed; and thirdly, multicollinearity tests must be conducted to meet the assumptions necessary to run panel regressions (Finkel, 1995).

## Normal Distribution and Outliers

### Normal Distribution:

Normal distribution of aggregated questionnaire items for scales measured on interval or Likert scales was checked using histograms and box plots. For the most part, variables appeared to be reasonably normally distributed. The exceptions were two measures of motivation (intrinsic motivation and identified regulation) at Time 1, and the measure of well-being at Time 2. A decision was taken not to transform these scores because transformation can result in difficulties in interpreting relationships between variables following transformation (Coolican, 2013; Tabachnick & Fidell, 2014).

### Outliers

Analysis of the independent and dependent variables was carried out to identify any outliers within the data using the IBM SPSS explore function which provides useful illustrative statistics which allow researchers to identify outliers using tools such as boxplots and histograms. This test revealed one outlier participant, and as such data for this participant was removed. Following removal, further analysis revealed no additional outliers (Std. Residual Min = -3.02, Std. Residual Max = 3.12).

### Tests for Multicollinearity

In order to ensure that the data did not suffer from issues of multicollinearity, whereby variables are too highly correlated (Tabachnick & Fidell, 2014), collinearity statistics were calculated using IBM SPSS. Multicollinearity is particularly problematic in regression analysis as it can cause issues such as decreasing the precision of estimated regression coefficients and may negatively impact the contribution of other variables to the model (Tabachnik & Fidell, 2014). It is generally considered that multicollinearity exists when tolerance is <=0.2 and VIF (variance inflation factor) is 5 or 10 or greater (O’Brien, 2007). Analysis revealed that there was no problem with multicollinearity given that no variables exceeded cut-off levels for tolerance or VIF, with most results well within the threshold levels.

* + 1. **Coding of demographic variables**

For the purposes of correlation and regression analysis, given that regressions only allow quantitative and explanatory variables (Tabachnick & Fidell, 2014), the following variables were dummy coded; gender, education, nationality and innovation type. Dummy coding is the process of recategorizing categorical variables into dichotomous variables. The control variables were coded such that one dummy was included per measure (i.e. one for education, nationality), where the dummy with the largest response category was reflected against all other categories (i.e. ‘degree’ for education, ‘British’ for nationality). This process was carried out using the ‘transform’ function of IBM SPSS. Variables age and innovation experience were not dummy coded as these are continuous variables and are therefore suitable for regression and correlation analysis.

Dummy variables for organization (the six different participant organizations) were also created and included in the initial correlation and regression analysis. No significant relationships were found and as such these were omitted from the final analysis. It is noted that innovation outcomes may be impacted by organization culture which was why the potential differences between participant organizations was explored. However, the current research is primarily interested in individual and project level analysis and for this reason the organizational level differences were not explored in greater depth. The demographic variable ‘innovation type’ broadly mapped on to organization type, but allowed for greater exploration of different innovation project roles such as marketing.

## Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was carried out to ensure that the proposed constructs within the measurement model are distinct (Schreiber et al, 2006) and to check the factor structures of measures (Tabachnick & Fidel, 2014). The likelihood estimation method was used in AMOS and analysis was carried out using Time 1 data (N=651). This dataset was chosen for the CFA because it contained the largest amount of data compared to the Time 2 dataset.

Firstly, a five factor CFA model was conducted where items measuring the independent variable (innovation setbacks), and the dependent variables (well-being, innovative work behaviour, identified regulation and intrinsic motivation) were loaded onto their intended factors. This model was compared against an alternative four factor model where motivation items (identified regulation and intrinsic motivation) were combined to load onto a single factor, and the one-factor model where all variable items loaded onto a single factor.

Table 6.5: Confirmatory Factor Analysis, model fit statistics for IV, DVs and moderator scales.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | Factors | *χ2 (df)* | CFI | IFI | RMSEA |
| *IV and DVs* | Five factor model | 778 (72) | .91 | .92 | .07 |
|  | Four factor model | 761 (76) | .91 | .92 | .07 |
|  | Single factor model | 905 (79) | .86 | .83 | .09 |
| *Moderators* | Four factor model | 103 (26) | .98 | .98 | .05 |
|  | Three factor model | 160 (27) | .94 | .92 | .08 |
|  | Single factor model | 920 (30) | .70 | .71 | .20 |

*Notes: N = 651, CFI = comparative fit, IFI = incremental fit, RMSEA = root mean square error approximation. CFI and IFI values greater than 0.90 indicate acceptable fit; RMSEA values less than 0.10 indicate acceptable fit (Hoyle & Panter, 1995; Hu & Bentler, 1999). When comparing models, chi-square difference tests are reported.*

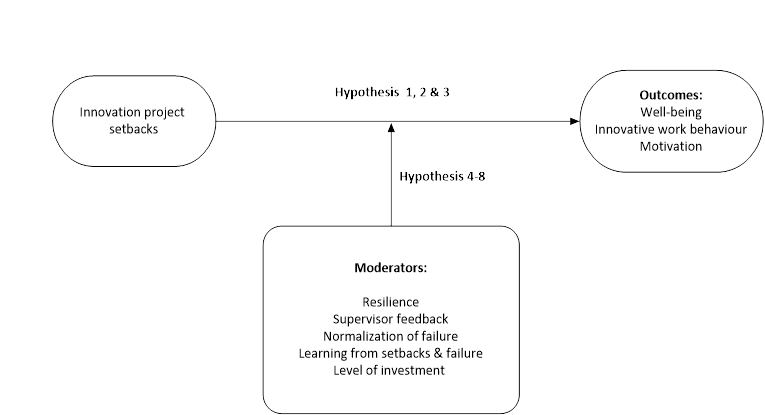
Table 6.5 above provides model fit statistics. Both the five and four factor models were a good fit (five factor model; *χ2 = 778, df = 72, p < .01, CFI = 91, IFI = 92, RMSEA = .07;* four factor model; *χ2 = 761, df = 76, p < .01 CFI = 91, IFI = 92, RMSEA = .07)*. The five-factor model was a slightly better fit than the four-factor model and as such was adopted for subsequent analysis. A chi-square difference test was conducted to compare models, where the difference between the five and four factor models was significant at the p < .01 level (CSDT = 17, df = 4, p < .01). The one factor model was not a good fit given that its CFI and IFI values were below the acceptable fit values of .09 (one factor model; *χ2 = 905, df = 79, p = n.s., CFI = 86, IFI = 83, RMSEA = .09).*

CFA models were also conducted to test the factor structures and distinctiveness of the multi-item moderator variables. In the first instance a four factor CFA model was conducted where items measuring resilience, normalization of failure, supervisor feedback, and learning were loaded onto their intended factors. This model was compared against an alternative three factor model where learning and normalization were loaded onto one construct. Next a one factor model was tested, where all items were loaded onto a single factor. Results indicated that the four-factor model was the best fit (four factor model; *χ2 = 103, df = 26, p < .01, CFI = 98, IFI = 98, RMSEA = .05;* three factor model; *χ2 = 160, df = 27, p < .01, CFI = 94, IFI = 92, RMSEA = .08)*. A chi-square difference test was conducted which was significant at p < .01 (CSDT = 57, df = 1, p < .01) indicating that the multi-item moderator variables tested are best represented as distinct constructs. Confirmatory factor analysis of the single factor moderator model indicated that this was not a good fit given that the CFI and IFI values were below the acceptable fit levels of .09, (single factor model; *χ2 = 920, df = 30, p < n.s., CFI = 70, IFI = 71, RMSEA = .20).*

## Theoretical framework diagram

To serve as a reminder of the theoretical framework guiding the current research, the theoretical framework diagram is included again below for easy reference purposes.

Figure 1: Theoretical framework diagram: Predicted relationships between innovation setbacks and failures, outcomes variables and moderators



## Correlation Analysis

### Correlation analysis of Time 1 and Time 2 data independently

Tables 7.2 and 7.3 below provide single order coefficients for the main variables of interest in this study, namely two measures of innovative performance and outcome variables well-being, innovative work behaviour, identified regulation and intrinsic motivation and moderator variables. Tables 7.2. and 7.3 provide coefficients for Time 1 and Time 2 independently, where Time 1 coefficients are presented below the diagonal and Time 2 above.

The first important finding relating to correlational analysis (Table 7.2) is that the single item measure of innovation setbacks and failures (single item) and the multi-item measure of innovation setbacks (main) appear to broadly corroborate each other. The two items were highly correlated with each other at both Time 1 (*r = .45, p < .01*) and especially at Time 2 (*r = .70, p < .01*). This finding suggests that the two measures capture similar information.

Given that the multi-item variable ‘innovation setbacks’ (main) is corroborated by the single item innovation setbacks and failure measure, this supports the validity of the multi-item innovation setbacks measure. In addition, bearing in mind that the multi-item innovation setbacks measure is a pre-validated and arguably more robust measure of project progress/performance, the decision was taken to use the multi item innovation setbacks measure for subsequent analyses.

Table 7.2 reveals that innovation setbacks (main) was negatively correlated with well-being at Time 1 (*r = -.32, p < .01*) and at Time 2 (*r = -.16, p < .01*). This is in line with the hypothesis which predicted that innovation setbacks would be negatively related to well-being (H1). The stronger correlation at Time 1 may be the result of a higher number of set-backs reported at Time 1 compared to Time 2 which therefore may have strengthened the relationship at Time 1.

In terms of the relationships between innovation setbacks (main) and innovative work behaviour, correlation analysis reveals a strong negative correlation between innovation setbacks (main) and innovative work behaviour at both Time 1 (*r = -.45, p < .01*) and at Time 2 (*r = -.60, p < .01*). This finding provides some support for hypothesis H2 that innovation setbacks are negatively related to innovative work behaviour, but it is noted that this relationship could be bidirectional. Directions of relationships between variables will be discussed below along with questions of causality.

Analysis of correlations between innovation project set-backs and failures and Multidimensional Work Motivation Scale items (MWMS) intrinsic motivation and identified regulation (Gagne et al, 2015) revealed that intrinsic motivation was correlated with innovation setbacks (main project) at Time 1 (*r = -.17, p < .01*). There was not a significant relationship between innovation setbacks (main project) and identified regulation at Time 1. At Time 2 innovation setbacks (main project) was negatively correlated with identified regulation (*r = -.18, p < .01*) and intrinsic motivation *(r = -.33, p < .01*). This finding provides some preliminary support for hypothesis 3 which predicts that innovation setbacks (main project) are negatively related to intrinsic motivation and identified regulation although, again, it is noted that this relationship may be bidirectional, and influenced by moderators. These possibilities will be discussed in detail below.

### Lagged variables correlation analysis

Time 1 and Time 2 variables were correlated against each other and are displayed in Tables 7.4 below. With the exception of the innovation setbacks and failures (single item) and innovation setbacks (main and other project) measures which did not significantly correlate with their lagged counterparts, all outcome variables at Time 1 were significantly correlated with their related Time 2 variable.

I include a lagged analysis as time separation is one of the three conditions of causality, with the other two being covariation, and ruling out alternative explanations (for a more in-depth discussion see Section 7.7). Beginning with the hypothesized effects of innovation setbacks (main project and other projects) on outcomes, inspecting the lagged effects of innovation setbacks on outcomes reveals that innovation setbacks were not significantly associated with any of the outcomes, except for the negative lagged association between innovation setbacks (other projects) and identified motivation (*r* = -.10, *p* < .05).

The lagged variables also provide the opportunity to explore the possibility of reverse causality; for example, whether dependent variables at Time 1 can predict the independent variable at Time 2, such as whether well-being at Time 1 predict innovation setbacks (main) at Time 2? The lagged correlation Table 7.4 below provides no evidence of this for the main variables of interest, with non-significant correlations returned for the relationship between innovation setbacks (main project) Time 2 and well-being Time 1 (*r = .00, n.s*), innovative work behaviour Time 1 (*r = -.06, n.s*), intrinsic motivation Time 1 *(r = -.02, n.s*), or identified regulation Time 1 *(r = -.02, n.s*).

Four of the moderator variables at Time 1 were found to correlate significantly with innovation setbacks (main project) at Time 2. These were idea realization Time 1 (*r = -.11, p < .05*), project lead Time 1 *(r = .14, p<.05*), and normalization of failure Time 1 (*r = -10, p < .05*).

The limited number of lagged correlations between innovation setbacks (main project and other projects) at Time 1, and outcome variables at Time 2, and outcome variables at time 1 and innovation setbacks at Time 2 suggests that between Time 1 and Time 2 data collection, there was little connection between the variables. This may be accounted for by previous research which has found psychological factors such as well-being, motivation, resilience, and work behaviours such as innovation to be relatively dynamic and prone to change in light of more immediate context and experiences (i.e. Lindquist et al, 2012; Rogers et al, 2012; Wilcox et al, 2016). The contemporaneous effect of innovation setbacks on outcomes is supported by cross-sectional correlations. The issue of the timing of effects will be discussed in greater detail in subsequent sections.

### Correlation analysis conclusions

Broadly speaking, results of the correlation analysis provide support for some of the hypothesized relationships in the current model, namely that innovation setbacks (i.e. the degree to which a project is meeting expected milestones) may negatively influence the well-being, innovative work behaviour, intrinsic motivation and identified regulation of employees. At Time 1, innovation setbacks (main) was found to be significantly negatively correlated with well-being, innovative work behaviour and intrinsic motivation, but not identified regulation. At Time 2, innovation setbacks (main) was found to be significantly negatively correlated with all four outcome variables, well-being, innovative work behaviour, intrinsic motivation and identified regulation.

## significant difference tests: comparing time 1 and time 2 data

In order to gain a high-level understanding of the differences between responses at Time 1 and Time 2, paired samples t-tests were conducted in IBM SPSS for the dependent and independent variables. Results indicated that there were significant differences between innovation setbacks (main) at Time 1 and Time 2, t = 3.94, df = 403, p< = .001, but results for innovation setbacks (other) were not significant. Results of difference tests for the independent variables revealed that there were significant differences between well-being at Time 1 and Time 2; t = 3.18, df = 390, p< = .001. The differences between Time 1 and Time 2 measures of identified regulation were also significant; t = 3.28, df = 390, p< = .001. T-test results demonstrated that there were not significant differences between Time 1 and Time 2 for innovative work behaviour and intrinsic motivation. While it may be surprising that significant differences were not found between measures at Time 1 and Time 2 for some of the variables, the current research is more interested in how outcome variables are impacted in light of the experience of innovation setbacks. As such, the results of synchronous effect regression analysis presented below provide more comprehensive analysis of the relationships between variables.

Table 7.1: N, Means and Standard Deviations for control, independent, dependent and moderator variables at both time points.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Time 1 | | | Time 2 | | |
|  | **N** | **Mean** | **S.D** | **N** | **Mean** | **S.D** |
| Control Variables |  |  |  |  |  |  |
| Gender | 651 | 1.23 | 0.42 | - | - | - |
| Age | 651 | 2.87 | 0.83 | - | - | - |
| Nationality | 651 | 1.51 | 1.01 | - | - | - |
| Education | 651 | 3.53 | 0.74 | - | - | - |
| Innovation experience | 651 | 2.68 | 0.92 | - | - | - |
| Innovation type | 651 | 1.95 | 0.90 | - | - | - |
| Independent Variables |  |  |  |  |  |  |
| Innovation setbacks / failures (single) | 648 | 3.04 | 1.10 | 401 | 3.14 | 1.17 |
| Innovation setbacks (main) | 651 | 2.58 | 0.98 | 401 | 2.88 | 1.74 |
| Innovation setbacks (other) | 531 | 2.43 | 0.87 | 331 | 2.23 | 0.87 |
| Dependent Variables |  |  |  |  |  |  |
| Well-being | 651 | 3.65 | 0.68 | 401 | 3.79 | 0.69 |
| Innovative work behaviour | 651 | 5.18 | 1.06 | 401 | 5.38 | 1.03 |
| Identified Regulation | 651 | 5.64 | 1.06 | 401 | 5.24 | 1.01 |
| Intrinsic Motivation | 651 | 5.45 | 1.05 | 401 | 5.37 | 1.14 |
| Moderator Variables |  |  |  |  |  |  |
| Resilience | 651 | 3.06 | 0.49 | 401 | 3.12 | 0.55 |
| Normalization of failure | 651 | 5.21 | 1.32 | 401 | 5.34 | 1.26 |
| Supervisor feedback | 646 | 5.84 | 2.29 | 373 | 5.83 | 0.83 |
| % time on main project | - | - | - | 401 | 70.63 | 23.64 |
| Learning from SB’s & failure | - | - | - | 105 | 4.29 | 1.25 |

Notes: N number vary on some variables, where responses were not relevant to all participants; i.e. not all respondents had experienced setbacks or failures on projects, and not all respondents were working on other projects.

While the above findings provide some initial support for the H1, H2 and H3, relationships will be considered in greater detail in the next section through a series of regression analyses, using synchronous effects modelling to explore whether innovation setbacks (main and other projects) predict levels of outcome variables over and above other factors. Regression analysis will also be used to examine the impact of innovation failure specifically on outcome variables well-being, innovative work behaviour, intrinsic motivation and identified regulation. Following on from this, synchronous effects models and interaction graphs will be used to examine the moderating effects of a number of variables on the relationship between innovation setbacks and outcome variables.

Table 7.2: Correlation matrix part 1; single-order coefficients for control, well-being, motivation and moderator variables. Time 1 (below diagonal). Time 2 (above diagonal)

|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Gender | 1 |  |  |  |  |  | -.04 | -.03 | .14\* | .05 | -.04 |
| 2 | Age | -.08 | 1 |  |  |  |  | .02 | .01 | .01 | .03 | .04 |
| 3 | Nationality | .21\*\* | -.14\*\* | 1 |  |  |  | .02 | .10\* | .01 | .08 | -.01 |
| 4 | Education | .03 | .01 | -.10\* | 1 |  |  | .12\* | -.02 | -.03 | -.04 | .05 |
| 5 | Innovation Type | -.01 | -.03 | -.08 | .08 | 1 |  | .01 | -.06 | .01 | .01 | .07 |
| 6 | Innovation experience | -.10\* | .58\*\* | -.10\* | -.08\* | -.13\*\* | 1 | .04 | .04 | -.01 | .08 | -.06 |
| 7 | Innovation setbacks / failure (single) | -.09\* | .26\*\* | -.02 | -.26\*\* | -.14\*\* | .27\*\* | 1 | .70\*\* | .32\*\* | -.20\*\* | -.44\*\* |
| 8 | Innovation setbacks (main) | -.12\*\* | .28\*\* | -.09\* | -.05 | .04 | .34\*\* | .45\*\* | 1. | .48\*\* | -.16\*\* | -.60\*\* |
| 9 | Innovation setbacks (other) | -.06 | .15\*\* | -.02 | -.27\*\* | -.12\*\* | .28\*\* | .64\*\* | .71\*\* | 1 | .02 | -.52\*\* |
| 10 | Well-being | .16\*\* | .07 | .28\*\* | .10\*\* | -.04 | .00 | -.20\*\* | -.32\*\* | -.28\*\* | 1 | .15\*\* |
| 11 | Innovative Work Behaviour | .00 | -.08\* | -.06 | .24\*\* | .10\* | -.17\*\* | -.45\*\* | -.45\*\* | -.61\*\* | .18\*\* | 1 |
| 12 | Identified Regulation | -.20\*\* | .15\*\* | -.24\*\* | -.04 | -.02 | .12\*\* | .16\*\* | -.07 | -.12\*\* | -.08 | .13\*\* |
| 13 | Intrinsic Motivation | -.18\*\* | .10\* | -.23\*\* | .07 | -.01 | .07 | .02 | -.17\*\* | -.23\*\* | .04 | .32\*\* |
| 14 | Resilience | .09\* | -.07 | .18\*\* | .01 | .02 | -.02 | -.03 | .18\*\* | .10\* | .05 | .02 |
| 15 | Normalization of failure | -.14\*\* | -.23\*\* | -.28\*\* | .01 | .10\* | -.20\*\* | -.34\*\* | -.37\*\* | -.49\*\* | -.10\* | .46\*\* |
| 16 | Supervisor feedback | -.04 | -.05 | -.03 | .03 | .13\*\* | -.06 | -.15\*\* | -.09\* | -.16\*\* | -.04 | .16\*\* |
| 17 | Learning from setbacks/ failure | - | - | - | - | - | - | - | - | - | - | - |
| 18 | Project lead | .08\* | -.05 | .15\*\* | -.01 | -.05 | .01 | -.08\* | .15\*\* | .08 | .09\* | -.16\*\* |
| 19 | % time on project | -.09\* | .07 | -.28\*\* | .03 | .09\* | -.10\* | -.26\*\* | -.20\*\* | -.38\*\* | -.02 | .41\*\* |

Notes: \*Correlation is significant at 0.05 level (two-tailed); \*\*Correlation is significant at 0.01 level (two-tailed) Learning from setbacks and failure was not measured at Time 1 and is therefore not reported

Control variables were not measured again at Time 2 and are therefore not reported

N, Mean and SD values are reported in Table 7.1 above.

Table 7.3: Correlation matrix part 2; single-order coefficients for control, well-being, motivation and moderator variables. Time 1 (below diagonal). Time 2 (above diagonal)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 12 | 13 | *14* | *15* | *16* | *17* | *18* | *19* |
| 1 | Gender | -.06 | -.06 | *.01* | *-.04* | *-.08* | *-.09* | *.03* | *-.87\** |
| 2 | Age | .07 | -.05 | *-.03* | *.03* | *.02* | *.02* | *.01* | *.07* |
| 3 | Nationality | -.04 | -.07 | *.04* | *-.07* | *.00* | *.06* | *.05* | *-.28\*\** |
| 4 | Education | .07 | -.01 | *-.01* | *-.01* | *.06* | *.15* | *-.05* | *.03* |
| 5 | Innovation Type | -.01 | .04 | *.06* | *.01* | *.07* | *.02* | *-.01* | *.09\** |
| 6 | Innovation experience | .04 | -.10\* | *.01* | *-.07* | *.00* | *.06* | *.02* | *-.10\** |
| 7 | Innovation setbacks/failure (single) | -.14\*\* | -.27\*\* | *.16\*\** | *-.37\*\** | *-.31\*\** | *.54\*\** | *.24\*\** | *-.08* |
| 8 | Innovation setbacks (main) | -.18\*\* | -.33\*\* | *.18\*\** | *-.43\*\** | *-.49\*\** | *.52\*\** | *.33\*\** | *-.18\*\** |
| 9 | Innovation setbacks (other) | -.25\*\* | -.41\*\* | *.35\*\** | *-.62\*\** | *-.55\*\** | *.31\*\** | *.38\*\** | *-.16\*\** |
| 10 | Well-being | -.04 | .03 | *.22\*\** | *.06* | *.17\*\** | *.14* | *.09* | *.00* |
| 11 | Innovative Work Behav’r | .46\*\* | .53\*\* | *.07* | *.68\*\** | *.67\*\** | *-.23\** | *-.26\*\** | *.20\*\** |
| 12 | Identified Regulation | 1 | .51\*\* | *.12\** | *.40\*\** | *.38\*\** | *-.34\*\** | *-.14\*\** | *.16\*\** |
| 13 | Intrinsic Motivation | .70\*\* | 1 | *-.12\** | *.53\*\** | *.50\*\** | *-.32\*\** | *-.26\*\** | *.16\*\** |
| 14 | Resilience | -.13\*\* | -.15\*\* | *1* | *-.18\*\** | *.02* | *.29\*\** | *.27\*\** | *.02* |
| 15 | Normalization of failure | .29\*\* | .36\*\* | *-.18\*\** | *1* | *.59\*\** | *-.19* | *-.30\*\** | *.18\*\** |
| 16 | Supervisor feedback | .06 | .04 | *.03* | *.17\*\** | *1.* | *-.07* | *-.12\** | *.12\** |
| 17 | Learning from failure | - | - | *-* | *-* | *-* | *-* | *.14* | *-.07* |
| 18 | Project lead | *-.25\*\** | *-.26\*\** | *.17\*\** | *-.28\*\** | *-.07* | *-* | *1* | *-.02* |
| 19 | % time on project | *.25\*\** | *.37\*\** | *-.17\*\** | *.58\*\** | *.11\*\** | *-* | *-.24\*\** | *1* |

Notes: \*Correlation is significant at 0.05 level (two-tailed); \*\*Correlation is significant at 0.01 level (two-tailed) Learning from setbacks and failure was not measured at Time 1 and is therefore not reported. Control variables were not measured again at Time 2 and are therefore not reported in the above matrix.

Table 7.4 (part one): Single order correlation coefficients of lagged effects. Time 1 (horizontal axis); Time 2 (vertical axis)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | Innovation setbacks / failure (single-item) | -.03 | .02 | -.01 | .00 | -.01 | .01 | -.07 | .06 |
| 2 | Innovation setbacks (main) | .02 | .04 | .01 | -.06 | -.06 | -.06 | -.11\* | .09 |
| 3 | Innovation setbacks (other) | -.06 | -.03 | -.02 | .03 | -.03 | -.05 | .00 | -.04 |
| 4 | Well-being | -.09 | .00 | -.04 | .21\*\* | .06 | .03 | .02 | -.06 |
| 5 | Innovative Work Behav’r | .04 | -.06 | -.04 | -.05 | .12\* | .13\*\* | .17\*\* | -.04 |
| 6 | Identified Regulation | .06 | -.02 | -.10\* | -.09 | .03 | .27\*\* | .17\*\* | -.02 |
| 7 | Intrinsic Motivation | .02 | -.09 | .09 | -.08 | .07 | .22\*\* | .29\*\* | -.11\* |
| 8 | Resilience | .04 | .04 | -.09 | -.02 | -.03 | .00 | -.01 | .41\*\* |
| 9 | Normalization of failure | .02 | -.10\* | -.06 | -.03 | .08 | .07 | .11\* | -.03 |
| 10 | Supervisor feedback | -.04 | -.04 | -.35\*\* | .03 | .07 | .06 | .06 | -.04 |
| 1 | Idea generation | .06 | -.04 | -.05 | -.05 | .06 | .12\* | .15\*\* | .04 |
| 13 | Coalition building | .00 | -.06 | -.05 | -.03 | .06 | .14\*\* | .11\* | .00 |
| 14 | Idea realization | .01 | -.11\* | -.09 | .01 | .12\* | .07 | .18\*\* | .05 |
| 15 | Transfer/diffusion | .01 | -.08 | .23\*\* | -.05 | .07 | .10\* | .16\*\* | -.01 |
| 16 | Project lead | .05 | .14\*\* | -.07 | .17\*\* | -.15\*\* | -.17\*\* | -.22\*\* | .24\*\* |

Notes: \*Correlation is significant at 0.05 level (two-tailed); \*\*Correlation is significant at 0.01 level (two-tailed)

Moderator variable ‘percentage of time spent on the project’ was only measured at Time 2 and is therefore not included in the lagged analysi

Table 7.4 (part two): Single order coefficients of lagged variables. Time 1 (horizontal axis); Time 2 (vertical axis)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 9 | 10 | 12 | 13 | 14 | 15 | 16 |
| 1 | Innovation setbacks / failure (single-item) | -.03 | .01 | -.02 | .01 | -.02 | -.04 | -.04 |
| 2 | Innovation setbacks (main) | -.12\* | .00 | -.05 | -.03 | -.05 | -.05 | .04 |
| 3 | Innovation setbacks (other) | -.22\*\* | .01 | .04 | .04 | -.05 | -.04 | -.02 |
| 4 | Well-being | .02 | .04 | .01 | .05 | -.01 | .02 | .07 |
| 5 | Innovative Work Behav’r | .12\* | .01 | .03 | .06 | .03 | .08 | .06 |
| 6 | Identified Regulation | .06 | .03 | .03 | .01 | -.04 | .01 | -.04 |
| 7 | Intrinsic Motivation | .03 | .08 | .11\* | .11\* | -.01 | .08 | -.09 |
| 8 | Resilience | .07 | -.07 | -.15\*\* | -.04 | -.09 | -.06 | .13\* |
| 9 | Normalization of failure | -.08 | .00 | .05 | .06 | .04 | .07 | -.10\* |
| 10 | Supervisor feedback | .21\*\* | .15\*\* | .04 | .05 | .07 | .08 | -.03 |
| 12 | Idea generation | .26\*\* | .03 | .03 | .02 | -.03 | .04 | -.03 |
| 13 | Coalition building | .05 | -.02 | .05 | .06 | .03 | .05 | -.05 |
| 14 | Idea realization | .02 | .05 | .06 | .00 | .02 | .13\* | -.02 |
| 15 | Transfer/diffusion | .09 | .02 | .07 | .06 | .07 | .08 | -.04 |
| 16 | Project lead | .00 | -.07 | -.23\*\* | -.22\*\* | -.05 | -.26\*\* | .64\*\* |

Notes: \*Correlation is significant at 0.05 level (two-tailed); \*\*Correlation is significant at 0.01 level (two-tailed)

Moderator variable ‘percentage of time spent on the project’ was only measured at Time 2 and is therefore not included in the lagged analysis

## Regression Analysis: Direct effects

### Regression analysis strategy

The data collected in the current study was time series panel data (two-wave). Studies employing panel designs, whereby information is gathered from the same individuals at two or more points in time, allow for much greater rigour compared with cross-sectional designs when testing causal analysis (Finkel, 1995), and also allows more accurate models to be generated with regards the effect of independent variables on dependent variables. As discussed in Chapter 6 above, the panel data collected during the current study involved a reasonably long-time gap (approx. 6 months) between the first wave of survey data collection and the second. The time gap was deemed necessary in order to increase the likelihood of capturing changes in the progress of innovation projects and possible failures. Given the type of data collected in the current study, and the length of time between the administration of the first and second surveys, use of the synchronous effects model as outlined by Finkel (1995) was felt to be the best option, since the alternative lagged-effects models are generally more appropriate for data with a shorter time lag (Finkel, 1995; Steinmetz et al, 2008).

In synchronous effects models, the dependent variable at Time 2 (e.g. well-being) is regressed on the independent variable at Time 2 (innovation setbacks, main and other project) while controlling for both the dependent variable (DV) and independent variables (IV) at Time 1. This strategy gives not only a greater indication of the most parsimonious predictors of the dependent variable, but in controlling for changes in the independent and dependent variables within individuals over time, it allows greater confidence in making causal inferences about the effect of innovation setbacks on the outcome variables. In addition, in controlling for the lagged counterparts of the IV and DVs, the Time 2 IV regression coefficient can be interpreted as the change in the IV on change in the DV (Finkel, 1995). For the remainder of this chapter, each hypothesis will be explored in turn through use of the above outline regression analysis strategy followed by post hoc analysis.

### The impact of control variables in the regression models

The first stage in each regression model included only the control variables. The control variables were gender, age, nationality, education, innovation experience and innovation type. These variables were included in order to be able to exclude alternative possible influences on the outcome variables.

Step 1 of each regression model containing the control variables returned non-significant results therefore suggesting that the control variables were not the most parsimonious predictors of the dependent variables.

### The relationship between innovation setbacks and well-being

**H1: Innovation setbacks and failures are negatively associated with well-being**

H1 was tested in a synchronous effects regression model whereby, with well-being at Time 2 as the dependent variable, the regression model was built by firstly entering control variables, followed by well-being at Time 1, innovation project set-backs at Time 1, and innovation setbacks (main and other) at Time 2. Pairwise deletion was applied to all regression models as the most appropriate technique for handling missing data (Marsh, 1998).

Panel regression analysis revealed that changes in well-being at Time 2 was predicted by changes in innovation setbacks, as indicated by the regression coefficient of innovation setbacks (main) at Time 2 (*β = -.28, p < .01*). This finding lends support to hypothesis 1, indicating that innovation setbacks impact well-being outcomes for innovators. Table 7.5 below provides regression statistics for this model.

Table 7.5: Synchronous effects analysis: the effects of innovation setbacks and failures on well-being

|  |  |  |
| --- | --- | --- |
| *Variables entered* | Well-being TIME 2 | |
| *Model 1 - Control variables* | |  |
| *Gender* | .06 |  |
| *Age* | .06 |  |
| *Nationality* | -.02 |  |
| *Education* | -.02 |  |
| *Innovation experience* | -.01 |  |
| *Innovation Type* | .00 |  |
| *R2* | .15 |  |
| *Model 2* | |  |
| *Well-being TIME 1* | .26\*\*\* |  |
| *Innovation setbacks (main) TIME 1* | -.08 |  |
| *Innovation setbacks (other) TIME 1* | .11 |  |
| *R2* | .06\*\* |  |
| *Model 3 – Independent Variable* | |  |
| *Innovation setbacks (main) Time 2* | -.28\*\* |  |
| *Innovation setbacks (other) Time 2* | .07 |  |
| *R2* | .15\*\*\* |  |
| *Model 3 Statistics* | |  |
| *Adjusted R2* | .11\*\*\* |  |
| *F* | 3.82\*\*\* |  |
| *Change R* | .08\*\*\* |  |
| *Change F* | 11.59\*\*\* |  |

Notes: Standardized regression coefficients are reported. \*p<.05, \*\*p<.01. N=319 due to the routing for Innovation setbacks (other projects) as not all respondents reported that they had worked on projects other than the main innovation project. Missing cases in the reported data were handled using the ‘exclude cases pairwise’ approach in SPSS for all regression models. A sensitivity analysis was conducted where the regression was also run using mean replacement to manage the missing data (the difference between the complete data set, innovation setbacks (main) N = 401, and innovation setbacks (other) N = 319). These results were similar to the pairwise exclusion results, and as such the pairwise exclusion analysis results are reported since these are based on unaltered data.

In addition to exploring the impact of one particularly important or challenging innovative project on well-being using the innovation project setback scores, it was necessary to also explore the possibility that innovative work projects more generally may be influencing levels of well-being. Therefore, the survey included a second measure which asked respondents to rate the performance of other projects that they were currently working on using the project implementation profile (PIP) scale. This measure is referred to as ‘innovation setbacks (other projects)’. In order to ascertain whether projects more generally were having an impact on well-being, the innovation setbacks (other projects) variable was included in the model at step 3. Although this reduced the size of the data set (from 401 to 319) because not all respondents reported that they were working on other innovative projects, it seemed important to include this in the analysis to get a more complete picture of the impact of innovation setbacks on outcomes. Results of this analysis were non-significant *(β = .07, p= n.s*) which suggests that in the case of well-being, the main project plays the most significant role in the relationship between setbacks and outcomes.

### The relationship between innovation setbacks and innovative work behaviour

**Hypothesis 2: Innovation setbacks and failures are negatively associated with innovative work behaviour**

As discussed in Chapter 6 (6.4.2) above, the innovative work behaviour (IWB) measure was included to explore how behaviours specific to the innovation process may change in light of innovation setbacks. In order to begin testing the hypothesis that innovation setbacks are negatively related to innovative work behaviours, a synchronous effect regression analysis was conducted with IWB Time 2 as the dependent variable. Firstly, control variables were entered into the model, followed by IWB Time 1, innovation set-backs (main) Time 1, innovation setbacks (other) Time 1 and finally, innovation setbacks (other) Time 2 and innovation setbacks (main) Time 2.

The regression coefficient of innovation setbacks (main) at Time 2 indicated that, after controlling for IWB and project setbacks at Time 1, IWB at Time 2 was significantly predicted by innovation setbacks (main) at Time 2 (*β = -.37, p < .001*) and was also significantly predicted by innovation setbacks (other) at Time 2 (*β = -.35, p < .001*). These results lend credence to the hypothesis that innovation project setbacks are negatively related to innovative work behaviours, and that both setbacks in the main and in other projects have a significant relationship with innovative work behaviour. The directional nature of this relationship will be discussed in more detail in the lagged analysis section below. Coefficients for this regression model are reported in Table 7.6 below.

Table 7.6: Synchronous effects analysis: the effects of innovation setbacks on innovative work behaviour

|  |  |  |
| --- | --- | --- |
| *Variables entered* | Innovative Work Behaviour Time 2 | |
| *Model 1 - Control variables* | |  |
| *Gender* | -.01 |  |
| *Age* | .03 |  |
| *Nationality* | .06 |  |
| *Education* | .02 |  |
| *Innovation experience* | .00 |  |
| *Innovation Type* | .02 |  |
| *R2* | .00 |  |
| *Model 2* | |  |
| *Innovative work behaviour TIME 1* | .09 |  |
| *Innovation setbacks (main) TIME 1* | -.04 |  |
| *Innovation setbacks (other) TIME 1* | .08 |  |
| *R2* | .01 |  |
| *Model 3 – Independent Variable* | |  |
| *Innovation setbacks (main) TIME 2* | -.37\*\*\* |  |
| *Innovation setbacks (other) TIME 2* | -.35\*\*\* |  |
| *R2* | .38\*\*\* |  |
| *Model 3 Statistics* | |  |
| *Adjusted R2* | .35\*\*\* |  |
| *F* | 13.24\*\*\* |  |
| *Change R* | .36\*\*\* |  |
| *Change F* | 70.50\*\*\* |  |

Notes: Standardized regression coefficients are reported. \*p<.05, \*\*p<.01. N=319 due to the routing for Innovation setbacks (other projects) as not all respondents reported that they had worked on projects other than the main innovation project. Missing cases in the reported data were handled using the ‘exclude cases pairwise’ approach in SPSS for all regression models. A sensitivity analysis was conducted where the regression was also run using mean replacement to manage the missing data (the difference between the complete data set, innovation setbacks (main) N = 401, and innovation setbacks (other) N = 319). These results were similar to the pairwise exclusion results, and as such the pairwise exclusion analysis results are reported since these are based on unaltered data.

### The relationship between innovation setbacks and failures and intrinsic motivation/identified regulation

**Hypothesis 3: Innovation setbacks and failures are negatively related to intrinsic motivation and identified regulation**

The above hypothesis was tested once again using synchronous regressions whereby, with intrinsic motivation and identified regulation at Time 2 as the dependent variables, the regression model was built by firstly entering control variables, followed by intrinsic motivation/identified regulation Time 1, innovation setbacks (main) TIME 1, Innovation setbacks (other) Time 1 and finally innovation setbacks (other) TIME 2 and innovation setbacks (main) at Time 2. Regressions were run for intrinsic motivation and identified regulation independently. Table 7.7 below provides regression coefficients and model statistics for the effects of innovation project setbacks on intrinsic motivation and identified regulation.

Table 7.7: Synchronous regression coefficients: the relationship between innovation setbacks on intrinsic motivation and identified regulation

|  |  |  |
| --- | --- | --- |
| *Variables Entered* | Intrinsic Motivation Time 2 | Identified Regulation Time 2 |
| *Model 1* | | |
| *Gender* | -.08 | -.02 |
| *Age* | -.04 | .05 |
| *Nationality* | -.04 | -.01 |
| *Education* | -.02 | .02 |
| *Innovation experience* | -.07 | -.02 |
| *Innovation Type* | -.05 | -.11 |
| *R2* | -.00 | .01 |
| *Model 2* | | |
| *Motivation variable Time 1* | .29\*\*\* | .27\*\*\* |
| *Innovation setbacks (main) Time 1* | -.05 | -.15\*\* |
| *Innovation setbacks (other) Time 1* | .08 | .08 |
| *R2* | .10\*\*\* | .09\*\*\* |
| *Model 3* | | |
| *Innovation setbacks (main) Time 2* | .09 | -.03 |
| *Innovation setbacks (other) Time 2* | -.45\*\*\* | -.23\*\*\* |
| *R2* | .26\*\*\* | .15\*\*\* |
| *Model 3 Statistics* | | |
| *Adjusted R2* | .23\*\*\* | .12\*\*\* |
| *F* | 7.53\*\*\* | 3.96\*\*\* |
| *Change R* | .16\*\*\* | .06\*\*\* |
| *Change F* | 25.81 | 8.33\*\*\* |

Notes: Standardized regression coefficients are reported. \*p<.05, \*\*p<.01. N=319 due to the routing for Innovation setbacks (other projects) as not all respondents reported that they had worked on projects other than the main innovation project. Missing cases in the reported data were handled using the ‘exclude cases pairwise’ approach in SPSS for all regression models. A sensitivity analysis was conducted where the regression was also run using mean replacement to manage the missing data (the difference between the complete data set, innovation setbacks (main) N = 401, and innovation setbacks (other) N = 319). These results were similar to the pairwise exclusion results, and as such the pairwise exclusion analysis results are reported since these are based on unaltered data.

Results provide some support for the hypothesis that innovation setbacks are negatively related to intrinsic motivation and identified regulation. The regression analysis of intrinsic motivation indicated a negative relationship with innovation setbacks (other projects) Time 2 (*β = -.45, p < .001*), but interestingly, the introduction of innovation setbacks (main project) Time 2 did not increase the strength of the regression model (*β = .09, n.s*.). Identified regulation regression analysis returned similar results with a negative relationship with innovation setbacks (other projects) and identified regulation (*β = -.23, p < .001*) but once again the main project did not significantly increase the strength of the relationship (*β = -.03, n.s*.). This result is interesting and suggests that motivation may be project specific.

### Summary of regression analysis findings

Table 7.8 below provides a summary of findings for the direct effects analysis against hypotheses:

Table 7.8: Summary of regression analysis findings

|  |  |
| --- | --- |
| Hypothesis | Finding |
| *H1: Innovation setbacks and failures are negatively associated with well-being* | Supported |
| *H2: Innovation setbacks and failures are negatively associated with innovative work behaviour* | Supported |
| *H3: Innovation setbacks and failures are negatively associated with intrinsic motivation and identified regulation* | Partially supported: Intrinsic motivation and identified regulation were both strongly negatively related to Innovation setbacks (other projects) but results were not significant for innovation setbacks (main project) |

## Lagged analysis in the relationship between innovation project setbacks and outcomes

In non-experimental designs such as this one, causality is notoriously difficult to infer (Tabachnick & Fidel, 2014). Although the above findings indicate that there is an association between innovation project setbacks and outcome variables, causality cannot be assumed on the basis of this finding. Cook and Campbell (1979) argued that three conditions underpin causal relationships and that these must be met before causation can be inferred. Firstly, covariation, where two effects vary together, such that when observing changes in one variable, changes in the other variable should also be observable. Secondly, temporal precedence, where the presumed cause must precede the presumed effect. Finally, all alternate explanations should be ruled out. With these conditions in mind, it was important to explore whether the data offered potential causal explanations for effects, because while change analysis can offer stronger evidence of covariation than a cross sectional analysis, lagged analysis offers some insight into the timings of effects. Therefore, conditions one and two offer different information with regards causal insights. As such, additional lagged analyses were conducted on each of the dependent variables in order to explore this research question in more depth.

### Lagged analysis: well-being

In order to further explore the effects of setbacks on well-being, and as a means of addressing questions of causality, a lagged regression analysis was conducted for this and subsequent hypothesis in order to ascertain whether Time 2 levels of well-being (and subsequently other dependent variables) were associated with innovation project setbacks and failures and well-being at Time 1.

Analysis was carried out using hierarchical regressions. Well-being at Time 2 was regressed against well-being at Time 1 and in the final step, innovation setbacks (main) Time 1, and innovation setbacks (other) Time 1 was entered into the model. Results were not significant (innovation setbacks main; *β = .01, p = n.s*), (innovation setbacks other; *β = .02, p = n.s)*

This finding therefore does not lend support for the hypothesis that well-being at Time 2 is related to innovation project setbacks at Time 1. While project setbacks were found in contemporaneous analyses (reported earlier) to affect well-being at the current time of measurement, project setbacks at Time 1 does not predict well-being at Time 2.

In addition to the above analysis, lagged regressions were also used to test whether there is any evidence to support the proposition that well-being Time 1 predicts innovation setbacks at Time 2 after controlling for innovation setbacks at Time 1. This was done in order to explore the possibility of reverse causality. Results of this analysis were not significant. Well-being at Time 1 did not predict innovation setbacks at Time 2 (innovation setbacks main; *β = .01, p = n.s*; innovation setbacks other; *β = .01, p = n.s*;).

### Lagged analysis: Innovative work behaviour

In order to explore in more detail, the relationship between innovation project setbacks and innovative work behaviour, a lagged regression analysis was conducted to examine whether Time 2 levels of innovative work behaviour are associated with innovation setbacks and innovative work behaviour at Time 1.

Analysis was carried out using hierarchical regressions. Innovative work behaviour Time 2 was regressed against innovative work behaviour at Time 1 and in the final step innovation setbacks (main) Time 1 and innovation setbacks (other) Time 1 was entered into the model. Results were not significant; innovative work behaviour Time 2 (innovation setbacks main; *β = -.01, p = n.s*.; innovation setbacks other; *β = -.02, p = n.s*). This finding suggests that Time 1 levels of innovation setbacks do not predict Time 2 levels of innovative work behaviour.

In addition to the above analysis, to examine the possibility of reverse causality, a lagged regression analysis was also carried out to explore whether innovative work behaviour at Time 1 predicted innovation setbacks at Time 2 after controlling for innovation setbacks (main), and innovation setbacks (other) at Time 1. Results of this analysis were not significant. Innovative work behaviour Time 1 did not significantly predict project setbacks at Time 2 (β = -.05, p = n.s). The lagged findings (and contemporaneous findings earlier) again lends support for the idea that psychological outcomes for innovators are more likely to be affected by current or very recent innovative experiences rather than by past ones.

### Lagged analysis: motivation variables

In order to further explore the effects of innovation project setbacks and failures on motivation (intrinsic motivation and identified regulation), a lagged regression analysis was conducted to examine whether Time 2 levels of intrinsic motivation and identified regulation are associated with innovation project setbacks and motivation variables at Time 1.

Analysis was carried out using hierarchical regressions. Intrinsic motivation and identified regulation Time 2 were regressed independently against their Time 1 counterpart and in the final step, innovation setbacks (main) Time 1 and innovation setbacks (other) Time 1 were entered into the model. Results were not significant; intrinsic motivation Time 2 was not related to innovation setbacks Time 1 (innovation setbacks main; *β = -.06, p = n.s*; innovation setbacks other; *β = -.04, p = n.s*), and neither to identified regulation Time 2 (innovation setbacks main; *β = -.04, p = n.s*; innovation setbacks other *β = -.04, p = n.s*).

To consider reverse causality, innovation setbacks (main) Time 2 and innovation setbacks (other) other Time 2 were regressed against both intrinsic motivation and identified regulation Time 1 while controlling for innovation setbacks (main) Time 1 in order to explore whether motivation variables at Time 1 predicted innovation setbacks at Time 2. Both lagged regression results were non-significant; intrinsic motivation Time 1 (β = -.08, p = n.s), identified regulation Time 1 (β = -.03, p = n.s).

This finding suggests that the relationship between motivation dimensions and innovative setbacks is time sensitive. Intrinsic motivation and identified regulation it would seem predominantly changes in light of current and not past innovation experiences.

## Moderation Analysis

Previous research into the outcomes of innovation for innovators are both sparse and inconsistent (Anderson et al, 2004). As such, an analysis of the moderating effects of a number of potentially key factors may help to explain the varying experiences of innovators in terms of the well-being, innovative behaviour and motivational outcomes that they may face as a result of innovation setbacks and failures. It was hoped that an exploration of moderators would also lead to greater understanding of why some individuals reap the rewards of their innovative experiences, while for others, innovating may result in significant personal costs. This addresses the second aim of this thesis, and answers hypotheses H4 through H8.

In line with suggested best practice with regards testing for moderator effects (i.e. Aiken & West, 1991; Hayes, 2013), the independent variable, and the moderator variables were standardized (to avoid issues with multicollinearity) and an interaction term was created by computing a multiplication of the standardised variables (moderator \* IV). These variables were then entered into multiple regression models.

Results of moderator regression analyses are discussed in turn in line with relevant hypotheses. Analysis of moderators resilience, normalization of failure, supervisor feedback, learning from setbacks and failures and level of investment are reported.

### Resilience as moderator

In order to explore the moderating effect of resilience on the relationship between innovation setbacks and outcome variables, well-being, innovative work behaviour, intrinsic motivation and identified regulation, a series of five step regression models were built in IBM SPSS with innovation outcome variables Time 2 (e.g. well-being, innovative work behaviour) as the dependent variables. The analysis focusses on innovation setbacks (main project) for two main reasons. Firstly, as discussed in Chapter 3 above, the projects on which innovators are most heavily involved with are expected to have the greatest impact on outcomes because of the increased time effort and dedication to that project. Secondly, there were a greater number of responses to the main project compared to ‘other’ projects as 81 individuals did not provide answers relating to other more general innovation projects. As such innovation setbacks (main) provided the largest dataset with which to work.

The regression steps were as follows:

* Step 1: Control variables
* Step 2: Dependent variable Time 1 (e.g. well-being, innovative work behaviour)
* Step 3: Innovation setbacks (main), (Time 1 and Time 2)
* Step 4: Moderator variables Time 1 and Time 2 (e.g. resilience)
* Step 5: Interaction term: moderator Time 2 x innovation setbacks (main) Time 2

Tables 7.9 and 7.10 below provide standardized beta coefficients for the moderation regression models, where both independent and dependent variables were standardized. Each model will be discussed in turn in line with relevant hypotheses and interaction graphs will be presented for all significant relationships.

Table 7.9: Moderation effects in the relationship between innovation setbacks and outcomes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | N | Well-being Time 2 | Innovative work behavior Time 2 | Intrinsic motivation Time 2 | Identified regulation Time 2 |
| *Moderator* |  |  |  |  |  |
| 1. Innovation setbacks (main) x Resilience | 401 | .17\*\* | .18\*\*\* | .23\*\*\* | .04 |
| ΔR2 |  | .02\*\* | .03\*\*\* | .04\*\*\* | .00 |
| R2 |  | .20\*\* | .45\*\*\* | .27\*\*\* | .17 |
| 2. Innovation setbacks (main) x Normalization of failure | 401 | .18\*\*\* | -.01 | -.02 | -.23\*\*\* |
| ΔR2 |  | .03\*\*\* | .00 | .00 | .04\*\*\* |
| R2 |  | .13\*\*\* | .62 | .39 | .32\*\*\* |
| 3. Innovation setbacks (main) x Supervisor feedback | 373 | .17\*\* | -.13\*\* | -.12\* | -.24\*\*\* |
| ΔR2 |  | .02\*\* | .01\*\* | .01\* | .04\*\*\* |
| R2 |  | .13\*\* | .61\*\* | .38\* | .27\*\*\* |
| 4. Innovation setbacks (main) x Learning from failure & setbacks | 105 | .07 | .29\*\* | .22\* | .28\*\* |
| ΔR2 |  | .00 | .07\*\* | .03\* | .07\*\* |
| R2 |  | .12 | .39\*\* | .30\* | .36\*\* |

Notes: β = Standardized beta-coefficients derived from the final step (interaction) of the regression model are reported; \*p<.05, \*\*p<.01, \*\*\*p<.001. N varies for some constructs because responses were routed, and non-response was due to non-applicability rather than attrition. (i.e. not all respondents had experienced setbacks or failures in their projects and therefore could not have learned from them.)

Table 7.10: Level of investment variables as moderators of the relationship between innovation setbacks and innovation outcomes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LOI x project setbacks interaction β | N | Well-being Time 2 | Innovative work behavior Time 2 | Intrinsic motivation Time 2 | Identified regulation Time 2 |
| *Level of investment* | | | | | |
| 5. Innovation setbacks (main) x Project lead | 401 | .06 | .07 | .03 | .02 |
| ΔR2 |  | .00 | .00 | .00 | .00 |
| R2 |  | .10 | .42 | .25 | .18 |
| 6. Innovation setbacks (main) x Time spent on project | 401 | -.08 | .06 | -.05 | -.09 |
| ΔR2 |  | .01 | .00 | .00 | .01 |
| R2 |  | .09 | .41 | .19 | .15 |
| 7. Innovation setbacks (main) x Perceived importance of project | 401 | .09 | .07 | .10 | .06 |
| ΔR2 |  | .01 | .01 | .01 | .00 |
| R2 |  | .15 | .17 | .27 | .16 |

Notes: Standardised Beta coefficients are reported to the final step of the regression model (LOI x innovation setbacks (main)); \*p<.05, \*\*p<.01, \*\*\*p<.00

N varies for some constructs because responses were routed, and non-response was due to non-applicability rather than attrition. i.e. not all respondents were working on other projects.

### Resilience as a moderator of the relationship between innovation setbacks and failure and outcome variables

**Hypothesis 4: Resilience moderates the negative relationship between innovative project setbacks/failures and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high resilience the relationship is less negative than for those with low resilience.**

Results indicated that resilience was a significant moderator of the relationship between innovation setbacks (main) and well-being (interaction β = .17, p < .01), innovative work behaviour (interaction β = .18, p < .001), and intrinsic motivation (interaction β = .23, p < .001). Resilience was not a significant moderator of the relationship between innovation setbacks (main) and identified regulation. Interaction graphs are presented at the end of each section.

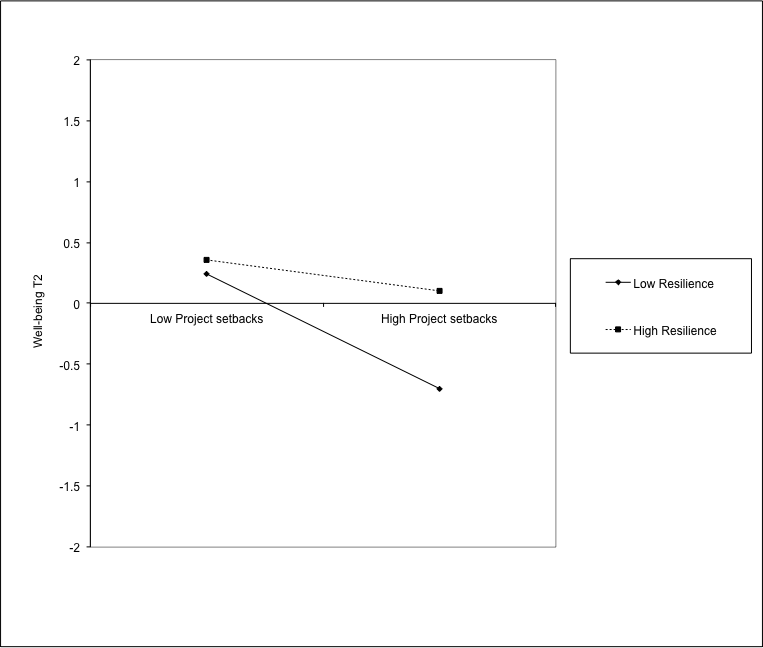
Graph 7.1 below indicates that those lower in resilience may experience a sharper decline in well-being as project setbacks increase. Conversely, those high in resilience appeared to experience a smaller decline in well-being as project setbacks increase. Both high and low resilience groups experienced a decline in innovative work behaviour when project setbacks were high, however the low resilience group appear to experience a more pronounced decline in innovative work behaviour when project setbacks are high (Graph 7.2). This suggests therefore that high resilience buffers the effects of project setbacks on innovative work behaviour.

Graph 7.3 below indicates that the moderating effect of resilience on intrinsic motivation may be an unusual one. Those low in resilience appear to display higher levels of intrinsic motivation when project setbacks are low, with a sharp decline in intrinsic motivation levels as project setbacks increase. Those high in resilience appear to retain relatively similar levels of intrinsic motivation regardless of the level of project setbacks experienced.

In summary, the above findings provide support for hypothesis 4 which was supported for three out of four outcomes in which cases resilience appears to dampen the negative effects of innovation project setbacks on outcomes. These findings will be discussed in greater detail in subsequent sections of this thesis. Moderation regression analysis indicated that resilience was not a significant moderator of the relationship between identified regulation and innovation project setbacks.

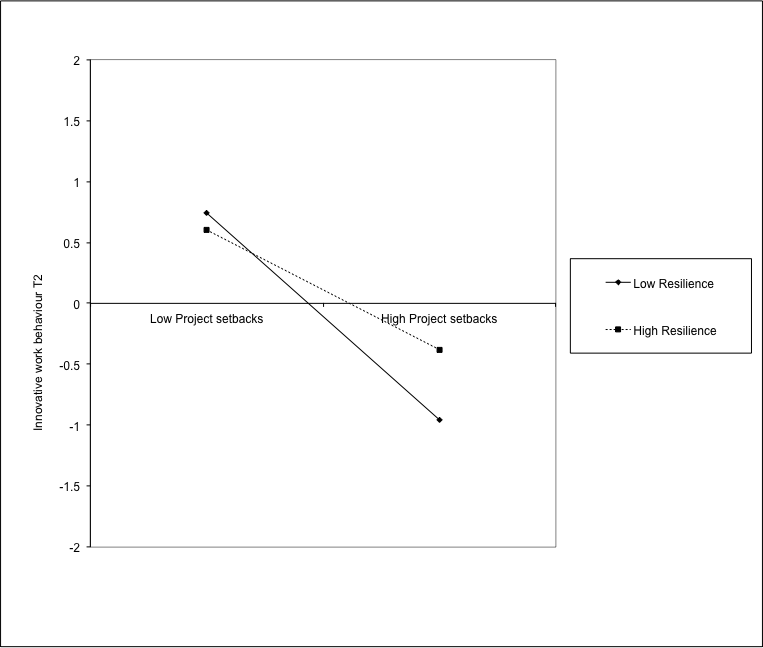
### Interaction graphs: Resilience as moderator

Graph 7.1: Resilience as a moderator of the relationship between innovation setbacks and well-being



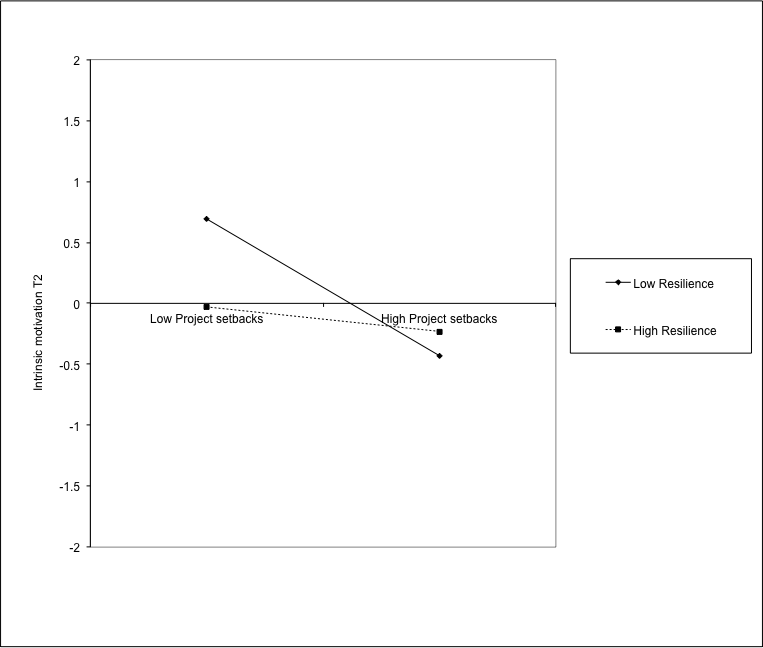
Notes: interaction β = .17, p<.01

Graph 7.2: Resilience as a moderator of the relationship between innovation setbacks and innovative work behaviour



Notes: Interaction β = .18, p<.001

Graph 7.3: Resilience as a moderator of the relationship between intrinsic motivation and innovation setbacks



Notes: Interaction β = .23, p<.001

### Supervisor feedback as moderator

**Hypothesis 5: Supervisory feedback moderates the negative relationship between innovative project setbacks and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high supervisor feedback the relationship is less negative than for those with low supervisor feedback.**

Moderator results indicated that the relationship between innovation setbacks (main) and all outcome variables were moderated by supervisor feedback: wellbeing (interaction β = .17, p < .01), innovative work behaviour (interaction β = -.13, p < .001), intrinsic motivation (interaction β = -.12, p<.05) and identified regulation (interaction β = -.24, p<.05).

Graph 7.4 below indicates the nature of the moderating relationship of supervisor feedback and well-being and suggests that low supervisor feedback is associated with a decline in well-being as project setbacks increase. Those in the high supervisor feedback category appear to maintain levels of well-being regardless of levels of project setbacks. This finding is in line with hypothesis 5 outlined in this thesis.

Interaction graph 7.5 below indicates that low supervisor feedback was associated with lower innovative work behaviour in both low and high setback categories, with innovative work behaviour declining as project setbacks increased. The high supervisor feedback plot shows that innovative work behaviour was higher for this group in both setback categories but the gradient for the high supervisor feedback category showed a slightly steeper decline between low and high setback categories than was demonstrated in the low supervisor feedback group. This finding therefore does not support the hypothesis 5 that supervisor feedback buffers the effects of high setbacks on innovative work behaviours.

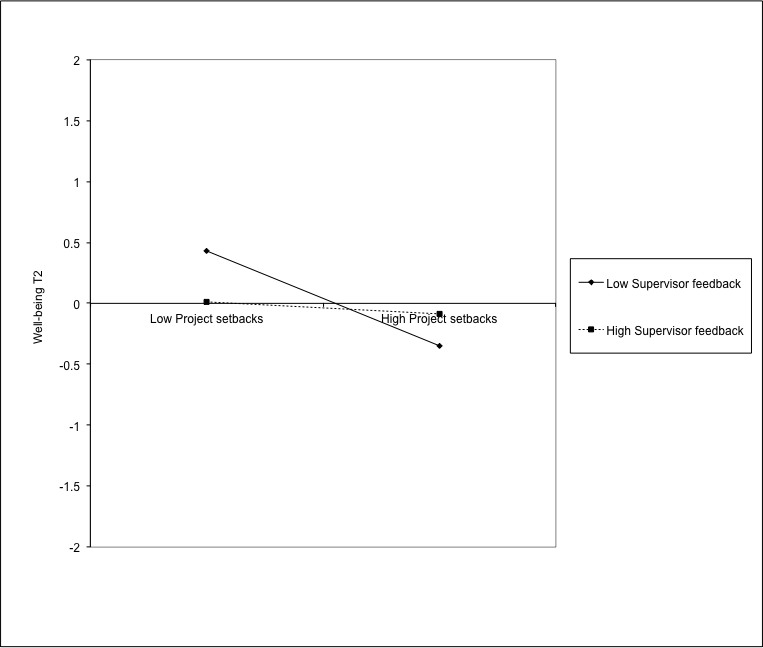
Supervisor feedback was a significant moderator in the relationship between innovative project setbacks and intrinsic motivation The interaction graph 7.6 below reveals the nature of this relationship, namely that, although the high supervisor feedback group appear to be associated with higher levels of intrinsic motivation, results reveal a steeper decline in intrinsic motivation as setbacks increase, compared to the low supervisor feedback group who, although they appear to have overall lower levels of intrinsic motivation, there is very little change in motivation levels associated with setbacks. This finding is contrary to the hypothesis and will be discussed in detail in the discussion and conclusions Chapter 9.

Supervisor feedback was a significant moderator of the relationship between innovation setbacks (main) and identified regulation. The interaction graph 7.7 below indicates that the interaction effects for identified regulation follow a similar pattern to the effects seen for intrinsic motivation. Low supervisor feedback appears to be related to lower levels of identified regulation, but these levels increase as project setbacks increase. Conversely, high supervisor feedback appears to be related to higher levels of identified regulation, but these levels decline as project setbacks increase. This finding does not support the hypothesis.

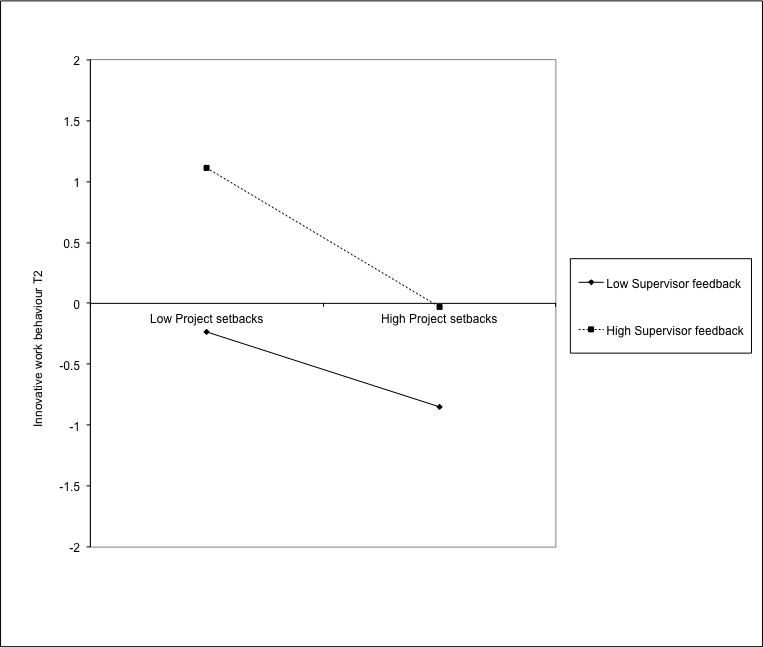
In summary, Hypothesis 5 was supported for only one out of four outcomes, and was not supported for three out of four outcomes where the effects were opposite to the hypothesized indicating that in general, high supervisory feedback amplifies the negative effects of setbacks on outcomes.

### Interaction graphs: Supervisor feedback as moderator

Graph 7.4: Supervisor feedback as a moderator of the relationship between innovation setbacks and well-being

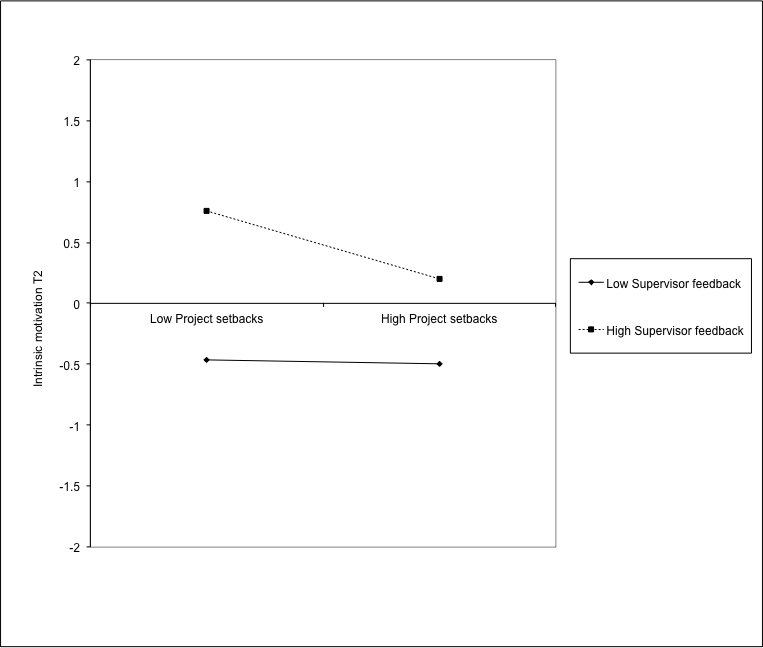


Notes: interaction β = .17, p<.01

Graph 7.5: Supervisor feedback as a moderator of the relationship between innovation setbacks and innovative work behaviour

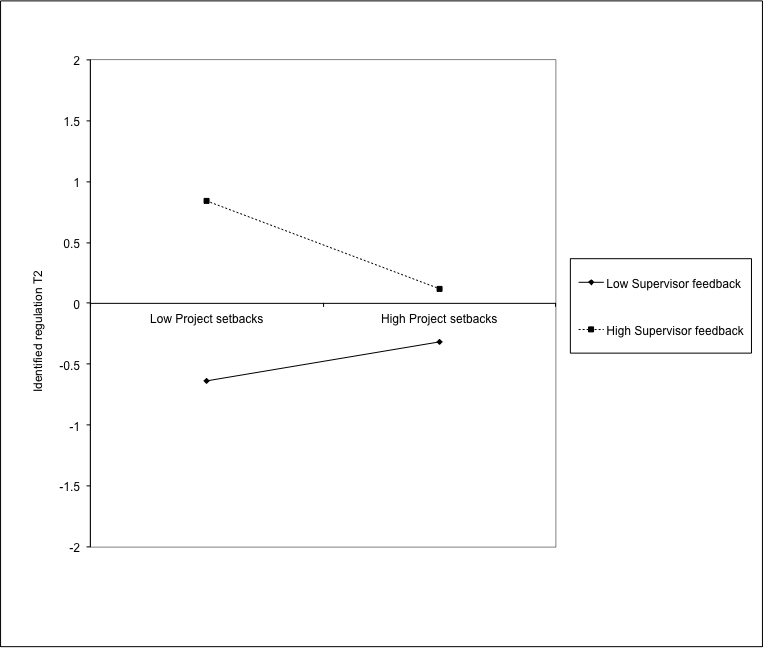
Notes: interaction β = -.13, p<.01

Graph 7.6: Supervisor feedback as a moderator of the relationship between innovation setbacks and intrinsic motivation



Notes: interaction β = -.12, p<.05

Graph 7.7: Supervisor feedback as a moderator of the relationship between innovation setbacks and identified regulation



Notes: interaction β = -.24, p<.001

### Normalization of failure as moderator

**Hypothesis 6: Normalization of failure moderates the negative relationship between innovative project setbacks and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees in organizations with high normalization of failure the relationship is less negative than for those with low normalization of failure.**

Normalization of failure is a management technique which involves diffusing or reframing negative emotions associated with failure (Ashforth & Kreiner, 2002). Moderation regression analysis revealed that normalization of failure moderated the relationship between innovation setbacks (main) and well-being (interaction β = .18, p < .001) and identified regulation (interaction β = -.23, p < . 001). The interaction effects were not significant for innovative work behaviour (interaction β = -.01, p = n.s), or intrinsic motivation (interaction β = .37, p = n.s).

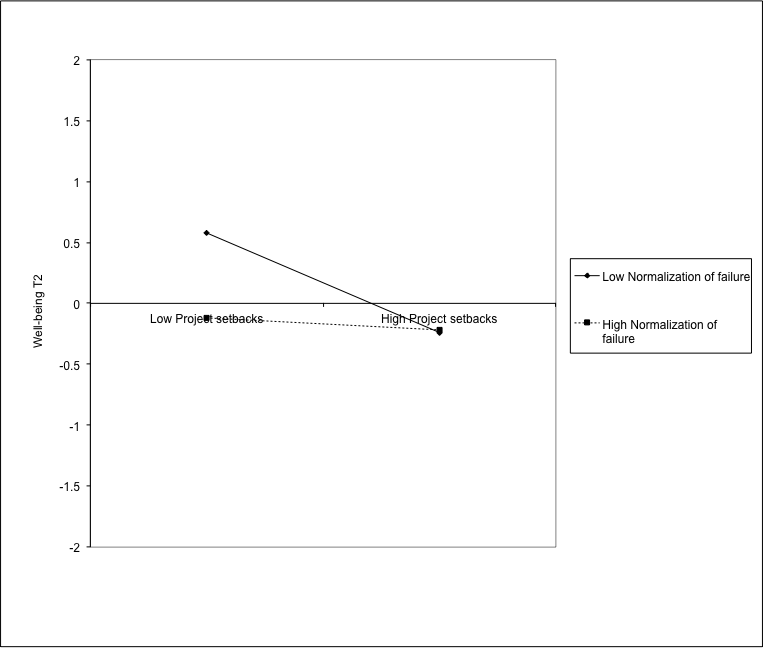
Graph 7.8 below indicates that in situations where failure is more highly normalized, there appear to be only minor differences in well-being in the low and high project setbacks groups. However, where respondents report low levels of normalization of failure, well-being appears to be higher where project set-backs are low, with a decline in well-being as project setbacks increase. To some extent this finding provides support for the hypothesis 6 that high levels of normalization should buffer the effects of an increase in setbacks on well-being. It is interesting and unexpected however, that those higher in normalization appear to be generally lower in levels of well-being. This finding is possibly related to differences between sample groups. Organizations which employ ‘normalization of failure’ policies may have higher levels of failure generally, which may result in overall lower levels of well-being. This is perhaps an area worthy of exploration by future researchers and will be discussed in greater detail in the subsequent discussion section of this thesis in Chapter 9.

The interaction beta for identified regulation was significant. However, Graph 7.9 below shows that the low normalization of failure group has a positive slope between innovation setbacks (main) and identified regulation, whereas the high normalization group shows a negative slope between innovative project setbacks and identified regulation. This finding therefore does not provide supports for hypothesis 6.

Normalization of failure did not have a significant moderating effect on either intrinsic motivation or innovative work behaviour. In summary there was little support for normalization operating in the expected direction, only doing so for one of the four outcomes and against the hypothesized direction for one outcome.

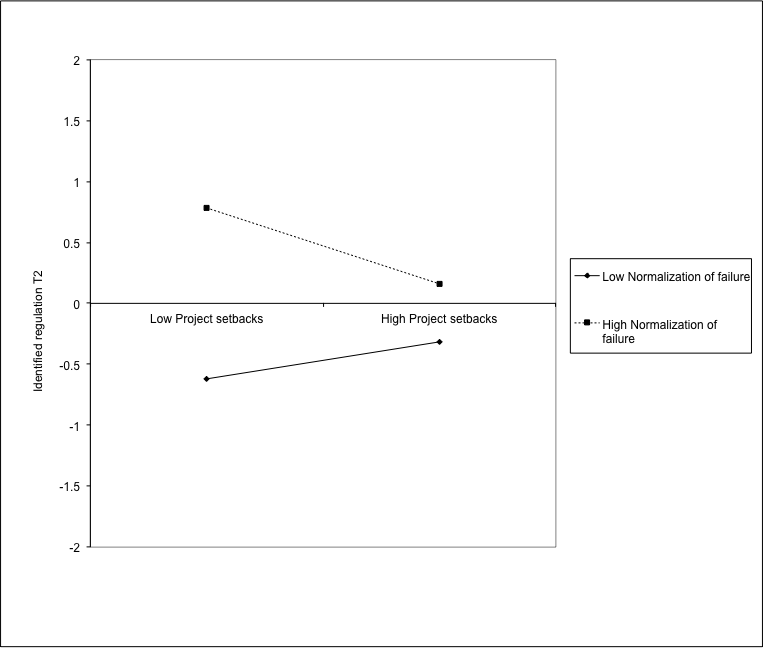
### Interaction graphs: Normalization of failure as moderator

Graph 7.8: Normalization of failure as a moderator of the relationship between innovation setbacks and well-being



Notes: Interaction β = .18, p <.001

Graph 7.9: Normalization of failure as a moderator of the relationship between innovation setbacks and identified regulation



Notes: Interaction β = -.23, p <.001

### Learning from setbacks and failure as moderator

**Hypothesis 7: Learning from setbacks and failure moderates the negative relationship between innovation project set-backs and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for individuals with high learning from failure the relationship is less negative than for those with low learning from failure.**

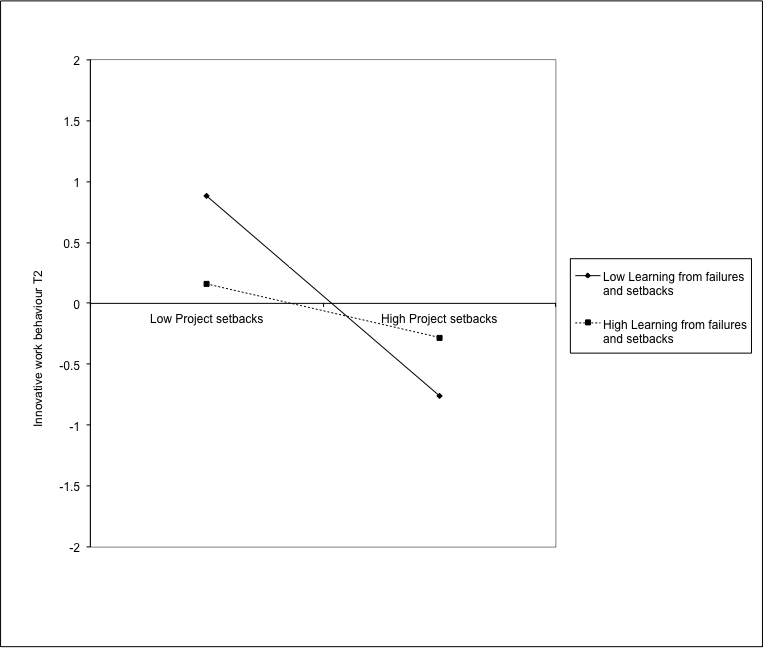
Moderation regressions indicated that learning from setbacks and failure significantly moderated the relationship between innovation setbacks (main) and innovative work behaviour (interaction β = .29, p < .01), intrinsic motivation (interaction β = .22, p < .05) and identified regulation (interaction β = .28, p < .01). The interaction term for well-being was not significant.

Graph 7.10 below indicates that innovative work behaviour declines sharply in the low learning group where project setbacks are high. Higher learning scores appear to be associated with a more moderate decline in innovative work behaviour between the low and high setback groups. Higher learning from setback and failure scores also appear to be associated with slightly higher innovative work behaviour scores where project setbacks are high.

Regression analysis indicated that learning from setbacks and failure was a significant moderator of the relationship between innovation setbacks (main) and intrinsic motivation. Graph 7.11 below indicates that low learning scores generally appear to be associated with higher levels of intrinsic motivation. However, although intrinsic motivation is lower in the high learning group, intrinsic motivation does appear to increase more strongly in this group as project setbacks increase. Similar findings were made for learning from setbacks and failure as a moderator of the relationship between innovation setbacks (main) and identified regulation as indicated by Graph 7.12 below. This finding provides some support for hypothesis 7 that predicts that learning from setbacks and failures buffers the negative effects of innovation setbacks (main) on intrinsic motivation and identified regulation.

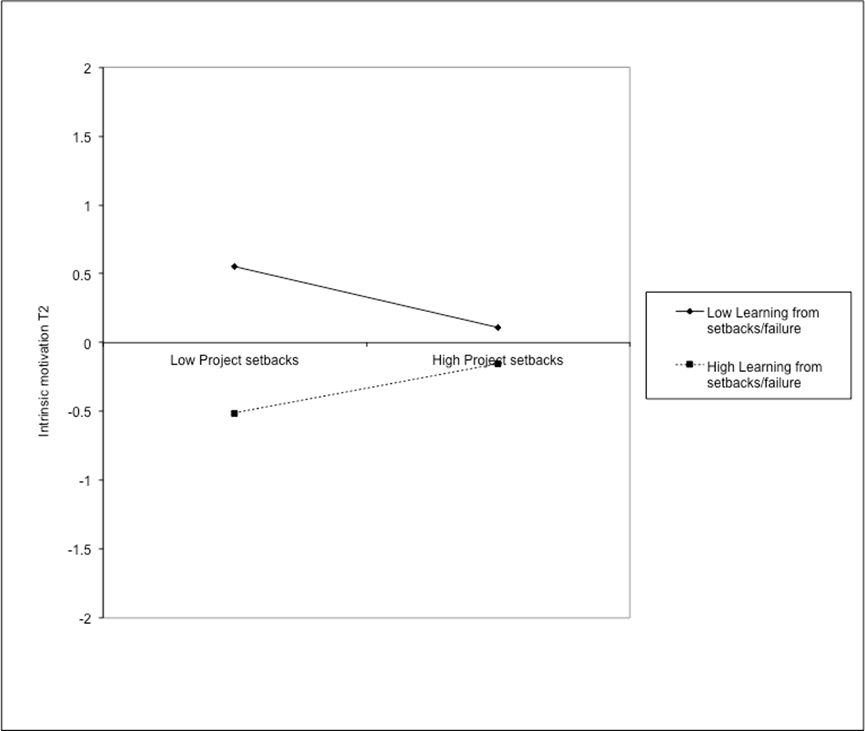
In summary, these results provide some support for Hypothesis 7 whereby three out of four outcome variables were moderated by learning from failure. Learning from failure however did not significantly moderate the fourth outcome variable, well-being.

### Interaction graphs: Learning from setbacks and failure as moderator

Graph 7.10: Learning from setbacks and failure as a moderator of the relationship between innovation setbacks and innovative work behaviour

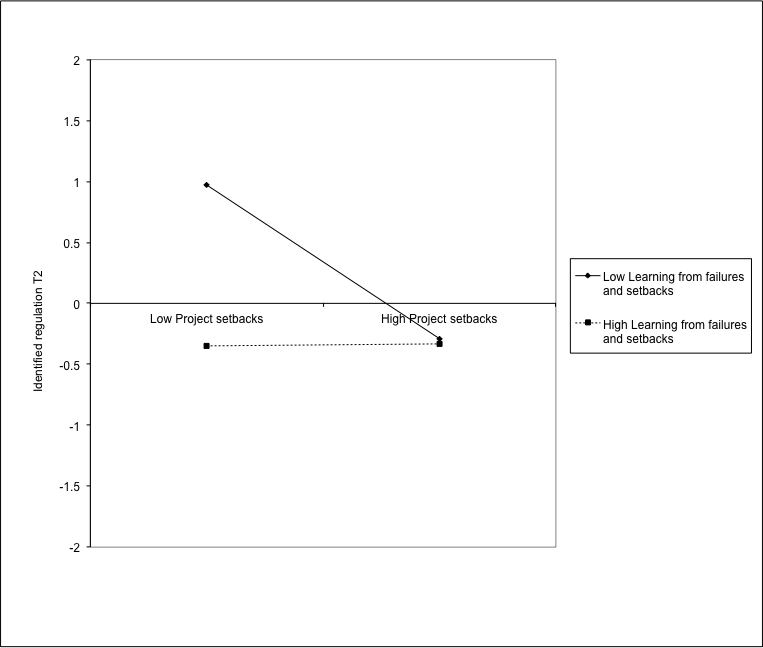
Notes: interaction beta .29, p<.01

Graph 7.11: Learning from setbacks and failure as a moderator of the relationship between innovation setbacks and intrinsic motivation



Notes: interaction β = .38, p<.05

Graph 7.12: Learning from setbacks and failure as a moderator of the relationship between innovation setbacks and identified regulation



Notes: interaction beta .28, p<.01

### Level of investment as moderator

**Hypothesis 8: Level of investment in the innovation project (perceived importance, time spent on the project, and project role) moderates the negative relationship between innovation project setbacks and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees with low levels of investment the relationship is less negative than for those with high levels of investment.**

In order to test the hypothesis that level of investment in the innovative project moderates the relationship between innovation project set-backs and well-being, innovative work behaviour, intrinsic motivation and identified regulation, a series of moderation regression analyses were carried out on each of the proposed ‘level of investment’ moderator variables as follows:

* Project role (lead or non-lead)
* Amount of time spent on the project
* Perceived importance of the innovation (to self and to organization)

Table 7.10 above provides standardized beta coefficients for the final step of each model, and the interaction terms. None of the level of investment constructs were found to significantly moderate the relationship between innovation setbacks (main) and outcome variables, and therefore, in summary, Hypothesis 7 was not supported and no graphs are presented.

### Summary of moderator findings:

Table 7.11: Summary of moderation analysis findings

|  |  |
| --- | --- |
| **Hypothesis** | **Finding** |
| *H4: Resilience moderates the negative relationship between innovative project setbacks/failures and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high resilience the relationship is less negative than for those with low resilience.* | Generally supported (for 3 out of 4 outcomes): Resilience was found to moderate the relationship between innovation setbacks (main) and well-being, innovative work behavior and intrinsic motivation. Resilience was not a moderator of identified regulation and innovation setbacks (main). |
| *H5: Normalization of failure moderates the negative relationship between innovative project setbacks and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees in organizations with high normalization of failure the relationship is less negative than for those with low normalization of failure.* | Little support: Normalization of failure was a significant moderator of the relationship between innovation setbacks (main) and well-being in the hypothesized direction, but in the opposite of the hypothesized direction for identified regulation.  There were no significant relationships between normalization of failure and intrinsic motivation or identified regulation. |
| *H6****:*** *Supervisory feedback moderates the negative relationship between innovative project setbacks and well-being, innovative work behaviours, intrinsic motivation and identified regulation, such that for employees with high supervisor feedback the relationship is less negative than for those with low supervisor feedback.* | Generally not supported (supported for 1 out of 4 outcomes; reverse of hypothesized direction for 3 out of 4 outcomes): Supervisor feedback significantly moderated the relationship between innovative setbacks (main) and well-being, such that, well-being was maintained despite increasing setbacks for those higher in supervisory feedback.  For innovative work behavior, although the interaction beta was significant, and those high in feedback showed higher levels of IWB, the slopes indicated that IWB steeply declined as setbacks increased in high feedback groups. Findings were similar for both intrinsic motivation and identified regulation, and as such, did not provide support for the hypothesis. |
| *H7: Learning from setbacks and failure moderates the negative relationship between innovation project set-backs and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for individuals with high learning from failure the relationship is less negative than for those with low learning from failure.* | Generally supported: Learning from setbacks and failures moderated the relationship between innovative work behavior, intrinsic motivation and identified regulation in the hypothesized direction, but was not a significant moderator of well-being |
| *H8: Level of investment in the innovation project (perceived importance, time spent on the project, and project role) moderates the negative relationship between innovation project setbacks and well-being, innovative work behaviour, intrinsic motivation and identified regulation, such that for employees with low levels of investment the relationship is less negative than for those with high levels of investment.* | Not supported |

## Summary of quantitative findings

Overall, the quantitative findings provide a good level of support for the theoretical model and hypothesized relationships in terms of the direct effects of innovation setbacks on outcomes, support for the moderators was mixed. Synchronous effects regression models significantly supported the hypothesis that innovation project setbacks were negatively related to well-being, and also suggested that the setbacks in the main project impacted well-being whereas setbacks on other innovative projects did not appear to have a significant relationship with well-being.

Regression analysis also provided supporting evidence of the theorized relationship between innovation setbacks (main) and innovative work behaviour and indicated that as innovation setbacks (main) increased, innovative work behaviour decreased. This was the case both for setbacks in the main innovative project and also setbacks in other innovative projects. This thesis takes the theoretical position that an increase in setbacks may lead to feelings of helplessness which result in a decline in innovative work behaviours.

The above analysis also partially supported the hypothesis that innovation setbacks are negatively related to intrinsic motivation and identified regulation with regression analysis indicating that innovation setbacks (other) were a strong negative predictor of both intrinsic motivation and identified regulation, but the introduction of innovation setbacks (main) did not significantly improve the strength of the model.

Lagged analysis was carried out on all outcome variables but returned non-significant results. Therefore, while the synchronous regression results may be attributable to our theorized phenomenon, it is particularly hard to argue causality in these relationships, and lagged analysis provided no further clues in this respect. It is possible, for example, that a decline in well-being, innovative work behaviours and motivation leads to an increase in project setbacks and failures. One possible explanation for these findings is that the time between samples was approximately six months, which is a relatively long time when talking about well-being, motivation and behaviour, which are dynamic and known to fluctuate over relatively short periods of time (Houle & Philippe, 2017; Milyavskaya et al, 2013). Six months is also a long time in the life cycle of an innovative project, given that such projects are often prone to significant progress changes over relatively short time periods (Kanter, 1988). While the decision to have a relatively long gap between samples was taken for pragmatic reasons (namely to enhance the likelihood of capturing instances of setbacks and failure), the results of lagged analysis lead us to argue that future research in this area should reduce the time lag in order to more accurately explore questions of causality and the time-ordering of effects.

Quantitative results also revealed a number of moderating effects in the relationship between innovation setbacks (main) and outcomes. Resilience, supervisor support, and learning from setbacks and failures, all demonstrated some moderating effects on the relationship between innovation setbacks (main) and one or more of the outcome variables.

The quantitative results in this study paint a picture of a complicated set of relationships where setbacks within the innovation process may result in a decline in well-being, innovative work behaviour, intrinsic motivation and identified regulation. However moderating factors point optimistically towards management tools which may be employed to minimize the potential effects of negative innovative experiences on their staff, though this is only the case for some of the moderators (i.e. resilience, learning from failures).

In order to explore the themes that have emerged from the survey data, the following chapter focuses on thematic analysis of qualitative interviews. While the main focus of the qualitative chapter is to respond to the third aim of this thesis, namely to provide a more robust understanding of the meanings and impact of setbacks and failure within the innovation process, qualitative analysis also aims add depth of understanding to the quantitative findings in line with a mixed-methods approach to data analysis.

# Chapter 8: Exploring innovation setbacks and failures through qualitative interviews

## Introduction

The following chapter aims to build on the previous quantitative chapter by adding greater depth of understanding to the main research questions that this thesis seeks to answer. A mixed methods approach, employing both quantitative and qualitative analysis, allows for the examination of interpretive processes that cannot be understood through questionnaire analysis alone (Creswell & Plano-Clark, 2011). Given the reasonably broad scope of the current research, it was important to be focused in terms of the main themes to be explored through qualitative analysis, and as such, two themes were chosen which it was felt were of key importance to the overall aims of the current research.

The principal aim of the current thesis is to understand how setbacks and failures are related to psychological outcomes in innovators. The previous chapter aimed to explore the relationships between setbacks and failure outcomes using statistical analysis but there remains a question as to what exactly constitutes setbacks and failures within an innovation context. This query was also raised previously in the quantitative chapter where two different measures of setbacks and failure were taken. The first, a single response item which asked respondents to rate their performance on a current innovation project ranging from 1 ‘successfully completed’ to 5 ‘failed/terminated’. 66 respondents answered that their project had failed or terminated. However, an additional multi-item measure asked respondents to rate their project on a number of key performance indicators. In this this case, no projects received an absolute zero score for performance despite the fact that 66 respondents had previously indicated that their projects could be classified as having failed. This suggests therefore, that setbacks and failure are subjective concepts and that innovators may draw on numerous factors in their assessments of levels of success and failure. Therefore, in order to more accurately interpret the findings of the quantitative chapter, it is important to gain a more comprehensive understanding and more nuanced description of setbacks and failures from the point of view of innovators. To my knowledge, there has been no previous attempt to define setbacks and failures in the innovation context, although Dornblaser, Lin and Van de Ven, (2000, in Van de Ven, Angle & Poole, p. 193) did provide a more useful understanding of successes and failures within the innovation process. They note the subjective nature of innovation success and failure outcomes, recognizing through extensive qualitative analysis, that one employee’s vision of success or failure may be markedly different from another person’s. They found that success and failure had very different connotations for resource controllers than it did for innovation managers. However, although their research alluded to a relationship between setbacks and outcomes (i.e. they found that incorrect interpretations of events inhibited learning and contributed to later failures), they did not specifically seek to define setbacks in the innovation process. Seeking greater accuracy in defining setbacks and failures is key not only to providing robust answers to hypotheses in the current thesis but also in addressing gaps in research in the innovation field, given that failure has been noted as a poorly defined and under-researched concept (Thomas & Fernandez, 2008) and setbacks arguably share the same issue. With this in mind qualitative analysis will focus on the following two analytic questions:

*Question 1: What are the main features of setbacks and failures in the innovation context?*

*Question 2: How are innovation setbacks and failures linked?*

## Qualitative analysis approach

### Participants

In order to gather the required data, 20 semi-structured interviews were carried out with individuals who were currently working on innovative projects. Of the 20 interviewees, ten were involved in IT software innovations, six were involved in process type innovations (setting up innovative new consultancy projects), one interviewee was involved in marketing innovations, and three were involved with hardware innovations. All of them were experienced innovators and had been involved in innovation projects for between six and 30 years, with an average of 14 years of experience. Four interviewees were female and 16 were male.

Participants were all working in innovation centric roles, in so much as the main focus of their work was innovative projects. This was felt to be important to ensure that when discussing work-related setbacks and failures, they were really talking about innovation and not about some other work-related task.

The majority of participants (16) were employees at organizations which had taken part in the quantitative survey study for the current research. When sending out the invitation to participate in the survey research, the emails also contained an invitation to participate in the qualitative interviews and 12 participants were secured in this way. An additional four participants who did not reply to the original invitation contained within the survey email were identified by contacts within the participating organizations as being potentially useful people to speak to given the nature of the projects that they were working on, and arrangements were made via these contacts to interview them. The remaining four participants were not employed by organizations which had participated in the survey research and were identified as working on innovative projects which would be relevant to the current research.

### Data collection and analysis method

One to one semi-structured interviews were carried out which lasted between 35 and 65 minutes, with an average time of 43 minutes. The interview questions aimed to evoke information regarding a number of key factors: the type of innovation project/s that participants had been involved in, the current status of the project (i.e. close to completion; suffering from setbacks), the perceived impact of the innovation project on participants’ psychological outcomes such as emotion, well-being and motivation, and interviewees perceptions of the main features of innovation setbacks and failures within the innovation context. Questions contained within the interview schedule were used as a guide, but in order to ensure that the most valuable information was gathered, interviewees were encouraged to speak as freely as possible, and as such, the course of the interview and the order in which the main themes and questions were addressed was largely directed by the participant as is considered best practice (Ritchie et al, 2013). The interview schedule is available in Appendix 11.4. Eighteen of the interviews were recorded and transcribed verbatim. Two of the interviewees declined to be recorded, but detailed notes of the interview were taken.

The data was explored using an inductive thematic analysis approach. Thematic analysis is a method for “identifying, analysing and reporting patterns (themes) within data” (Braun & Clarke, 2006, p.79). Thematic analysis was considered to be an appropriate methodology to employ in that it allows researchers to explore how individuals make sense of their experiences (Bazeley, 2013). Thematic analysis focusses on organizing and identifying rich themes within qualitative data (Guest et al, 2012). This fitted well with the requirements of the current research because the previous chapter focused on detailed statistics, it was felt that an approach to interview analysis which used rich data and explored implicit and explicit ideas would add a more robust dimension to the thesis as a whole. Data analysis proceeded iteratively, seeking out insights that emerged from the data (Lilius et al, 2011).

Braun and Clarke’s (2006) paper offered a step by step approach to thematic analysis which lent itself well to the current research in that it was user friendly and fitted well with an inductive approach. Braun and Clarke (2006) outline the following six steps in the thematic analysis process which they suggest following in order to ensure that rigor and validity is applied to the method. These steps are: familiarizing yourself with the data (by transcribing or reading transcripts); producing initial codes (features of the data which are particularly relevant to the research question); searching for themes and sorting codes into themes; reviewing and refining themes to ensure that only those fully supported by the data are included in the final analysis; defining and naming themes (to ensure that each theme is named in such a way as to identify the ‘essence’ of what it represents); and finally, producing the final report. Each of the above steps were followed in the current analysis.

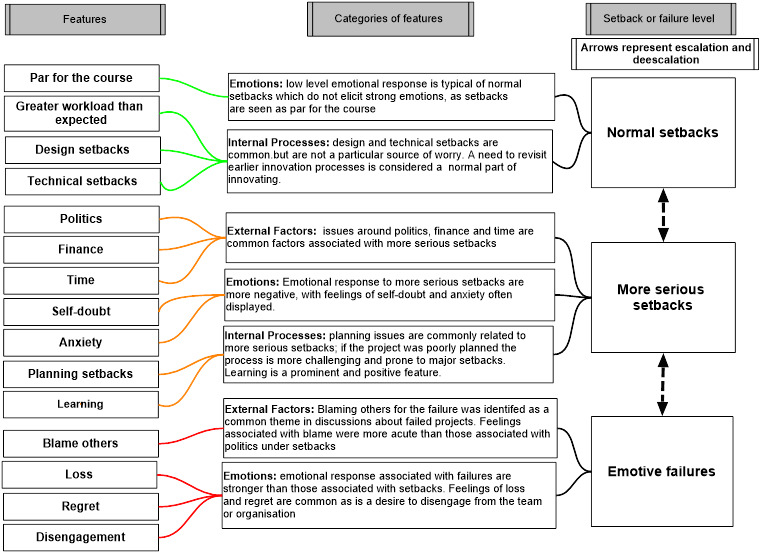
Firstly, as per Braun and Clarke’s (2006) suggested approach, familiarization with the data was achieved through personally transcribing all interviews and secondly by rereading transcripts prior to initial coding. The next phase of the process, ‘producing initial codes’ was carried out using the software NVivo 10 as an organizing tool. A number of first order codes were generated during the familiarization stage, and as the transcripts were coded on NVivo, additional first order codes were added. Once the process of first order coding was completed, the third phase of ‘sorting through themes and sorting codes’ was achieved by printing and cutting out coded quotes and organizing them into a giant thematic map. This is a suggested approach outlined by Bazeley (2013). This worked well to check the validity of the original coding and allowed the quotes and codes to be easily checked and redistributed as necessary which represented the fourth stage of Braun and Clarke’s six step process. Finally, once I was satisfied that all codes and relevant quotes had been appropriately distributed, the fifth stage ‘defining and naming themes’ was carried out which resulted in the drawing up of the final thematic maps, with relevant quotations organized within each theme and code.

Validity checking, whereby the appropriateness of codes is assessed by asking others to validate your interpretations of interview data (Creswell & Plano-Clark, 2011), was also carried out. Firstly, codes and relevant quotations were presented to three of the interviewees who were asked whether they felt that my interpretations were appropriate. For the most part, the three participants agreed with my interpretations of the data, although four coded quotations were moved into alternative codes following discussions around their interpretations which differed from my own. Secondly, the first draft and second drafts of this chapter were presented to two PhD supervisors and their perspectives on the coding was discussed. Following these validity checks, one code ‘communication’ was changed to ‘politics’, a term which it was felt was more in line with the current data, and a number of quotations were removed which were felt to potentially capture factors which were not in line with the codes under which they had been placed. The next section provides an overview of the findings and presents the finally agreed first, second and third order codes.

## Overview of findings

An overview of the current findings is presented visually in Figure 2 below which explores the features, categories of features and levels of setbacks and failures created through thematic analysis of the interviews. Each of the three levels are differentiated from one another by their degrees of abstraction.

Figure 2: The features and categories of features of setbacks and failures



Notes: Internal and external are in reference to factors which are internal or external to the project or team.

### First order coding (Features):

The first step of the analysis identified descriptions within the interviews which related to features of innovation setbacks and failures. These first order codes were referred to as ‘features’ and were topics which were repeatedly discussed in relation to innovative projects. The features are represented by the left most boxes in the diagram above.

### Second order coding (Categories of features):

After identifying first order codes, it was recognized upon further reflection that these features could be further ordered into ‘categories of features’, which would allow for direct comparison between levels. These third order categories of features were:

* **External factors:** factors which are external to the project itself, but which have an impact upon it.
* **Emotion:** emotional responses to setbacks and failures such as self-doubt, anxiety, and regret.
* **Internal Processes:** Setbacks relating to the innovation process e.g. planning, technical and design setbacks.

This division of categories is useful because it allows the different setback and failure levels to be comparable on the same categories of features, making it possible to differentiate between different types of setbacks and failures.

### Third order coding (Setback and failure levels):

During the course of the interviews, participants were asked to talk about the current progress of the projects that they were working on. Most interviewees also discussed previous innovation projects that they had worked on, and probing questions were asked in order to ascertain the status of these past and present projects at the time of the experience that they were discussing. Failures were always discussed in the past tense although some of these failures had occurred within the weeks leading up to the interview, and therefore recall was relatively recent. From this data, it was clear that the first and second order features of setbacks and failures of innovation projects were divisible into three different levels and as such three third order codes were generated which represented different setback and failure levels. These are, ‘normal setbacks’, ‘more serious setbacks’ and ‘emotive failures’.

Although previous quantitative analysis indicated that there were differences between setbacks and failures, there were no preconceived ideas about what these differences may be, and the three codes relating to the qualitative analysis emerged exclusively from the content of the qualitative data. Setback levels were not mutually exclusive in that innovative projects were likely to experience both normal and more serious setbacks throughout the course of a project. The experiences of normal and more serious setbacks were not linear in that normal setbacks may be experienced subsequent to more serious setbacks, and at times, both setback levels may be experienced simultaneously. However, emotive failure was likely to denote the end point of a project and as such, although setbacks were linked to failure in that they could contribute to it, it was unlikely that setbacks and emotive failures would occur simultaneously. The relationship between setbacks and emotive failures was sequential in that real failures would occur in a successive sequence, following setbacks. This will be discussed in more detail in section 8.8.1 below where the links between setbacks and failures are explored. Third order codes are displayed in the rightmost boxes in Figure 2 above. The remainder of this chapter addresses each analytic question in turn and provides analysis and quotations relevant to the analysis.

## Analytic question 1: What are the main features of setbacks and failures in the innovation context?

As shown in Figure 2 above, innovative projects have a number of features associated with them which are specific to different levels of setbacks and failures. Each of these features can be grouped into one of three categories of features within each setback and failure level.

Normal setbacks are categorized largely by features associated with ‘internal processes’, particularly design and technical setbacks. A greater than expected workload is also common within projects experiencing normal setbacks. ‘Emotions’ (par for the course) also come into play in the normal setbacks code but are not dominant features and are set apart from other levels of setbacks and failures by the moderate strength of their impact.

More serious setbacks are characterized predominantly by problems related to ‘external factors’ which are external to the project or team. Issues around politics, finance and time appear to have a significant bearing on projects suffering from more serious setbacks. ‘Emotion’ (self-doubt and anxiety) are also associated with more serious setbacks as are ‘internal processes’ (processes internal to the project) in the form of planning setbacks. Learning also plays an important role in the more serious setbacks level, in so much as learning provides a conduit through which project teams can turn setbacks and failures into successes either on current or future projects. All interviewees described experiencing features associated with more serious setbacks during the course of their innovative projects.

Emotive Failures where projects are terminated short of reaching their goals and with limited learning to feed future projects, are predominantly associated with negative ‘emotions’, with strong emotional responses which are categorized as loss, regret and disengagement. The category ‘external factors’ is also related to failure, with blaming others as a common feature of emotive failures. The labelling of this level as ‘emotive failures’ as opposed to ‘failures’ relates to the subjective nature of innovation. Projects which were unsuccessful in objective terms (i.e. they did not meet their revenue targets, or were shelved due to poor supporting technology), were described by interviewees as setbacks rather than failures due to the learning opportunities which emerged from the project and the positive impact of that learning on subsequent projects. Given that this thesis is interested in innovation from the point of view of the innovator, setbacks and failure are categorized based on their point of view and not based on the perspectives of those who may be more focused on capital gain. Emotive failures then are more emotive and are not viewed in a positive light by innovators. The strong negative emotions associated with emotive failures create a block to learning which means that emotive failures are less likely to positively feed future projects. Terminally failed projects are therefore not the same as the ‘failures’ in which learning creates positive opportunity and which are viewed more as setbacks by innovators as described above. This will be discussed in more detail with reference to the learning feature in section 8.6.3 below.

The previous quantitative chapter presented findings that increases in project setbacks were negatively related to well-being, innovative work behaviour, intrinsic motivation and identified regulation. These qualitative findings may provide some evidence as to why this relationship exists. Thematic analysis results proffer a sense of escalation as setbacks increase through the levels towards emotive failure. Problems become compounded, stress levels rise and negative emotions escalate as setbacks increase towards emotive failure level. It makes sense then, that relatively low levels of setbacks were associated with higher levels of well-being, IWB and motivation in the survey data, given that at this level, setbacks are not creating serious problems or heightening stress levels. The survey results however, demonstrated that as setbacks increased and crept closer towards failure, this was associated with a decline in well-being, IWB and motivation. The features associated with more serious setbacks and emotive failures as demonstrated by the interview results are demonstrably more challenging, involving more negative emotions and greater demands on both physical and material resources. It is not surprising then that the quantitative results showed a general decline in outcome levels as setbacks increased towards the point of failure.

The features of each setbacks and failure level will be examined in turn beginning with ‘normal setbacks’.

## Normal setbacks

Thematic analysis revealed that all of the innovators reported experiencing ‘normal setbacks’ in the course of innovation projects that they had worked on in the past or were currently working on. Within the normal setbacks category, a number of features emerged: ‘greater workload than expected’, ‘par for the course’, ‘technology setbacks’ and ‘design setbacks’. Illustrative quotations are provided in Table 8.1 below.

### Category of feature: Emotions

**Par for the course:** Normal setbacks are distinguished from more serious setbacks and emotive failures by their comparative lack of strong emotion. Setbacks it seems are a normal part of most, if not all, innovative projects and as such, normal setbacks do not elicit strong emotional responses. Experienced innovators (as all of the interviewees were) appeared to anticipate normal setbacks as being par for the course of any innovative project, and as such seem to take these kinds of setbacks in their stride. They talk about them calmly, in a matter of fact way, without panic or emotion. A number of studies have examined the relationships between emotion and innovation (i.e. Gonzalez-Roma & Hernandez, 2016; Shepherd & Cardon, 2009), but the focus has tended to be on emotional responses to failure or conflict within the innovation process. I found, that emotion is a pervasive presence during both setbacks and failure, but that the nature of the emotion and the strength of it varies at different levels of setbacks and failure.

### Category of feature: Internal processes

**Greater workload than expected:** Even experienced innovators often appear to find themselves surprised by the level of workload involved. Workload is something that seems to be frequently underestimated in innovation projects and can be a setback in so much as innovators feel that they have to work long hours and ‘spin multiple plates’ in order to achieve their innovation goals. The frequent under-estimation of the work involved in innovation projects may be due to the relatively unknown, unchartered nature of innovations. Because each project is new, it may be difficult to accurately predict what will be involved in the pursuit of each innovative endeavour (Johannessen et al, 2001). While workload emerged as an issue in many of the interviews, it was not positioned as a major setback and innovators tended to display stoicism on this point, seeing excessive workload as a means to an end, albeit at times exhausting and occasionally described as ‘stressful’. The idea that innovation tends to involve a high workload has been acknowledged by a number of previous researchers (Anderson et al, 2004; Janssen et al, 2004), but the impact that this workload has on innovators and whether innovators may habitually underestimate the workload involved with innovations is an area that has not to date been researched.

**Technology setbacks & design setbacks:** in terms of Internal processes, normal setbacks are often associated with issues to do with technology and/or design. Interviewees described difficulties with getting new technology to work according to client specifications and gave examples of technological difficulties where the idea had simply been ahead of its time with supporting technology not yet available to make the new technology feasible. These types of issues were not seen as failures, merely as predictable setbacks, whereby you learn what you can from what you have developed to date and you allow that knowledge to feed ongoing projects with the idea of returning to the original idea at a later date. Similar setbacks were raised in terms of software development, whereby setbacks occurred because salespeople had overpromised delivery capabilities to clients. These instances weren’t seen as major issues, but simply required a revisiting of the original proposal and further conversations with clients to ensure that realistic expectations could be met.

Design issues also appear to be a theme in normal innovation setbacks, where, as the technology evolves, the original design for the innovation must be reassessed and often updated as new learning emerges during the course of the innovation. This idea of revisiting previous phases of the innovation view is very much in line with Kanter’s (1988) view of the innovation process as consisting of distinct but non-linear phases.

Table 8.1: Normal setbacks: category of features, features and quotations

|  |  |  |
| --- | --- | --- |
| Normal Setbacks; Category of features, features and quotations | | |
| Category of features | **Features** | **Illustrative supporting evidence** |
| Emotions | Par for the course | *“RE: Have you experienced any setbacks along the way?*  *INV: Of course, all the time. you get knocked back and you just try again really. That's just what you have to do.” (Interviewee 16)*  *“…I’m comfortable with change, that's why I took this role...it requires tenacity though, I have to deal with a lot of knock backs on a weekly or even daily basis.” (Interviewee 8)*  *“…I can see that pattern. So, I don't have concerns about this project...I have the same concerns that I've had on previous projects, previous start-ups and I know that it's par for the course.” (Interviewee 4)*  *“I think inevitably, in any start up there are going to be challenges. And of course, there have been a few issues that we’ve needed to deal with. But we have a great team behind us, and we get on with it.” (Interviewee 6)* |
| Internal processes | Greater workload than expected | *“If you’re behind schedule with something, long hours kick in then and of course that can impact family life. But those periods of stress tend to be relatively short lived…until the next project!” (Interviewee 7)*  *“…it was a lot of work, and a lot of the ideas didn't work as we had expected. So, you have to slog it out and put in the hours in order to get the idea to fruition.” (Interviewee 15)*  *“It has been a lot more work than we anticipated, and we anticipated a lot!” (Interviewee 5)* |
|  | Technolo-gy setbacks | *“So, in my role, I take software and I have to make it do stuff right, and sometimes it’s very new ground-breaking stuff, with data and things like that and you can get to the point where you reach your limitations, where you need to deliver something but you're just not able to do that without help.” (Interviewee 16)*  *“When a piece of technology doesn’t work as you expect it to, you don’t throw your hands in the air and say, let’s just give up on all of this…you go back to the drawing board and you find a new solution that you can try. Even if you have to shelve an idea for a few months or even years that’s not necessarily a failure because you can always go back to it.” (Interviewee 18)* |
|  | Design setbacks | *“…there have been times when I’ve spoken to people and they've been frustrated because they think other people are being naive, or that it's a bit, are we being over adventurous, that kind of stuff.” (Interviewee 2)*  *“I'm confident that the model will work, but it's the mechanism by which I can get it to work that is the real challenge.” (Interviewee 17)* |

## More serious setbacks

Setbacks are divided into two different levels. ‘Normal setbacks’ and ‘more serious setbacks’ which are underscored with a greater sense of urgency, higher levels of stress, and are closer in nature to failure, although they do not necessarily result in failure. As Figure 2 above indicates, more serious setbacks are mainly defined by problems emanating from ‘source’ factors, politics, finance and time. Emotions play more of a role here than they do in normal set-backs (in the form of self-doubt and anxiety) but less than they do in emotive failures. In the ‘internal processes’ category, planning setbacks are prevalent under more serious setbacks. Planning setbacks appear to represent potentially greater challenges than those posed by design and technical setbacks under normal setbacks. Overall, there is an escalation during more serious setbacks with a sense of things being more out of the individual’s control compared to normal setbacks. This is perhaps due to a cumulative effect of setbacks which may take a toll on innovators’ well-being, as suggested by the finding in the previous quantitative section of this thesis which showed that as setbacks increased, well-being decreased.

Learning also features predominantly in more serious setbacks. Whereas the other features are largely negative, learning is a positive aspect of the setback experience. It appears to protect innovators from the negative experience of emotive failures, by downgrading what may otherwise be considered failures to being perceived as setbacks. Table 8.2 below provides illustrative supporting evidence relating to the features of more serious setbacks.

### Category of feature: external factors

**Politics:** Innovations are often tightly enmeshed in organizational politics (Ibata-Arens, 2005) and this appears to be a potential source of serious setbacks. Politics were mentioned regularly in the context of change, and the political difficulties involved with appealing to others to change their ways of doing things in order for the innovation to be successfully realized. The ability to understand the politics involved with the innovation, and the ability to communicate effectively within the political landscape was often discussed as a crucial mechanism which determined the potential success of an innovation and which created serious setbacks if one was unable to navigate the politics involved successfully.

Another political issue was related to perceptions of the innovator who was trying to bring about radical innovative change. Innovators often talked about feeling that others created barriers to their attempts to innovate due to a reluctance to take risks and a distrust of things that jeopardized the status quo. This reluctance in others to become aligned with the innovation was not only a source of frustration for innovators but it was also considered a serious setback within the project as a whole. This mismatch between the needs of the innovators and the desires of others to remain detached from it often appeared to cause a breakdown in relationships between the innovator and others who put the innovation at risk. This finding is in line with those of Janssen (2003) who reported that even successful innovations could result in conflict between innovators and those for whom the innovation would necessitate the need for change. It also sheds some light on the quantitative findings of this thesis which found that setbacks were significantly negatively related to well-being, innovative work behaviour and motivation, and the stress involved in navigating political setbacks may well take its toll on psychological well-being, motivation and the desire to behave innovatively. However, Monroy & Solis (2015) found that organizational politics did not negatively impact innovation success outcomes. This finding supports the placement of ‘politics within the more serious setbacks level as opposed to within the failures category. Politics, although potentially unpleasant and harmful to innovators’ well-being, does not appear to be associated with the failure of innovation projects.

**Finance:** Financial issues were cited as a serious potential problem for innovative projects. Innovators in larger organizations where there were plentiful resources available for innovative projects were less likely to discuss finance as an issue, but in small or medium organizations where budgetary constraints were tighter, financial considerations posed a potentially significant problem to innovative projects. Finance was often related to time in that when there were financial setbacks there was often a more critical need to abandon or change innovations which were not performing as they should be. This risked ‘good’ innovations being shelved because of budgetary constraints. Finance therefore can represent a serious setback for innovation projects and can contribute to subsequent failures.

**Time:** Timing was closely related to planning and often presented a serious setback in the innovation process. The first issue with time relates to the novelty of innovation, in that a new product is only innovative if it hasn’t been done before. With fierce competition between companies developing similar innovations, the need to get your product to market first can mean that timing may have a significant impact on the overall success of an innovation. A perfectly working product which makes it onto the market after another similar product, is likely to be less successful because it is no longer innovative and may no longer be relevant if the market is already saturated. Timing and delays therefore are considered serious setbacks in the innovation process which can contribute to failures.

### Category of feature: Emotion

**Self-doubt and anxiety:** stronger negative emotional responses were present as setbacks became more serious. These emotions have been categorised as self-doubt and anxiety. Normal setbacks did not appear to elicit anxious or self-doubt responses but as setbacks became more serious, many innovators mentioned these emotional responses. Anxiety was talked about in the context of concern over whether the innovation would be successful, whether they would meet deadlines, and often whether they were proceeding down the right path. Anxiety has been touched upon by previous innovation researchers such as Janssen (2003) and Janssen et al (2004), who found that innovation could result in breakdowns in relationships with colleagues which could in turn produce feelings of anxiety. It is possible therefore that anxiety is closely linked to political issues discussed above. However, current interviewees did not specifically link politics or breakdowns in relationships with anxiety. Instead, anxiety appeared to stem more from the unknown, and a sense of never being entirely sure what problems might crop up next.

As setbacks became more serious, self-doubt appeared to creep in with innovators describing instances where they no longer felt sure of their abilities in their areas of expertise because of repeated setbacks. Sometimes this was described as feeling like a ‘novice’ in their profession despite being very experienced innovators. The associations between self-doubt and innovation have not, to my knowledge, been identified in research previously. Emotion and well-being are closely linked, and therefore these qualitative findings offer further explanations as to why survey data analysis results found an association between innovation setbacks and well-being.

### Category of feature: Internal processes

**Planning:** Numerous innovators cited poor planning as being related to more serious setbacks. This stemmed from the idea that without a comprehensive plan in place, the innovation may be poorly specified, the outcomes misunderstood, and timeline and budgetary issues misjudged.

Naivety often appeared to play a role in serious setbacks related to planning. Interviewees often talked about having ‘no real idea of what was going to be involved’ leading to poor planning which opened the project up to unanticipated problems. The need to ‘plan for problems’ was also repeatedly cited, with some interviewees talking about the most serious setbacks as arising from totally unforeseen problems.

This to some extent contradicts the findings of Song, Van der Bij & Song (2011) who found that overt planning practices impeded firms’ overall innovation productivity. The difference in findings may be related to the level of analysis. At an organizational level, strict planning regulations may impede innovation by quashing opportunities for creativity. However, at the project level, clear plans may remove the elements of uncertainty and risk that can lead to negative emotions such as anxiety. As such plans made by individuals and teams may protect against more serious setbacks and therefore may enhance innovation capability, whereas higher level planning, less directly relevant to individual projects, may be harmful to organization-wide levels of innovation.

**Learning:** Learning was an important and common feature of innovation projects which appeared to have a significant impact on the way in which projects were labelled in terms of their level of success or failure. Learning of course, is a feature of innovations at all levels and during all stages, but its importance is most prevalent during more serious setbacks for three reasons. Firstly, projects suffering from more serious setbacks often appear to offer the best learning opportunities and as such, learning was discussed far more as a feature of more serious setbacks than as a feature of normal setbacks. Secondly, learning protects innovations from being perceived as emotive failures because learning provides new opportunities which feeds subsequent innovations. Thirdly, learning was not discussed as a feature of ‘emotive failures’. This is likely because the negative emotions associated with emotive failure interfere with individuals’ ability to learn from it (Shepherd et al, 2011).

Participants talked about projects which had, in revenue terms been classed as failures but which they viewed as setbacks or as the impetus for future success because of learning opportunities that had arisen. This finding supports Nelson’s (2005) study of 72 large IT projects in which participants were asked to provide retrospective accounts of the success or failure of projects that they had worked on. Nelson found instances of projects which may have been considered ‘failures’ due to issues during the development process, but which, retrospectively were considered to have had some measure of success due to learning which had occurred.

Common parlance suggests that we ‘learn more from failures than from success’. I suggest that learning plays an even greater role in the innovation process than this, that for innovators, learning opportunities can in fact change the whole perception of a failure, rendering it instead merely a setback.

These findings support the quantitative results presented in the previous chapter, which demonstrated that learning from setbacks moderated the relationship between innovation setbacks (main) and innovative work behaviour, intrinsic motivation and identified regulation. Learning effectively buffered the effects of setbacks and in doing so ensured sustained or heightened levels of innovative work behaviour and motivation. Table 8.2 below provides quotations as Illustrative supporting evidence relating to more serious setbacks

Table 8.2: More serious setbacks: category of features, features and illustrative quotations

| Table 8.2 More serious setbacks: Category of features, features and quotations | | |
| --- | --- | --- |
| Category of features | Features | Illustrative supporting evidence |
| External factors | Politics | *“Things aren't written down, they're spoken about and you have to sort of absorb it via osmosis, what really is the direction of travel, so that’s the source of it really and then, every now and then I think, I completely get it, and then something comes up in discussion or a decision is made and I think, hang on a minute, that's not what I thought this was about.” (Interviewee 2)*  *“The thing about it is that I’m probably equally loved and praised there as I am hated, because there are a lot of executives who didn’t want that innovation to happen. What they wanted was the opportunity to talk about innovation in a way that generated good headlines, that made them look good, but they didn't actually want to go through with the changes. they didn't want to actually change anything that would require them to do things differently. With my innovation, in their eyes, what I brought to the table was risk, and possibly threatened their jobs.” (Interviewee 8)*  *“People who are all for change and positive disruption, who are good at positively disrupting what they're used to, what they're comfortable with are actually quite unusual. And that is the hardest thing as an innovator. You learn quite quickly to let them screw it up at the beginning so that you can identify the people who don't like change and you try to get them on board from the start. And you set some boundaries, because it's better that they push those boundaries later than try to contract them back in.” (Interviewee 7)* |
|  | Finance | *“We are in the midst of a funding crisis. We have all of these great people but we can’t afford to keep them on so several members of our team have been made redundant. It’s very stressful and very depressing.” (Interviewee 19)*  *“If you have lots of money to spend on a project I think that makes things easier. It gives you a bit more breathing space, you can afford to take a punt. But we couldn't afford to do that. It was all or nothing for us.” (Interviewee 1)*  *“For us because the lag was too long, by the time we had something ready to sell we undercut ourselves because we needed a cash injection...and that can cause lots of harm because what you are doing is underselling your product and leaving yourself with a deficit...” (Interviewee 16)*  *“You might have the best model in the world, you might have the best forecast in the world, but without funding behind it it's nothing. So, that's where I am... building all of that...but it's getting the money in…that is the tough bit.” (Interviewee 5)*  *“…every month you have those salaries to pay, each month that you’re not selling you’re not realizing those opportunities, your revenues are falling...that was the biggest challenge for us, the financial one.” (Interviewee 17)* |
|  | Time | *“…so, it was a massive thing, and it took longer than we thought and in that time, you're not selling the product so you've pushed the market, you've changed it, you're talking about it, but still nothing tangible has actually happened…what happens then is there's this lag and you start getting desperate, you need to start making some money out of this.” (Interviewee 1)*  *“…the longevity of the innovation is a problem, because unless you get in there quickly, someone else does, and then what you have isn't innovative any more, it's out of date. I mean we could do the same project relatively cheaply and easily now, but we missed the window of opportunity, someone got there before us and so we could develop the product but would people buy it? I’m not so sure because it's no longer innovative, it's already been done...and that is a massive problem with IT innovations, you have to move so quickly, so there's very little room for error.” (Interviewee 1)*  *“So, you're moving very very quickly, you have to get it done, but you feel like you're constantly on the edge of this precipice, there's very little room for error in terms of timing, and yet it's never been done before, there's no manual to tell you how to do it, and sometimes you get it wrong and it causes delays.” (Interviewee 13)*  *“We…have strict deadlines to work to, the stuff we do is very time sensitive, if there are big delays with a project that we’re working on then the likelihood is that a competitor will beat us to it.” (Interviewee 11)*  *“…back in 2006/2007 it was more innovative. No one else was doing it. and while this is still innovative, aspects of this are innovative, if I’d done it then I would have led the market place. I would have been the only one. That's another regret, you've got to jump on it while it's hot. but I’ve delayed it. I’ve delayed it and delayed it through personal circumstances, and now I think, is it too late. Is it too late?” (Interviewee 5)* |
| Emotions | Self-doubt & anxiety | *“You're not in control any more of discipline and you've lost belief in yourself so you feel like you're not making the right calls, you don't trust your calls. And even if you make the right decisions you've lost that belief in yourself so you don't allow yourself the time to ride out those ideas.” (Interviewee 17)*  *“Personally, I wake up in the middle of the night and I’m thinking about it so I’m definitely very worried.” (Interviewee 4)*  *“As the process goes on and we get more and more involved in this, the anxiety definitely increases, and that's why I’m not sleeping at night” (Interviewee 10)*  *“…those previous experiences, it doesn't protect you from anxiety but I would say anxiety is still there, sometimes irrational, sometimes its provoked by something and then you respond with anxiety and then you think 'are we doing well'. Because we're innovative, we don't have a benchmark. You don't know what’s going to happen.” (Interviewee 8)*  *“To me, there are always doubts. You know, are we doing the right thing (sigh), is it stupid to think that everyone will respond to this, that this will work. Is it too romantic, is it too much ahead of its time? and there were some practical anxieties like when we put our ad out to recruit new people and at first, we didn't get many responses, and we thought, are we failing. We thought, maybe this isn't meeting people's expectations.” (Interviewee 12)*  *“In this new innovation, I find myself alone a lot, focussing on my own doubts.” (Interviewee 5)* |
| Internal processes | Planning setbacks | *“…you know there just wasn't really a plan and everything was spiralling out of control. We had buyers for our products but we'd put all of our eggs in one basket and I was painfully aware that if we dropped that 'basket' everything would fall apart.” (Interviewee 15)*  *“In hindsight, I embarked on that project with zero understanding of what was going to be involved. I thought that it was going to be relatively straightforward, but in reality, there was nothing straightforward about it. From the creation of the idea, to the development of the idea, to the implementation of the idea, it was a lot of work, and a lot of the ideas didn't work as we had expected.” (Interviewee 17)*  *“Maybe at first, we were a bit over optimistic...well not over optimistic...we had biases and prejudices from our previous lives which led us to create a certain business plan, but actually it wasn’t the correct one.” (Interviewee 4)*  *“RE: So, what causes that kind of setback?*  *INV: Commercial people overpromising sometimes. Not planning your engagement and I think from a technical perspective, not really understanding the challenge that you’re trying to face and you need to almost think ahead to what it is that you're trying to achieve, so you need to envisage those problems before they happen. Those are the worst kinds of problems, the ones that take you by surprise. That’s a massive setback.” (Interviewee 11)* |
|  | Learning | *“I think as well I need to clarify what I said about never having worked on a project that has failed. I think it depends on your definition of failure. I’ve worked on projects that haven’t succeeded. There was one project that I worked on, that I’m still sort of working on, well, thinking about at least, that didn’t succeed. It hasn’t been developed yet into a tangible, marketable project. But I don’t see it as a failure. We did absolutely everything that we could to make it work, but in the end, the supporting technology just wasn’t there. So, was it a success, no, but was it a failure? Absolutely not. So much of what we do in other successful projects was informed by our work on that one, and we did everything right, but we were ahead of our time, so as soon as the other technology that we need to support it catches up, we’ll revisit it and I’m confident that it will work.” (Interviewee 8)*  *“RE: So, the current project that you’re working on is an evolution of the previous one?*  *INV: Yes, the current project is 100% an evolution of the failed one. I’ve learned some important lessons from that last project and I now understand what needs to be done.” (Interviewee 19)*  *“I don't see the project as an all-out failure because we still use parts of it now…I learned a huge amount on that project in terms of, if we were to embark on something similar again it’s not something that you can just create in a moment, it’s going to take time but also, I’ve learned a lot in terms of do's and don'ts. The first 4 or 5 months of work, of research, I still use now.” (Interviewee 17)* |

## Emotive Failure

As discussed in the analysis of the learning feature above, there are instances where objectively failed innovations are not considered to have been ‘real failures’ because of the learning opportunities gleaned from them, and it is for this reason that we have discussed these within the more serious setbacks context. However, emotive failures do exist, and these are failures which have a much stronger and more negative impact upon the innovator, where there are not clear ‘silver linings’ as in the case of the learning failures discussed above. Failure from the perspective of the innovator I argue is rarely about the failure of products or processes alone but appears to be related to more ‘human’ and ‘emotional’ factors. Based on the interview data, I argue that failures which innovators perceive as ‘emotive’ failures tend to be fairly focused on subjective factors whereas normal setbacks, and more serious setbacks are more focused on objective, measurable issues. Emotive failures contain one or more of the following factors.

* There is a strong emotional response to the failure. These emotional responses appear to be related to feelings of loss or regret.
* The innovator disengages from the team or the organization following the failure
* There are lingering feelings of ‘blame’ related to the failure; they blame others for the failure.

Emotive failures are distinguishable from setbacks, and non-emotive failures (i.e. failures where learning takes place which feeds future innovations) in that setbacks and non-emotive failures are less likely to result in strong, lingering negative emotional responses associated with loss and regret. Setbacks are also less likely than emotive failures to result in disengagement and enduring feelings of blame. Setbacks therefore are less emotionally harmful than emotive failures which have the potential to have a longer-lasting negative impact. Emotive failures seem to carry with them a sense of the termination of something, whereas setbacks tend to feel like the start of something which is new, different or improved.

The dominant category related to failure is ‘emotions’, with loss, regret and disengagement all falling under this grouping. ‘External factors’ also contains one failure code ‘blame others’.

These findings may help to explain why the survey results showed a decline in well-being, innovative work behaviour and motivation as innovation project setback scores were at their lowest, and therefore closest to the point of failure.

### Category of features: external factors

**Blame (others):** ‘Emotive’ failures tended to involve some human element. A recurring theme in the interview data was that despite the innovator’s best efforts, the actions of others had resulted in the failure of the project. Factors such as underhanded tactics, others misunderstanding the technology or mis-selling the innovation, were cited as reasons for failures. When others were blamed for the failure, innovators discussed feeling frustrated, helpless and that things were out of their control.

Previous researchers have looked at cultures of blame within organizations and found them to prohibit opportunities for learning from failure (i.e. Shepherd & Cardon, 2009; Rami & Gould, 2016). Blame, arising from failure then, would be expected to be associated with lower levels of learning, and this was supported to some extent in that blame did appear to interfere with participants desire to talk about particularly painful aspects of failed innovations which arguably offer some of the greatest learning opportunities.

### Category of features: Emotions

When interviewees discussed the ‘emotive’ failures that they had experienced, strong emotional responses were often expressed. These emotions included anger, frustration, resentment, grief, and feelings of depression and stress. These types of emotions were rarely talked about in relation to setbacks, and I argue therefore that ‘emotive’ failures, are associated with stronger emotional responses than setbacks. The emotion associated with ‘emotive’ failures is more personal and focused on the self, whereas emotion associated with serious setbacks tended to be focused on the project and stemmed from a sense of frustration or worry rather than a deeper sense of loss or regret. This finding is in line with research by Shepherd et al (2009, 2011) who found that emotions associated with significant workplace failures were often likened to feelings of grief. Given that loss and regret are emotions which are often associated with grief, this finding lends support to the work of Shepherd and colleagues. Previous authors have suggested that strong negative emotions can give rise to affective emotional states (Ekman & Davidson, 1994). These affective emotional states may interfere with an individuals’ ability to learn from the experience (Shepherd et al, 2013; Shepherd et al, 2011). Without the ability to learn from the failure, the feelings associated with the failure become more acute and take longer to recover from, and innovators become less able to see the positive aspects of the failed project.

**Loss:** Emotive failures were often characterized by a deep sense of loss. The loss was most commonly associated with loss of time, effort and hard work which had been ploughed into the innovation without ultimate return on investment. Financial loss was also a factor for smaller organizations where innovators themselves, or investors, had risked capital that had been lost due to the failure. Where individuals were deeply emotionally invested in the innovation the sense of loss following failure appeared to be greatest.

**Regret:** feelings of regret were frequently associated with failure, whereby the failure remained a source of disappointment for weeks, months or even years. Interviewees discussed feeling regret that they had mismanaged the project, had planned the innovation poorly, had not managed the team properly or had had to make team members redundant due to the poor performance of the innovation. In these situations, innovators tended to talk about feeling that they “had failed”, and this was often associated with feelings of regret.

**Disengagement:** Interviewees also talked about feeling the need to disassociate themselves from their team or organization following ‘emotive’ failure. The disengagement tended to take two different forms, feeling that they had failed, or feeling that they had been failed. Following failures, some talked about disengaging because they felt that they had failed and therefore were no longer capable of performing the duties required of them. Others, felt that they had been failed by others which left them with a sense of frustration or with a feeling that no matter how hard they worked they would continue to fail because of the actions of others, and this resulted in them taking the decision to exit the organization. This finding may help to explain the quantitative results findings that innovation setbacks were negatively related to innovative work behaviour, intrinsic motivation and identified regulation. However, none of the interviewees had become permanently disengaged from innovative activities, and all reported that they had or would later return to innovation in some form.

Table 8.3: Emotive failures: Category of features, features and illustrative quotations

| Table 8.3: Emotive failures; category of features, features and quotations | | |
| --- | --- | --- |
| Category of features | Features | Illustrative supporting evidence |
| External factors | Blame others | *“If I’d attracted the right person, we'd be having a very different conversation now. Someone who had opened doors for us rather than getting them slammed in our faces. If we'd had that kind of supporter we would have succeeded, I know we would have, our customers would have stuck with us and we would have had a project that would be doing well right now rather than having been abandoned.” (Interviewee 1)*  *“…in my job, I can deliver something technically that the customer is perfectly happy with but they don't end up buying it. so, my boss tells me, you've done your job, it was excellent, you've done it, but the sales people have failed. So effectively my Proof Of Concept has failed but I am not the failure in that instance, the sales person is.” (Interviewee 11)*  *“…all of that work we put in was lost, all of it was for nothing. I was gutted. You know, I worked on this thing for months and months, and it was perfect, it worked, but because it was mis-sold, the customer didn't even end up paying for it, you know, months of my time, my bosses time, my teams time, all for nothing. It wasn't positioned properly...they weren't on top of the sales process. We did our job, but that was theirs and they didn't do it properly, you know we're there to deliver the technology, we can't be expected to get involved with the sales side of things too.” (Interviewee 9)* |
| Emotions | Loss | *“…it had a huge effect on all of us. we all felt desperate for this project to work, we put in a lot of time and energy and into it, and we all felt that it could have been a huge revenue stream. But we didn't have the luxury of time.” (Interviewee 1)*  *“…it was a very difficult time, I found it very hard to walk away. It felt like losing, like failing and I’ve never felt that before or since and I hope to never do that again.” (Interviewee 13)*  *“The other guys and I had put in so much work, so much time and effort, time away from our families, because we really believed that it was a great product that we were developing. We believed that it would work. And as things started to fall apart, we clung onto that belief…all of those hours spent away from my family, all of that work just washed down the drain with the rest of the crap.” (Interviewee 1)* |
|  | Regret | *The point that I started to panic was where it all went wrong. I wish I could turn the clock back but there you have it...it's done.” (Interviewee 14)*  *“I felt a level of desperation actually, I really desperately wanted it to work. I wasn't helping things to be honest. Because I was so stressed about the way things were going, I created a feeling of negativity in the whole office. I was sitting in the office with the developers and my desire to get everything of the ground quickly, and my sense of frustration was putting everyone into a bad place mentally… I think the outcome could have been different if I’d managed the team better, and my behaviour at that time is something that I really regret.” (Interviewee 17)*  *“I was gutted. It felt like someone had punched me in the stomach…when I had to walk away from it…I felt like I was giving away a part of myself.” (Interviewee 13)* |
|  | Disengag-ement | *“People who give up and leave our industry, they would feel that they have failed. Giving up is failure, everything else is just setbacks.” (Interviewee 17)*  *“I was angry about that one, in fact I became totally disillusioned because it felt like, no matter how hard I worked it wouldn’t ultimately make a difference to the overall success of something that we developed. It wasn’t long after that that I left the company.” (Interviewee 11)*  *“RE: So, we've talked about what motivates you to succeed. What happens when things aren't going so well?*  *INV: Well, that's when I leave the company and go to work somewhere else (laughs)*  *RE: Is that true?*  *INV: No, well, I have done that in the past.” (Interviewee 12)*  *“X project was a disaster, from my point of view and in the end, it turned out be a disaster full stop, for everyone involved. But I was the first to walk away and that was not my proudest moment, it was the right choice as it turned out but I felt like a total failure at the time.” (Interviewee 16)* |

## Analytic question 2: How are setbacks and failures linked?

### Escalation and de-escalation of setbacks and failure

Analysis reveals that broadly speaking, setbacks and failures are not interchangeable concepts, although they are inextricably linked. Figure 2 above demonstrates this visually with dashed black arrows which represent escalation and de-escalation between setback and failure levels. As demonstrated by the evidence presented in Table 8.4 below, this association between setbacks and failures appears to be related to a potential cumulative effect of setbacks on failures where setbacks may escalate (i.e. where increased workload, contributes to time setbacks, which in turn creates other setbacks such as financial ones), and it is this snowballing effect which can increase the potential for innovation failures. In this sense then, normal setbacks may escalate into more serious setbacks which in turn may escalate into failure. While emotive failures have a number of specific factors associated with them, setbacks had occurred earlier in the process which had contributed to those feelings of failure.

It is important to note that ‘normal setbacks’ and ‘more serious setbacks’ frequently occur in isolation and although they may contribute to later failures they frequently do not result in failure. This is because failure and setbacks are often de-escalated by innovators thereby pushing the project back onto the path of success as demonstrated by the evidence from the data presented in Table 8.4 below. In addition to de-escalating problems within projects in order to enhance chances of success, participants also cited instances where setbacks in current innovations had been de-escalated through knowledge and experiences gained on previous failed or problematic projects. As such, de-escalation and learning from failure are likely to be closely linked concepts. It is also worth noting that de-escalation is more common in innovative projects than escalation with around 90% of participants citing examples of de-escalation, whereas only around 40% of participants cited examples of escalation.

It may also be useful to explore these qualitative findings regarding escalation and de-escalation in relation to the quantitative findings discussed in the previous chapter. One of the important findings of the quantitative research was that resilience was a moderator of the relationship between well-being, innovative work behaviour, and intrinsic motivation. The ability of innovators to de-escalate innovative projects which are suffering from setbacks or are failing may be closely linked to their resilience potential. The moderation results demonstrated that those lower in resilience showed a steep decline in innovative work behaviour and intrinsic motivation when innovative project setbacks were high (i.e. getting closer to failure). It is possible that highly resilient individuals are better able to de-escalate potential failures and setbacks because they are able to retain higher levels of innovative work behaviour and remain more intrinsically motivated to achieve their project goals. Table 8.4 provides illustrative examples from the data of these escalating and de-escalating effects.

Table 8.4: Escalation and de-escalation: illustrative quotes

| Table 8.4: Escalation and de-escalation of setbacks and failures | |
| --- | --- |
| Link | Illustrative supporting evidence |
| Escalation | *“The extreme setbacks take a bit out of you every time, each one becomes harder, especially as you get older and have more experience because you feel like these setbacks shouldn’t be happening any more, but they still do. And each one makes a dent in your pride I suppose, a dent in your belief that you can get up and do it again tomorrow. You’re constantly trying to rally the troops in your head, telling yourself, it’s just another blip, get back in there. It’s hard and there’s a certain amount of relief in giving up and walking away.” (Interviewee 17)*  *“The last two years have felt like constant fire-fighting. Problem, after problem, after problem. And yes, each one individually, I’ve been able to solve. And I’m a positive person, I like to get things done. But you get to the point where you just think, enough. This isn’t worth it any more. I need to see some light at the end of the tunnel or it stops feeling like any of this is worth it.” (Interviewee 20)* |
| De-escalation | *“I believe a good leader can actually turn failures within innovation into successes. Those big, crushing failures where everything turns to ash I would say are fairly rare, most problems can be overcome, and most failures can be turned into something even better than what you'd originally planned.” (Interviewee 7)*  *…I also have, I suppose you could call it arrogance, but it's a belief structure whereby if I really believe that I can do something, then I’m going to go for it and despite the setbacks along the way I believe that eventually I’ll get it right. It allows me to keep going. If you have that belief structure, then failure is just an obstacle, it's not something that will stop you from achieving your goal. It’s just something that's in your way and you need to figure out why it's in your way and how you're going to get around it.” (Interviewee 12)* |

## Qualitative Conclusions

Setbacks and failures are commonplace within innovation projects, so much so that they are often considered by innovators to be the norm. Given the prevalence of setbacks and failures it is surprising that to date the two terms have been inadequately defined, with features of setbacks and failures, and links between the two concepts poorly understood (Morris et al, 1994). This chapter represented a step towards unpicking these complicated but vital terms in order to enhance understanding of how setbacks and failures may impact the innovation process.

Firstly, results indicate that setbacks and failures contain a number of different features. Setbacks and failure can be divided into three different levels: normal setbacks, more serious setbacks and emotive failures. Normal setbacks are characterized as being ‘par for the course’. Normal setbacks are to be expected, and while greater workload than normal is presented by innovators as an annoyance, normal setbacks are dealt with calmly and without great emotional response.

More serious setbacks are predominantly related to issues associated with external factors where time, finance, and politics play a significant role. Concerns become more significant and self-doubt and anxiety creep in, meaning that the negative emotional impact of more serious setbacks is greater than the impact of normal setbacks. Internal process issues around planning appear to play a role in more serious setbacks where innovators cite poor planning as a significant factor in more serious setbacks. Learning is also a feature of more serious setbacks. Learning is the mechanism by which projects may be transformed from potential failures into setbacks. Projects which perhaps did not meet their market potential, or technology which has to be shelved because it’s ahead of its time are not necessarily perceived by innovators to be failures, because they ‘did everything they could’ and learned from it. A ‘failed’ project which you learn from is often not seen as a failure at all but as a seed for a future, better project.

Emotive failures are largely related to emotion and human interaction. Innovators do not seem to measure success and failure in the same ways as higher-level management might. Failure for them is not only about revenue generation or lack thereof. It cannot simply be measured in black and white, profit versus loss terms. Instead it is about achievement, about feeling that they have met their objects, and not let themselves or others down. ‘Emotive’ failures are projects that have a strong emotional association for the innovators. Feelings of regret over the way in which they conducted themselves, things that they did or didn’t do which contributed to the failure; a strong sense of loss, disengagement from the team or organization and feelings of blame of others regarding why the innovation failed.

These findings demonstrate that as setbacks escalate through the levels towards emotive failure, the negative emotional responses to those setbacks become stronger and more pervasive and there is a sense that these emotional responses take a greater toll on individuals’ well-being as setback levels increase.

This chapter also explored the links between setbacks and failures and conjectured that a relationship does indeed exist. Setbacks and failures are not interchangeable terms but they are inextricably linked. Setbacks can cumulatively lead to subsequent failures in that as setbacks escalate, the risk of failure becomes greater, largely perhaps because of the pressure that ‘fire-fighting’ problems places on innovators. Setbacks often, however do not lead to failures. The ability of innovators to de-escalate setbacks means that in many cases setbacks may lead to successes.

The themes which emerged through analysis of the interview data did not specifically feature the potential role of supervisor feedback in relation to the varying setback and failure levels. This is perhaps surprising given that supervisor feedback was found through quantitative analysis to be an important moderator in the relationship between innovation setbacks and outcomes. However, qualitative analysis did indicate that relationships and interactions with others may have a substantial impact on innovation setback and failure outcomes. For example, ‘politics’ feature heavily within the ‘more serious setbacks’ category, and although not all of these references were specifically in relation to supervisors, it is possible that had these political situations been better managed and communicated by supervisors, they may not have had such a negative impact on the projects and those working on them. Kanter (2000), highlights the important role of ‘sentries’ in the management of innovation projects. The role of a sentry is to control the transactions that occur to minimise disruption of the project, and it is often supervisors or innovation champions who carry out this role. Where politics becomes a negative force in innovative projects, this may be partly due to supervisors not being adept at controlling and managing this ‘flow’ of information. As such, supervisor feedback may be closely tied to issues associated with ‘politics’.

The following chapter presents discussions and conclusions for the thesis as a whole.

# Discussion & Conclusions: The contribution of this research to the fields of innovation and management

## Introduction

This thesis intended to address three main aims. Firstly, to further understanding of the outcomes of innovation setbacks and failures from the point of view of innovators, with a particular focus on well-being, innovative work behaviour and two dimensions of motivation; intrinsic motivation and identified regulation. This first aim was addressed through the analysis of panel data collected using an extensive longitudinal survey study of innovators. Analysis was carried out through synchronous effects regression models and lagged regression models, the results of which broadly supported the hypothesized relationships between innovation setbacks and outcome variables well-being, innovative work behaviour, intrinsic motivation and identified regulation. Analysis of qualitative interview data built upon these findings and offered potential explanations for the quantitative results.

Secondly, this thesis aimed to explore why some innovators suffer negative outcomes of innovation setbacks and failures while others experienced neutral or positive outcomes. This second aim was addressed through a series of moderation regression analyses using data gathered through the longitudinal survey. Resilience, supervisor feedback, learning from setbacks and failure and level of investment were all found to buffer the effects of innovation setbacks (main) on some or all outcome variables. These results have a number of important implications for practice given that they offer ideas for potential management techniques and recruitment practices that may in theory smooth the path of innovation projects and reduce negative effects of setbacks and failures for innovators.

The third aim of this thesis was to provide a more robust understanding and more nuanced description of the meanings and impact of setbacks and failures within the innovation context. This aim was explored through the thematic analysis of in-depth interviews carried out with innovators. The results of this analysis show innovation to be a challenging process where normal setbacks are a regular occurrence in most innovative projects, more serious setbacks present greater difficulties and concerns and emotive failures are relatively rare but are a source of considerable angst and emotional turmoil. Each of these setback and failure levels are underscored by a number of features and categories of features which set them apart from one another. The next sections provide a detailed summary and discussion of the findings of this thesis relating to each of the three aims.

## Main findings and implications relating to each aim

This section discusses the findings relating to each of the three aims of this thesis and discusses implications in light of these findings. For the most-part, the first and second aims relate to quantitative findings, and the third aim relates to qualitative results. However, given that this research employed a mixed methods approach, where relevant, the results of the first and second aims will also draw upon qualitative findings and the third aim will also be discussed in light of quantitative findings. This provides opportunities for more robust and cohesive discussions in relation to the aims.

## Aim One: Contributions, main findings, directions for future research and implications for theory and practice

**Aim one: To further understanding of the outcomes of innovation setbacks and failures for innovators, with particular consideration of the impact of innovation setbacks and failures on well-being, innovative work behaviour and motivation of innovators working within innovation teams.**

### Well-being outcomes: Summary of findings, contributions, directions and implications

The first hypothesis that this thesis aimed to address argued that innovation setbacks are negatively associated with well-being. This research presents strong empirical evidence of a relationship between innovation project setbacks and well-being. This hypothesis was tested using a synchronous effects regression model, the findings of which revealed that changes in well-being at Time 2 was predicted by changes in innovation setbacks (main). The relationship between the variables was negative, meaning that as innovation projects setbacks increased closer towards the point of failure, well-being decreased. Thematic analysis indicated that emotion played a substantial role in the escalation of setbacks and demonstrated that as setbacks became more serious, or developed into emotive failures, the manifestation of negative emotions such as self-doubt, anxiety, loss and regret increased thereby negatively impacting well-being. Issues around politics and communication also escalated problems and appeared to have a negative impact on well-being. Organizational ‘politics’ such as secrecy between teams, a reluctance to accept the innovation due to personal motivations and miscommunications either accidental or purposeful, were common factors of more serious setbacks.

These findings make important contributions to research in that they demonstrate for the first time that well-being may be adversely affected by innovation setbacks and failure. This is important because not only do organisations want their staff to be ‘well’, a decline in well-being due to the experience of setbacks and failures may also have a detrimental impact on innovative efforts.

These findings provide support and build upon previous research into setbacks and failures of general projects which produced evidence of a relationship between setbacks and failures and well-being. For example, Moldenhaur-Salazar and Valikangas (2008) presented evidence that failures could elicit strong negative emotions such as shame and grief which may adversely affect the well-being of individuals. The link between emotion and well-being is explicable through previous research which has demonstrated that where negative emotions endure over time, they may take shape as affective reactions which can harm well-being (Diener, 2006; Shepherd, 2003).

Other research had focused on the social implications of failures where evidence has been produced which points towards failure as precipitating a breakdown of personal relations as the individuals involved in the failure may withdraw from their social or work group due to a sense of shame associated with having failed, and this social withdrawal may negatively impact well-being (Shepherd & Kuratko, 2009). This is in line with the current qualitative findings which indicated links between escalating setbacks and political issues.

Previous research however has rarely attempted to explore the relationship between setbacks/failures and well-being in an innovation specific context, and as such the current research contributes to the field and breaks new ground in this area. In addition, previous research has tended to explore isolated failures rather than setbacks and failure. Given that setbacks and failure are a particularly prevalent feature of innovation projects, it is important to understand what impact they may have on well-being outcomes, and the current research provides new evidence in this area and points towards a need for continued research so that a more complete picture of the relationship between setbacks/failures and well-being may be established.

Organizations espouse and encourage innovative behaviour because without innovation, stagnation and repetition become unwelcome norms. However, organizations also want to ensure high levels of well-being within their workforce. The findings of this thesis indicate that setbacks and failures within the innovation process may make the simultaneous attainment of both high levels of innovation and high levels of well-being difficult within innovation teams. While it is impossible to avoid setbacks and failures within the innovation process, these research findings highlight the importance of employing management practices which reduce the preponderance of serious setbacks and emotive failures, given that the qualitative findings demonstrate that at these levels, negative emotions become more severe, and it is at this point that there is greater potential of harm to well-being. The survey results support this view, demonstrating a decline in well-being as setbacks increase towards failure. The moderators provide evidence relating to ways in which setbacks and failures may be reduced within the innovation process in order to lessen the impact of setbacks and failures on well-being; however, there are further potential avenues for future research. Qualitative results point towards a couple of factors which may have the potential to protect against serious setbacks and failures. Firstly, robust planning appears to negate issues within the innovation process and therefore protects well-being. This finding is supported by Pinto’s (2013) review of recurring human errors in project planning. He argues that these errors in planning can result in serious project setbacks and failures which in turn create stressful work situations. There is scope for future research which specifically explores the psychological outcomes of such planning errors given that most research to date tends to focus on objective outcomes rather than psychological ones. In terms of practical implications for practice relating to the current findings, practitioners may look towards improving planning prior to the commencement of innovative projects as a means of reducing setbacks which in turn may improve the well-being of those working on innovative projects. Thematic analysis results also found that politics were a feature of more serious setbacks. As direction for practitioners, this suggests that management practices which break down these political barriers and enhance communication may be effective in reducing the incidence of more serious setbacks and emotive failures and in doing so, may protect the well-being of those working innovatively.

Theoretical and empirical evidence was cited in Chapter 4 which noted a number of different factors associated with setbacks and failure which may be linked to well-being. These factors were negative emotions resulting from setbacks or failure, breakdowns in relationships with co-workers, stress, high workload, burnout and the inability to attain goals. All of these factors are associated with setbacks and failure and may be linked to well-being. Given the current finding that innovation setbacks (main) are negatively related to well-being, it is likely that interventions that address any of these fore-mentioned factors (i.e. practices designed to alleviate innovator stress and workload), may result in a related improvement in well-being, and this therefore points towards directions for practitioners.

### Innovative work behaviour outcomes: Summary of findings, contributions, directions and implications

The second research question in relation to the first aim of this thesis, considered how innovation setbacks relate to innovative work behaviour, and hypothesized that innovation project setbacks are negatively associated with innovative work behaviour.

Results of a synchronous effects regression model indicated that innovation setbacks (main and other) at Time 2 negatively predicted innovative work behaviour at Time 2. This finding therefore lends support for the hypothesis that there exists a significant relationship between innovation setbacks and innovative work behaviour. Follow-up lagged analysis was carried out on the data in an attempt to ascertain directions of causality in the relationship between innovation setbacks and IWB, i.e. do high setbacks result in low IWBs, or do low IWBs result in high setbacks? However, results of this analysis were inconclusive, probably because the time-lag between survey data collection at Time 1 and Time 2 was too great (this will be discussed in Section 9.10 below in relation to limitations of the current research). The non-significant findings in the lagged regression indicated that IWBs may be subject to more continuous change in light of current experiences, and as such, lagged analysis, particularly in the current data set for which there was a significant time lag, cannot be used effectively to explore questions of causality. An important point to note from the current findings is that they suggest a potential vicious cycle whereby setbacks and failure result in a decrease in IWB, which undermines future innovative efforts.

The findings in relation to the impact of innovation setbacks and failures on innovative work behaviour make significant contributions to research in that this is the first study to demonstrate that innovative work behaviour may be impacted by innovation setbacks and failure. This is important because IWB has always been thought of as a factor which determines the success of innovative projects, rather than conversely, as a dependent variable. To my knowledge previous research has not set out to explicitly explore the relationship between innovation setbacks and failure and IWB, and as such the current research makes a first and valuable contribution to the field, but there is a great deal of scope for further research. Previous research has tended to focus on factors which help to enhance innovative work behaviours in employees and have produced evidence to suggest that factors such as engagement (Agarwal et al, 2011), and good work-life balance (Abstein & Spieth, 2014) are related to positive levels of IWB. However, given the high setback and failure rates of innovative projects and the fact that innovation processes within organizations should be continuous and cyclical, it is important that further empirical work is carried out to build upon the current research which explores in greater detail the potential impact of negative events such as setbacks and failure on ongoing innovative efforts.

The findings in relation to the relationship between innovative project setbacks and innovative work behaviours also have a number of implications for theory and practice. Firstly, the finding discussed above that IWBs are changeable rather than stable behaviours, has important implications in terms of defining and understanding IWB. The findings indicate that rather than having to recruit employees with high levels of IWB, it may instead be possible to train and adapt these behaviours within an existing workforce. There is scope for future research to explore this relationship.

Secondly, in terms of shining light on the direction of causality in the innovation setbacks and IWB relationship, it may be useful to consider this relationship in light of the qualitative findings of this paper. The interview data revealed a progressively negative decline in emotional state as setback levels increased towards emotive failure. In terms of implications for practice, this finding indicates the importance of managing employee emotions throughout the innovation process, given that it is possible that negative emotions resulting from innovation setbacks and failure, may have a negative impact on IWB.

Third, a possible direction for future research is to conduct further research into the effects of emotion on the relationship between innovation setbacks and IWB. Given the importance of ensuring continuous IWBs within organizations, the possible relationship between setbacks, emotion and IWB is worthy of further investigation.

Fourth, as discussed in Chapter 4 above (Section 4.6.2), there is evidence to suggest that IWBs may be buffered by the effects of needs satisfaction so that where working innovatively enhances individuals needs satisfaction, this is positively related to IWB (Devloo et al, 2015). Given that previous research has noted that emotions such as anxiety are negatively related to needs satisfaction (Derakshan et al, 2009; Zhen et al, 2017), it is possible that as innovation setbacks increase, along with negative emotions, this results in a decline in needs satisfaction and a related decline in IWBs. This would suggest therefore that the survey analysis results may be better interpreted as representing a decline in IWB as a result of increasing innovation setbacks rather than the converse directional relationship. There is scope for research to explore these relationships empirically.

### Motivational outcomes: Summary of findings, contributions, directions and implications

The third research question in relation to the first aim of this thesis, considered how innovation setbacks relate to intrinsic motivation and identified regulation, and hypothesized that innovation setbacks are negatively associated with intrinsic motivation and identified regulation.

Results of the synchronous effects regression analysis provided partial support for the hypothesized relationship. Although innovation setbacks of ‘other innovation projects’ at Time 2 were found to negatively predict both intrinsic motivation and identified regulation, non-significant results were returned for the main innovation project. The relationships between these factors requires further investigation to understand why project setbacks in some projects impact motivation but not others. It is possible that there are specific characteristics of innovative project setbacks that impact motivation, but it was outside the scope of the current research to investigate whether this may be the case and this represents an opportunity for future research.

Lagged analysis carried out on the motivation variables returned non-significant results and as such offered no further insights into the direction of the relationship between innovation setbacks and intrinsic motivation or identified regulation. Lagged analysis did not provide support for a direction of causality in the relationship between innovation setbacks and intrinsic motivation and identified regulation (i.e. as innovation setbacks increase does this result in a decline in intrinsic motivation or is the converse true?), and as such it is not possible to draw any conclusions in this respect. However, qualitative analysis results may offer some explanations in terms of the direction of this relationship. While motivation per se was not a specific feature of any of the setback or failure levels, factors associated with motivation did feature within the qualitative results. Most notably, disengagement was a strong feature of emotive failures whereby individuals suffering the effects of failures often disengaged from innovative activities, particularly in the short term. Previous authors have found evidence that disengagement and a decline in motivation are closely related concepts (Castell et al, 2013) and as such, we may surmise that the qualitative disengagement reported as a result of failure, may be linked to the quantitative finding that innovation setbacks and intrinsic motivation/identified regulation are negatively associated.

Another factor which indicates that the most likely direction of the relationship between setbacks and motivation is that as innovation setbacks increase, motivation decreases, is related to the characteristics of innovators. Innovation consists of largely self-directed, self-motivated behaviour (Angle, 2000; in Van de Ven et al), and as such in order for an employee to be engaged in innovative activities in the first place, you would expect them to be intrinsically motivated to innovate. It seems unlikely therefore that low levels of motivation, lead to high levels of setbacks, given that in order to engage in innovative activities, individuals must first be motivated to do so. There is scope for future research to explore these relationships in more detail.

This thesis views innovation as a cyclical process, where every innovative project results feeds future innovative opportunities. This view of the innovation cycle is key to organizational success since one, stand-alone innovation is not enough to ensure the ongoing thriving of businesses, and motivation plays a key role in ensuring that innovation is continuous and not simply a one-time only pursuit. The findings of this thesis indicate that innovation setbacks are negatively related to intrinsic motivation and identified regulation make important contributions to the field, in that they are represent the first research which has explicitly explored the relationship between innovation setbacks and failures and motivational outcomes. While it was not possible to establish a statistically significant result in terms of the direction of this relationship, it seems likely given the qualitative and other evidence cited above that high levels of setbacks result in a decline in motivation. This has important implications for practice. If innovation setbacks and failures have the potential to cause a decline in levels of motivation, it is important that management practices are put in place to reduce innovation setbacks and failures where possible. If a reduction in setbacks and failures is not possible, measures must be taken to enhance levels of motivation both during innovation projects and following them in order to ensure the highest possible levels of ongoing innovative efforts.

More specific ideas in terms of management practices that may be employed to buffer the effects of innovation setbacks and failures on all outcomes variables will be presented in the following section in light of the second aim of this thesis and in relation to moderation and qualitative analysis findings.

## Aim two: main findings, directions for future research and implications for theory and practice

**Aim 2: To further understanding of why some innovators suffer negative outcomes of innovation setbacks and failures while others experience neutral or positive outcomes.**

While the above discussion of findings in relation to the first aim of this thesis presents a fairly bleak picture of the outcomes of innovation setbacks and failure, namely that innovation setbacks results in a decline in well-being, IWB and motivation, it is certainly not the claim of this thesis that all negative innovative experiences result in negative outcomes. In fact, in many cases the converse may be true, that innovation project setbacks and failure often result in neutral or positive outcomes for innovators. In order to provide more robust understanding of why some innovators suffer negative consequences of innovation setbacks and failures while others experience neutral or positive outcomes, a number of moderator variables were investigated as a means of shedding light on these relationships. Each outcome variable will be discussed in turn, in relation to variables found to be significant moderators, beginning firstly with moderators of the innovation setbacks and well-being relationship.

## Moderators of well-being outcomes:

A number of factors were found to moderate the relationship between innovation setbacks (main) and well-being. These were resilience, supervisor feedback, normalization of failure and learning from setbacks and failure. Each of these moderators will be discussed in turn below along with implications for practice in relation to the findings.

### Well-being & resilience: Contributions, findings and implications for future research and practice

Moderation regression analysis showed that resilience was a significant moderator of the relationship between innovation setbacks (main) and well-being. The relationship was such that those low in resilience had a sharper decline in well-being as project setbacks increased towards failure compared to those high in resilience who experienced a smaller decline in well-being as setbacks increased. This finding makes an important contribution to the field in that it suggests that resilience may be a key factor in helping to understand why some individuals suffer the costs of innovation setbacks and failure while others reap the rewards. This finding is in line with and builds on the work of Moenkemeyer et al (2012) who propose that an individual’s ability to recover from the emotional trauma of failure lies in an individual’s ‘innovator resilience potential.’

With the exception of Moenkemeyer et al (2012), the potential links between resilience and innovation lack empirical research, and as such this finding has important implications for practice within innovative organizations. It seems that when recruiting for innovation projects, and when assembling innovation teams within organizations, including people within those teams who are high in resilience potential may have benefits both in terms of innovative output and may help to ensure that the well-being of innovation teams is maintained. In addition, a number of management tools have been found to increase levels of resilience in employees and should be considered for enhancing resilience in innovative teams. For example, Cooke and colleagues (2016) found that high performance work systems (HR practices which are designed to enhance employee performance and skills), were effective at enhancing employee resilience. Bardoel et al (2014) identified a set of HRM practices which are expected to enhance employee resilience. These included; ‘developments of social support at work’, ‘work-life balance practices’, ‘employee development programs, including resilience training’ and ‘risk and crisis management systems’ (p. 284). The research of Bardoel et al (2014) was based on general employee needs, but it is the assertion of this thesis that the need to develop greater resilience amongst employees is even more pronounced for innovation teams given the challenges that they may face while working innovatively and it is hoped that these findings highlight that need. Future research is needed to identify innovation specific practices for enhancing resilience within innovation teams. Practitioners should consider utilizing such practices as a means of enhancing resilience of innovative employees which may in turn buffer the effects of setbacks and failures on well-being.

### Well-being & supervisor feedback: contributions, findings and implications for future research and practice

Supervisor feedback was found to be a significant moderator of the relationship between innovation setbacks (main) and well-being, where high projects setbacks are associated with a decline in well-being where supervisor feedback quality is low, whereas those with better levels of supervisor feedback maintained levels of well-being despite setbacks increasing. This is the first research that specifically explores the moderating effect of supervisor feedback in the relationship between innovation setbacks and failures and well-being, and therefore these findings make an important contribution to the field. The empirical evidence in relation to feedback and well-being presented in Chapter 5, Section 5.9 of this thesis suggested that the impact of supervisor feedback on well-being outcomes may be closely linked to the manner in which it is delivered, for example whether it is delivered in a considerate, supportive way (Liden & Mitchell), and whether the feedback is perceived to be fair (Leung et al, 2001). The measure used within the current survey focused largely on quality and fairness perceptions relating to supervisor feedback. Therefore, given the finding that feedback moderated the relationship between and well-being, ensuring that good quality, fair feedback is provided to innovation teams, may help to ensure high levels of well-being and ongoing innovative success. Future research in this area should include more detailed measures of feedback and should focus on feedback from different sources such as exploring the relationship between team or peer feedback and well-being. There is also scope for future research to explore how different types of feedback are related to learning and well-being. Previous studies have demonstrated that effective peer feedback can enhance learning and well-being in students following poor test results (Chew et al, 2014). The importance of effective feedback in the innovation process is recognized by researchers and practitioners, but the detailed mechanisms by which it moderates outcomes are not yet clearly understood and as such there is scope for further research which explores the nature of these relationships.

### Well-being & normalization of failure: Contributions, findings and implications for future research and practice

Normalization of failure was found to significantly moderate the relationship between innovation project setbacks and well-being. However, the results were somewhat unexpected in that although as hypothesized, those in the low normalization group show a steeper decline in well-being as project setbacks increase, those in the high normalization group showed a generally lower level of well-being in both high and low setback categories contrary to the hypothesized relationship. One possible explanation for this is that high normalization organizations experience by their nature, greater instances of setbacks and failure hence the need to normalize it and as a result of these higher levels of innovation, well-being is generally lower within this group. As such, without normalization practices in place, well-being may in-fact have been considerably lower within this group. Therefore, in terms of implications for practice, normalization of failure and setbacks is suggested as a potentially effective management technique to help guard against reduced levels of well-being as a result of experiencing innovation setbacks and failure. Further research should be carried out which tests whether the rationalization for findings presented above is accurate. This will allow best practice recommendations to be made based on a greater body of empirical evidence with regards how organisations may effectively utilize normalization of failure techniques to enhance innovation and support innovators.

## Moderators of innovative work behaviour outcomes

A number of factors were found to moderate the relationship between innovation setbacks (main) and innovative work behaviour (IWB). These were resilience, supervisor feedback, and learning from setbacks and failure. Each of these findings will be discussed in turn below.

### Innovative work behaviour & resilience: Contributions, findings and implications for future research and practice

Moderation regression analysis revealed that resilience was a significant moderator in the relationship between innovation setbacks (main) and innovative work behaviour. Results revealed that while both high and low resilience groups showed a decline in IWB when project setbacks were high, the decline was more pronounced for those in the low resilience group. This finding is in line with research by Moenkemeyer et al (2012) who emphasized the importance of resilience in innovation teams, and that it is an individual’s resilience potential that allows them to bounce back after experiencing setbacks and failures within the innovation process. The current finding contributes the bank of evidence in this field which, with the exception of the work of Moenkemeyer, was sparse.

This finding was also supported qualitatively, in that thematic analysis indicated that innovators were often able to de-escalate setbacks in order to push the project back on track towards success, and this ability to de-escalate may be closely linked to resilience. Previous research supports this finding. For example, Corner et al (2017) found that entrepreneurs displayed particularly high levels of resilience which allowed them to maintain good levels of innovative functioning despite experiencing potentially debilitating failures. Future research could build on these findings by examining the effects of resilience in employees more widely, and not just in innovation teams. High levels of resilience is known to be a feature present in many entrepreneurial and innovative employees. However, today’s organisations require the whole work force and not just ‘innovation teams’ to display innovative work behaviours and as such, research that improves our understanding of the relationship between IWB and resilience may make it easier for individuals in non-innovation specific roles innovate.

These findings have important implications in terms of innovation practice. IWBs are coveted behaviours which ensure the long-term survival of organizations (Janssen, 2000), but setbacks and challenges which are inherent in the innovation process can pose a risk to ongoing levels of IWBs (Devloo et al, 2016). Therefore, any factors which can buffer the effects of setbacks and failures on IWB will be important tools in the management of innovation, and as such practices which either recruit for or improve resilience levels amongst innovative employees may have a positive impact upon overall levels of IWB.

### Innovative work behaviour & supervisor feedback: Contributions, findings and implications for future research and practice

Moderation analysis indicated that supervisor feedback was a significant moderator of the relationship between innovation setbacks (main) and innovative work behaviour, where the high supervisor feedback category showed higher levels of innovative work behaviour in both the low and high project setback categories. Contrary to the hypothesized relationship however, the high supervisor category showed a steeper decline in IWB where setbacks were high. These results contribute to the field in that they demonstrate complicated but potentially significant moderating effects of supervisor feedback on the relationship between innovation setbacks and IWB. The findings suggest that while supervisor support is important for improving overall levels of IWB, it does not necessarily protect IWB from decline during periods of setbacks within the innovation process. A possible explanation for this finding is that supervisors have been found to play an important role in fostering innovation within innovation teams (Alpkan, 2010; Bystead & Jespersen, 2014) which is supported by the current finding that IWB was higher in the high feedback group during both high and low setback states. As such, good levels of supervisor feedback are likely to be important for improving levels of innovation within innovation teams. However, the sharper decline in IWB in the high feedback group demonstrates that good supervisor feedback does not necessarily protect again harm to IWB as a result of high levels of setbacks. One possible explanation for this finding is that high levels of feedback draws attention to failures and issues which may be attributable to individuals which in turn results in a decline in IWB. As such, practitioners should note that supervisor feedback is very important in fostering innovation but it doesn’t necessarily protect IWB from the effects of setbacks and failures. Further research should be carried out to explore this relationship in more depth.

### Innovative work behaviour & learning from setbacks: Contributions, findings and implications for future research and practice

Learning from setbacks and failure was expected to moderate the relationship between innovation setbacks (main) and IWB outcomes, and moderation analysis supported this hypothesis. The findings showed that IWB declined sharply in the low learning group where project setbacks were high. However, the high learning group showed a more moderate decline in IWB as setbacks increased.

The general premise behind theory related to learning from setbacks and failures is that learning facilitates recovery and re-emergence from negative outcomes associated with setbacks and failures (Cope, 2011). In terms of its relationship to IWB, learning is expected to enhance grief recovery, by allowing individuals to take the positives out of a negative event (Shepherd & Cardon, 2009). This recovery is expected to enhance all aspects of IWB, idea generation, promotion and realization. The current findings contribute to the few studies that previously existed.

Learning from failure also featured strongly in the qualitative results of this thesis. Individuals who talked about having learned from setbacks were much more positive generally about the outcomes of the project and displayed a sense of keenness when talking about innovation, with a strong desire to continue to innovate. Therefore, these results strongly support the proposition that learning from setbacks and failure can buffer the effects of setbacks and failures on IWB. There is scope for future researchers and practitioners to explore and develop tools to effectively encourage and enhance learning within innovation projects. One such tool is the IFF (Intelligent Fast Failure), which has been found to stimulate idea generation following failure (Tahirsylaj, 2012). Based on the current findings, the implementation of management practices and tools which encourage learning are recommended.

## Moderators of motivation outcomes

A number of factors moderated the dimensions of motivation, intrinsic motivation and identified regulation. Both dimensions were moderated by supervisor feedback and learning from failure. Resilience also moderated intrinsic motivation, and normalization of failure also moderated identified regulation. Each of these relationships will be discussed below.

### Motivation & resilience: Contributions, findings and implications for future research and practice

Resilience was found to significantly moderate the relationship between innovation setbacks (main) and intrinsic motivation, although the nature of this relationship was somewhat unexpected. The high resilience group had lower levels of intrinsic motivation in both high and low project groups with a moderate decline in intrinsic motivation as setbacks increased, while the low resilience group had higher levels of intrinsic motivation during low setbacks, but this showed a steep decline where project setbacks were high. These findings make an important contribution to research as it is the first study of its kind to demonstrate a possible moderating effect of resilience in the relationship between innovation setbacks and motivational outcomes.

It is possible that resilience and motivation in innovators are not both required in high levels, because the factors complement each other, rather than acting in unison. In other words, individuals may not need to be high in both intrinsic motivation and resilience in order to innovate successfully. This finding however is contrary to previous research which has found that more highly resilient individuals display more positive motivational behaviours (Rouse, 2001), and as such the best advice for practitioners wishing to improve the motivation of innovative employees would be that high resilience is more likely to have a positive impact on motivational outcomes in light of setbacks and failures. Given that the current research discovered a pattern in the relationship between resilience, setbacks and intrinsic motivation, this may be an area worthy of investigation in order to provide some possible answers as to the nature of this relationship.

### Motivation & supervisor feedback: Contributions, findings and implications for future research and practice

Moderation regression indicated that supervisor feedback was a significant moderator of the relationship between innovation setbacks (main) and both intrinsic motivation and identified regulation. However, the interaction graphs, presented in Chapter 7 show that although high supervisor feedback is associated with generally higher levels of both intrinsic motivation and identified regulation, low levels of supervisor feedback were not associated with a decline in intrinsic motivation or identified regulation as setbacks increased. In actual fact, the low supervisor feedback group saw an increase in identified regulation as setbacks increased, contrary to hypothesis 6. These findings contribute to the field because they indicate that there exists a relationship between feedback and motivational outcomes and point towards the need for future research to provide a more nuanced understanding of the details of this relationship.

This finding may be related to empirical evidence which suggests that the links between motivation and feedback are extremely complex. It is not the frequency of feedback that impacts outcomes, but the differing nature and content of that feedback. For example, feedback that focuses on dispositional attributes, or when feedback indicates that failure is due to innate ability this may result in a decrease in motivation (Kaymaz, 2011; Ellsworth, 1985). This may help to explain why the high supervisor feedback group showed a decline in identified regulation as setbacks increased, as it is possible that they were receiving high levels of feedback but that the feedback focused on ability and dispositional attributes which led to a decline in motivation. Another possible explanation is that in general feedback may be helpful in terms of improving performance, whereas feedback which is specific to innovation failure may be highly sensitive and may therefore compound issues. Further research should be carried out to ascertain which specific types of feedback may help and which may hinder the innovation process so that organisations may be better informed in terms of the best practice approaches to using feedback in innovation teams.

The current research has demonstrated that supervisor feedback plays an important role in the relationship between innovation setbacks and failure and outcomes. However, it was not possible within the scope of the current research to extensively study this research, and the measure used, although appropriate for the current study, did not capture factors such as the content of the feedback. Future research should focus on supervisor and co-worker feedback in greater detail in order to fully understand the nature of this relationship, so that practical advice may be given to organizations in terms of the best feedback approaches for aiding innovative efforts. Kluger and DeNisi (1996), in their meta-analysis of feedback research found that fewer than 50 percent of feedback interventions improved performance. As such, given the importance of feedback to innovation outcomes, it is imperative that further research is conducted to allow feedback interventions to be put in place within innovation projects that have a greater than 50 percent chance of success. In terms of advice for practitioners in light of these findings; supervisor feedback in some form appears to be important for improving motivation following innovation setbacks and failure, but the type of feedback which is likely to be most effective requires further research.

### Motivation & normalization of failure: Contributions, findings and implications for future research and practice

Normalization of failure was found to moderate the relationship between innovation setbacks (main) and motivation dimension, identified regulation, but not in the expected direction. The nature of the relationship was such that low levels of normalization of failure were associated with low levels of identified regulation in both low and high project setbacks categories whereas high normalization of failure was associated with higher levels of identified regulation in both high and low setbacks. However, the high normalization group showed a decline in identified regulation as setbacks increased, while conversely, the low normalization group showed an increase in identified regulation as setbacks increased. This finding was contrary to the hypothesized relationship but nonetheless it contributes to the field in that it suggests that there exists a relationship between innovation setbacks, normalization of failure, and motivation, but that in order to fully understand the nature of this relationship, further research is required.

This finding lends support to Shepherd & Kuratko’s (2009) theory which suggested that normalizing failure may decrease motivation to innovate because in reducing the potential for negative emotional responses to failure, the level of commitment, motivation and drive to succeed may be hampered, because negative emotions, although unpleasant, can motivate action as a means of overcoming the unpleasant emotions. These findings suggest therefore, that normalization of failure may not be a useful management technique because of its potential for causing a decline in motivation to innovate. Future research should explore this relationship in more detail, perhaps using qualitative methods to help understand the nuances of the relationship.

### Motivation & learning from setbacks and failures: Contributions, findings and implications for future research and practice

Learning from setbacks and failures was found to be a significant moderator of the relationship between innovation setbacks (main) and both intrinsic motivation and identified regulation. Where learning was low, both intrinsic motivation and identified regulation showed a steeper decline as project setbacks increased, and where learning was high, both motivation variables showed a fairly steep incline. This finding was in line with hypothesis 7 and makes and important contribution to the field given that this was the first study to explicitly explore learning as a moderator in the relationship between innovation setbacks and motivation.

One explanation for this finding is that successfully learning from setbacks and failure helps people to understand what went wrong, which gives them both the requisite knowledge about how to proceed next time (Badovick et al, 1992), and also protects against fear of failure where anxiety paralyses action because without the understanding of what went wrong last time, individuals fear the same outcomes of future action (Smiricich & Morgan, 1982).

Learning from failure also featured heavily in the interviews carried out as part of this research. Learning was discussed as an important tool for maintaining or enhancing levels of motivation despite setbacks and failures. More than that, learning often appeared to transform potential failures into possible successes and the language used around these possible failures was not of negativity and demoralization, but of positivity and motivation.

This research has demonstrated the importance of learning from failure as a tool for buffering the effects of setbacks and failure on innovative work behaviour and motivation. It was beyond the scope of this research to provide detailed data and analysis relating to the role of learning from failure on innovation outcomes, but future research should address the role of learning from setbacks and failure in detail so that comprehensive tools may be created to help in the management of innovation projects. Shepherd and colleagues have been paving the way in learning from failure research, and future work should also focus on learning from setbacks specifically as setbacks are arguably more common in the innovation process than failures.

## A note on non-significant findings

A number of hypotheses were not supported by the current findings, and this section provides a brief discussion of these along with consideration of why these results may have been insignificant despite theory which supported the hypotheses.

The first notable non-significant finding was that innovation setbacks (main) did not significantly predict motivation (intrinsic or identified), whereas ‘other’ innovation setbacks did return significant results. One possible explanation for this non-significant finding is that innovation is largely self-directed (Angle, 2000; in Van de Ven et al), and innovators often innovate for the pleasure of innovating. Therefore, they may be generally motivated to innovate, and changes in levels of motivation may not be related to specific projects but to more general innovative endeavours.

The second notable non-significant finding was that learning from setbacks and failure did not significantly moderate well-being. This is surprising given that one of the theoretical values of learning is that it reduces negative emotions associated with failure, therefore enhancing well-being (i.e. Shepherd et al, 2013). However, previous research has focussed on failure specifically and measures employed in the current research were interested in both setbacks and failure. It is possible therefore that learning does not moderate the relationship between *setbacks* and well-being, and that previous empirical support for this relationship is applicable to failure but not setbacks. This is an area worthy of further investigation by future researchers.

Finally, it was surprising that level of investment was not found to moderate any of the outcome variables. Chapters 2, 3 and 4 presented strong arguments in support of a relationship between level of investment and outcome variables. Indeed, common sense supports the idea that the more heavily an individual is invested in an innovation, the greater the negative outcomes of setbacks and failure. The insignificant findings may be indicative of the measures used being inappropriate. While every effort was taken to pilot the survey and ensure the validity of the measures, the insignificant findings suggest that they may not have been fit for purpose. Future researchers in this area should develop appropriate measure of level of investment in innovation and re-examine these relationships.

## Aim three: main findings and implications for theory and practice

**Aim 3: To provide a more robust understanding and more nuanced description of the meanings and impact of setbacks and failures within the innovation context.**

Given the frequency with which innovators encounter setbacks and failures while working on innovation projects (Horibe, 2001, Shepherd & Kuratko, 2009), it is surprising that few attempts have been made at defining failure, and fewer still at defining setbacks, within the innovation context. This deficit in definition and theory is perhaps linked to an approach taken by many previous innovation researchers which has often viewed innovation as a process consisting of inputs and outputs, where outputs are categorized in fairly black and white terms as either successes or failures, or profits versus loss (Anderson et al, 2004). The findings of this thesis however, demonstrate that the outcomes of innovation cannot be reduced to a simple success or failure assessment based on revenue generated. Instead, the outcomes and overall performance of innovative projects are highly subjective and dependent on a number of features which innovators draw upon in their summation of the seriousness of setbacks and failures within the process. This is closely linked to the need to refocus innovation research so that it is studied as a cyclical process rather than as standalone projects, given that subjective interpretations of a previous projects’ performance is often assessed at least partly on the basis of how the previous project was able to inform and improve performance on later projects. There was a clear need to provide more a more robust understanding of setbacks and innovation in the innovation process, and this thesis achieved this aim through the qualitative exploration of two questions:

1. What are the main features of setbacks and failures in the innovation context?
2. How are innovation setbacks and failures linked?

The answers to both of these questions will be discussed below in relation to empirical findings and implications for practice will also be explored.

### The main features and links between setbacks and failures: Contributions, findings and implications for future research and practice

The qualitative findings of this thesis contribute a new way of conceptualising setbacks and failures within the innovation process. These findings are important because in providing more robust descriptions and understanding of innovation setbacks and failure, it becomes possible to design new ways of studying innovation setbacks and failure and may help practitioners to manage projects better by helping them to identify ‘warning signs’ within the process.

Setbacks and failures are commonplace within the innovation process, but all setbacks and failures are not equal in that they vary in terms of the level of seriousness and the risks they pose to the project and the team working on it. As discussed in Chapter 8 above, setbacks and failure can be divided into three different levels; normal setbacks, more serious setbacks and emotive failures. Normal setbacks occur within most innovative projects, are par for the course and are more an annoyance than a particular source of stress. There is an escalation however of stress and anxiety as setbacks increase to the ‘more serious setbacks’ level. More serious setbacks also pose a greater risk for innovation projects and innovators. The next level, ‘emotive failures’, represent the termination of a project associated with great disappointment felt by innovators. Emotive failures are markedly different from more serious setbacks where projects may be terminated but are not considered failures because opportunities for learning feed into current or future projects in which sense the previous projects are resurrected in some form and retain some element of success. Emotive failures however, are underscored by strong negative emotions, regretful thinking, loss and blame. Emotive failures are more difficult to bounce back from and are potentially harmful to innovators and the innovation capabilities of organizations. Emotive failures, and to some extent more serious setbacks should be avoided where possible, and where avoidance is not possible, management tools should be put in place to reduce negative outcomes of these experiences for innovators.

This leads onto the second qualitative finding which explored how setbacks and failures are linked. This research demonstrated the mechanisms through which setbacks are de-escalated and escalated. Escalation occurs when setbacks accumulate to the point that managing the project successfully becomes untenable and this is where failure becomes a possibility (i.e. Lambooij & Koster, 2016). However, setbacks often do not result in failures because innovators are often adept at de-escalating issues (Van Oorschot et al, 2011). Through learning (Shepherd, 2003), resilience (Moenkemeyer, 2011) and tenacity (Van Gelderen, 2012), innovators are often able to turn failing projects into great successes.

These findings have a number of important implications for practice. Firstly, presenting the features of normal setbacks, more serious setbacks and failure provides practitioners and managers with signs to look out for which indicate that a project may be in trouble. Planning setbacks, issues around politics, increasingly negative emotions displayed by the innovation team all signal that problems within a project may be escalating and this is the point at which management tools should be employed with the aim of de-escalating the situation. The moderator variables discussed in Section 9.4 above provide some robust ideas for buffering the effects of setbacks and failure.

Secondly, these findings provide detailed descriptions of setbacks and failures within the innovation context. Setbacks and failures are defined by the level and type of emotion, internal processes and external factors which underscore them. Setbacks and failures cannot be understood simply by assessing them against profit and loss parameters, and to do so would belie the very nature of innovation, that it is about creating something new by learning from what came before.

Finally, this research provides not only a more robust understanding of innovation setbacks and failures, it also points towards a number of gaps in current research.

The first gap in research is that innovation should be researched as cyclical rather than standalone projects. The current research demonstrates that innovation is an ongoing process where experiences on previous projects impact future behaviours and outcomes. Previous research has often explored single innovation projects in isolation from the wider innovation and organizational context (Anderson et al, 2004). The current research aimed to contribute to this gap, by moving away from the most frequently adopted methodology in innovation research of cross-sectional designs at the single level of analysis. However, there is a need for further research which explores innovation in its wider context, considering the impact of previous innovation experiences and the environment in which the work takes place so that a more complete understanding of innovation may be achieved.

Secondly, there should be a greater focus on the people who innovate rather than breaking innovation down into a series of processes. It is after all, people and not processes who achieve great things through innovation (Kingdon, 2012), and without fully understanding the role of human behaviour and psychology in the innovation process, our understanding of innovation remains incomplete as does our toolkit for enhancing it in organisations.

Third, there remains scope for research into the important role of learning within the innovation process. Although authors such as Shepherd and colleagues have made positive advancement in this area, the current qualitative research indicated that learning was a fundamental factor in overcoming potential failures and de-escalating setbacks. It was outside the scope of the current research to explore these relationships in detail and future research could add considerably to the field of innovation and to practitioner tools by providing a more detailed understanding of the role of learning in innovation and how best to harness it.

Fourth, setbacks within the innovation process have been largely ignored by researchers to date. Given the prevalence of setbacks within the innovation process there is a clear need for further research in this area which builds on the current findings. There are also a number of limitations of the current research which will be discussed below.

## Contributions to existing theory

This research contributes to existing theory in a number of ways. Firstly, theories relating to failure and setbacks in the work context are currently sparse and as such this research contributes to this important field by providing insight into possible levels and determinants of setbacks and failures in the innovation context. The current research also presents novel evidence in relation to the psychology of individuals as an important consideration for setback and failure theorists. These findings also contribute to existing theory in this field, most notably error theory. The current findings builds on Metcalfe (2017) proposition that learning from errors (rather than avoiding them) improves longer term performance. This view is supported by the current findings which found that learning from failure and setbacks was a moderator of innovative work behaviour and motivational outcomes whereby the impact of setbacks and failure on these outcomes was less negative for those who had learned more. The qualitative findings also support the idea that learning from setbacks and errors improves innovative performance in that where learning takes place, the likelihood of serious emotive failures were diminished.

The second important contribution of this research to current theory relates to process theories of innovation, such as Kanter’s (1988) four stage model of innovation. Previous innovation models, including Kanters’ have tended to view innovation in terms of single standalone projects. However, the current research highlights the need to view innovation projects as cyclical, determined by context, and influenced and driven by experiences of working on other projects. The current findings demonstrate that innovation projects do not end abruptly at some fixed point; rather because of their newness and inherent challenges, they provide rich learning opportunities which shape and determine future projects. Innovation then, should be seen not so much as a cyclical process, but more as a continuous loop. In addition, the current findings highlight the importance of psychology in the innovation process and have demonstrated that innovation setbacks and failures may impact psychological outcomes including innovative work behaviour and motivation. This suggests therefore that innovation process theories such as Kanters’ may benefit by considering the potential impact of setbacks and failures on each stage of the innovation process, and their related psychological outcomes.

## Limitations of current research and their implications for future research

### Limitation 1:

The time lag between the first and second wave of survey data collections was too long and resulted in inconclusive results of lagged analysis. The time between samples was approximately six months, which is arguably too long when measuring factors such as well-being which is known to potentially fluctuate over a relatively short period of time (Houle & Philippe, 2017; Milyavskaya et al, 2013). Six months is also a long time in the life cycle of an innovative project, given that such projects are often prone to significant progress changes over relatively short time periods (Kanter, 1988). The decision to have a relatively long gap between samples was taken for practical reasons, to enhance the likelihood of capturing instances of setbacks and failure, but this led to insignificant and inconclusive lagged analysis results. Therefore, future research with a similar design should reduce the time between first and second survey dissemination.

### Limitation 2:

While every effort was made to provide analysis of the most relevant moderator variables in the relationship between innovation projects setbacks and outcomes, the qualitative analysis revealed a number of additional factors that may shed further light on the question of why some innovators suffer harmful outcomes of setbacks and failures while others experience neutral or positive outcomes. For example, planning issues were raised by interviewees as a factor that may moderate this relationship and there is empirical evidence to support this idea. For example, Song et al (2011) presented evidence that strategic planning plays a complicated but important role in innovation performance. In addition, qualitative analysis indicated that organizational politics had a significant impact on innovation performance and outcomes, an assertion supported by a number of previous researchers (i.e. Hart & Branscomb, 2000; Ibata-Arens, 2005).

Future researchers should therefore broaden the scope of their research to include additional moderator variables such as planning and politics. This will provide a more complete understanding of the factors which impact innovation outcomes following setbacks and failures.

### Limitation 3:

In the interests of brevity and reducing the possibility of respondent attrition rates, level of investment measures were only taken in relation to the main innovation project and not other projects. The expectation at the time of survey design was that innovation setbacks of the main project would have the greatest impact on outcomes because it was anticipated that it would be the project that individuals were most heavily invested in. However, synchronous regression models demonstrated that setbacks of other innovation projects had a significant relationship with innovative work behaviour, and in the case of motivation variables, other projects returned significant results whereas the main project was insignificant. Given these significant findings for other projects, it is regrettable that level of investment data wasn’t available to carry out moderation analysis on the relationship between innovation setbacks (other projects) and outcomes. This also points towards a direction for future research, namely that there is a need to provide more detailed understanding of the similarities and differences between substantial, main innovation projects, and more general innovative work, and to explore the psychological impacts of both.

### Limitation 4:

The qualitative results indicated that learning played a significant role in the de-escalation of setbacks, while also effectively allowing ‘failed’ projects to be resurrected into different potentially successful forms. However, when learning was tested as a moderator variable, it was not found to moderate well-bring outcomes. Given the importance that interviewees placed on learning, it would be expected that the importance of learning would be reflected more strongly in the quantitative results. It is possible therefore, that the measure used was not appropriate for the current study. It was a pre-validated measure (Shepherd et al, 2011) but had been designed specifically to measure ‘failure’ whereas the current study was interested in capturing both setbacks and failures. The measure was routed and adapted slightly for the purposes of the current research to capture instances of learning from setbacks as well as failures, but it is possible that the measure was not entirely fit for purpose. As such, future researchers should aim to design a survey tool which aims to specifically measure learning from both setbacks and failures within the innovation process to allow better exploration of these important relationships.

### Limitation 5:

The survey study relied on self-report data. While this was deemed the only practical approach for securing a large data set, a number of issues around self-reported measures are noted. Firstly, we were relying on respondents to be honest in their responses but it is a recognized issue with self-report measures that honesty and image management can skew results (Brown & Finlayson, 2013). Given that the current study aimed to measure setbacks and failure, it is possible that these were underreported by participants because of a desire to represent their projects as more successful than they were in reality. The second issue with self-reported measures relates to introspective ability, that even where individuals are trying to be honest in their responses, they sometimes lack the ability to see their behaviours as other do (Coolican, 2009). As such, studies which employ methods to assess behaviours using feedback of managers and peers can be useful, but that was not practically possible in the current research. Every effort was taken to try to minimize self-report measure bias. Confidentiality was clearly assured in the survey introduction and anonymity was guaranteed by using a subject generated identification code. Confidentiality and anonymity have been found to reduce self-report issues, so it is hoped that the current results are as closely representative of reality as possible but potential issues are noted none-the-less.

### Limitation 6:

Emotion featured heavily in much of the theory surrounding this thesis and in the qualitative findings. However, because of the complexity of the potential relationships between emotion and innovation setbacks and failure, it was not possible to explore in detail the role of emotion in the context of the current research. This leaves a number of questions without robust answers, such as how does emotion relate to well-being and learning from failure in the context of innovation setbacks and failure?

The need to regulate emotion in order to protect the well-being of innovators, is a view supported by the qualitative findings in Chapter 8. Emotion featured strongly in the thematic analysis findings. Negative emotions increased in intensity as setbacks deepened and these emotions appeared to be related to a decline in well-being. There was a general sense from interviewees that as setbacks escalated, emotional responses intensified and this was related to a decline in well-being. Therefore, these findings strongly support the idea that successfully regulating emotion within the innovation process may enhance levels of innovator well-being, but this requires further exploration. Qualitative finding presented in Chapter 8 also indicated that a preponderance of negative emotions in response to more serious setbacks could interfere with the ability of innovators to learn from setbacks and failure and avoid emotive failures. This is an important finding which is worthy of more detailed empirical investigation. Numerous techniques exist which aim to regulate emotion (i.e. Hope, 2004; Zaki et al, 2013) and practitioners and researchers should aim to study and develop these further for use specifically within innovation teams.

## Suggested future research as a direct result of the findings of this thesis

While the current findings provide some new clarity in relation to the impact of innovation setbacks and failures on psychological outcomes, they also raise additional questions and point towards opportunities for further research which could enhance and add detail to the current findings. One such study that I propose would focus on the role that supervisors and teams play in the management of innovation setbacks and failures. Current findings indicate that supervisor feedback has a potential moderating role but it was beyond the scope of this study to explore the nature of this relationship in detail. It was also beyond the scope of the current thesis to explore the role of team feedback in the innovation journey. Therefore a further study which focusses in detail on the nature of the relationship between supervisor and team feedback and innovation outcomes in light of setbacks and failure may result in some valuable findings. In particular, this study could focus on the efficacy of different types of feedback and the effects of communication style (i.e. disseminating ‘political’ information) on innovation outcomes. To my knowledge, the specific relationships between supervisor and team feedback content and type have not been studied previously in relation to the outcomes of innovation setbacks and failures.

## Thesis Conclusions

This thesis makes important contributions to the field of innovation, by exploring how innovation setbacks and failures impact well-being, innovative work behaviour and motivational outcomes, and by presenting a number of moderators of these relationships, it also provides evidence as to why the impact of setbacks and failures differs across individuals. In addition, this thesis provides important new understanding of the features of setbacks and failures, and the links between innovation setbacks and failures. Setbacks and failure are inadequately defined and poorly understood in the innovation context, and this research represents a positive step towards forging better understanding of the role of setbacks and failure in the innovation life cycle.

Innovation is absolutely key to the success of organizations and to the effective functioning of whole economies. However, it is a highly complex, risky and challenging process (Colquitt et al, 2007; Garcia-Granero et al, 2015) and as a result, setbacks and failures are rife within innovation projects. There are sound theoretical links between setbacks, failures and outcomes well-being, innovative work behaviour and motivation, as presented in Chapter 4 of this thesis, although the majority of past evidence emanates from broader occupational fields and is not specific to innovation per se. This thesis bridged a number of gaps in innovation research. It moved away from a focus of innovation as an independent variable, and instead positioned innovation as the dependent variable, where innovative experiences impacted psychological outcomes. This approach also moved away from a focus that has been common in much previous innovation research which has seen outcomes largely in profit versus loss terms. In addition, this research explored innovation as a cyclical process where the experiences amassed in each project impact future behaviours, whereas there has been a tendency in previous research to explore stand-alone projects with little consideration of how past and future projects may be linked. Finally, in a move away from many traditional innovation studies, this research focused on innovation as the behaviour of people rather than innovation as the operation of processes. The results of this research provides important new insights and empirical evidence regarding the relationship between innovation setbacks and failure and its outcomes; well-being, innovative work behaviour and motivation.

Innovation is fundamental to the success of organizations and to the growth of whole economies and it is hoped that this research provides potential new paths for empirical study and leads to the creation of new management tools to support innovators in their quests for innovative excellence.

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# Appendices

## Survey

\*The Time 1 survey is included here as it contains all of the same measures as the time two survey with the addition of control variables.

**Innovation Survey Time 1**

**Start of Block: Default Question Block**

Q1 Thank you for taking part in this study.  This survey should take around 15 minutes to complete. The aim of this research is to build a clearer understanding of the innovation process, and in particular to explore the outcomes of both successful and unsuccessful innovations from the point of view of those involved in the innovation process.  By innovation, I mean something that is new and expected to be of benefit to your organisation, to the wider market in which you operate or to the world.  An innovation can be a new strategy, product, process, service or marketing technique.  Changes big and small to old strategies, products, etc,  are also considered innovations.  If its new, and expected to bring about benefits, it's innovative.  
   
 Previous innovation research has tended to focus on innovation outcomes in black and white, profit versus loss terms, but this research is important and unique because it aims to build a clearer understanding of what you experience over the course of an innovative project and how this may impact the way in which you innovate in the future.   
    
Because feelings and experiences are not static and may change over time, I may invite you to complete one or two additional surveys over the course of the next weeks or months.      
    
Please be assured that all responses are absolutely anonymous and confidential.  You have the right to withdraw from this study at any time.  
   
 Your help and participation are very much appreciated.  
  
  
  
  
Thank you!   
    
  
 Amy Redmond

I have read and understood the above information relating to this study and of my own free will, give my consent to participate in this research

* Yes (1)
* No (2)

I understand that I am free to withdraw from this study at any time, without giving a reason

* Yes (1)
* No (2)

**Subject Generated Identification Code**

Q3 **A few questions about you...**

The next four questions are included to make it possible for us to match your responses on this survey to other surveys that we may ask you to complete in the future.

What is the first letter of your mothers first name?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What month were you born (Please give a number)?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the first letter of your middle name (if none use X)?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How many brothers do you have?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Control Measures**

Q5 Are you...

* Male (1)
* Female (2)

Q6 What is your age?

* 18-24 (1)
* 25-34 (2)
* 35-44 (3)
* 45-54 (4)
* 55-64 (5)
* 65-74 (6)
* 75 or older (7)

Q67 What is your nationality?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q7 What is your highest educational or vocational qualification to date?

* GCSE/O-levels or equivalent (1)
* A-levels or equivalent (2)
* Degree (3)
* Postgraduate degree (4)
* Phd (5)
* Other vocational qualification (6)

Q8 What is your organisation's primary business activity?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q9 For how many years have you worked in a role which has required you to be involved in innovative type activities

* 1-3 years (1)
* 4-7years (2)
* 7-10 years (3)
* 10-15 years (4)
* 15 or more years (5)

**Innovation Project Type Measures**

Q10 **In the following section, we're going to ask you about an innovative strategy or project that you are currently working on.   We'd like you to focus on just one innovation initially, and subsequently, we'll ask you about any other innovations that you may be involved with.**

Q11 Please briefly describe something that you're working on that could be considered innovative (i.e. a new trading strategy).  If you are currently working on more than one innovative strategy or project, please tell us about the one which is currently the most challenging, the most problematic and/or most important to you.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q12 In reference to the innovative strategy/project that you have described above, to what extent does it fit into each of the following categorisations, where 1 = doesn't fit at all, and 10 = perfect fit

|  |  |
| --- | --- |
| An improved product or service (1) |  |
| A completely new product or service (2) |  |
| Significant changes to practices, structures or business aims within your organisation (3) |  |
| Other (4) |  |

*Display This Question:*

*If In reference to the innovative strategy/project that you have described above, to what extent doe... [ Other ] > 1*

Q13 If you answered 'other' to the previous question, please tell us a little more about how you would categorise your project.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Level of Investment Measures**

Q14 Please indicate below approximately what percentage of your time at work is usually spent working on the strategy/project that you have described above

|  |  |
| --- | --- |
| (1) |  |

Q15 What date did you start working on this innovation? Rough estimates are fine MM/YYYY

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q16 How important is the success of this innovation to YOU? 1 = not at all important, 10= extremely important

|  |  |
| --- | --- |
| (1) |  |

Q17 How important is the success of this innovation to your ORGANISATION? 1 = not at all important, 10= extremely important

|  |  |
| --- | --- |
| (1) |  |

Q18 Are you working alone or as part of a team on this innovation?

* Alone (1)
* Part of a team (2)

Q19 How many people are currently working on this innovative project/strategy with you?

* 1-5 (1)
* 6-10 (2)
* 11-20 (3)
* 20-30 (4)
* 30-50 (5)
* 50+ (6)

Q20 What is your role on this innovative project/strategy?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q21 Are you leading this innovative project/strategy?

* yes (1)
* No (2)

**Stage of Innovation Project Measure (not taken forward for use in analysis)**

Q22 At the moment, how much of your time spent on this innovation involves carrying out the following activities? 1 = no time at all, 10 = most of the time

|  |  |
| --- | --- |
| Generating new ideas (1) |  |
| Rallying support and/or resources needed for the innovation (2) |  |
| Developing the idea/innovation into a useable product/strategy/process/service (3) |  |
| Introducing the new strategy/product/process/service to its target users (4) |  |

**Innovation Setback / Failure Measure (single item)**

Q24 Which of the following most closely represents the status of the innovation at present?

* Successful/Completed (1)
* Close to successful completion (2)
* Progressing well, with work still to do (3)
* Progressing, but with setbacks (4)
* Progressing badly, with the possibility of termination/failure (5)
* Failed/Terminated (6)

**Innovation Project Setback Measure (Multi item)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree (1) | Disagree (2) | Somewhat Disagree (3) | Neither agree nor disagree (4) | Somewhat agree (5) | Agree (6) | Strongly Agree (7) |
| This project will come in on schedule (4) |  |  |  |  |  |  |  |
| This project will come in on budget (5) |  |  |  |  |  |  |  |
| The project that is being developed looks as if it will work (6) |  |  |  |  |  |  |  |
| The project will be used by its intended users/clients (16) |  |  |  |  |  |  |  |
| This project will directly benefit the intended users (7) |  |  |  |  |  |  |  |
| Given the problem for which it was developed, this projects seems to do the best job of solving that problem, i.e. it was the best choice among the set of alternatives. (8) |  |  |  |  |  |  |  |
| Clients/users directly affected by this project, will make use of it (9) |  |  |  |  |  |  |  |
| I am satisfied with the process by which this project is being completed (10) |  |  |  |  |  |  |  |
| I am confident that start-up problems will be minimal (11) |  |  |  |  |  |  |  |
| I am confident that the project will be readily accepted by it's intended users (12) |  |  |  |  |  |  |  |
| Use of this project will directly lead to improved or more effective decision making or performance for the users (13) |  |  |  |  |  |  |  |
| The project will have a positive impact on those who make use of it (14) |  |  |  |  |  |  |  |
| The results of this project represent a definite improvement in performance over the way users/clients used to perform these activities (15) |  |  |  |  |  |  |  |
| Knowing what you know now about the status of this project, we would have developed the project (26) |  |  |  |  |  |  |  |

**Question to ascertain whether participants were working on any other innovative projects. If answer >0 they were routed to Innovation Setbacks (other):**

Q26 In addition to the innovation that you have described above, how many other innovative projects/strategies are you currently working on?

* 0 (1)
* 1 (2)
* 2 (3)
* 3 (4)
* 4 (5)
* 5+ (6)

**Innovation Setbacks (Other)**

Q27 You have indicated that you are currently working on more than one innovative project or strategy.  So that we can get an idea of how well these innovations are progressing generally please could you respond to the statements below.  In responding, please think only about the projects/strategies other than the one that you have already told us about.  Again, the items below ask about 'projects', but please respond in reference to 'strategies' if this is more relevant to you.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree (1) | Disagree (2) | Somewhat Disagree (3) | Neither agree nor disagree (4) | Somewhat agree (5) | Agree (6) | Strongly Agree (7) |
| These projects will come in on schedule (4) |  |  |  |  |  |  |  |
| These projects will come in on budget (5) |  |  |  |  |  |  |  |
| The projects that are being developed look as if they will work (6) |  |  |  |  |  |  |  |
| These projects will be used by their intended users/clients (16) |  |  |  |  |  |  |  |
| These projects will directly benefit the intended users (7) |  |  |  |  |  |  |  |
| Given the problem for which they were developed, these projects seem to do the best job of solving that problem, i.e. they were the best choice among the set of alternatives. (8) |  |  |  |  |  |  |  |
| Clients/users directly affected by these projects, will make use of them (9) |  |  |  |  |  |  |  |
| I am satisfied with the process by which these projects are being completed (10) |  |  |  |  |  |  |  |
| I am confident that start-up problems will be minimal (11) |  |  |  |  |  |  |  |
| I am confident that these projects will be readily accepted by their intended users (12) |  |  |  |  |  |  |  |
| Use of these projects will directly lead to improved or more effective decision making or performance for the users (13) |  |  |  |  |  |  |  |
| These projects will have a positive impact on those who make use of it (14) |  |  |  |  |  |  |  |
| The results of these projects represent a definite improvement in performance over the way users/clients used to perform these activities (15) |  |  |  |  |  |  |  |

**Emotional response to project setbacks and failure measure (routed depending on response to innovation setbacks (single item)**

Q31 You indicated above that the innovation that you were working on experienced setbacks or was recently terminated.  How do your feelings now differ from how you felt prior to the termination of the innovation?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly Agree (1) | Agree (2) | Somewhat Agree (3) | Neither Agree nor Disagree (4) | Somewhat Disagree (5) | Disagree (6) | Strongly Disagree (7) |
| I have difficulty remembering information important for successfully completing tasks (1) |  |  |  |  |  |  |  |
| I have increased difficulty remembering things from past projects (2) |  |  |  |  |  |  |  |
| I more easily forget things at work (e.g. important names, telephone numbers) (3) |  |  |  |  |  |  |  |
| The failure is an ongoing source of disappointment (4) |  |  |  |  |  |  |  |
| I avoid closeness with my colleagues as a result of experiencing the failure (5) |  |  |  |  |  |  |  |
| I feel more detached from coworkers (6) |  |  |  |  |  |  |  |

**Learning from setbacks and failure measure**

Q33 Please review the following statements and rate how your personal views have changed during the period of time since the innovation was terminated.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly Agree (1) | Agree (2) | Somewhat Agree (3) | Neither Agree nor Disagree (4) | Somewhat Disagree (5) | Disagree (6) | Strongly Disagree (7) |
| I am more willing to help others deal with their failures (1) |  |  |  |  |  |  |  |
| I am more tolerant of others' shortcomings when it comes to projects/strategies (2) |  |  |  |  |  |  |  |
| I am a more forgiving person at work (3) |  |  |  |  |  |  |  |
| I have learned to better execute an innovative strategy (4) |  |  |  |  |  |  |  |
| I can more effectively run a project/innovation (5) |  |  |  |  |  |  |  |
| I have improved my ability to make important contributions to a project/innovation (6) |  |  |  |  |  |  |  |
| I can 'see' earlier the signs that a project/innovation is in trouble (7) |  |  |  |  |  |  |  |
| I now realise the mistakes that were made that led to the failure (8) |  |  |  |  |  |  |  |

**Well-being measure**

Q34 Thinking of the past two weeks, how much of the time has your job made you feel each of the following?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Never (1) | Occasionally (2) | Some of the time (3) | Much of the time (4) | Most of the time (5) | All of the time (6) |
| Tense (1) |  |  |  |  |  |  |
| Uneasy (2) |  |  |  |  |  |  |
| Worried (3) |  |  |  |  |  |  |
| Calm (4) |  |  |  |  |  |  |
| Contented (5) |  |  |  |  |  |  |
| Relaxed (6) |  |  |  |  |  |  |
| Depressed (7) |  |  |  |  |  |  |
| Gloomy (8) |  |  |  |  |  |  |
| Miserable (9) |  |  |  |  |  |  |
| Cheerful (10) |  |  |  |  |  |  |
| Enthusiastic (11) |  |  |  |  |  |  |
| Optimistic (12) |  |  |  |  |  |  |

**Motivation measure (identified regulation & intrinsic motivation highlighted)**

Q35 To what extent do you agree with the following statements about why you put effort into your current job?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not at all (1) | Very little (2) | A little (3) | Moderately (4) | Strongly (5) | Very Strongly (6) | Completely (7) |
| I don't, because I really feel that i'm wasting my time at work (1) |  |  |  |  |  |  |  |
| I do little because I don't think this work is worth putting efforts into (2) |  |  |  |  |  |  |  |
| I don't know why I'm doing this job, it's pointless work (3) |  |  |  |  |  |  |  |
| To get other's approval (e.g. supervisor, colleagues, family, clients…) (4) |  |  |  |  |  |  |  |
| Because others will respect me more (e.g. supervisor, colleagues, family, clients…) (5) |  |  |  |  |  |  |  |
| To avoid being criticized by others (e.g. supervisor, colleagues, family, clients…) (6) |  |  |  |  |  |  |  |
| Because others will reward me financially only if i put enough effort into my job (e.g. employer, supervisor…) (7) |  |  |  |  |  |  |  |
| Because others offer me greater job security if I put enough effort into my job (e.g. employer, supervisor…) (8) |  |  |  |  |  |  |  |
| Because I risk losing my job if I don't put enough effort into it (9) |  |  |  |  |  |  |  |
| Because I have to prove to myself that I can (10) |  |  |  |  |  |  |  |
| Because it makes me feel proud of myself (11) |  |  |  |  |  |  |  |
| Because otherwise I will feel ashamed of myself (12) |  |  |  |  |  |  |  |
| Because otherwise I will feel bad about myself (13) |  |  |  |  |  |  |  |
| Because I personally consider it important to put efforts into this job (14) |  |  |  |  |  |  |  |
| Because putting efforts into this job aligns with my personal values (15) |  |  |  |  |  |  |  |
| Because putting efforts into this job has personal significance to me (16) |  |  |  |  |  |  |  |
| Because I have fun doing my job (17) |  |  |  |  |  |  |  |
| Because what I do in my job is exciting (18) |  |  |  |  |  |  |  |
| Because the work i do is interesting (19) |  |  |  |  |  |  |  |

**Resilience Measure**

Q36 To what extent do you agree with the following statements?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly disagree (1) | Disagree (2) | Neutral (3) | Agree (4) | Strongly Agree (5) |
| I tend to bounce back quickly after hard times (1) |  |  |  |  |  |
| I have a hard time making it through stressful events (2) |  |  |  |  |  |
| It does not take me long to recover from a stressful event (3) |  |  |  |  |  |
| It is hard for me to snap back when something bad happens (4) |  |  |  |  |  |
| I usually come through difficult times with little trouble (5) |  |  |  |  |  |
| I tend to take a long time to get over set-backs in my life (6) |  |  |  |  |  |

**Normalization of Failure Measure**

Q37 To what extent do you agree with the following statements about how your organisation responds to project failure?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree (1) | Disagree (2) | Somewhat Disagree (3) | Neither agree nor disagree (4) | Somewhat agree (5) | Agree (6) | Strongly Agree (7) |
| Organizational communications signal that failure is considered an ordinary occurrence (1) |  |  |  |  |  |  |  |
| The organisation takes failure in its stride (2) |  |  |  |  |  |  |  |
| As far as the organisation is concerned, failure is not seen as anything extra-ordinary (3) |  |  |  |  |  |  |  |

**Innovative Work Behaviour Measure**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Never (1) | Rarely (2) | Sometimes (3) | Occasionally (4) | Often (5) | Usually (6) | Always (7) |
| Creating new ideas for difficult issues (1) |  |  |  |  |  |  |  |
| Searching out new working methods, techniques or instruments (2) |  |  |  |  |  |  |  |
| Generating original solutions for problems (3) |  |  |  |  |  |  |  |
| Mobilizing support for innovative ideas (4) |  |  |  |  |  |  |  |
| Acquiring approval for innovative ideas (5) |  |  |  |  |  |  |  |
| Making important organisational members enthusiastic for innovative ideas (6) |  |  |  |  |  |  |  |
| Transforming innovative ideas into useful applications (7) |  |  |  |  |  |  |  |
| Introducing innovative ideas into the work environment (8) |  |  |  |  |  |  |  |
| Evaluating the utility of innovative ideas (9) |  |  |  |  |  |  |  |

**Supervisor Feedback Measure**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly disagree (1) | Disagree (2) | Somewhat disagree (3) | Neither agree nor disagree (4) | Somewhat agree (5) | Agree (6) | Strongly agree (7) |
| My supervisor is generally familiar with my performance on the job (1) |  |  |  |  |  |  |  |
| My supervisor is fair when evaluating my job performance (4) |  |  |  |  |  |  |  |
| I have confidence in the feedback my supervisor gives me (5) |  |  |  |  |  |  |  |
| My supervisor gives me useful feedback about my job performance (6) |  |  |  |  |  |  |  |
| The performance feedback I receive from my supervisor is helpful (7) |  |  |  |  |  |  |  |
| I value the feedback I receive from my supervisor (8) |  |  |  |  |  |  |  |
| My supervisor is supportive when giving me feedback about my job performance (11) |  |  |  |  |  |  |  |
| When my supervisor gives me performance feedback, he or she is considerate of my feelings (12) |  |  |  |  |  |  |  |
| My supervisor is tactful when giving me performance feedback (15) |  |  |  |  |  |  |  |
| When I do a good job at work, my supervisor praises my performance (16) |  |  |  |  |  |  |  |
| My supervisor generally lets me know when I do a good job at work (18) |  |  |  |  |  |  |  |
| I frequently receive positive feedback from my supervisor (19) |  |  |  |  |  |  |  |
| My supervisor tells me when my work performance does not meet organisational standards (21) |  |  |  |  |  |  |  |
| On those occasions when my job performance falls below what is expected, my supervisor lets me know (22) |  |  |  |  |  |  |  |
| On those occasions when I make a mistake at work, my supervisor tells me (23) |  |  |  |  |  |  |  |

## Ethics Approval Form



Royal Holloway Ethics Approval Form

Please complete all parts of the form and the checklist. Please append consent form(s) and information sheets and any other materials in support of your application.

If relevant, please also append the appropriate department-specific annex.

**All applicants should refer to the Royal Holloway, University of London Research Ethics Guidelines document.**

Check one box:

STAFF Project  ✓POSTGRADUATE Project  UNDERGRADUATE Project

Start date \_\_\_\_1/11/2014\_\_\_\_Duration\_\_6-8 months\_Funding Agency\_N/a\_\_\_\_\_\_\_

Title of project : Exploring the outcomes of innovation: The relationship between innovation failure and the emotions, well-being and motivation of innovators

Name of Researcher(s) : Amy Redmond

Name of Supervisor (Student Project) : Neil Conway Date: 09/10/2014

Contact e-mail address : amy.redmond.2013@rhul.ac.uk

Does your project involved NHS patients, staff and facilities? Yes No ✓

*If your project* ***only*** *involves NHS patients, staff and facilities, you do not need to complete the rest of this form. Please send the above information, along with a copy of your initial NHS ethics application to your departmental ethics coordinator and the college ethics committee secretary. Please provide any interim communication about amendments required. Final approval by the college can only be provided once evidence of NHS approval has been provided. The researcher should provide an electronic version of the final approved NHS application, with all its attachments and a photocopy/scanned copy of the final letter of approval from the NHS ethics committee.*

**Section 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | YES | NO | N/A |
| 1 | Will you describe the main experimental procedures to participants in advance, so that they are informed about what to expect? | ✓ |  |  |
| 2 | Will you tell participants that their participation is voluntary? | ✓ |  |  |
| 3 | Will you obtain written consent for participation? | ✓ |  |  |
| 4 | Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)? | ✓ |  |  |
| 5 | If the research is observational, will you ask participants for their consent to being observed? |  |  | ✓ |
| 6 | Will you tell participants that they may withdraw from the research at any time and for any reason? | ✓ |  |  |
| 7 | With questionnaires, will you give participants the option of omitting questions they do not want to answer? | ✓ |  |  |
| 8 | Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs? | ✓ |  |  |
| 9 | Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)? | ✓ |  |  |

If you have ticked **‘NO’** to any of Q1 – 9, please give an explanation in the box below (expand as necessary):

**Section 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | YES | NO | N/A |
| 10 | Will subjects/participants be paid? |  | ✓ |  |
| 11 | Is electrical or other equipment to be used with subjects/participants? |  | ✓ |  |
| 12 | Are there any financial or other interests to the researcher(s) or department arising from this study? |  | ✓ |  |
| 13 | Will your project involve deliberately misleading subjects/participants in any way? |  | ✓ |  |
| 14 | Is there any realistic risk of any *subjects/participants* experiencing either physical or psychological distress or discomfort? If yes, describe any measures to avoid/minimise harm to subjects in the box below. |  | ✓ |  |
| 15 | Is there any realistic risk of *researchers* experiencing either physical or psychological distress or discomfort? |  | ✓ |  |
| 16 | Will the project require approval by any ethics committee outside Royal Holloway (eg NHS NRES committee)? |  | ✓ |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 17 | Do subjects/participants fall into any of the following special groups?  (see attached guidelines) | a) Children (under 16) |  | ✓ |  |
| b) Those aged 16-18 |  | ✓ |  |
| b) People with learning or communication difficulties |  | ✓ |  |
| c) Patients |  | ✓ |  |
| d) People in custody |  | ✓ |  |
|  |  | e) People engaged in illegal activities. (e.g. drug taking) |  | ✓ |  |

If you answered ‘yes’ to any of questions 10-17, please provide full details in the box below (expand as necessary).

\*N.B in relation to Q13, it was not my intention to inform participants that one of the aims of my research is the outcomes of innovation *failure*, but planned instead to explain that I’m interested in both successful and unsuccesful innovations. I make no assumptions during data collection about how successful participant’s innovative projects are expected to be, and believe that if I include in my information sheet that I’m interested in failed innovations specifically, this could both bias results and may cause harm to participants as they may wrongly believe that their innovations are expected to fail. I don’t think that the description of the research contained within the information sheet is deceitful as I am indeed interested in both successful and unsuccessful outcomes and make no predictions about the outcomes of individual projects.**Section 3**

Please provide a description of the project using the following headings ***Expand this section as necessary***

**1. Title of Project:** Exploring the outcomes of innovation: The relationship between innovation failure and emotion, well-being and motivation to innovate

**2. Purpose of Project:** the purpose of this project is to understand how the outcomes of innovative projects affect the well-being, innovative work behaviour and motivation of innovators. The main focus of the research is on the outcomes of ‘failed’ innovations. However this research also aims to understand how involvement in innovative projects generally may impact innovators, and therefore, innovative projects with outcomes of all types will be included in this research.

**3. Methods and measurements to be used** (widely used questionnaires need not be appended, but previously unpublished questionnaires should be submitted for approval). Please provide a full list.

The survey measures are attached. Most measures are taken from pre-existing surveys, with some self-designed items.

**4. Participants: recruitment methods, number, age, gender, exclusion/inclusion criteria**

**Recruitment Methods:** Participants will be recruited from a number of different organisations from which I have obtained agreement to allow me access to their employees. I have decided to gather data from a number of different organisations for two reasons. Firstly, I’m interested in looking at innovations of all types, product, process, marketing, radical, and incremental, and therefore gathering data from a range of industries is important to achieve this goal. Secondly, from a practical point of view, I need lots of participants! I need to ensure that my data contains instances of a range of innovative outcomes, successful, failed, neutral, and since it will be impossible to predict the outcomes of projects at the start of data collection, I will need to ensure that I have plenty of participants from the outset.

Participating organisation types are as follows:

* 2 IT companies, which specialise in designing innovative IT solutions for clients
* 1 Finance company, which designs and creates new trading platforms
* 1 financial exchange company, which is involved in a number of innovative projects including technical innovations and process innovations
* 1 product innovation company – specialising in innovating and taking to market electrical components
* 1 phone app developer – developing music related apps for phones

**Number of participants:** I am hoping to get at least 400 survey respondents, and 50 interviewees.

**Age:** Range of ages from 18+

Gender: Both male and female

**Exclusion/Inclusion criteria:** The only inclusion criteria is that participants are currently engaged in some form of innovative project

**5. Consent and participant information arrangements** (see checklist below). Include description of procedure for obtaining second consent where deception was involved (see guidelines).

An information sheet will be provided to all participants (attached). Further information about the research will be provided at the start of the survey, and the first survey question states: “I have read and understood the above information relating to this study and of my own free will, give my consent to participate in this research

* Yes (1)
* No (2)”

Signed consent will be obtained from interview participants prior to the start of interviews.

**6. Nature of data to be collected** (including a description of any sensitive data)

Nature of the data to be collected is as follows:

* demographics: age, gender, main business activity, tenure, education
* information about an innovative project: description of project, date started, type of innovation, reasons for the innovation, percieved importance of project, progress and current performance of the project
* Well-being
* Motivation
* Innovative work behaviour
* Organisational normalisation of failure
* Resilience
* Work Demands
* Supervisory feedback

(It is noted that well-being, motivation, resilience and supervisory feedback are potentially sensitive. These constructs are measured using pre designed and validated instruments and confidentiality, anonymity is assured)

**7. Possible benefits to subjects/participants of taking part in this research**

Individuals will be offered feedback about findings, and participating organisations will also be offered feedback relating to the research, but ensuring that individual respondents cannot be identified.

**8.** **Description of procedure for obtaining parental consent for research involving participants aged under 16 (or 18, if relevant). An opt-out only method will require a strong justification (see attached guidance).**

N/A

**9. Data security and destruction and data protection procedures.**

Survey respondents will be asked to provided an email address purely for the purposes of matching longitudinal responses. Once all responses have been received, the email addresses will be deleted and matching data will be identified with an allocated number. Survey responses will be collected through Qualtrics, which provides a secure means of collecting data. Survey responses are password protected and can only be accessed by me. All data is anonymised as soon as responses have been matched.

Qualitative interviews will be recorded but no names will be recorded. Recordings will be deleted as soon as they have been transcribed, and any details which would make individuals identifiable (organisation names, teams etc) will be altered in the transcription. Interview transcripts will be stored on a password protected computer.

**Section 4: Applicant’s Statement**

I am familiar with the RHUL and other appropriate subject-specific guidelines and have discussed them with the other researchers involved in the project.

I undertake to inform the Committee of any changes to the protocol or the staffing of this project

Applicant(s) Amy Redmond

*UG or PG Researcher(s) or research staff. If applicable:*

Signed: ………………..…………… Print Name: ………………………………Date: …………

Signed: ………………..…………… Print Name: ………………………………Date: …………

Signed: ………………..…………… Print Name: ………………………………Date: …………

Signed: ………………..…………… Print Name: ………………………………Date: …………

*Lead Researcher or Supervisor:*

Signed: ………………..…………… Print Name: ………………………………Date: …………

**Head of Department (or designate)** statement ofsupport (if project is to be forwarded to the College Ethics Committee)

Section 5: STATEMENT OF ETHICAL APPROVAL

Applicant:……………………………………………………………………………………………

Department:…………………………………………………………………………………………

Title of project:……………………………………………………………………………………..

Start Date:…………………………………………………………………..

***Please complete the appropriate section below:***

1. This project has been considered and has been approved by the Department of………….. for …...….. months.

Signed: …………………………………… Print Name: ………………..……………………… Date: ………..……

(Chair, Departmental Ethics Committee)

2. This project has been considered by the Royal Holloway, University of London Research Ethics Committee and is now approved for …...….. months.

Signed: …………………………………… Print Name: ………………..………………………

Date: ………..……

(Chair, RHUL Ethics Committee)

3. This project has been approved by Chair’s action and is authorised for …...….. months.

Signed: …………………………………… Print Name: ………………..……………………… Date: ………..……

(Chair, RHUL Ethics Committee)

## Research information sheet and informed consent

**Research Information Sheet**

**Researcher:** Amy Redmond, [amy.redmond.2013@rhul.ac.uk](mailto:amy.redmond.2013@rhul.ac.uk), 07775828507

Research Supervisor: Neil Conway, [neil.conway@rhul.ac.uk](mailto:neil.conway@rhul.ac.uk),

The following aims to provide you with information about this research. Thank you for taking the time to read it and for considering participating in this study.

My name is Amy Redmond and I’m a PhD researcher at Royal Holloway, University of London.

The aim of this research is to build a clearer understanding of the innovation process, and in particular to explore the outcomes of both successful and unsuccessful innovations from the point of view of those involved in the innovation process.  By innovation, I mean something that is new and expected to be of benefit to your organisation, to the wider market in which you operate or to the world.  An innovation can be a new product, process, service or marketing technique.  Changes big and small to old products, processes, services or marketing techniques are also considered innovations. Previous innovation research has tended to focus on innovation outcomes in black and white, profit versus loss terms, but this research is important and unique because it aims to build a clearer understanding of what you experience over the course of an innovative project and how this may impact your well-being, motivation and the way in which you innovate in the future.

My Research

Innovation is considered fundamental to the success of organizations. However, the path to innovative success is rarely straightforward. Innovative projects are plagued by uncertainty, highly variable and risky returns, and for innovators, can be a challenging and often stressful process. Given the importance of innovation it is surprising how little is understood about the outcomes of innovation for innovators. This research aims to contribute to this field by exploring the relationships between innovation outcomes (i.e. success vs failure) and the well-being and motivation of innovators. By researching a number of moderating factors such as resilience, feedback and learning from failure, I also hope to provide some answers to the question of why some innovators are more able than others to recover from setbacks and failures in the innovative process, thereby providing important new knowledge to this field.

Who can participate?

Anyone who is working on a project that could be considered innovative.  By innovative, I mean a project that aims to produce something new which is intended to benefit your organization.  I'm interested in gathering data on a wide range of innovative projects, from major new products, processes or techniques, to smaller changes to existing products, processes or techniques.  So, anyone who is working on a project that aims to introduce something new and beneficial to your organization could be involved in this research.

What would participation involve?

Participants would be asked to complete a survey at three different points in time over the next few months.  Those who agree to participate would be sent a link to the survey to complete online.  Each survey should take no longer than 15 minutes to complete.  A small number of participants may also be invited to be interviewed by me about their innovative experiences.  All information provided by participants is entirely confidential.  No individuals or individual organizations will be identified in the write up of these results.

You are hereby invited to participate in this study.

Should you agree to participate, you will be asked to complete 2 or 3 online questionnaires over the next few weeks or months.

The first questionnaire is available now and is accessible via the link which is included in this email. Links to the second and third questionnaires will be sent to you in a separate email at a later date.

This questionnaire should take no longer than 15-20 minutes to complete.

Your participation is entirely voluntary. You may withdraw from this study at any time without giving a reason.

Any information that you provide is confidential. Your anonymity is guaranteed. Although we ask you to provide your email address, this is only so that we can match your response to this survey to subsequent surveys that you may complete at a later date. Once we have received all of your responses, your email address will be deleted, as will any information that could make individual respondents identifiable.

You do not have to answer every question, and may skip any that you would prefer not to answer.

If you would like to participate in this research, please click on the link in the email, or copy and paste the link below into your internet browser.

Thank you for your time. Your participation is very much appreciated,

Amy Redmond

**Consent Form:**

**Name of Study:** The outcomes of innovation: Exploring how involvement in innovative projects affects innovator’s well-being and motivation to innovate

**Researcher:** Amy Redmond, [amy.redmond.2013@rhul.ac.uk](mailto:amy.redmond.2013@rhul.ac.uk), 07775828507

Research Supervisor: Neil Conway, [neil.conway@rhul.ac.uk](mailto:neil.conway@rhul.ac.uk),

Please click on the appropriate response:

I have read the information sheet about this study (Yes/No)

I have had the opportunity to ask questions (yes/No)

I have received satisfactory answers to any questions (Yes/No)

I understand that I am free to withdraw from the study at any time, without giving a reason (Yes/No)

I agree to participate in this study (Yes/No)

Signed…………….

Name………………..

Date…………………..

N.b. this consent form will be stored separately from the responses that you provide.

## Qualitative interview schedule

**Qualitative Interview Schedule**

**Overview of Research and Ethics:**

The aim of this research is to build a clearer understanding of the innovation process, and in particular to explore the outcomes of both successful, challenging and unsuccessful innovations from the point of view of those involved in the innovation process.  By innovation, I mean something that is new and expected to be of benefit to your organisation, to the wider market in which you operate or to the world.  An innovation can be a new strategy, product, process, service or marketing technique.  Changes big and small to old strategies, products, etc,  are also considered innovations.  If it’s new, and expected to bring about benefits, it's innovative.

This interview aims to explore the themes of this research by asking you a number of questions about an innovative project that you are currently working on. The interview is expected to last between 30 and 45 minutes.

Please be assured that all responses are absolutely anonymous and confidential.  Your responses will be reported in aggregate form and as overarching themes. You have the right to withdraw from this study at any time.

Please confirm that you understand the aims of the research and the research process, and confirm that you agree to participate…

Yes

No

Can you start by telling me a bit about the project (name project) that your currently working on?

-when did you start working on it

- what are the overall aims of this project/what do you and your company hope to achieve as a result of this project

- how is it progressing so far/is it going according to plan

\*assess level of investment – lead/stage/perceived importance

What are the main achievements of the project to date?

* how did you feel about this (achievement)
* did progress remain as good following this achievement/did you remain as motivated as you were before
* How did this achievement make you feel

Do you have any concerns about the project at present?

How would you define ‘setbacks’ in the context of innovative projects?

Have you faced any setbacks or problems during the course of this project?

* have you managed to overcome them

how did you feel during this set back/problem (probe well-being, innovative work behavior, motivation)

How would you define a ‘failure’ in the context of innovative projects?

What would you consider to be the main differences between setbacks and failure in innovation?

Have you experienced any innovative failures in the past?

* how did you feel following this failure? (probe well-being, innovative work behavior, motivation)

What have been the most difficult things that you have faced during an innovative project?

What, in your opinion, helped you to overcome these issues?

Probe:

Resilience

Normalization of failure

Supervisor feedback

Level of investment

Do you consider yourself to be a resilient person?

How has this helped/hindered your innovative efforts?

How does your organization deal with failure?

What effect has this approach had on the way in which you work?

What kind of feedback do you receive from your supervisor with regards your performance on this innovative project?

* Is this feedback helpful?

## Notes on the fieldwork process

The section below presents a summary of how the fieldwork conducted during this research unfolded:

### The search for participant organizations

One of the greatest challenges of the current research was to obtain the participation of innovative organisations and innovators in order to gather relevant data. This process lasted several months. In order to gather relevant data, I needed to gain the participation of numerous employees (my aim was 800 at time one) who were currently working on innovative projects.

Through my extended network, I organised calls and meetings in a number of organisations which were potentially interested in participating. Ideally, I wanted to gather data from a range of industries given my interests in innovation as a process which can benefit all organisations and not just those with a technical focus. With this in mind my meetings included both public and private sector organisations. Following initial meetings it was clear that the main challenges were:

* Time and workload: people working innovatively are inherently busy, and there was some reluctance within some organisations to add to their employees’ already burdensome workloads
* Intellectual property: There were some concerns around the innovative nature of the research, and that involvement would risk exposure of proprietarty information.

To overcome these issues, I gave assurances that participants would only be asked to complete two surveys at two time points, lasting 15 minutes each (with the option of participation in interviews at a later date). I also assured organisations of the measures taken to assure confidentiality and anonymity, and that proprietary information would not be exposed. I signed Non-Disclosure Agreements with some of the participating organisations. I also offered free feedback to participating organisations based on the data that I collected, to ensure that they received something in return for their participation.

This process secured the participation of six different organisations. Three organizations specialized in financial innovations, another two in technological innovation and one smaller organization specializing in research and consultancy. Unfortunately, the public sector organizations that I approached could not overcome the workload issue, and given the numerous surveys that staff had already been asked to complete in recent months, they declined to participate.

### The process of gathering data

Within each participant organisation I had a main point of contact. The decision was taken that the easiest approach would be for the contacts within each organisation to send out invitations to participate directly from their own email accounts. I supplied the invitation to participate copy to be contained within the email, and fully briefed each contact on the type of partipants that I was ideally seeking, namely that they should be currently working on an innovative project either as the project lead or as part of a wider innovation team. These details were re-iterated in the invitation to participate email. Follow-up email reminders were also sent to potential participants via the organizational contacts.

This process resulted in 651 useable responses at time one, and 401 useable responses at time two.

Further details of the fieldwork process can be found in Chapter 6 above.