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Employee innovative behavior in public sector services

PhD Innovation in Services in the Public and Private Sectors (INSEPP)
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"The important thing is not to stop questioning. Curiosity has its own reason for existence. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery each day."

Einstein (1955)

Dedication

To my late grandfather Gerosome Maswere! For the blessing of embracing this world for 102 years, and for your positive outlook on the mysteries of this world. You will be dearly missed!

Abstract

Studies of employee innovative behavior have predominantly focused on private sector employees and their innovative capabilities; however, there is little understanding of its value in the public sector. Nevertheless, some empirical studies explore the factors that foster such behavior and its consequences in public sector services (PSSs).

The overall aim of this dissertation is to contribute new knowledge and understanding of employee innovative behavior in PSSs. This dissertation and all four of the appended published papers conceptualize and empirically investigate the fostering factors and consequences of employee innovative behavior. All four papers employ online surveys and questionnaires to gather data, develop empirical models, and test the proposed relationships using the partial least squares structural equation modeling (PLS-SEM) statistical technique with Stata and SmartPLS statistical programs. This dissertation and the papers acquired empirical data from three branches of the public sector: transport, higher education, and health.

This dissertation contributes to the research literature in three ways. First, it extends our current understanding of the three levels of fostering factors — organizational, environmental, and individual—on employee innovative behavior in PSSs by demonstrating the key strategic drivers of successful innovations in the currently changing economic environment. Second, it adds new knowledge about the consequences of employee innovative behavior by revealing the importance of organizational commitment for retaining innovative employees. Third, it contributes knowledge on the benefits for this topic of using more advanced quantitative research techniques. This dissertation reveals the importance of public managers possessing leadership qualities and acquiring skills to encourage, cultivate, and nurture employee innovative behavior. Moreover, this dissertation reveals the significant role of policymakers in acquiring knowledge to improve the guidelines and regulations that promote and enable

innovation in work environments. Furthermore, it shows the benefits of employing complex research methods such as PLS-SEM in social science research and advances the scholarly debate on employing such techniques. Overall, the dissertation contributes to the ongoing academic conversation on the vital role of employee innovative behavior in PSSs.

Sammendrag

Tidligere forskning på ansattes innovative adferd har i stor grad fokusert på ansatte innen privat sektor. Dette betyr at det er begrenset med forskning som har studert hvilke faktorer som fremmer ansattes innovative adferd innen offentlig tjenesteyting.

Målsettingen med denne avhandlingen er å bidra til ny kunnskap om innovativ adferd hos ansatte innen offentlig tjenesteyting. Avhandlingen, som består av fire (publiserte) artikler, har studert hva som fremmer samt effekten av innovativ adferd blant ansatte innen offentlig tjenesteyting. Datagrunnlaget for avhandlingen ble samlet inn ved hjelp av elektroniske spørreskjema. De foreslåtte sammenhengene i de fire artiklene ble testet ut ved bruk av PLS-SEM analyser hvor statistikkprogrammene Stata og SmartPLS ble benyttet. Data ble samlet inn fra i alt tre kontekster innen offentlig tjenesteyting, henholdsvis: transport, høyere utdanning og helsevesenet.

Denne avhandlingen bidrar med ny kunnskap om ansattes innovative adferd innen offentlig tjenesteyting på tre måter. For det første utvider den vår nåværende forståelse av faktorer som fremmer innovativ adferd ved å studere dette på tre ulike nivåer, henholdsvis: 1) organisasjonsnivå, 2) omgivelsesnivå og 3) individuelt nivå. For det andre bidrar avhandlingen til å avdekke hvilken effekt offentlig ansattes innovative adferd kan medføre når det gjelder organisasjonsmessig forpliktelse. For det tredje bidrar avhandlingen med ny kunnskap ved å ta i bruk mer avanserte kvantitative analyseteknikker i studier av ansattes innovative adferd innen offentlig tjenesteyting.

Avhandlingen viser viktigheten av at offentlige ledere har gode lederskapsegenskaper og videre at de har evnen til å forstå hva som kan fremme og kultivere ansattes innovative adferd. Avhandlingen viser også den viktige rollen beslutningstakere har i å skaffe seg kunnskap om,

samt oppfordre til innovasjon og innovativ aktivitet gjennom forbedring av retningslinjer og lovverk som legger til rette for et arbeidsmiljø hvor innovativ adferd er mulig. Videre viser avhandlingen fordelene av å bruke komplekse forskningsmetoder, som PLS-SEM, i samfunnsvitenskapelige studier, og bidrar dermed til den akademiske debatten om bruk av avanserte forskningsmetoder i studier av ansattes innovative adferd i offentlig tjenesteyting. Overordnet bidrar avhandlingen til den pågående debatten og diskursen knyttet til viktigheten av ansattes innovative adferd i offentlig tjenesteyting.

Resumen

Las investigaciones anteriores sobre el comportamiento innovador de los empleados se han centrado principalmente en los empleados del sector privado y sus capacidades innovadoras, lo que reduce nuestra comprensión del valor del comportamiento innovador de los empleados en el sector público. Sin embargo, esa investigación escasa se centra en el estudio empírico de los factores impulsores y las consecuencias del comportamiento innovador de los empleados en los servicios públicos (SPs).

El objetivo general de esta tesis es contribuir con nuevos conocimientos y comprensión sobre el comportamiento innovador de los empleados en los SPs. Esta tesis y sus cuatro artículos adjuntos (publicados) conceptualizaron e investigaron empíricamente los factores de fomento y las consecuencias del comportamiento innovador de los empleados en los SPs. Específicamente, los cuatro artículos adjuntos se centraron en fomentar los factores del comportamiento innovador de los empleados en los SPs. Además, el Artículo III reveló las consecuencias del comportamiento innovador de los empleados en los PSS. Al recopilar los datos empíricos, los cuatro artículos adjuntos emplearon encuestas y cuestionarios en línea. Las relaciones propuestas en los cuatro artículos adjuntos de esta tesis han desarrollado modelos empíricos y probado la relación propuesta utilizando la técnica estadística de modelado de ecuaciones estructurales mínimas parciales (PLS-SEM) para el análisis, con la ayuda de los programas estadísticos Stata y SmartPLS. Esta tesis y sus cuatro artículos adjuntos obtuvieron los datos empíricos de tres distintos sectores englobados dentro de los SPs; sector del transporte público, sector de la educación superior pública y sector de la salud pública.

Esta tesis aporta nuevos conocimientos y comprensión sobre la investigación del comportamiento innovador de los empleados en los SPs. Específicamente, esto se logra de tres

formas. Primero, amplía nuestro conocimiento actual sobre los tres niveles de factores de fomento -i), nivel organizacional, ii), nivel ambiental y, iii), nivel individual- del comportamiento innovador de los empleados en los SPs, mediante la revelación de varios factores de fomento como ingredientes estratégicos clave en el impulso de innovaciones exitosas dentro del actual y cambiante entorno económico. En segundo lugar, agrega nuevos conocimientos sobre las consecuencias del comportamiento innovador de los empleados en los SPs, al revelar el compromiso organizacional como un resultado importante en la retención de empleados innovadores. En tercer lugar, aporta nuevos conocimientos sobre los beneficios de utilizar técnicas de investigación cuantitativa más avanzadas en la investigación del comportamiento innovador de los empleados en los SPs. Esta tesis revela la importancia de que los gerentes públicos posean cualidades de liderazgo y adquieran habilidades, lo que fomenta, cultiva y nutre el comportamiento innovador de los empleados en las organizaciones de los SPs. Además, esta tesis revela el importante papel desempeñado por los responsables de la formulación de políticas en la adquisición de conocimientos para mejorar las directrices y normativas que promueven y habilitan un entorno de trabajo que acoge la innovación y las actividades innovadoras. Adicionalmente, esta tesis revela los beneficios de emplear métodos de investigación complejos, como PLS-SEM, en la investigación de las ciencias sociales, y promueve el debate académico sobre el empleo de técnicas de investigación avanzadas en el estudio del comportamiento innovador de los empleados en los SPs. En general, la tesis contribuye al debate y al diálogo en curso sobre el papel vital del comportamiento innovador de los empleados en los SPs.

Resum

Les investigacions anteriors sobre el comportament innovador dels treballadors s'han centrat principalment en els treballadors del sector privat i les seves capacitats innovadores, reduint la nostra comprensió del valor del comportament innovador dels treballadors en el sector públic. Tanmateix, aquesta investigació es centra en l'estudi empíric dels factors impulsors i les conseqüències del comportament innovador dels treballadors en els serveis públics (SPs).

L'objectiu general d'aquesta tesi és contribuir amb nous coneixements i comprensió sobre el comportament innovador dels treballadors dels SPs. Aquesta tesi i els seus quatre articles adjunts (publicats) van conceptualitzar i investigar empíricament els factors de foment i les conseqüències del comportament innovador dels treballadors dels SPs. Específicament, els quatre articles adjunts es van centrar a fomentar els factors del comportament innovador dels treballadors dels SPs. A més, l'Article III va revelar les conseqüències del comportament innovador dels treballadors dels SPs. En recopilar les dades empíriques, els quatre articles adjunts van fer servir enquestes i qüestionaris en línia. Les relacions proposades als quatre articles adjunts d'aquesta tesi han desenvolupat models empírics i han provat la relació proposada utilitzant la tècnica estadística de modelatge d'equacions estructurals mínimes parcials (PLS-SEM) per a l'anàlisi, amb l'ajuda dels programes estadístics Stata i SmartPLS . Aquesta tesi i els seus quatre articles adjunts van obtenir les dades empíriques de tres diferents sectors englobats dins dels SPs; sector del transport públic, sector de l'educació superior pública i sector de la salut pública.

Aquesta tesi aporta nous coneixements i comprensió sobre la investigació del comportament innovador dels treballadors dels SPs. Específicament, això s'aconsegueix de tres maneres. Primer, amplia el nostre coneixement actual sobre els tres nivells de factors de foment -i), nivell organitzatiu, ii), nivell ambiental i, iii), nivell individual- del comportament innovador dels

treballadors dels SPs, mitjançant la revelació de diversos factors de foment com a ingredients estratègics clau en l'impuls d'innovacions exitoses dins de l'actual i canviant entorn econòmic. En segon lloc, afegeix nous coneixements sobre les conseqüències del comportament innovador dels treballadors dels SPs, en revelar el compromís organitzatiu com un resultat important en la retenció de treballadors innovadors. En tercer lloc, aporta nous coneixements sobre els beneficis de l'ús de tècniques de recerca quantitativa més avançades en la recerca del comportament innovador dels treballadors dels SPs. Aquesta tesi revela la importància que els gerents públics posseeixin qualitats de lideratge i adquireixin habilitats, cosa que fomenta, cultiva i nodreix el comportament innovador dels treballadors dins de les organitzacions dels SPs. A més, aquesta tesi revela l'important paper exercit pels responsables de la formulació de polítiques en l'adquisició de coneixements per millorar les directrius i normatives que promouen i habiliten un entorn de treball que aculli la innovació i les activitats innovadores. Addicionalment, aquesta tesi mostra els beneficis de fer servir mètodes de recerca complexos, com PLS-SEM, en la recerca de les ciències socials, i promou el debat acadèmic sobre l'ús de tècniques de recerca avançades en l'estudi del comportament innovador dels treballadors dels SPs. En general, la tesi contribueix al debat i al diàleg en curs sobre el paper clau del comportament innovador dels treballadors dels SPs.

Preface

As science has become an increasingly important part of our lives today, social, ethical, and political questions pertaining to science are increasing (Bird, 2007). Some issues concern me as a scientist, but also affect the value and effects of science as an institution and practice.

The ethical values pertaining to a scientist are an important responsibility to which I as a scientist have psychologically subscribed. This means that I need an open mind about the knowledge I have acquired or will acquire. Therefore, I must value not only curiosity and free inquiry, but most importantly also honesty in advancing theoretical knowledge and social science (Gale, 1984). Similarly, Bird (2007) notes that sharing information should be encouraged and peer review constructive critique welcomed. I believe that by doing so, knowledge can be advanced.

Now, as knowledge is shared, responsibility for the value and effects of science institutions and practices follow. In this dissertation, the goal is to improve quality of life through social science. As beautifully noted by Machamer (1998, p. 10), "science is a human activity, and as such has ethical and social implications." My only hope is that the methodological foundations of my dissertation can inspire you to seek new knowledge.

Acknowledgments

In the fall of 2010, I journeyed to Lillehammer, Norway, from Oslo, to embark on a voyage that today I couldn't have foreseen. In the following years, I would come to be inspired beyond words. In the Spring of 2013, I had already made a life changing decision, that one day I would become a professor in higher education. In the Fall of 2017, I got the opportunity from Inland Norway University of Applied Science (INN) to start my PhD journey, bringing me closer to my main goal. Today, I am but grateful to all that have inspired and motivated me along the way in the continuous pursue of my dream that one day I will become a professor in higher education. What the past has taught me is to stay curious and learn while I can. What the future holds, I can only imagine.

This PhD journey would not have even began without the encouragement and the enthusiasm of my main supervisor Terje Slåtten! In 2012, after attending one of Terje's lectures, I was beyond inspired. I entered his office and exclaimed "I am going to be a professor one day". Behind these words was the exclamation of; I want to be like you one day! Little did I know then, that Terje would continue to inspire, motivate and encourage me in pursuing my goal. It has now been more than 10 years, and you still encourage me, motivate me and most of all, still believe in me! For your insights, your trust and your commitment, I wholeheartedly thank you!

To my second supervisor, Gudbrand Lien, who inspired me to take on a statistician journey in my PhD, I still have much to learn thanks to you! I remember in the Spring of 2015, when I was planning on writing my Master thesis, and Terje enthusiastically brought you onboard. One day, while we were having our weekly meetings, your charisma and laughter filled the room and extended to the hallways, and in that moment, a part of me exclaimed inside of me: "I found another role model". I had not the slightest idea that our laughter sessions, your inspiration and genuineness would add significantly to who I am today, and to whom I strive to become in my

goal. It has now been more than 6 years, and you still motivate me, inspire me and cheer me on. For your support, your encouragement and trust, I wholeheartedly thank you!

To INN, for the opportunity you gave me and the trust you put in me, I am but grateful. To my PhD leader Martin Rønningen and the administrative staff at INSEPP, thank you for your guidance, your leadership and for your encouragement, especially in hard times. To my four musketeers at INSEPP who held me grounded, listened to my endless complains and struggles, shared my frustration and equally shared my joys with me, Eva Duedahl, Chukwuemeka Kevin Echebiri, Jo Anders Sollien, and Gard Ringen Høibjerg, my deepest appreciation to you! To the ones that have come to my aid in unexpected times, Andrew Musau, Prosper Ameh Kwei-Narh, Randi Bredvold, Linda Tangen Bjørge, Gunhild Wedum, and Terje Onshus my sincere gratitude to you! To Svein Bergum, my earnest gratitude for providing me with ample feedback on my mid-term evaluation, and for motivating me in the progress of my dissertation. To the rest of my colleagues at INSEPP, you led by example and your inspiration brought me to this point. For that, I am grateful! To the rest of INN staff, thank you! To the management and the participants who made the empirical data attainable, my deepest thanks! A special thanks to the Director of Research at Hospital Trust, Ingeborg Hartz, for your willingness, your collaboration and your enthusiasm for health innovation research!

To Manel González Piñero, Universitat Politecnica de Catalunya, CREB, Barcelona, Spain, for embracing me with open arms during my research stay, for your friendship, and your inspiration, I am beyond grateful! Also, to my newfound colleagues and friends at CREB, Barcelona, thank you for embracing me with open arms during my research stay!

Last, but not least, to my dearest, Dragana, Albina, Isabella, Alejandra, Melissa, Reidun, Hulda, and my family, no amount of words can describe my appreciation to you. I would not have reached this milestone alone. For believing in me, for encouraging me, for your optimism, for

your reassurance, for your consolation and most importantly, for your love, I am but touched, marveled and immensely grateful!

Lillehammer, Norway, January 2022

Barbara Rebecca Mutonyi

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Appended papers[1]

This dissertation includes four published papers in addition to a detailed overview of the leading theories of this dissertation and description of how the papers are linked. All four papers are listed below with their titles and journals in which they are published. Note each paper is ranked based on Norwegian Centre for Research Data (NSD) criteria. The NSD ranks publishers and journals based on criteria that include but are not limited to quality. NSD level 2 indicates the first highest quality and NSD level 1 represents the second highest quality. Moreover, NSD level 2 publications and journals are deemed to be those that publish the most significant scholarly work worldwide, accounting for about one-fifth (20%) of scientific publications. See https://nsd.no/en for more information.

Paper I:

Mutonyi, B. R., Slåtten, T. & Lien, G. (2020). Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: Empirical evidence from Norway. *International Journal of Public Leadership*, 6(2), 175–197. Awarded Outstanding Paper in the 2021 Emerald Literati Awards. NSD level 1

[1] Note that an article-based dissertation was chosen for three reasons. First, it provides a unique opportunity to study and examine various theoretical perspectives in depth. Second, it offers an alternative way of studying the phenomenon of employee innovative behavior in relation to a range of fostering factors and their consequences for PSSs. Third, it offers excellent opportunities for collaborations.

Paper II:

Mutonyi, B. R. (2021). Employees' psychological capital and innovative behavior in higher education. *International Journal of Quality and Service Sciences*, 13(2), 198–215. Awarded Best Paper Award nomination QMOD Conference 2019, Krakow, Poland. NSD level 1. Due to copyright infringements, this article is available at https://doi.org/10.1108/IJQSS-02-2020-0024. As such, the full article is not appended accordingly in this dissertation.

Paper III:

Mutonyi, B. R., Slåtten, T. & Lien, G. (2021). Fostering innovative behavior in health organizations: A PLS-SEM analysis of Norwegian hospital employees. *BMC Health Services Research*, 21(1), 470. NSD level 2

Paper IV:

Slåtten, T., Mutonyi, B. R., & Lien, G. (2020). The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour. *BMC Health Services Research*, 20(1), 1096. NSD level 2

1 Introduction

Innovation has become a word we use in our daily lives. We often link innovation to newness and to products and services that create, add, or redistribute value (Fagerberg et al., 2005). In addition, we often associate innovation with the innovativeness of individuals (Midgley and Dowling, 1978), such as those great innovators of our time, Bill Gates and Steve Jobs. What both men have in common is that implementing their ideas helped solve problems that still have a meaningful impact on our society (Shah and Mulla, 2013) and have changed the importance of successful innovation by employees (Hult et al., 2004). As Miao et al. (2018) noted, the term "employees" refers to qualified individuals at work. Scott and Bruce (1994) suggest that employee innovative behavior is a way to understand how and when novel ideas are implemented. This has been said to impact society, governments, markets, and organizations (Fagerberg et al., 2005).

Previously, employee innovative behavior has predominantly been studied through the lens of the private sector (Bysted and Jespersen, 2014; Eun, 2020; Jiang and Iles, 2011; Lim, 2010), which limits our understanding of its value in the public sector (Bos-Nehles et al., 2017b; Osborne and Brown, 2013; Rafique et al., 2021). In addition, innovation scholars have established that when cultivated properly, employee innovative behavior is of vital importance for the efficiency, effectiveness, and competitive advantage for both private and public sector innovation (Bason, 2010; Borins, 2002; Eun, 2020; Li and Hsu, 2016b; Sullivan et al., 2021). Consequently, there are good reasons to assume that cultivating employee innovative behavior is important (Eun, 2020; Vivona et al., 2021).

Although Suseno et al. (2019, p. 42) claimed that while employee innovative behavior "is important in improving public sector service delivery and provision … previous studies on public sector innovation somewhat neglect examining [it]". With increased attention to public

sector innovation research (Osborne and Brown, 2013), we still "know little about the innovative behavior of employees in the public sector and even less how innovative behavior can be initiated, and supported" (Bos-Nehles et al., 2017a, p. 380). This dissertation holds that it is vital for public organizations and their leaders to equip themselves with better tools and resources for cultivating employee innovative behavior in public sector services (PSSs) (Hansen and Pihl-Thingvad, 2019). Therefore, the specific aim of this dissertation is to contribute knowledge and advance the current discussion. In line with Bysted and Jespersen (2014) and Miao et al. (2018), this dissertation defines employee innovative behavior in PSSs as *the adoption and implementation by public sector employees in their work roles, units or organizations of novel and useful ideas that benefit the individual, work environment, or organization.*

In general, studies of employee innovative behavior have found that in creating a conducive work climate for innovation, "achieving the desired level of organizational innovation capacity also relies on individual innovation behavior … as employee innovative behavior is considered to be at the heart of all organizational innovation" (Kör et al., 2021, p. 3). The pioneering study on employee innovative behavior by Scott and Bruce (1994) prompted researchers to explore employee involvement in innovative activities at work and the crucial importance of individual behaviors at various stages of the innovation process in PSSs (e.g. Bos-Nehles et al., 2017b; Burns, 2007; Palmer, 2006; Verhoest et al., 2007). The basis of innovation is ideas or novel ideas. Having such ideas is often termed *creativity* (Tan et al., 2019). Creativity is understood to be the creation or the generation of novel ideas that are original and useful at work (Amabile, 1988). However, as in the above definition of employee innovative behavior, this implies that ideas (creativity) alone will not lead to successful innovation unless they are developed and implemented (employee innovative behavior) (Carnevale et al., 2017). Therefore, understanding employee innovative behavior is critical because the behavioral approach to

individual innovation is particularly appropriate for PSSs (Bos-Nehles et al., 2017a). This is because measures of innovation such as productivity, profit, or numbers of patents are not necessarily available or relevant to PSSs innovation (Eun, 2020; Rafique et al., 2021). In addition, employee innovative behavior forms the microfoundations of PSS innovation, where innovation is discovered, adopted, and implemented by PSSs employees, who often go beyond their work roles in search of new ways of quality service delivery, suggesting new services, applying new methods, and securing new resources (Garg and Dhar, 2017). Consequently, employee innovative behavior is seen as an important asset and a determinant of innovation success in these dynamic work environments (Riaz et al., 2018), because innovation lies with individuals. Therefore, employee behavior is vital for successful adoption and improved implementation of novel ideas at work (Li and Hsu, 2016b). This is not only suggested in innovation management literature (Yuan and Woodman, 2010), but also in the literature on PSSs (Windrum and Koch, 2008) and innovation (Palmer, 2006).

Although studies of employee innovative behavior have generally emphasized research and development (R&D) units (Messmann and Mulder, 2012), organizational factors (Shanker et al., 2017), and group factors (De Jong and Kemp, 2003), the results of these studies may have substantial relevance for cultivating innovative behavior among all levels and types of employees (Lukes and Stephan, 2017). For instance, Garg and Dhar (2017, p. 254) urged that "a lot of work needs to be done for gaining a better understanding … of innovative behavior." This is because employee innovative behavior "is a necessary condition for incremental innovations to come into being" (De Jong and Kemp, 2003, p. 191).

Academic research on innovation (e.g. Oke, 2007) shows that combinations of more common, nontechnological forms of innovation and the behaviors linked to improvements are often of great importance (Bos-Nehles et al., 2017b; Montani et al., 2014; Oppi et al., 2019). In addition, Miao et al. (2018, p. 79) recognized the need to move from organizational to individual

innovation, maintaining that the "use *of* objective data on innovative behavior," such as data on individual employees, is required to investigate its importance in PSSs. Accordingly, previous studies have observed an increased need for the behavioral aspect of innovative employees (Deshpandé and Farley, 2004) and a knowledge gap concerning employee innovative behavior in PSSs (Vivona et al., 2021).

The aim of this dissertation to examine whether employee innovative behavior in PSSs can be divided into three secondary objectives. First, it investigates the fostering factors of employee innovative behavior. Second, it contributes new knowledge on the consequences of such behavior. Third, it describes the benefits of employing advanced quantitative research techniques in this context. These objectives are briefly elaborated below.

First, pioneering and later studies on employee innovative behavior in PSSs (Lee, 2008; Palmer, 2006; Seok-Hwan, 2008; Xerri and Brunetto, 2013) have proposed various conceptual models of fostering factors and conducted empirical studies of these models. Specifically, previous studies have studied fostering factors, such as public service motivation (Miao et al., 2018), leader–member exchange (Park and Jo, 2018), openness to innovation (Carlucci et al., 2020), cooperative culture (Cho and Song, 2021), creative collective efficacy (Oppi et al., 2019), job involvement (Peng, 2020), innovative culture (Nazir et al., 2018), psychological empowerment (Schermuly et al., 2013), transformational leadership (Günzel-Jensen et al., 2018), and organizational citizenship behavior (Xerri and Brunetto, 2013). These studies show that employee innovative behavior is impacted by organizational factors (e.g., leader–member exchange), group-level factors (e.g., creative collective efficacy) and individual factors (e.g., psychological empowerment), which all foster employee innovative behavior in PSSs. In addition, studies indicate that employee innovative behavior is influenced by both internal psychological factors such as individual creative self-efficacy (Oppi et al., 2019) and external environmental factors, such as organizational social support (Suseno et al., 2019). The

employee innovative behavior in PSSs "that leads to creative solutions has become gradually imperative due to changing economic conditions, global trends and emergent challenging demands" (Rafique et al., 2021, in press). Therefore, employee innovative behavior has become a significant driver of successful innovation, effectiveness, and performance in PSSs. Thus, revealing the fostering factors remains a valid research aim for current PSSs research (Rønning, 2021).

Second, several previous studies in PSSs research have indicated the need to examine the consequences of employee innovative behavior (Asurakkody and Shin, 2018; Kwon and Kim, 2020; Lee, 2008). Although this topic is crucial (Asurakkody and Shin, 2018), empirical papers have been scarce to date (Janssen, 2004) and to the best of the author's knowledge, no previous empirical research exists. However, studies of private sector service organizations (e.g. Karatepe et al., 2020) have explored management innovation as a consequence of employee innovative behavior. Karatepe et al. (2020, p. 2510) claimed that "the presence of new ideas for improvement in service delivery and novel solutions for customer problems in challenging service encounters encourages management to focus more on innovation … in the organization." The importance of examining the consequences of employee innovative behavior in PSSs is fundamental, as PSSs are often under pressure to innovate because of the increasing public demand for new and improved service delivery (Hartley, 2005) and better service quality (Garg and Dhar, 2017). Asurakkody and Shin (2018, p. 241) noted that for PSSs, "the consequence of innovative behavior illustrates three beneficiaries: organization, clients, and employees." Yet we know little about the consequences of such behavior for these three categories of beneficiaries; hence, the scarcity of research on these consequences requires discussion (Garg and Dhar, 2017). Specifically, previous studies have discussed but not empirically explored factors such as improved public services (Miao et al., 2018), organizational performance (Damanpour et al., 2009), job productivity (Asurakkody and Shin,

2018), value created (Arundel et al., 2019), new services (Li and Hsu, 2016b), and work competence (Asurakkody and Shin, 2018). These academic discussions reveal that empirical studies are important to gain an overall understanding of the benefits of cultivating employee innovative behavior in PSSs organizations, customers and employees (Li and Hsu, 2016b). Although it is evident that PSSs employee innovative behavior has yet to be sufficiently explored (Eun, 2020; Miao et al., 2018), it is imperative to examine fostering factors and consequences because innovation is thought to "be accomplished through an individual's participation and action" (Eun, 2020, p. 69). Therefore, this dissertation seeks to fill this research gap.

Third, previous studies have predominantly operationalized employee innovative behavior using the quantitative approach of questionnaires for data collection (i.e. Cho and Song, 2021; Nazir et al., 2018; Xerri and Brunetto, 2013). Although employee innovative behavior in PSSs has received greater empirical research attention (Palmer, 2006), it has been undertheorized in regard to model complexity (Rafique et al., 2021), often employing simple models that follow a universalistic perspective (i.e. Günzel-Jensen et al., 2018). Providentially, PSSs scholars are now moving from universalistic to more multifaceted and complex models (i.e. Carlucci et al., 2020; Rafique et al., 2021) based on contingency perspectives, involving multiple interactions and context, such as social, cultural, or institutional factors, as well as configurational perspectives, such as higher-order interactions (Rafique et al., 2021; Sarstedt et al., 2022). Thus, a number of studies call for further research on advanced statistical techniques on fostering employee innovative behavior in PSSs (Carlucci et al., 2020; Rafique et al., 2021). For example, in their study, Carlucci et al. (2020, p. 20) argued for the use of advanced statistical techniques by suggesting that further studies would improve the quality of the results reported in scientific studies, through "exploring further moderations and mediation effects." This is because advanced statistical techniques have relatively few limitations (Hair et al., 2018), providing

countless opportunities to run complex statistical analyses such as multigroup, mediation, and moderation analyses (Ghasemy et al., 2020; Hair et al., 2017). Consequently, this dissertation elaborates on the benefits of advanced quantitative research techniques on this topic.

The above discussion documents three knowledge gaps in the literature and reveals that more research is needed to fill them. Specifically, a number of scholars call for more research on the fostering factors of employee innovative behavior in PSSs (Bos-Nehles and Veenendaal, 2017; Eun, 2020), the consequences of such behavior (Asurakkody and Shin, 2018) and the use of advanced statistical techniques for this research (Rafique et al., 2021).

The aim of the dissertation

The primary aim of this dissertation *is to contribute new knowledge and understanding of employee innovative behavior in PSSs*. The three secondary objectives naturally follow the overall dissertation model (see Figure 1). Specifically, these objectives in relation to employee innovative behavior in PSSs are:

1. To extend our understanding on the fostering factors of employee innovative behavior in PSSs.
2. To add new knowledge on the consequences of employee innovative behavior in PSSs.
3. To contribute new knowledge on the benefits of employing advanced quantitative research techniques on employee innovative behavior research in PSSs.

All three secondary objectives are directly related to the distinct contributions of the four appended papers, which together address the overall aim of this dissertation. This dissertation provides a unique response to the call for more research on public employees' innovative behavior in PSSs (Cho and Song, 2021; Eun, 2020; Kwon and Kim, 2020; Sullivan et al., 2021). This is achieved in three ways. First, it expands the current theoretical knowledge pool and

insight into the value of such behavior. Second, it provides practical knowledge for public managers desiring increased performance, effectiveness, and commitment from their employees. Third, it has practical implications for policymakers aspiring to achieve long-term innovation success and gain a competitive edge for their PSSs.

While this dissertation primarily targets researchers and practitioners, the interweaving of employee innovative behavior and PSSs generates insights that may also interest researchers and practitioners in the public sector (Bryson et al., 2014; Dahl and Soss, 2014; Fuglsang and Rønning, 2014). As discussed above, PSSs innovation studies have neglected employee innovative behavior as a significant factor in the innovation success of the public sector (Bason, 2018; De Vries et al., 2016; Vivona et al., 2021). By specifying fostering factors and consequences of employee innovative behavior in PSSs that may have a significant impact on overall organizational performance, effectiveness, and competitive advantage (Osborne and Brown, 2013; Sullivan et al., 2021), this dissertation should also inform future research.

In summary, by contributing knowledge of employee innovative behavior in PSSs, this dissertation may help theorists to understand the importance of nurturing such behavior and assist public managers and policymakers to cultivate it. It suggests why some PSSs organizations perform better than others and why their employees have a competitive edge.

The overall dissertation model

The overall model shown in Figure 1 demonstrates the three secondary objectives that align with the overall aim of this dissertation to investigate employee innovative behavior in PSSs.

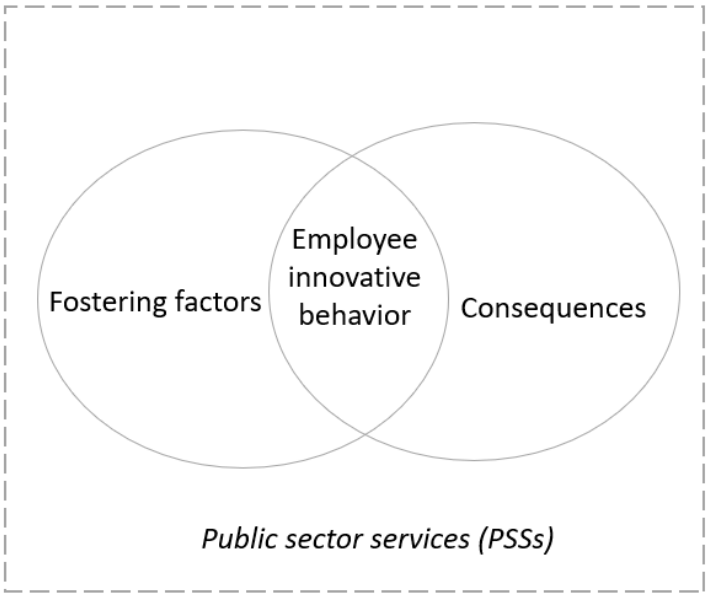

Figure 1: The overall dissertation model

Specifically, the Venn diagram illustrates the relationship between employee innovative behavior in PSSs and fostering factors (on the left-hand side) and consequences (on the right-hand side). As indicated above, the four appended papers examine fostering factors. In addition, Paper III considers consequences and the two sides overlap in employee innovative behavior (center). Therefore, the Venn diagram visually represents a similarity (employee innovative behavior), and differences (fostering factors and consequences). Finally, the dotted rectangular outline signifies that these relationships are examined empirically in the context of PSSs.

1.1 Structure of the dissertation

Chapter 2: This chapter describes the dissertation's theoretical foundations and reviews the current literature on employees' innovative behavior in PSSs.

Chapter 3: This chapter provides the methodological foundations. It introduces the philosophical background and describes how the foundations have influenced the methods used in the four papers.

Chapter 4: This chapter summarizes the most important findings of each of the four papers and explains how they are linked.

Chapter 5: This chapter discusses the research contributions and practical implications for policymakers.

Chapter 6: This chapter concludes by explaining limitations of the dissertation and suggestions for future research.

Chapter 7: This chapter provides a full list of references in this dissertation.

Appendix: The appendix comprises the four papers that form the basis of this research.

Abbreviations:

AVE: Average variance extracted; CPA: Conditional process analysis; DOR: Director of Research; f^2: Effect size; HLM: Hierarchical linear modeling; HTMT: Heterotrait–monotrait; IMOC: Internal market-oriented culture; KIF: Knowledge-intensive firm; NPM: New public management; NSD: Norwegian Centre for Research Data; PSS: Public sector services; R&D: Research and development; R^2: Coefficient of determination; SEM: Structural equation

modeling; SET: Social exchange theory; PLS: Partial least squares; PLS-SEM: Partial least-square structural equation modeling; Q^2: Predictive relevance; VIF: Variance inflation factor

2 Theoretical framework

In line with the overall dissertation model (see Figure 1), this chapter describes the theoretical foundations. Specifically, this chapter covers the historical background of innovation and public sector innovation. The chapter concludes with a summary of the theoretical framework of this dissertation.

The 21st century has seen rapid economic changes, such as the continuing challenges of globalization and sustainability, the COVID-19 pandemic, and unstable labor markets (Blustein et al., 2020; Di Fabio and Kenny, 2016; Duradoni and Di Fabio, 2019). The latest challenges and crises, such as the COVID-19 pandemic, have forced organizations to conduct what may be termed "imposed innovation" (Heinonen and Strandvik, 2020). This is no longer discretionary but rather obligatory to ensure organizational survival and resilience (Feng et al., 2021). However, at the heart of it all lies the employees who are known to drive innovation in both the private and public sectors (Spender and Strong, 2010; Sullivan et al., 2021). Employees are regarded as key assets in advancing innovation at work, as well as essential sources of innovative ideas (Kesting and Ulhøi, 2010; Spender and Strong, 2010). The individual-level phenomenon of employee innovative behavior is an explanatory construct characterized by tasks and activities performed by employees and required for innovation development (De Jong and Den Hartog, 2010; Messmann and Mulder, 2012; Wu et al., 2020). As such, it forms the microfoundations of innovation at work (Lukes and Stephan, 2017), which is performed by employees who often go beyond their established work roles (Eun, 2020; Palmer, 2006). Before we embark on what employee innovative behavior entails, we must cover the historical background of innovation, specifically public sector innovation, to make sense of theories of employee innovative behavior in PSSs.

2.1 Definitions of innovation

In modern society, innovation seems to be included on many, if not all, organizational agendas. The term *innovation* has become a fashionable explanation of the performance, promotion, and competitive advantage of organizations (Fagerberg et al., 2005). However, there is a need to "clarify what innovation means, test the suggestions that are made to promote it in the public sector" (Podger, 2015, p. 119). Worldwide, some understand what innovation entails as "trendy," "policy chic," or as a key "buzzword," while others approach it with caution or out of necessity (Osborne and Brown, 2013; Ricard et al., 2017). Regardless, innovation is not a new phenomenon, and some argue that it is as old as mankind itself (Van de Ven et al., 1999). The common understanding is that innovation is crucial to the continuing success of any organization as well as to gaining competitive advantage through people (Feng et al., 2021). This is especially evident in innovation's impact on four areas: local, national, international, and global (Gates, 2021).

Although it is more than 70 years since Schumpeter (1934, p. 76) introduced the term "innovation," it has only entered widespread use in the past two decades (Rønning, 2021). A general definition is infamously elusive, and the concept is generally held to lack either "a single definition or measure" (Adams et al., 2006, p. 22). The systematic review by De Vries et al. (2016) finds that most articles do not provide a direct definition of innovation.

Schumpeter (1934) introduced innovation under the theory of economic development, wherein its purpose was to find ways to maximize profit. According to Schumpeter (1934), there were five types of innovation: new goods, new methods of production, new sources of supply, new markets, or the establishment of a new organization. However, innovation now encompasses a broader range of purposes and definitions. Baregheh et al. (2009) identified more than 60 definitions of innovation, as well as variations in research streams. The research streams ranged

from economics to technology, showing that its importance is recognized not just in economics but across various sectors and organizations (Anderson et al., 2014; Baregheh et al., 2009; Crossan and Apaydin, 2010).

Over the years, innovation has had various definitions (i.e., Fuglsang, 2008; Osborne and Brown, 2005). Specifically, De Leede and Looise (2005, p. 108) defined innovation as a "deliberate and radical change in existing products, processes or the organization in order to achieve a competitive advantage over competitors." Thompson (1965, p. 2) defined innovation as the capacity to change or adapt through "the generation, acceptance, and implantation of new ideas, processes, products or services." Along the same lines, Kaiser and Ringlstetter (2010) cautioned that an innovation is only such when it is implemented. Osborne and Brown (2005, p. 4) defined innovation as "the introduction of new elements into a public service—in the form of new knowledge, a new organization, and/or new management or processual skills, which represents discontinuity with the past." Baregheh et al. (2009, p. 1334) proposed that innovation can be defined as a "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." Moreover, Crossan and Apaydin (2010) defined innovation as the production or adoption, assimilation, and exploitation of value-added novelty, which is both a process and an outcome.

Nevertheless, the consensus of the various definitions and an essential feature of innovation is that it can be developed and implemented at work (Drejer, 2004). It is not to be confused with invention, which is the "first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out in practice" (Fagerberg et al., 2005, p. 4). Hence, innovation is often recognized as a pivotal driver of competitive advantage as well as organizations' ability to deal with environmental challenges (Oppi et al., 2019). In addition, innovation marks a new product or the introduction of a new process, whereas imitation occurs

after the innovation has taken place, whereby organizations adopt new services or use new products generated in other industries (Fagerberg et al., 2005).

In line with Bason (2010), De Vries et al. (2016), and Arundel et al. (2019), this dissertation uses a definition of innovation that corresponds to its research objective: *the introduction and implementation of novel ideas at work that benefit and add value to the organization, work environment, and individual employees*.

2.2 The distinction between public and private sector innovation

Examining the principal differences of private versus public innovation, Fitjar (2015) stated that the term *innovation* has traditionally been linked to the private sector, while terms such as *renewal* and *modernization* have been favored by the public sector. This reflects a perception that if the public sector is to succeed in innovation, it must learn from private sector innovation (Koch and Hauknes, 2005; Osborne and Brown, 2005; Podger, 2015). As shall be discussed below, the controversial aspect of this is that the public and private sectors differ in their objectives, opportunities, and motives to innovate (Bason, 2010; Borins, 2002). As shown in Figure 1, this dissertation focuses on PSSs employees; therefore, it is important to consider what distinguishes their public sector innovation from that of the private sector.

From an employee standpoint, innovation is a fundamental source of encouragement and motivation at work (Hsu and Chen, 2015; Wu et al., 2020). From a managerial or organizational effectiveness standpoint, innovation is vital because of improvement in various areas, such as products and services, efficiency, effectiveness, and overall performance that cumulatively provide a competitive edge (Battistelli et al., 2014; Bowen and Ford, 2002; Podger, 2015). According to Klomp and Van Leeuwen (1999, p. 27), although “innovation for economic

activity is often widely acknowledged," it is essential for furthering public and private organizations' growth, as well as for solving social problems in a sustainable and efficient way (Fagerberg et al., 2005; Legge, 1978; Scott and Falcone, 1998; Vivona et al., 2021).

Innovation scholars have reported that private sector organizations focus on the market and the economic benefits of innovation (Eun, 2020; Osborne and Brown, 2013) because their success hinges on cost and benefit analyses (Lee et al., 2020). Private sector employees must not only be visible to promote their businesses, but also be accountable for every action taken in their work (Bysted and Jespersen, 2014). In contrast, innovation scholars report that public sector organizations are more concerned with developing the country and society (Borins, 2002; Fitjar, 2015), arguing that the success of public sector innovation depends on meeting citizens' demands and increasing public value (Flemig et al., 2016). Public sector employees under the public eye must show complete transparency while being prepared for criticism (Sullivan et al., 2021).

The private sector is often seen to set clear objectives with its apparent subjectivity (Fagerberg et al., 2005). The private sector is often accused of being profit oriented because its objectives are clearer (Podger, 2015). Conversely, the public sector often has ambiguous objectives in performing complex sets of tasks in response to societal demands (Borins, 2006). Its key role is to maintain law and order, ensure standardized and fair administration, as well as involve citizens in the decision-making process and provide welfare services (Rønning, 2021).

Vivona et al. (2021, p. 2) cautioned that "the distinction between private and public sectors is not dichotomous but rather falls along a spectrum, with several areas of ambiguity." Consequently, public sector innovation can occur in various ways, such as a policy tool to increase private sector innovation (Edler and Georghiou, 2007). Alternatively, such activities may sustain or improve the creation of public value to maintain public legitimacy (Demircioglu

and Audretsch, 2017). Accordingly, the fundamental difference between public and private sector innovation is in their philosophies (Koch et al., 2006). For instance, public sector environments are well known for being risk neutral (Arrow and Lind, 1970; Rainey, 2009) and public employees are identified as risk averse (Walters and Ramiah, 2016). Not surprisingly, a dilemma arises when a bureaucracy requires stability and rule abidance while innovation demands innovativeness, creativity, and entrepreneurialism (Koch and Hauknes, 2005; Windrum and Koch, 2008).

In addition, the challenges faced at various levels (e.g., organization, group, and individual) in public sector innovation are inherently different from those in the private sector (Bason, 2010; Borins, 2002; Koch and Hauknes, 2005; Mulgan and Albury, 2003). There are five reasons for this difference. First, while scholars have argued that private sector innovation focuses on satisfying stakeholders through profit maximization (Voss et al., 2005), the ambiguous goals in the public sector are challenging because organizations must balance a myriad of stakeholder and citizen expectations in addition to opposing interests (Casebourne, 2014). Second, the private sector is often viewed as a market-oriented culture, while public sector innovation often generates nonmarketable outputs, such as access to public services, citizen engagement, and social equity (Rainey, 2009). Third, public organizational structures are generally more complex than those of the private sector because of unclear governance policies (Kruyen and Van Genugten, 2020). Fourth, the leadership of the public sector often faces close scrutiny from the public, unlike the flexibility and the autonomy that private sector leaders are often portrayed as enjoying (Borins, 2002; Rainey, 2009). Fifth, private sector employees' innovation is often shown to be motivated by monetary rewards, such as bonuses (Bysted and Jespersen, 2014). However, public sector employees have been shown to approach innovative activities with caution because of their fear of the repercussions of failure (Koch and Hauknes, 2005). As a result, "their motivations to innovate come from desires for prestige and professional

recognition" (Vivona et al., 2021, p. 5). Therefore, while it is widely understood that innovation plays a key role in creating value and sustaining competitive advantage (Scott and Falcone, 1998), it is considered to be the lifeblood of an organization's survival and growth in the public and private sectors (Baregheh et al., 2009; Zahra and Covin, 1994). Consequently, with the scarcity of research on public sector employees (Sullivan et al., 2021), this dissertation focuses on public sector innovation arising from employee innovative behavior in PSSs.

Public sector innovation

Vivona et al. (2021) argued that to grasp what public sector innovation entails, one must first understand what innovation is (as discussed above) and what the public sector is. The above discussion highlights some points of debate concerning public and private sector innovation. Subsequently, Vivona et al. (2021) maintained that it is a complex task to define the public sector, because its definition will change depending whether one views it from the institutional or functional standpoints. The institutional standpoint considers the public sector to be a "set of organizations owned by the state or under political authority" (Vivona et al., 2021, p. 2), whereas the functional standpoint considers it to be a set of organizations with the main goal of serving the public interest (Koch and Hauknes, 2005). This dissertation considers the public sector from a functional perspective.

Borins (2002) contended that innovation in the public sector has long been viewed as an oxymoron and listed four reasons for this observation. First, the public monopoly influences the freedom to innovate. Second, the influence of media and opposition party hinders public managers from acting through fear of failure, which results in a powerful impediment to innovation. Third, stringent central agency constraints often act as barriers to innovation. Fourth, large public organizations tend to be extensive bureaucracies that enforce stability and

consistency, which results in resistance to change and exposure of failures. However, in recent years, we have seen a shift in public sector innovation, such as in the application of information technology or the encouragement of development and dissemination of innovations and best practices, not simply public management innovation (Ringholm et al., 2013; Rønning, 2021). Consequently, in the public sector, innovation has been embraced as way to improve services and problem-solving capacity (Walker et al., 2011).

Innovation is crucial to support the public sector's role as an efficient, effective, and legitimate service provider (Bason, 2010), especially as public sector innovation has generally been neglected in mainstream innovation research (Osborne and Brown, 2013). In addition, even though "innovation in the public sector undergoes more scrutiny" (Oppi et al., 2019, p. 45), Mintzberg (1983) argues that innovation can be viewed as a key strategy because of the high complexity of public sector organizations. Moreover, the need for public sector innovation in general is highlighted by fast changes in society proving governments' ability to be flexible and agile to respond to evolving technologies, changes in social environments, and the complex demands of citizens (Borins, 2002).

Various types or modes of public sector innovation have been proposed (Damanpour et al., 1989; De Vries et al., 2016; Osborne and Brown, 2011). Windrum and Koch (2008) divided public sector innovation into six distinct areas or categories:

1. Innovation of new services.
2. Innovation in the delivery of new services to users or in interactions with them.
3. Administrative and organizational innovation entailing changes in structures and routines whereby services are produced in a novel way.
4. Conceptual innovation involving new perspectives on a phenomenon.

5. Governance innovation involving the development of new organizational forms and processes to address specific societal problems.
6. Systematic innovation of new or improved ways of interacting with other organizations and knowledge bases.

Later, Osborne and Brown (2011) added to these categories to include modes of public sector innovations, such as radical innovation, architectural innovation, incremental innovation, and product or service innovation. These modes or categories are often termed *dimensions* or *types* of public sector innovation to differentiate and define them (Damanpour et al., 2009; De Vries et al., 2016; Vivona et al., 2021). It is important to note that the distinct areas, categories, or types of public sector innovation are not mutually exclusive because innovations can fall into more than one area (Windrum and Koch, 2008). Nonetheless, such distinctions are a "helpful analytical tool to focus on the different forms of innovation" (De Vries et al., 2016, p. 14).

2.3 Public service innovation

There are three reasons for this dissertation to focus on public service innovation. First, Windrum and Koch (2008, p. 9) argued that "it is paradoxical that the innovation literature has hitherto neglected the public service—a major provider of services in all developed economies." Second, a comprehensive review of the literature on employee innovative behavior in services by Li and Hsu (2016b) revealed a scarcity of research pertaining to innovative behavior by PSSs employees. Third, a systematic review by De Vries et al. (2016) revealed that the second largest category of innovation was service innovation, which suggests that more research is needed to understand fully the fostering factors and consequences of employee innovative behavior.

Toivonen and Tuominen (2009) called attention to the many existing definitions of public service innovation, indicating the complex evolution of research in the field (Osborne et al., 2015). In their review, Witell et al. (2016, p. 2863) noted that "the concept of service innovation is broad and loosely defined" and they argued for a common understanding of what public service innovation entails. For example, Windrum and Koch (2008, p. 8) defined it as the "introduction of a new service product or an improvement in the quality of an existing service product." Barcet (2010, p. 51) defined it as "an introduction to something new... *that* can generally be described as the individual and collective processes that relate to consumers." Witell et al. (2017, p. 291) defined public service innovation as a recombination of resources in new ways, stating that public "service innovation takes advantage of new combinations of resources … and often starts with a change in a resource." Despite the various definitions, this dissertation, in line with Enz (2012, p. 187), defines public service innovation as "the introduction of novel ideas that focus on services that provide new ways of delivering a benefit … through continuous operational improvement, technology, investment in employee performance, or management of the customer experience."

Among public innovation researchers and public policymakers, there has been growing interest in the topic of public service innovation (Albury, 2011; Lusch and Nambisan, 2015), mainly because of its importance for productivity, competitiveness, and quality of life (Fagerberg et al., 2005). The diversity of innovation has attracted interest because public service markets are diverse in terms of users, businesses, and the public sector, and public service innovation may expand the current range of approaches to explaining, measuring, and managing it (Fagerberg et al., 2005). Moreover, Carlborg et al. (2013) noted that although research around public service innovation has gained attention, the concept remains underexplored compared with product or manufacturing innovation; therefore, further empirical analysis is essential. In addition, Lusch and Nambisan (2015, p. 157) argued that the volume and diversity of public

service innovation research “underscore the significance given to service innovation in different fields”.

Osborne and Brown (2011) argued that public services and their innovation can be understood as intangible, inseparable, perishable, or coproduced. There is four reasons for this. First, the outcomes of public service innovation are separate from the process of development. Second, innovation can be implemented. Third, the proposed public service innovation must be new to one of the actors. Fourth, the goal of the public service innovation is to create value for some actors.

Podger (2015) has previously argued that for innovation to flourish, a culture of trust and learning is needed, yet a culture of control has been a hallmark of public service innovation. Therefore, the public sector and its employees have previously been assumed to innovate less than the private sector (Sullivan et al., 2021). However, this may be reflecting the paucity of previous studies on innovation in PSSs (Osborne and Brown, 2013), which according to Windrum and Koch (2008, p. 3) is “a consequence of disciplinary myopia” because most innovation studies have focused on the private sector. Nevertheless, innovation is certainly found in PSSs (Borins, 2002). For example, Windrum and Koch (2008, p. 3) note that “on a daily basis, novel ideas and technologies are developed in public health and medicine, in universities and general education, and in social services.” For a PSSs innovation to occur, several components must be combined, such as knowledge, capabilities, skills, and resources (Fagerberg et al., 2005). As mentioned above, this is due to the complex systems found in public institutions, which often require complex service provision (Kaiser and Ringlstetter, 2010).

Lusch and Nambisan (2015) argued that the value of service innovation as an outcome should be seen from the perspective of a customer. Witell et al. (2016, p. 2865) noted that public sector innovation “is likely to be the result of a number of components, contextual aspects, actors and

interactions." It is important to note that value can be created in various ways. In terms of the general service sector, value has traditionally been linked to the production of goods and services in a value chain (Hofstede, 1998; Porter et al., 1974). In the knowledge economy, value is created during the problem-solving process (Cole and Parston, 2006), whereas in a network and information system, value can be created through dissemination. As we entered the age of the experienced economy, Pine et al. (2011) noted that value can be created by consumers through meaningful, sensual, and emotional impressions. Both Skålén et al. (2015) and Osborne et al. (2015) argue that value is cocreated in terms of public service-dominant logic.

Windrum and Koch (2008) contended that despite its importance to the national growth and the welfare of individual citizens, scant research on PSSs innovation has been conducted because of the excessive focus on innovation in private sector and manufacturing organizations. Accordingly, Osborne and Brown (2013) maintained that because public services account for a considerable proportion of the service sector, it is imperative that more effort is put into empirical examinations of the scope of public service innovation.

Osborne and Brown (2013, p. 79) noted that activities related to public service and public service innovation are more "about *doing* things rather than *making* things." Thus, Podger (2015) endorsed the view that a key strategy for fostering innovation at work was focusing on a bottom-up approach infused with autonomy. This is especially crucial as public sector employees require motivation as well as training to interact positively with service users (Casebourne, 2014; Rafique et al., 2021) because they are vital for the successful implementation of innovation (Miao et al., 2018). For this reason, organizations are reliant on individuals, be they internal employees or external agents with the knowledge, capabilities, skills, and resources needed.

This dissertation answers the call for public service innovation research examining fostering factors and consequences of employee innovative behavior in PSSs. This leads us to the focus and main discussion of this dissertation, namely what is employee innovative behavior? The following discussion elaborates on this in detail.

2.4 Employee innovative behavior

As innovation is imperative in the public sector (Harris and Albury, 2009), the significance of public employees' innovative behavior is notably underestimated (Vivona et al., 2021). This is especially evident in today's turbulent environment, where public organizations strive to survive and maintain effective services for their citizens (Miao et al., 2018). In addition, public sector organizations are increasingly encouraged to keep up with changes related to shifts in public policy and priorities (Bason, 2018; Ricard et al., 2017). For example, public organizations are pressured to achieve desired short- and long-term innovation outputs (Osborne and Brown, 2005), deal with current economic, social, and environmental challenges (Demircioglu and Audretsch, 2020), as well as increase national innovation through economic growth, innovative activities, and development (Acs and Audretsch, 2010; Arundel et al., 2019).

Not surprisingly, public organizations are becoming increasingly reliant on the innovativeness of their employees (Suseno et al., 2019), especially as "innovation at the lower levels, such as individual innovativeness of public servants, has been deemed lacking in the public sector" (Vivona et al., 2021, p. 6). In addition, studies of employee innovative behavior have predominantly focused on organizations (Li et al., 2018; Walker et al., 2011), groups (Nsenduluka et al., 2009), projects (Borins, 2002), and policy (Osborne and Brown, 2011). As a result, "the innovative behavior of individual employees has received far less attention" (Miao

et al., 2018, p. 72). Consequently, this dissertation examines the fostering factors and consequences of such behavior.

Although there is consensus on the importance of employee innovative behavior in PSSs (Cho and Song, 2021; Rafique et al., 2021) and increased reliance on employee contributions (Sullivan et al., 2021), there is ongoing debate on how to define employee innovative behavior (De Spiegelaere et al., 2014).

2.4.1 Definitions of employee innovative behavior

Employee innovative behavior has seen a variety of definitions since its introduction by Scott and Bruce (1994), when it was a combination of idea processes and behaviors in various stages of the innovation process. Since then, myriad definitions have been proposed, added to, and improved. In particular, Kleysen and Street (2001, p. 284) noted that employee innovative behavior has become "a rich and elusive construct that has been defined and operationalized differently by various researchers." A nuanced explanation of these definitions and the terms used is provided in Table 1. It is important to note that the definitions and the nine articles included in Table 1 are all taken from the leading review articles that reviewed *employee innovative behavior* in the period 2001 to 2020. For example, journals such as *Human Resource Management Review*, *Personnel Review*, *International Review of Management and Marketing*, and *Review of Educational Research* were considered in choosing the nine review articles included in Table 1. In addition, the pioneering review article by Kleysen and Street (2001) set off ripple effects of subsequent review studies on employee innovative behavior. To the best of the author's knowledge, only these nine review articles have focused on or extensively reviewed the definitions of employee innovative behavior. Therefore, only these definitions are reviewed

to demonstrate the variations in current research definitions. Table 1 shows the authors' name(s), the terms used, and the definition(s) provided.

Table 1: Definitions of employee innovative behavior

Author	Term	Definition
Kwon and Kim (2020)	Innovative behavior	"the intentional proposal and application of novel and improved ideas, processes, practices, and policies aimed at organizational effectiveness, business success, and long-term sustainability" (p. 3)
Lukes and Stephan (2017)	Employee innovative behavior	"behaviors through which employees generate or adopt new ideas and make subsequent efforts to implement them" (p. 4)
Carnevale et al. (2017)	Innovative behavior	"an employee's intentional introduction or application of new ideas, products, processes, and procedures to his or her work role, work unit, or organization" (p. 525)
Bos-Nehles et al. (2017b)	Innovative work behavior	"the intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization" (p. 1229)
Abdullah et al. (2016)	Innovative behavior	"developing, adopting, and implementing new ideas for products and work methods in organization" (p. 179)
Li and Hsu (2016b)	Employee innovative behavior	"a method used to develop creative products and a process through which employees generate and implement new ideas to improve performance or solve work-related problems" (p. 2821)
Thurlings et al. (2015)	Innovative behavior	"can be described as a process in which new ideas are generated, created, developed, applied, promoted, realized, and modified by employees to benefit role performance" (p. 430)
Li and Zheng (2014)	Employee innovative behavior	"an act of generating, promoting and application of innovative thinking in the organization for the purpose of personal and organizational performance, which enables employees to use innovative ways of thinking, quickly and accurately respond to customer demand changes" (p. 447)
Kleysen and Street (2001)	Individual innovative behavior	"all individual actions directed at the generation, introduction and or application of beneficial novelty at any organizational level" (p. 285)

As can be seen in Table 1, three of the nine articles chose the term *employee innovative behavior*. For consistency, this dissertation uses the same term in its examination of individual

employee innovation at work. This is also because this dissertation takes the perspective of employees.

As shown in Table 1, the various definitions and the terms used differ. For instance, Kwon and Kim (2020) completed an integrative literature review of employee innovative behavior seen through the lens of a job demands–resources model and defined employee innovative behavior in line with Anderson et al. (2014) and Janssen (2000) as "the intentional proposal and application of novel and improved ideas, processes, practices, and policies aimed at organizational effectiveness, business success, and long-term sustainability" (p. 3). In contrast, Lukes and Stephan (2017) reviewed existing measurement scales and defined employee innovative behavior in line with Shane (2000) as "behaviors through which employees generate or adopt new ideas and make subsequent efforts to implement them" (p. 4). In addition, Carnevale et al. (2017) reviewed the quantitative literature and based on West and Farr (1990) and Yuan and Woodman (2010) defined employee innovative behavior as "an employee's intentional introduction or application of new ideas, products, processes, and procedures to his or her work role, work unit, or organization" (p. 525). Furthermore, Bos-Nehles et al. (2017b) completed a systematic literature review on employee innovative behavior in human resource management practices, and defined employee innovative behavior in line with Janssen (2000) as "the intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization" (p. 1229). Moreover, Abdullah et al. (2016) reviewed the literature on employee innovative behavior in depth by considering measures, and defined it in line with Scott and Bruce (1994) as "developing, adopting, and implementing new ideas for products and work methods in organization" (p. 179). Likewise, Li and Hsu (2016b) comprehensively reviewed the literature on employee innovative behavior in services, and based their definition of employee innovative behavior on Janssen (2004), among others, as "a method used to develop creative products and

a process through which employees generate and implement new ideas to improve performance or solve work-related problems" (p. 2821). Thurlings et al. (2015) reviewed a possible model for explaining teachers' innovative behavior, and based their definition of employee innovative behavior on De Jong and Den Hartog (2005), among others, as "a process in which new ideas are generated, created, developed, applied, promoted, realized, and modified by employees to benefit role performance" (p. 430). In addition, Li and Zheng (2014) sought to summarize factors affecting employee innovative behavior, and proposed a definition that was based on Scott and Bruce (1994), among others, by defining employee innovative behavior as "an act of generating, promoting and application of innovative thinking in the organization for the purpose of personal and organizational performance, which enables employees to use innovative ways of thinking, quickly and accurately respond to customer demand changes" (p. 447). Finally, in their review, Kleysen and Street (2001) explored a multi-dimensional measure of employee innovative behavior and defined employee innovative behavior in a similar manner to West and Farr (1989) as "all individual actions directed at the generation, introduction and or application of beneficial novelty at any organizational level" (p. 285). Despite the various definitions of employee innovative behavior in present innovation studies (see Table 1), it seems that the consensus is that *employee innovative behavior* refers to employee's implementation of novel ideas at work.

As the aim of this dissertation is to contribute new knowledge and further our understanding of fostering factors and consequences of employee innovative behavior in PSSs, there are two bases for the definition of the phenomenon used here: the definitions shown in Table 1 and consistency with the literature (Bysted and Jespersen, 2014; Miao et al., 2018; Mutonyi et al., 2021). Therefore, employee innovative behavior is defined as *the adoption and implementation by public sector employees in their work roles, units, or organizations of novel and useful ideas that benefit the individual, work environment, or organization*.

It is important to note that employee innovative behavior in this dissertation is distinguished from creativity, as creativity pertains to "the novelty and radicalness of ideas; innovative behavior encompasses an inter-individual socio-psychological process that is concerned more about the execution and realization of ideas" (Kwon and Kim, 2020, p. 3). Consistent with Scott and Bruce (1994), this dissertation acknowledges that employee innovative behavior can take place before, during, and after the process of innovation. Consequently, various previous reviews on employee innovative behavior (Bos-Nehles et al., 2017b; Kleysen and Street, 2001; Li and Zheng, 2014; Thurlings et al., 2015) have viewed employee innovative behavior as a multistage process that begins with problem recognition and idea generation, either novel or adopted, as shown in Table 1. However, Amabile (1988) cautioned that problem recognition and idea generation are related to creativity, which involves the production of useful and novel ideas at work. This dissertation, in line with Kwon and Kim (2020), has focused on the employee innovative behaviors pertaining to the intentional application, adoption, and implementation of novel ideas at work. The nucleus of employee innovative behavior is that an employee is able to adopt, implement, or make use of a creative idea (Kwon and Kim, 2020; Yuan and Woodman, 2010).

With the definition of employee innovative behavior presented above, it is important to examine employee innovative behavior on the study context of PSSs. The following section will elaborate further on this aspect.

2.4.2 Employee innovative behavior in PSSs

Although it seems to ring true that the main driving force of employee innovative behavior is competitive pressure among private sector organizations (Bysted and Jespersen, 2014), the same claim cannot be made for employees in PSSs (Osborne and Brown, 2013). Particularly,

as public sector innovation studies "form an important part of the backbone of what is variously known as evolutionary and neoSchumpeterian economics" Osborne and Brown, (2013, p. 75), limited attention has been paid to employee innovative behavior (Bos-Nehles et al., 2017a; Miao et al., 2018; Vivona et al., 2021).

The literature on employee innovative behavior in PSSs is divided into three types (De Vries et al., 2016): i.e., definitions and classifications (Li and Hsu, 2016b); fostering factors (Scott and Bruce, 1994); and abstract discussions of the consequences of such behavior (Lee, 2008). Given the aim of this study shown in the overall model (see Figure 1, Chapter 1), this dissertation focuses on fostering factors and consequences.

Among private sector innovation researchers and practitioners, there is consensus about the importance of bottom-up innovations, whereby innovation is generated and implemented by employees (Amundsen, 2019; Fagerberg et al., 2005; Swedberg, 2000). By contrast, Borins (2002, p. 468) noted that "the conventional wisdom in the public sector [is] that whatever innovation occurs comes almost exclusively from the top." In PSSs, the commonly reported type of innovation is top-down and innovation is deemed to be a passive process (Osborne and Brown, 2013). However, challenging the Weberian idealization of ideal bureaucracy, this dissertation, in line with Windrum and Koch (2008), Osborne and Brown (2013), and Sullivan et al. (2021), argues that public employees, especially those lower in a hierarchy, can champion innovation because its potential may be greater on the lower rungs. This is because employees low in the hierarchy "are specialists with a deep knowledge of their field, usually with professional training and qualifications" (Windrum and Koch, 2008, p. 14). Therefore, this dissertation limits its focus to such employees to examine fostering factors and consequences of their innovative behavior. Here, employees are understood to be qualified individuals in jobs where public organizations depend on their qualifications, quality, and motivation to provide services (Miao et al., 2018).

Since Schumpeter's time, organizations worldwide have relied on the expertise of R&D to face new challenges successfully (Abbey and Dickson, 1983). However, this view was later shown to have limitations because R&D units underrepresent the innovative activities and capabilities of public service organizations (Fagerberg et al., 2005). For instance, Fitjar (2015) proposed three main sources of innovation: customers, employees, and owner representatives. Employees are found to be a crucial element in the successful implementation of innovation (Rafique et al., 2021). In contrast, Rønning (2021) proposed four forms of public sector innovation: social, political, employee-driven, and user-driven innovation. Regardless of the form or the source, the common link is employees at work. Although they are not the only or most important sources or forms of innovation, their role in the public sector is unique (Rønning, 2021).

The importance of employees for service innovation and proposed various concepts concerning their key strategic role are highlighted in the literature (Li and Hsu, 2016b). For example, previous studies have shown that employees have a crucial part in driving innovation at work through various concepts such as practice-based innovation (Ellström, 2010), high-involvement innovation (Smith, 2018), shop-floor innovation (Nijhof et al., 2002), employee-driven innovation (Kesting and Ulhøi, 2010), and innovative behavior (Scott and Bruce, 1994). The common factor in these concepts is that innovation and the innovativeness of employees are not solely linked to R&D units or innovation-specific functions (Spender and Strong, 2010). The various concepts that have emerged support the view that novel and useful ideas and well as implementation are possible through individuals at work with novel ideas (Van de Ven et al., 1999). One crucial aspect that separates employee innovative behavior from other related concepts is that by definition, employee innovative behavior relates more clearly and directly to the behavioral aspect of work. Therefore, employee innovative behavior does not capture or focus on any specific output (De Spiegelaere et al., 2014). The implementation of novel ideas at work is to improve public services for the adopter, organization, or society (Bos-Nehles et

al., 2017a; Eun, 2020; Garg and Dhar, 2017; Rafique et al., 2021). Not surprisingly, employees are valued as the most important innovation resources in the public sector (Rønning, 2021). Hence, their behavior can greatly influence the innovativeness, growth, and success of a public organization (Afsar and Badir, 2017; Bysted and Jespersen, 2014; Lukes and Stephan, 2017; Riaz et al., 2018; Scott and Bruce, 1994). Consequently, this dissertation focuses on employee innovative behavior as a concept and a source of innovation in PSSs.

Remarkably, Bani-Melhem et al. (2018) argued that because of the changing socioeconomic environment, globalization, and increasing competing demands, the shift in focus to employees' innovative behavior has been termed an "essential prerequisite for organizational survival" (p. 1601). Nonetheless, positive employee innovative behaviors are increasingly important for PSSs, as utilizing their innovative capabilities has been shown to improve overall service quality, performance, competitiveness, and overall improvements in organizational outcomes (Afsar and Badir, 2017; Sullivan et al., 2021).

Research on employee innovative behavior has long been hampered by a double problem. First, as mentioned above, because previous studies have focused on the organizational or firm levels (Verhoest et al., 2007; Walker et al., 2011), research on individual employees' innovative behavior in PSSs organizations has been limited (Bos-Nehles et al., 2017b; Kwon and Kim, 2020). Second, most data have been from sources, such as R&D centers, knowledge-intensive firms (KIFs) (De Jong and Den Hartog, 2010), the private sector (Ramamoorthy et al., 2005), and leaders (De Jong and Den Hartog, 2007). All the above-mentioned data sources have well-known deficiencies. The meaning of R&D varies, as it can range from basic research to development work. In addition, R&D is just one among several important categories of innovation expenditure (Abbey and Dickson, 1983). Moreover, according to Rylander and Peppard (2005, p. 3), KIF "as an organizational category can … be analyzed from two perspectives." Therefore, KIF can refer to a classification of an organization, a commercial or

research organization, but can also differ in its meaning (Rylander and Peppard, 2005). The other data source, the private sector, indicates a clear lack of understanding of its employees' innovative behavior, as private employees are not under the same bureaucracy as public employees (Bos-Nehles et al., 2017a; Osborne and Brown, 2013; Sullivan et al., 2021). In addition, while Jafri (2010) argues that the ways leaders can enhance employee innovative behavior at work should be understood from the viewpoint of leaders, Bos-Nehles et al. (2017b) maintains that the focus should shift toward the viewpoints of individual regular employees.

In their research, Verhoest et al. (2007) challenged the doctrines of new public management (NPM) by arguing that employee innovative behavior in public sector organizations is influenced and triggered by more complex relationship factors. Examples of such complex relationship factors, though not limited to, are managerial autonomy, political pressure, market-like pressure, and proactive behavior (Bos-Nehles et al., 2017b; Verhoest et al., 2007). Battistelli et al. (2014) viewed employee innovative behavior as an essential factor in the implementation and improvement of public innovation, especially when workers are viewed as "resources that are rare, valuable, inimitable and non-substitutable … paired with an appropriate dynamic capability or organizing context that benefit the firm" (Aaltonen and Hytti, 2014, p. 160). Additionally, Lee (2008, p. 27) argued that it is vital to understand that "improvement often requires innovative behaviors among employees." Thus, as discussed above, this dissertation challenges and furthers previous studies, based on the view that it is essential to understand the fostering factors and consequences of individual PSSs' employee innovative behavior.

Fagerberg et al. (2005, p. 10) noted that openness to new ideas and solutions is "considered essential for innovation," because the fundamental characteristics of innovation include new combinations of existing skills, ideas, resources, and capabilities. It follows logically from this that such skills and capabilities are derived from resources such as employees who implement

novel ideas at work (Mutonyi et al., 2021). However, there are two crucial issues associated with lower hierarchy or bottom-up innovation in the public sector. First, bottom-up innovation is underreported and thus receives less attention (Miao et al., 2018; Windrum and Koch, 2008), which has ramifications for the correct measurement of public sector innovation and its contributions (Borins, 2006). As a spillover from the first critical issue, the second concerns policy. As bottom-up innovation goes unnoticed, the recognition it should earn in policy is misplaced in terms of resource allocation and responsibilities (Arundel et al., 2015).

For these reasons, there are three incentives for the focus of this dissertation. First, innovation research on the general agenda has predominantly taken the private sector employee perspective, neglecting public sector employees and their importance in the growth and development of public sector innovation (Osborne and Brown, 2013; Sullivan et al., 2021). Second, most previous studies have focused on macro-level approaches and on organizational- or group-level outcomes (Bos-Nehles et al., 2017b; Miao et al., 2018). As a result, there is a dearth of empirical research on the fostering factors and consequences of employee innovative behavior at the individual level in PSSs (Carlucci et al., 2020; Sung and Kim, 2021). Third, public sector studies have seen an increased need for the innovativeness of public sector employees (Borins, 2006; Hansen and Pihl-Thingvad, 2019) because they are key to championing positive change while accommodating organizational and societal goals (Rønning, 2021; Vivona et al., 2021). This is especially evident as "employees are the individuals who create and implement innovative solutions in organizations" (Purc and Laguna, 2019, p. 2). As such, their behavior is vital to innovation in PSSs (Garg and Dhar, 2017). Consistent with this view, Asurakkody and Shin (2018) maintained that to gain a comprehensive understanding of its importance, it is crucial to examine both the fostering factors and the consequences of employee innovative behavior, and employ advanced statistical techniques.

2.5 Review of employee innovative behavior in contemporary PSSs research

Following the overall dissertation model (Figure 1, Chapter 1), this chapter provides a literature review of current research on employee innovative behavior in PSSs.

This literature review briefly describes the current research on employee innovative behavior in PSSs. It is important to note that this review is limited to empirical articles from so-called PSSs research journals such as the *International Journal of Public Sector Management*, published between 2013 and 2020. It is acknowledged that the empirical study of employee innovative behavior dates further back than 2013. However, these studies are not included in the review for two reasons. First, the review should only include PSSs research. The 2013 pioneering PSSs study by Xerri and Brunetto (2013) is currently the most cited article on the topic; therefore, it provides the baseline for subsequent studies. Second, the review showed that articles published prior to 2013 have been cited in those published between 2013 and 2020. Consequently, the aim of this review has not been to provide an overall overview and summary of all studies but of current research. In total, 12 journals were used to identify relevant studies: *Public Personnel Management*, *International Journal of Innovation Management*, *Korean Journal of Policy Studies*, *Journal of Librarianship and Information Science*, *Australian Journal of Public Administration*, *International Journal of Public Sector Management*, *Leadership & Organization Development Journal*, *Public Administration Review*, *Sustainability*, *International Journal of Public Administration*, *The International Journal of Human Resource Management*, and the *Journal of Personnel Psychology*.

Although there may be other journals that could have been included in the review, it is hoped that the current review provides satisfactory insight and well-rounded representation of the literature. The 13 articles reviewed in Table 2 include the authors' name(s), the primary focus of the articles, fostering factors and consequences, methods, and study context. As mentioned

above, the categories reflect the overall dissertation model (see Figure 1) and establish the empirical basis for examining employee innovative behavior in PSSs.

Following the guidelines of Albury (2005) for PSSs, and those of Li and Hsu (2016b) based on a comprehensive review of employee innovative behavior, this dissertation chose the articles summarized in Table 2 based on three inclusion criteria consistent with the overall aim and three secondary objective(s). First, the term *employee innovative behavior* must be included in the article title. Second, the term *PSSs* could be identified or detected within the article. Specifically, studies of employee innovative behavior included keywords such as *innovative behavior*, *individual innovative behavior*, *innovative work behavior*, and *employee innovative behavior*. Studies of PSSs included keywords such as *public service*, *public sector services*, *public service innovation*, *public service management*, *public service organization*, and *public service industry*. The third inclusion criteria required empirical papers based on a sample of qualitative or quantitative data. Articles that did not meet all three of these inclusion criteria were excluded from the review. It is important to note that review articles, although empirical, are not included in Table 2 because these articles are summarized with the definitions in Table 1 (Chapter 2.4.1)

According to Kleysen and Street (2001), researchers interested in studying individual-level innovation are usually faced with the issue of finding a precise definition that suits the context. In addition to nuances in definitions (see Chapter 2.4.1), there are also variations in the primary focus of the study in relation to employee innovative behavior, fostering factors and consequences, methods employed in the study, and context. Table 2 includes a total of 13 articles that focus on contemporary employee innovative behavior research in PSSs. As mentioned above, the studies were published between 2013 and 2020, prompting the call for further empirical research (Sullivan et al., 2021).

Table 2: Literature review of current research on employee innovative behavior in PSSs

Author	Primary focus in relation to employee innovative behavior	Antecedents to employee innovative behavior	Consequences of employee innovative behavior	Methods	Study context
Cho and Song (2021)	To consider comprehensively organizational characteristics, task characteristics, and motivational factors in explaining innovative behavior and organizational citizenship behavior.	Cooperative culture Change management capacity Lack of organizational support Autonomy Role conflict Public service motivation	None	Hierarchical linear modeling—Quantitative	4070 public service officials in central and local governments in South Korea
Carlucci et al. (2020)	To explore empirically the relationships between organizational climate, organizations' openness to innovation, and innovative work behavior in the context of a public sector health-care organization.	Openness to innovation Organizational climate	None	PLS-SEM—Quantitative	560 hospital professionals in a large public Italian hospital
Eun (2020)	To explore factors that contribute to the innovative behavior of individual civil servants.	Public service motivation Private sector experience	None	Hierarchical linear modeling—Quantitative	4000 public servant employees in local and central governments in South Korea
Peng (2020)	To examine the relationships between job involvement, leader–member exchange, and innovative behavior of public librarians through SEM.	Job involvement Leader–member exchange	None	SEM—Quantitative	444 public librarians in Taiwan

Author	Primary focus in relation to employee innovative behavior	Antecedents to employee innovative behavior	Consequences of employee innovative behavior	Methods	Study context
Suseno et al. (2019)	To examine the roles of task characteristics, organizational social support, and individual proactivity on innovative work behavior in the public sector.	Task characteristics Social support Proactive personality	None	Conditional process analysis—Quantitative	154 government agency employees in Australia
Oppi et al. (2019)	To hypothesize a direct relationship between individuals' perceived creative self-efficacy, creative collective efficacy, and innovative work behavior.	Creative self-efficacy Creative collective efficacy	None	SEM—Quantitative	446 clinical managers in Italian public health-care organizations
Park and Jo (2018)	To explore the factors that affect innovative behaviors in the government sector.	Climate for innovation Leader–member exchange Proactivity	None	SEM—Quantitative	1011 Ministry of Education employees in South Korea
Miao et al. (2018)	Employs psychological empowerment theory to examine the underlying processes by which entrepreneurial leadership and public service motivation shape innovative behavior among civil servants.	Entrepreneurial leadership Public service motivation Psychological empowerment	None	Hierarchical linear modeling—Quantitative	59 public bureau department heads and their 281 immediate subordinates in China
Nazir et al. (2018)	To reveal how perceived organizational support serves as an imperative mediating process between leader–member exchange, tie strength, innovative organizational culture, and employee innovative behavior.	Leader–member exchange Tie strength Innovative culture Perceived organizational support	None	SEM—Quantitative	325 nurses in public sector hospitals in Jiangsu province in China

Author	Primary focus in relation to employee innovative behavior	Antecedents to employee innovative behavior	Consequences of employee innovative behavior	Methods	Study context
		Affective commitment			
Günzel-Jensen et al. (2018)	To examine the relationship between transformational, transactional and empowering leadership and the innovative behavior of public sector employees.	Transformational leadership Transactional leadership Empowering leadership	None	Multivariate regression—Quantitative	1647 employees in one Danish public hospital
Bos-Nehles et al. (2017a)	To explore the role of supervisors in supporting innovative work behavior by considering the unique challenges of knowledge-intensive public sector organizations and the conditions and characteristics of innovative work behavior in this context.	Knowledge-intensive public sector organizations characteristics	None	Exploratory case study—Qualitative	21 interviews of selected public members of the Netherlands Fire Services, including document analysis
Schermuly et al. (2013)	To investigate the process underlying the relationship between leadership and employees' innovative workplace behavior.	Leader–member exchange Psychological empowerment	None	SEM—Quantitative	225 employees in various PSSs in Germany
Xerri and Brunetto (2013)	To examine nurses' organizational commitment, organizational citizenship behavior and innovative behavior in the workplace.	Affective commitment Organizational citizenship behavior (individual) Organizational citizen behavior (organizational)	None	SEM—Quantitative	210 nursing employees in private and public hospitals in Australia
Notes: SEM – Structural equation modeling; PLS-SEM – partial least squares structural equation modeling					

In line with Table 2, four areas of the review are discussed in detail in relation to employee innovative behavior in PSSs: i) fostering factors; ii) consequences; iii) methods employed in the study; and iv) the study context.

Fostering factors

As shown in Table 2, previous studies have explored various fostering factors in relation to employee innovative behavior in PSSs. The pioneering study by Scott and Bruce (1994) set the premises on which subsequent research studied this behavior as a consequence of fostering factors related to work (e.g. Bani-Melhem et al., 2018; De Jong and Den Hartog, 2005; De Jong and Kemp, 2003; Montani et al., 2014; Ramamoorthy et al., 2005; Romero and Martínez-Román, 2012; Scott and Bruce, 1994). As shown in Table 2, all reviewed articles focused predominantly on fostering factors such as job involvement (Peng, 2020), proactive personality (Suseno et al., 2019), leader–member exchange (Park and Jo, 2018), and public service motivation (Eun, 2020). As suggested by Kwon and Kim (2020), the fostering factors in previous studies shown in Table 2 fall into three categories: i) organizational-level factors, such as cooperative culture (Cho and Song, 2021); ii) environmental-level factors, such as creative collective efficacy (Oppi et al., 2019); and iii) individual-level factors, such as psychological empowerment (Miao et al., 2018). There are three reasons why Kwon and Kim (2020) recommended that the study of employee innovative behavior in PSSs encompasses these three categories. First, to appreciate such behavior, it is important to understand the organizational-level factors that may promote or impede innovation. On this point, Kabasheva et al. (2015) maintained that although some organizational barriers can be overcome given the proper environment, others can produce long-term interference. Thus, organizational fostering factors are vital for the adoption and implementation of novel ideas at work (Chao et al., 2011). Second, in relation to environmental-level fostering factors, employees in PSSs must navigate the

"service triangle" of the complex power relationship between employees, managers, and customers (Rinne et al., 2012; Sullivan et al., 2021). These employees may have a higher risk of experiencing negative interactions with others at work (Van Knippenberg et al., 2004). Therefore, an organizational work environment or climate is ideal for observing the organizational capacity to innovate while encouraging employee innovative behavior (Carlucci et al., 2020; Sarros et al., 2008; Scott and Bruce, 1994). In addition, the effect of supportive employees can be particularly important (Sloan, 2012). Employees can also have an important effect on innovative activities at work, given the social intensity of the work environment for employees in service occupations, where the number and frequency of social interactions is high (Vivona et al., 2021). It has been shown that when work has high social intensity, colleagues have a strong influence on individual employees (Suseno et al., 2019; Tews et al., 2013). Third, as shown in Table 2, although studies have accounted for various individual fostering factors of employee innovative behavior in PSSs (e.g. Cho and Song, 2021; Nazir et al., 2018; Peng, 2020; Sung and Kim, 2021), there is still a need to examine them further (Ding et al., 2021; Osborne and Brown, 2013; Rafique et al., 2021; Sullivan et al., 2021; Suseno et al., 2019). Innovation scholars have suggested that the challenge of implementing novel ideas at work may prevent PSSs organizations from discovering innovative ways to facilitate, cultivate, and benefit from their employees' innovative behavior (Carlucci et al., 2020; Cho and Song, 2021).

Consequences of employee innovative behavior

As Table 2 shows, few studies have considered the consequences of employee innovative behavior in PSSs. Additionally, to the best of the author's knowledge, no previous studies have empirically examined the consequences of such behavior in PSSs. Hansen and Pihl-Thingvad

(2019, p. 935) argued that "employee innovative behavior is the first step towards public-sector innovation"; therefore, it is important to explain the comprehensive implications of this view to public managers, including both fostering factors and consequences by examining the complex milieus that surround innovation in PSSs (Asurakkody and Shin, 2018; Kwon and Kim, 2020; Li and Hsu, 2016b). For example, a concept analysis by Asurakkody and Shin (2018) sought to identify the fostering factors and consequences of nurses' innovative behavior. They maintained that identifying the consequences was crucial for further research on PSSs. The importance of studying consequences lies in the notion that they help solve "organizational problems, job productivity, lower levels of job burnout, job satisfaction, organizational commitment, organizational efficiency, and effectiveness" (Asurakkody and Shin, 2018, p. 241). In addition, reviewing employee innovative behavior in public and private services, Li and Hsu (2016b) found that employee innovative behavior often leads to positive consequences, such as enhanced service quality and improved organizational performance and core competencies. Such behavior helps organizations retain competitive advantage through their employees and improves job satisfaction. Despite these positive consequences, most studies have treated employee innovative behavior as "the endpoint of their study and focus on its influencing factors" (Li and Hsu, 2016b, p. 2827). As discussed above, previous studies have categorized fostering factors into three levels related to job demand resources: organizational, work environmental, and individual levels (Kwon and Kim, 2020). Although job demand resources encourage employee innovative behavior (Bani-Melhem et al., 2018), knowledge about how such behavior can influence the organization, work environment, and individuals, is lacking (Li and Hsu, 2016a). Surprisingly, although their review calls for further research on the consequences of employee innovative behavior, Li and Hsu (2016b) focused on fostering factors. In addition, Janssen (2004) introduced the innovation–fairness–stress model to investigate further the consequences of employee innovative behavior, stating that "the focus

on determinants of innovative behavior has meant that little attention has been given to the consequences of innovation for individual employees who invest comprehensive and demanding efforts in taking an innovative approach" (p. 211). However, although subsequent studies have stressed the importance of examining the consequences of employee innovative behavior (i.e. Asurakkody and Shin, 2018; Li and Hsu, 2016b), minimal efforts have been made to conduct empirical studies of PSSs such as those shown in Table 2.

Methods employed in studies of employee innovative behavior in PSSs

Table 2 shows a variety of analysis methods used in the literature. For example, five out of the 13 articles used SEM to analyze the sample data. Another three articles used hierarchical linear modeling. Apart from Carlucci et al. (2020), who used PLS-SEM, the studies employed conditional process analysis, multivariate regression, and an exploratory case study.

One of the objectives of this dissertation is to explore the benefits of using more advanced research techniques to analyze the fostering factors and consequences of employee innovative behavior in PSSs. This is especially important, as Carlucci et al. (2020) argued that advanced statistical techniques would strengthen investigations of hypothesized relationships and advance knowledge of employee innovative behavior.

Study context

In relation to study context, Hansen and Pihl-Thingvad (2019) contended that "more work is needed to highlight how public managers encourage innovation in their organizations … which happens in complex networks of employees, citizens, users, and other stakeholders" (p. 935).

As can be seen in Table 2, five of the 13 articles focused on hospitals, another four focused on government agencies, and the rest considered various PSSs contexts such as a libraries, education, and fire services. Accordingly, the review in Table 2 shows that knowledge on employee innovative behavior in PSSs remains the subject of ongoing theoretical discussion and a knowledge gap, as "greater insights may be developed … in a wider range of countries and with a wider variety of public organizations" (Voss et al., 2005, p. 191).

2.6 Summary of the theoretical framework

To summarize, the overall aim of this dissertation *is to contribute new knowledge and understanding of employee innovative behavior in PSSs*. Consequently, the purpose of the theoretical framework has been to provide an overview of the theoretical background. The discussion of the theoretical framework explains how previous studies have investigated the topic, including methods and study contexts (see Table 2, Chapter 2.5). Because of the limited attention given to PSSs, however, several calls for more research on the subject have been made (Rafique et al., 2021). In addition, the theoretical framework has revealed knowledge gaps, such as a lack of empirical studies on the consequences of employee innovative behavior. Consequently, this dissertation aims to extend our understanding of such behavior in PSSs and fill some remaining knowledge gaps.

First, although previous studies in PSSs have predominantly focused on the fostering factors of employee innovative behavior, such as public service motivation (Eun, 2020), leader–member exchange (Peng, 2020), and climate for innovation (Park and Jo, 2018), there is a call for further research on fostering factors (Kwon and Kim, 2020). This is especially evident, as today's unpredictable environment has forced PSSs to accelerate innovation and innovative solutions in their service delivery to improve effectiveness and efficiency (Cho and Song, 2021).

Accordingly, Rafique et al. (2021) emphasized that employee innovative behavior in PSSs is "crucial for innovation in organizations and organizational innovations in such dynamic and continuously changing environment that demands innovations for continuous growth and sustainability". Although Table 2 (Chapter 2.5) shows variations in the literature on fostering factors, innovation scholars urge further examination of the topic (Cho and Song, 2021; Suseno et al., 2019). This dissertation is a response to this call.

Second, although previous studies have stressed the importance of empirical research on the consequences of employee innovative behavior in PSSs, as it can influence overall work performance, effectiveness, efficiency, and competitive advantage (Li and Hsu, 2016b), these studies remain scarce (see Table 2, Chapter 2.5). Previous studies have found that identifying the consequences of employee innovative behavior is vital for extending our understanding of this crucial concept (Arundel et al., 2019) because employee innovative behavior can emerge in incremental adaptations of existing work processes, services, or products, or it can manifest as an entirely new practical solution (Miao et al., 2018). Research "may help develop innovative behavior assessment tools [or] further research framework[s]" (Asurakkody and Shin, 2018, p. 243). As Table 2 (Chapter 2.5) shows, despite the theoretical framework, the consequences of innovative behavior remain underexplored. This is an indication of a vast knowledge gap for this dissertation to fill.

Third, because PSSs employee "innovative behavior has emerged as a crucial concept for scholars, practitioners, and policymakers in different fields" (Asurakkody and Shin, 2018, p. 243), advanced statistical techniques are required (Carlucci et al., 2020). Rafique et al. (2021) argued that advanced statistical techniques are "the best option when supposition cannot be matched … when research models are complex." Although the majority of previous studies on employee innovative behavior have employed quantitative methods (see Table 2, Chapter 2.5), innovation scholars call for more studies to employ more advanced statistical techniques in this

research area (Carlucci et al., 2020; Rafique et al., 2021). Therefore, this dissertation considers the benefits of advanced statistical techniques for empirical examinations of employee innovative behavior in PSSs.

To that end, this dissertation contributes to the current knowledge pool by examining public employee (*perspective*) innovative behavior in PSSs. Specifically, this dissertation contributes with new empirical knowledge on how employee innovative behavior can be cultivated in PSSs. Moreover, employee perspectives on employee innovative behavior in PSSs contribute to theory and provide managerial and policy implications for PSSs organizations.

The next chapter discusses the methodological foundations of this dissertation, including its four appended papers.

3 Methodology

"Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No. Commit it then to the flames, for it can contain nothing but sophistry and illusion."

Hume (2000)

In their book *Ways of Knowing,* Moses and Knutsen (2012) noted that however we regard the scientific world, there exist different ways of knowing the nature of reality because "the scientific process is not driven solely by the ideals of impartial and measured dialogue, drawing on empirical and rational support" (p. 1). Instead, there are variations of roads taken in securing scientific knowledge (Okasha, 2016). Thus, the aim of this chapter is to provide the methodological foundations of this dissertation, detail the philosophical background, and explain the methodological foundations of the four appended papers.

3.1 Methodological foundations

The word philosophy originates from Greek, and has two parts: *philo,* which translates as love, and *Sophia*, which translates as wisdom (Gale, 1984). With these parts combined, philosophy entails a *love of wisdom*. The philosophy of science can then be understood as the *love of the wisdom of science*. Philosophy is defined as the use of abstract ideas and beliefs during research, while the philosophy of science is concerned with methods of scientific discovery (Delanty and Strydom, 2003). In truth, "science is a method of inquiry, about the things and structure of the world" (Machamer, 1998, p. 1). According to Nyeng (2010), the philosophy of science is about

understanding what research is, and research is about producing knowledge. It is presumed that pursuing scientific ideas or science itself is a fast-paced activity (Okasha, 2016).

Delanty and Strydom (2003, p. 14) discussed philosophy of science by noting that it is a "reflexive activity" and that because there exist numerous degrees of reflexivity, there are various ways to study a phenomenon. There are three foundations pertaining to naturalist social science: ontology, epistemology, and methodology (Moses and Knutsen, 2012). Briefly, ontology is the study of reality, whereby the real world exists independently of our perceptions (Okasha, 2016). From this ontological position, epistemology, the study of the nature of knowledge, seeks to document the regularities that occupy naturalists through accumulated associations or correlations to study the realities of the world (Moses and Knutsen, 2012). Naturally then, methodology is "the logic behind the methods we choose" (Mehmetoglu and Jakobsen, 2017, p. 2). In line with Moses and Knutsen (2012), *methodology* is understood to be the basic and more comprehensive *toolboxes*, whereas *methods* refers to the *tools* and problem-specific *techniques* employed in understanding truth. Therefore, to reveal and explain the regularities of the real world and gather scientific knowledge from it, statistical methods are applied to empirical observations (Moses and Knutsen, 2012).

There are two more central methodological perspectives: naturalism and constructivism (Hempel, 1966; Ricoeur, 1981). Naturalism is occupied with the discovery and explanation of patterns assumed to exist in nature; therefore, it relies profoundly on knowledge generated through sensual perceptions (Moses and Knutsen, 2012). Moreover, naturalism understands truth through logic and reason, which can be supported by direct experiences (Locke, 1847). On the other hand, constructivism is occupied with observing society to construct patterns in social reality and truth is drawn from sense perception and experience (Bryman, 1984). This being so, various factors such as individual and social characteristics can alter the way the world is perceived (Davidson, 1963). Consistent with this view, Moses and Knutsen (2012, p. 11)

stated that “truth lies in the eye of the observer.” In addition, an emergent approach—scientific realism—seeks to fill the gap between naturalism and constructivism (Leplin, 1984). Scientific realism has yet to distinguish itself ontologically, although it is occupied both with examining the real world independent of direct experiences and observing patterns that occur (Cherryholmes, 1992). As such, scientific realism operates with various layers of reality (Smart, 2014).

Although the two central methodology perspectives—naturalism and constructivism—have some similarities, such as the search for truth, they differ greatly in terms of how they search for that truth (Moses and Knutsen, 2012). Note that naturalism in an academic context can be recognized under numerous names, such as positivism, empiricism, or behavioralism (Creswell and Creswell, 2018; Mehmetoglu and Jakobsen, 2017; Moses and Knutsen, 2012). Although they bear different names, they have the same meaning and take the same basic methodological positions (Moses and Knutsen, 2012). In line with Moses and Knutsen (2012), this dissertation has chosen the more neutral and descriptive term *naturalism* to capture the core naturalist characteristics of methodology described in this dissertation. As mentioned above, the reason for choosing a naturalist perspective is that this dissertation is concerned with explaining the patterns of fostering factors and consequences of employee innovative behavior presumed to exist in PSSs.

For a naturalist, the process of evaluating truth should satisfy various criteria for the evaluation of the produced knowledge’s reliability (Bryman, 1984). There are a myriad of such criteria, including predictive capacity, validity of data, and falsification of data. In addition, there are many variations in the methods used to analyze and test knowledge (Moses and Knutsen, 2012). In the footsteps of the founding fathers of naturalism, Hume (1748/2000) and Locke (1847), this dissertation considers the naturalist philosophy of social science, following the deductive model (Moses and Knutsen, 2012), which captures both the theoretical foundations of studied

phenomena to make assumptions (claims), and the empirical study (test) reveals the truth about a phenomenon (Moses and Knutsen, 2012). This is often represented as a causal relationship: X → Y (Mehmetoglu and Jakobsen, 2017). In line with Moses and Knutsen (2012), this dissertation has used hypothesis development to test empirically and explain various fostering factors and their consequences for employee innovative behavior in PSSs. Naturally, the algebraic expression for the methodology of this dissertation can be summarized as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

In this algebraic *scientific* expression, the dependent variable is known as Y, and independent variables as $X_{1,2}$. $\beta_{1,2}$ are coefficients that show the strength of the corresponding independent variable (X) in explaining observed variation in Y. In addition, α is a constant, while ε is error. In summary, the algebraic expression implies a linear relationship between X and Y.[2]

Hume (1748/2000) maintained that because the world is filled with many regularities and repetitions, it is important that these regularities are identified and communicated. Therefore, the methodological lenses of this dissertation and its four appended papers focus attention on these regularities among public employees in PSSs. In addition, with the scientific method, there are two ways to identify regularities in naturalism (Moses and Knutsen, 2012). One way is through experiment by testing and controlling for causal and temporal relationships (Thye, 2014; Webster and Sell, 2014). The other way is through nonexperimental methods, which involve systematic comparisons of observed data (Stone-Romero and Rosopa, 2008; Thrane, 2020b). There are three ways by which a naturalist can search for truth with the nonexperimental method: statistical methods, comparative methods, and case studies (Moses and Knutsen, 2012). In view of the theoretical models presented in the four appended papers,

[2] For further reading on the algebraic expression, I recommend the book by Mehmetoglu and Jakobsen (2018) *Applied Statistics using Stata: A Guide for the Social Sciences*.

this dissertation chose a statistical method, which is a nonexperimental scientific approach. To avoid unnecessary confusion, it is important to note that terms such as *causal*, *effect*, and *correlation* are used interchangeably in the four appended papers, as these terms refer to the naturalistic approach of understanding regularities in the real world.

Under statistical methods, we find two traditions: descriptive and inferential (Moses and Knutsen, 2012). Briefly, descriptive statistics are the conventional statistical tools used to describe a distribution, whereas inferential statistics are the more complex tool used for predictions and hypothesis testing (Mehmetoglu and Jakobsen, 2017; Thrane, 2020a). Moreover, inferential statistics have two main types of regression analysis: bivariate and multivariate (Mehmetoglu and Jakobsen, 2017). Bivariate analysis is single correlation analysis, while multivariate, as its name suggests, relates to multiple correlation analyses (Thrane, 2020b). In line with the guidelines of Mehmetoglu and Venturini (2021) and Sarstedt et al. (2022), this dissertation uses the inferential method and multivariate regression, because the theoretical models in the four appended papers were all based on a deductive research approach.

Moses and Knutsen (2012, p. 92) expressed the view that the *basic regression* model has become a staple tool of modern scientific analysis. The basic regression model consisted of bivariate and multivariate regression. Since the 1980s, the use of statistics has seen steady growth and development, parallel to problems and violations pertaining to the basic regression model (Snyder, 2019). The development was not only in the field of econometrics, as it quickly spread to other social science disciplines, such as human science, psychology, and sociology (Bagozzi and Yi, 2012). Among these issues were improvements "of so-called 'structural equation models' that allow researchers to incorporate systematic hypotheses about measurement error and missing variables into a wide variety of models" (Moses and Knutsen, 2012, p. 93). Harmonious, Brown (2015) and Mehmetoglu and Jakobsen (2017) also

recommended structural equation models as a way to incorporate systematic hypotheses, reveal measurement error, missing variables, and data shortages, and deal with complexity.

Today, there are numerous methodological approaches and statistical techniques that allow statisticians to address various issues related to data shortages, complex models, and advanced analysis (Marsden and Wright, 2010). For example, the best known generalized statistical technique is ordinary least squares (OLS), which estimates the parameters of a regression model by minimizing the sum of the squared residuals (Dempster et al., 1977). Over the years, more complex forms of OLS regression have emerged (Marsden and Wright, 2010), such as multivariate regression (Alexopoulos, 2010), hierarchical regression analysis (Schafer, 1991), hierarchical linear modeling (HLM) (Woltman et al., 2012), conditional process analysis (CPA) (Hayes, 2017), SEM (Ringle et al., 2015a), partial least squares (PLS) regression (Mateos-Aparicio, 2011), and partial least squares structural equation modeling (PLS-SEM) (Hair et al., 2011). Consequently, refinements and improvements to the basic regression model were inevitable (Thrane, 2020a).

In short, multivariate regression is used when there are more than one independent variable for analysis and where simple linear regression is ineffective (Alexopoulos, 2010). Hierarchical regression analysis involves a process of adding or removing predictor variables from the regression model in steps (de Jong, 1999). In contrast, HLM is a common statistical technique when the cases in the data have a nested structure (Woltman et al., 2012). CPA is "used when your goal is to understand and describe the conditional nature of the mechanisms by which a variable transmits its effect on another and testing hypotheses about such contingent effects" (Hayes, 2017, p. 395). There are two types of SEM: covariance-based SEM (CB-SEM) and PLS-SEM. CB-SEM is often referred to as SEM. However, in this dissertation, in line with Hair et al. (2017), the term CB-SEM is preferred to avoid confusion. CB-SEM is "primarily used to confirm (or reject) theories … it does this by determining how well a proposed theoretical

model can estimate the covariance matrix for a sample data set" (Hair et al., 2017, p. 4). CB-SEM is a statistical technique that "allows one to estimate the relationship between a number of independent variables and more than one dependent variable at the same time" (Mehmetoglu and Jakobsen, 2017, p. 294). In doing so, one can not only use observed variables in any analysis but concurrently use a multiple-equation technique to place latent variables on both sides of the equation (Ringle et al., 2015a). PLS regression was later introduced to battle multicollinearity issues in a regression model, an approach that is suited for predictive purposes where the aim is to find "principal components that explain X and are also the best for explaining Y" (Mateos-Aparicio, 2011, p. 2308). As PLS-SEM is similar but not equivalent to PLS, it is a composite-based SEM method "that offers researchers much more flexibility in terms of data requirements and specifying even highly complex models with multiple mediators and moderators" (Sarstedt et al., 2020, p. 290). PLS-SEM is "primarily used to develop theories … by focusing on explaining the variance in the dependent variables when examining the model" (Hair et al., 2017, p. 4). PLS-SEM is currently the most prominent and advanced composite-based SEM approach in social science methodological research (Hwang et al., 2020).

Previous studies have discussed the numerous advantages and disadvantages of the abovementioned statistical techniques. For example, although the advantage of multivariate regression is its widespread use in machine learning algorithms in mathematics (Finn, 1974), scholars have argued that the multivariate technique can be too complex and can require high-level mathematical calculations (Imai, 2011). Osborne (2000) noted that although HLM is advantageous for directly incorporating substantive multilevel theory into a model, McNeish et al. (2017, p. 122) maintained that it "requires many explicit assumptions and is not always robust to violations." Moreover, comparing CPA to PLS-SEM, Sarstedt et al. (2020, p. 291) distinguished two limitations of CPA "(1) [it is] confined to estimating singular model structures in isolation, and (2) [it] ignore[s] the diluting effect of measurement error."

As mentioned above, the two main approaches in SEM are CB-SEM and PLS-SEM (Hair et al., 2017). Previous studies contain various scholarly debates on the advantages and disadvantages, similarities, and differences between these approaches (e.g. Bagozzi and Yi, 2012; Hair et al., 2014; Richter et al., 2016; Ringle et al., 2015a). Hair et al. (2017, p. 22) cautioned that neither was superior to the other and "neither of them is appropriate for all situations." This is because the strengths found in PLS-SEM can easily become limitations for CB-SEM, and vice versa (Hair et al., 2018). However, there are various aspects that differentiate the two. For example, CB-SEM focuses on explaining covariations through common factor scores (Davcik, 2014), a technique shown to differ from "the theoretical concepts that are the focus of research" (Hair et al., 2017, p. 16). For this reason, a large gap in validity occurs between the intended concept and the measured concept (Deng et al., 2018). However, PLS-SEM focuses on composites, using proxies to represent the chosen constructs (Hair et al., 2017), a method that assumes equal weighting of the presumed indicators to form the composite (Sarstedt et al., 2022). Thus, PLS-SEM is often referred to as composite-based SEM (Hair et al., 2014), whereas CB-SEM is often termed covariance-based SEM. Moreover, CB-SEM is often assessed with model fit indices (Richter et al., 2016) to modify and alter model specifications, such as by deleting variables, which can ultimately lead to rejection of the initial hypothesized model (Deng et al., 2018; Mehmetoglu and Jakobsen, 2017). Conversely, PLS-SEM easily incorporates various measurement models into complex structural models (Hair et al., 2017). Because PLS-SEM is a nonparametric method, there are no distributional assumptions concerning the data, making it suitable for small sample sizes and well equipped for complex data or large samples (Venturini and Mehmetoglu, 2017). While the PLS-SEM algorithm technique focuses on composites, the parameter estimates offer a high level of statistical power compared with CB-SEM (Hair et al., 2017; Ringle et al., 2020; Sarstedt et al., 2019). Although scholars praise PLS-SEM as good for small sample sizes and nonnormal

data, and because it can accommodate formative and reflective measured latent variables (Hair et al., 2011), studies have found that the misuse of PLS-SEM has been on the rise as scholars believe that they can explain any research problem with this technique (Zeng et al., 2021). In addition, while CB-SEM offers an established global goodness-of-fit criterion to measure model fit indices adequately, PLS-SEM currently does not (Sarstedt et al., 2019). However, Hair et al. (2017, 2019) offer various recommendations and rules of thumb for evaluating PLS-SEM measurement and structural models. Overall, although CB-SEM and PLS-SEM are suited for different research contexts, if the goal is to test or confirm a theory or to compare alternative theories, CB-SEM is recommended (Brown, 2015; Mehmetoglu and Jakobsen, 2017). However, for prediction or identification of key constructs, PLS-SEM is favored (Hair et al., 2017, 2019; Purwanto, 2021). Therefore, PLS-SEM is "the preferred method when the research objective is theory development and explanation of variance (prediction of the constructs)" (Hair et al., 2017, p. 17).

Recent studies have shown that the popularity of PLS-SEM as an advanced statistical technique is on the rise (Zeng et al., 2021) because it can be used to estimate various advanced models, and the approach is both robust and relatively easy (Mehmetoglu and Venturini, 2021). Agreeing with this view, Hair et al. (2017) and Ringle et al. (2020) suggested that PLS-SEM is a key tool for multivariate analysis because it provides less contradictory results than other regression analysis techniques, such as CB-SEM, HLM, and CPA (Sarstedt et al., 2019).

As mentioned above, the third secondary objective of this dissertation pertains to advanced quantitative research techniques (see Chapter 1). While reviewing employee innovative behavior research in PSSs, Thurlings et al. (2015, p. 464) asserted that "it would also be valuable to use more advanced quantitative research techniques, such as structural equation modeling or other path analysis approaches." In another recent review on PLS-SEM in social and management research, Purwanto (2021, p. 114) argued that studies applying quantitative

methods or using statistical techniques that are "partial least sound," would benefit greatly from the power and robustness of PLS-SEM. In addition, while examining employee innovative behavior in public health organizations, Carlucci et al. (2020) proposed PLS-SEM as an advanced statistical technique to extend knowledge on fostering factors and consequences of employee innovative behavior in PSSs. Consequently, in line with Carlucci et al. (2020), Hwang et al. (2020), and Hair et al. (2017), this dissertation focused on the most prominent and advanced composite-based SEM approach, namely PLS-SEM, as a statistical technique for analyzing data for the four appended papers.

Over several years, many specialized statistical software packages for PLS-SEM have been developed in line with improvements of the basic regression model to facilitate this statistical technique (Mehmetoglu and Jakobsen, 2017; Ringle et al., 2015b; Sanchez, 2013; Thrane, 2020a). Examples of these are R, Stata, and SmartPLS. Recently, Mehmetoglu and Venturini (2021) advanced the debate on statistical software by detailing and illustrating how R and Stata can be used to perform PLS-SEM. In this dissertation, and in line with Venturini and Mehmetoglu (2017), two statistical software packages were used: Stata and SmartPLS, because both were available at the author's workplace. Mehmetoglu and Jakobsen (2017, p. 16) add that Stata is "statistical software that contains a comprehensive and continuously updated/upgraded list of built-in analytical … and data management features," in addition to user commands enabled by Stata programming language (Venturini and Mehmetoglu, 2017). SmartPLS is a graphical user interface software package that utilizes PLS path models for analysis (Hair et al., 2017; Ringle et al., 2015a). In their recent review, Sarstedt and Cheah (2019, p. 200) noted that the SmartPLS software "is currently the most comprehensive software for conducting PLS-SEM analyses." In practice, there is little difference between R, Stata, and SmartPLS in PLS-SEM analysis other than their commands and software language. Ultimately the choice depends on personal preference (Hair et al., 2021b; Mehmetoglu and Venturini, 2021; Ringle et al.,

2015b; Venturini and Mehmetoglu, 2017). Most PLS-SEM researchers are moving from Stata to SmartPLS because it is primarily for this purpose (Hair et al., 2011; Sarstedt and Cheah, 2019). However, Stata and R work just as well (Hair et al., 2021b; Venturini and Mehmetoglu, 2017). Consequently, in line with Mehmetoglu and Venturini (2021) and Sarstedt and Cheah (2019), Stata software was used in this study for Papers I and II, and SmartPLS for Papers III and IV. This choice followed a logical development where the author personally sought to acquire statistical software knowledge and skills, as can be seen in the four appended papers.

The PLS-SEM analyses are evaluated in two steps (Hair et al., 2017)[3]. The first step involves examining a set of criteria for the measurement model, which can be reflective or formative (Hair et al., 2019). Briefly, formative measurement models deal with exogenous latent variables where the direction of causality is from the observed variables to their respective constructs (Hair et al., 2014). In contrast, reflective measurement models deal with endogenous latent variables where the direction of causality is from the constructs to their observed variables or claims (Venturini and Mehmetoglu, 2017). Suffice it to note that all four papers of this dissertation used reflective measurement models (see the appended papers for further details). When the measurement model assessment is satisfactory, the second step is to assess the structural model (Hair et al., 2020). Then, if mediating or moderating relationships are included in the model estimations, they can be analyzed based on the PLS-SEM results (Mehmetoglu and Venturini, 2021; Sarstedt et al., 2020). Finally, to check the robustness of the results, observed and unobserved heterogeneity are tested (Hair et al., 2018). Hence, in line with the rules of thumb of Hair et al. (2018), the four papers report assessments of the quality of the measurement and structural model results, using the above two-step approach.

[3] For more detail on PLS-SEM, I recommend the book by Hair et al. (2017), *A Primer on Partial Least Square Structural Equation Modeling (PLS-SEM)*, 2nd edition.

Under any chosen research design and choice of method, “lies a researcher’s (often implicit) understanding of the nature of the world and how it should be studied” (Moses and Knutsen, 2012, p. 1). In this way, important research questions concerning the nature of truth, certainty, and objectivity are easily addressed (Locke, 1847).

For nonexperimental statistical methods, one common way of exploring the nature of truth, certainty, and objectivity is through questionnaires or surveys (Goertzen, 2017; Moses and Knutsen, 2012). These are a systematic method of collecting data from a sample of individuals in an identifiable group (defined by criteria such as membership of an organization and their interests or geographical location) to provide a statistical description of the population from which the sample is drawn (Mehmetoglu and Jakobsen, 2017; Thrane, 2020b). Using surveys to collect data dates back to early censuses of populations (Stanton, 1998) and the method is still widely used today in both research and everyday life (Davino and Fabbris, 2013). To collect data, surveys are conducted through standardized questionnaires (Goertzen, 2017). A questionnaire or a survey instrument can be a written document administered in person, by mail, by phone, or online (Marsden and Wright, 2010). The aim of a survey is often to generalize results to the population to test predictions (Davino and Fabbris, 2013). They often include predetermined claims concerning the features of a large sample (Marsden and Wright, 2010). When utilized well, surveys can use the information gathered to draw general conclusions about the population (Goertzen, 2017). This is also known as formulating projections or broad-based conclusions (Bryman, 1984). Other benefits of surveys pertain to cost effectiveness and efficiency, as surveys can reach many respondents in a short time (Goertzen, 2017). Although there are many advantages of survey research, it has some disadvantages, such as inflexibility, respondents answering strategically, and limitations concerning respondents’ interpretations of items (Creswell and Creswell, 2018). Nevertheless, surveys are by far the most widely used data collection method in the social sciences (Ringdal, 2013).

There are various types of surveys. For instance, in the social sciences and in the study of employee innovative behavior, cross-sectional surveys are the most widely used method of collecting data (Li and Hsu, 2018). Cross-sectional surveys are often completed at one point in time (Levin, 2006). Another type is longitudinal surveys, which permit a researcher to make observations over an extended period of time (Goertzen, 2017). Scholars' preferences for cross-sectional or longitudinal surveys depend on the purpose of the research and the time allotted (Rindfleisch et al., 2008). Consequently, based on the timeframe and the methodological foundations of this dissertation, a cross-sectional survey is a natural choice for gathering data for the four papers.

Statistics in the study of social phenomena are used to examine events that have already occurred; therefore, it is concerned with the manipulation of collected data in a conceptual model (Moses and Knutsen, 2012). Statistical methods cannot control for all possible variables, but only selected ones that are known to exert influence (Thrane, 2020b). Consequently, the four papers in this dissertation each focus on selected variables to explore the fostering factors and consequences of employee innovative behavior in PSSs. The papers all utilized a cross-sectional online survey for data collection. The research design of the four papers is described below.

3.2 Research design in the four appended papers

Although statistical methods are widely used in the social sciences (Mehmetoglu and Jakobsen, 2017), they are seldom used to analyze employee innovative behavior in PSSs (Kwon and Kim, 2020; Osborne and Brown, 2013; Sullivan et al., 2021). Specifically, De Vries et al. (2016) called for more variety in research methods, giving priority to scientific methods, as previous studies were *theory poor*. They underlined the need for more cross-sectoral studies in

innovation. Likewise, Carlucci et al. (2020) echoed a call for further research on employee innovative behavior in PSSs with more advanced statistical techniques for data analysis. The four appended papers aim to fill this methodological gap by extending the use of advanced statistical techniques in employee innovative behavior research in PSSs, contributing knowledge on the benefits of inferential statistics and multivariate analyses in the PLS-SEM research method.

As summarized in Table 3, all four appended papers employed PLS-SEM, but differ in their purposes and empirical database. Table 3 shows the purposes of the studies, the data collection, and analytical methods as well as the data source. The empirical data are derived from three PSSs: transport, higher education, and health. A more detailed overview of the research designs of the four papers is provided below.

Table 3. Overview of the four appended papers and their empirical foundations

Paper	Purpose of the study	Data collection	Analytical method	Data source
I	To examine the factors that foster individual innovative behavior in the public sector by examining the effects and roles of empowering leadership, work group cohesiveness and individual learning orientation.	Online survey	Inferential statistics—Multivariate regression, PLS-SEM	96 employees in a public transportation organization in Norway
II	To examine the role of psychological capital among employees in the higher education sector.	Online survey	Inferential statistics—Multivariate regression, PLS-SEM	250 employees in public higher education institution in Norway
III	To examine empirically how hospital employees' individual innovative behavior is fostered by focusing on direct and indirect relationships of organizational culture, psychological capital and organizational commitment.	Online survey	Inferential statistics—Multivariate regression, PLS-SEM	1008 employees in public health organization in Norway
IV	To examine factors with potential impacts on individual employee innovation in hospital organizations.	Online survey	Inferential statistics—Multivariate regression, PLS-SEM	1008 employees in public health organization in Norway

Paper I

Paper I is titled *Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: empirical evidence from Norway*.

As shown in Table 3, Paper I is based on data from 96 employees in the Norwegian public transportation sector. The empirical data were gathered using an online survey. In March 2016, the author contacted managers from various offices in the public transportation sector and was fortunate that a number permitted their subordinates to participate in the proposed research. The

author then constructed a questionnaire using Google Forms as a platform for gathering data. Next, the intended study and data management plan was reported to the NSD for legal approval, guaranteeing to ensure voluntary participation and anonymity. After it was granted legal approval, two experts in the field and eight randomly selected individuals completed a pretest. The purpose of the pretest was to ensure overall quality of the research design, content validity, readability and clarity of the items. Based on the results, the items were amended. The final questionnaire included study items and demographic and personal characteristics such as age, gender, level of education, cumulative years with the current organization and total work experience in the public sector. After that, the questionnaire was ready to send to respondents via. The respondents received the survey link through work email addresses provided to the author by their managers. The link was sent to 256 employees in various departments of the public transportation organization and yielded 96 completed and usable surveys.

There are various reasons for sampling the public transport sector, which has grown steadily (Atabani et al., 2011), partly because of its increased competitiveness but also because of the increased pace of globalization (Chan and Daim, 2012). Western developed countries, such as Norway, have experienced accelerated technology implementation in transport (Koasidis et al., 2020; Ryghaug and Toftaker, 2016; Tether, 2003). As a global leader in innovative solutions in the transport sector (The Explorer, 2020), countries such as Norway has used employee innovative behavior as a strategic tool to address current and future environmental changes and to meet societal needs and expectations (Fernandez and Moldogaziev, 2013; Mouwen, 2015; Vivona et al., 2021). Research on the public transport sector has often centered on technology (Atabani et al., 2011; Chan and Daim, 2012), customers and customer management (Dell'Olio et al., 2011; Mouwen, 2015; Ryghaug and Toftaker, 2016; Sindakis et al., 2015), environmental challenges (Dulal et al., 2011), quality management (Friman, 2004), and policy (Koasidis et al., 2020; Ong et al., 2012), but neglected the views of public transport employees and ways to

cultivate employee innovative behavior at work (Orcutt and AlKadri, 2009; Sullivan et al., 2021). Consequently, new knowledge on employee innovative behavior among public transport sector employees is needed.

Paper II

Paper II is titled *Employees' psychological capital and innovative behavior in higher education*.

Paper II acquired empirical data from 250 employees in public sector higher education in Norway. The empirical database in this paper was constructed from online survey responses. The data for this paper are part of a larger study completed in 2018. In February 2018, a questionnaire was developed consisting of 41 questions and statements. The questionnaire was first sent to the NSD for legal approval. In addition, the study was legally approved by the rector and the human resource director of the higher education institution. This was necessary to guarantee anonymity and voluntary participation. After the legal approval was granted, a pretest was conducted by three academic experts. The three academic experts provided sufficient constructive feedback to revise and improve the overall quality of the questionnaire. The online questionnaire gathered data though the Checkbox platform (Checkbox Survey, 2021). The link to the questionnaire was distributed to a total of 1335 public higher education employees and yielded a total of 250 usable surveys.

There are various reasons for choosing public higher education faculty as a sampling unit. Windrum and Koch (2008) stated that "parts of the public sector are among the most knowledge-intensive in the economy, and play a central role in the creation and distribution of knowledge in society" (p. 6). One such aspect is public higher education. In an era of knowledge organization, the value of public higher education is the ability to generate, share, and store

knowledge (Santo, 2005). Mufeed and Gurkoo (2006) argued that the increasingly competitive environment today pressures public higher education institutions to keep up with global, national, and local changes. The challenges they face include economic, political and societal challenges (Brewer and Brewer, 2010; Decramer et al., 2013). In Norway, for instance, Andersen (2021) reported that many institutions had to adapt abruptly and rapidly to online teaching because of the COVID-19 pandemic using tools such as Zoom or Google Teams, services that prior to the COVID-19 pandemic were seldom used. Indeed, owing to the rapid changes brought about by the pandemic, many Norwegian public higher educational institutions have experienced a new era of adaptation to change, such as online teaching (Schei, 2020; Tejedor et al., 2021). Research in public higher education has predominantly focused on managerial factors such as organizational culture (Tierney, 1988), knowledge management (Brewer and Brewer, 2010; Lee and Choi, 2003; Moss et al., 2007; Santo, 2005), performance (Khalid et al., 2019), students as customers (Luthans et al., 2016; Ogunmokun et al., 2021), and service quality (Sultan and Yin Wong, 2012). Consequently, the study of employee innovative behavior in public higher education can offer new knowledge on flexibility and readiness to adapt to a constant changing environment (Decramer et al., 2013; Rego et al., 2012).

Papers III and IV

Paper III is titled *Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees*.

Paper IV is titled *The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour.*

Papers III and IV are based on empirical data from 1008 public health employees in Norway. The database was compiled from an online survey. In January 2018, initial contact was established between the Director of Research (DOR) of the hospital in question and me. Several emails were exchanged to present a general idea of the intended study, following online and physical meetings to establish a mutual interest in the proposed research. Following immense interest from the DOR and division and the department managers, the construction of the survey was initiated. The study was first submitted to the NSD for the legal approval. Subsequently, because the study was intended to be conducted among public health employees, the Data Protection Officer of the hospital must approve it. This is in line with data protection protocols in Norway. After the legal approvals were authorized, the next phase was distributing information about the survey to hospital employees. It is important to note here that all the communication with the hospital was through the DOR, which distributed all the information pertaining to the study to the division and department managers, who forwarded it to the employees. In this way, the author adhered to the requirements of the Data Protection Officer and guaranteed full anonymity and voluntary participation. Before the launch of the online survey, several pretests were conducted to improve the overall quality of the questionnaire. Suffice it to note here that the survey was developed through several workshops, meetings with academic experts, and meetings at the site of the study. The final questionnaire was distributed through a platform called Nettskjema (University of Oslo, 2021). Seven (7) staff units and ten (10) divisions participated in the study. It is important to note that the units and divisions were selected in consultation between the DOR, the human resources management office, and senior managers. A total of 2000 hospital employees were invited to participate in the study, and 1008 (n = 1008) provided valid responses.

There are various reasons for choosing the public sector health for the study. Public health can be viewed as a broad services system that highlights the complex nature of health services that

must be integrated and managed (Windrum and Koch, 2008). This view of health as a service system entails that service innovation includes all innovations that affect the relationship between service providers (i.e., employees) and service users (i.e., clients or consumers) (Länsisalmi et al., 2006). Consequently, the roles of health sector employees and their innovative behaviors are crucial in improving performance (Asurakkody and Shin, 2018), improving quality (Carlucci et al., 2020), providing competitive advantage (Casida and Pinto-Zipp, 2008) and ensuring the effectiveness and the efficiency of resource use (Länsisalmi et al., 2006; Oppi et al., 2019). Research on employee innovative behavior in public health has predominantly focused on organizational climate (Carlucci et al., 2020), creative self-efficacy (Oppi et al., 2019), innovative culture (Nazir et al., 2018), empowering leadership (Günzel-Jensen et al., 2018), and organizational citizenship behavior (Xerri, 2013). Consequently, further studies on employee innovative behavior in public health could offer new understandings of its pivotal role in success at work.

In conclusion, as shown in Table 3, these four papers utilized surveys for data collection, applied inferential statistical approaches, and employed PLS-SEM to analyze data. In addition, the papers are all based on empirical data from three areas of PSSs: transport, higher education, and health. Moses and Knutsen (2012, p. 93) noted that for a naturalist, one problem with statistical approaches such as surveys "is their inability to examine causal mechanisms" because causality is imperceptible (Hume, 1748/2000). Because statistical methods focus on variables and correlations, the particular contexts of the empirical observations and their relationships are invisible (Hume, 1748/2000). However, the original argument for employing advanced statistical methods in this dissertation holds as they support the validation and reliability of the study (Hair et al., 2020; Mehmetoglu and Jakobsen, 2017). The validation of applied research methods is elaborated below.

3.3 Validation of research method

To ensure the quality of the research, demonstrate its methodological rigor, and communicate the trustworthiness of its findings (Brown, 2015), it is important to consider two essential elements: reliability and validity (Bagozzi and Yi, 2012). Marsden and Wright (2010) suggested various criteria for trustworthy research findings: clear objectives and sound procedures for data collection, analysis, and drawing conclusions. However, Brown (2015) argued to extend these suggestions, contending that they are inadequate for drawing conclusions about the trustworthiness of research. This is because the reliability and the validity of studies could be tainted by contextual factors pertaining to the social, political, or individual context (Mehmetoglu and Jakobsen, 2017). For that reason, in social sciences, and especially with nonexperimental statistical methods, it is imperative to assess the stability and the consistency (reliability) of measurements and determine whether the correct concept has been measured (validity) (Thrane, 2020a). The four papers described above all used surveys to gather data; therefore, their reliability reveals the extent to which complementary results can be produced in various contexts, assuming there are no alterations (Bagozzi and Yi, 2012). As noted above, reliability is measured by both stability and consistency (Hair et al., 2019). However, validity is evaluated internally and externally (Hair et al., 2017). Internal validity controls for context and represents a degree of certainty regarding hypothesized correlations (Hair et al., 2020). By contrast, external validity tests the degree to which the data can be trusted and the generalizability of findings to the wider world (Hair et al., 2020).

It is important to note that survey research and samples often have high external validity, but low internal validity (Thrane, 2020a). Although the procedures to test for reliability and validity (internal and external) differ depending on the statistical techniques and methods used (Brown, 2015), this study has consistently followed the recommendations of Hair et al. (2017), using

PLS-SEM for multivariate analysis to assess reliability and validity. Specifically, (as noted in Chapters 3.1 and 3.2), this dissertation and the four papers utilized reflective models. Consequently, it is important to evaluate the measurement model first and then the structural model (Benitez et al., 2020).

To assess the reflective measurement model, the author examined convergent validity, internal consistency reliability, and discriminant validity. Convergent validity is the extent to which a variable correlates positively with alternative variables used to measure the same construct. This was evaluated using variable loadings and average variance extracted (AVE) (Hair et al., 2019). Internal consistency reliability provides estimates of a construct's reliability based on the magnitude of intercorrelations among the observed variables, which were evaluated by their composite reliability and Cronbach's α (Hair et al., 2019). Discriminant validity is the extent to which one construct is distinct from others, and as suggested by Hair et al. (2017), it was assessed using the heterotrait–monotrait (HTMT) ratio of correlations between constructs. The HTMT test is to ascertain that the 95% confidence interval of the HTMT value does not include the value of 1 (Hair et al., 2018).

Before the structural model was assessed, collinearity between the latent variables was examined using the variance inflation factor (VIF) (Hair et al., 2020). All VIF values less than 2 indicate no multicollinearity issues. Moreover, to identify any misspecifications in the PLS-SEM structural models, the author followed three main guidelines proposed by Hair et al. (2017) for testing model fit indices against the empirical data. First, the model's in-sample predictive power for the endogenous constructs is examined with the coefficient of determination, R^2. Second, to evaluate changes in R^2 when an item is omitted from its latent variable, effect size f^2 was used to evaluate the impact. According to Hair et al. (2017), the impact values can differ. For example, a value of 0.02 is small, 0.15 is moderate, 0.35 is large,

and values below 0.02 indicate no impact. Third, after assessing the model's in-sample predictive power, the author evaluated its out-of-sample predictive power, Q^2. As mentioned above, PLS-SEM method was used to analyze the reflective models in all four papers. Thus, to obtain Q^2 values, the blindfolding method was used to obtain cross-validated redundancy values (Hair et al., 2020). Moreover, predictive relevance values differ when measuring Q^2, where 0.02, 0.15, and 0.35 indicate small, moderate, or large effects, respectively.

Furthermore, all four papers examined mediating effects to investigate the underlying correlations and effects of the proposed mediated relationships. Mediation occurs when a third variable, called a mediator variable, intervenes and causes change between two related constructs (MacKinnon et al., 2007). Specifically, mediation analysis "assumes a sequence of relationships in which an antecedent variable affects a mediating variable, which then affects a dependent variable" (Nitzl et al., 2016). To test proposed mediation relationships, I followed the guidelines of Hair et al. (2017) and Zhao et al. (2010) in regard to PLS-SEM models. Specifically, to test mediation in PLS-SEM, these authors recommend a bootstrapping test to assess how a third variable intervenes between two related constructs and a significance test to determine whether the direct and indirect effects are statistically significant (Hair et al., 2017). The combination of bootstrapping and significance testing determines whether there exist direct effects only—without mediation, no-effect nonmediation, complementary mediation, competitive mediation, or indirect-only mediation. To determine the type of mediation or nonmediation with PLS-SEM, a series of analyses is required (Nitzl et al., 2016). First, significance testing of the indirect effect of the independent variable (X) on the mediator variable (M). If there is no significant effect, the next step is to test the significance of the direct effect on the dependent variable (Y). If this is not significant either, we have a case of no-effect mediation. However, if the direct effect, Y, is significant but not the indirect effect of X on M, this is direct-only mediation. On the other hand, if the indirect effect of X on M is significant

but the direct effect on Y is not, this is a case of indirect-only mediation, also known as full mediation. Furthermore, if the indirect effect of X on M is significant, and the direct effect on Y is significant, but the total effect of X, M and Y is negative and points in the opposite direction, this shows competitive mediation. Lastly, complementary mediation occurs if the direct effect of X on M and the direct effect of Y are both significant, and the total effect of X, M and Y is positive and points in the same direction. See Hair et al. (2017) for further illustrations and details on the different types of mediation and nonmediation.

In addition to mediation analysis, two of the papers (II and III) use a multigroup analysis. While testing for hypothesized relationships can be sufficient for PLS-SEM models, it is suggested that possibly statistically significant differences between individual group models be examined through a multigroup test (Hair et al., 2018). First, the two types of heterogeneity—observed and unobserved—should be tested for (Hair et al., 2018). Respondents and organizations can differ; thus, assuming homogeneity in data characteristics can yield misleading results (Sarstedt et al., 2011). Therefore, "it is important to identify, assess, and, if present, treat heterogeneity in the data" (Hair et al., 2017, p. 290). Briefly, observed heterogeneity occurs when observed differences between two or more groups of data are linked to observable characteristics, such as demographic variables (i.e., age, gender, tenure, or education) (Sarstedt et al., 2019). Unobserved heterogeneity is not dependent on observable characteristics or a combination of these; therefore, heterogeneity is rarely known *a priori* (Streukens and Leroi-Werelds, 2016). Hair et al. (2017, p. 291) have suggested various ways to manage observed and unobserved heterogeneity, such as "when heterogeneity is present, significantly negative and positive group-specific effects can cancel each other out when analyzed on the aggregate data level and suggest the absence of a significant relationship." In this dissertation and its appended papers, the author tested for unobserved heterogeneity using the finite-mixture PLS-SEM technique, as recommended by Hair et al. (2018), to reveal heterogeneity. Second, a multigroup analysis was

performed to test the individual group models for measurement invariance and statistically significant differences in the parameters of the structural models (Papers II and III). In the multigroup analyses in Papers II and III, the author tested for observed heterogeneity using chosen subsamples in variables such as tenure, employee type, and work experience, by dividing the sample into two groups intended for the analysis (see Papers II and III for full details).

To summarize, it is imperative to evaluate the quality of measurement and structural model results to ensure the quality of research, demonstrate rigor in the methodological processes, and communicate the trustworthiness of its findings (Brown, 2015; Hair et al., 2020; Mehmetoglu and Jakobsen, 2017).

As this chapter dealt with methodology, the next chapter provides the main findings of the four appended papers in this dissertation. Note that for a detailed understanding of the findings or methods, the author recommends reading the four appended papers of this dissertation in full.

4 Main findings of the four appended papers

This chapter summarizes the most important findings in each of the four appended papers and describes how they are linked. Note that for detailed results, please read the papers. Moreover, as noted above, all four papers have been published in leading international journals ranked either level 1 or 2 by the NSD.

4.1 Paper I

Mutonyi, B. R., Slåtten, T. & Lien, G. (2020). Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: empirical evidence from Norway. *International Journal of Public Leadership,* 6(2), 175–197.

The purpose of this study was to examine empirically the factors that foster individual innovative behavior in the public sector by considering the effects and roles of empowering leadership, work group cohesiveness, and individual learning orientation in public employees' innovative behavior. Using a sample of 96 public transportation employees in Norway, a model and hypothesized relationships were proposed. After the collection of data through an online survey, the proposed hypothesized relationships were analyzed using PLS-SEM.

One main finding of this paper was that the empowering leadership style and learning orientation had a significant relationship with public employees' individual innovative behavior. The study also revealed the important role of learning orientation in mediating the proposed relationships, which is consistent with previous studies that found similar results among employees and their supervisors in information technology (e.g. Zhang and Bartol, 2010). The contribution of this study is its finding that employee innovative behavior is an

important strategic tool for successful innovation in PSSs. This paper offers new insights into factors fostering innovative behavior among public transportation employees. In addition, the findings affirm the importance of a balanced leadership style that encourages learning and in turn fosters employee innovative behavior at work.

4.2 Paper II

Mutonyi, B. R. (2021). Employees' psychological capital and innovative behavior in higher education. *International Journal of Quality and Service Sciences*, 13(2), 198–215.

The purpose of this paper was to examine the role of psychological capital, psychological empowerment, and organizational culture among public employees in public higher education. For this purpose, a conceptual model was developed and tested on 250 university employees. PLS-SEM was used to analyze the empirical data.

The findings revealed the vital role of psychological capital in the relationship between psychological empowerment and innovative behavior, as well as the important effect of organizational culture on employee innovative behavior in public higher education. The findings are consistent with those of previous studies of employees in various industries such as the technology and manufacturing industries in Taiwan (e.g. Hsu and Chen, 2015). The findings of this study illuminate employee innovative behavior in PSSs by uncovering psychological capital as a vital indicator of investment in employees' innovative capabilities at work. Thus, this paper contributed new knowledge on the symbiotic nature of organizational culture in cultivating employee innovative behavior and enhancing the capabilities of public higher education institutions.

4.3 Paper III

Mutonyi, B. R., Slåtten, T. & Lien, G. (2021). Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees. *BMC Health Services Research*, 21(1), 470.

The purpose of this study was to examine hospital employee innovative behavior empirically by focusing on the direct and indirect relationships of organizational culture—here labeled *internal market-oriented culture* (IMOC)—psychological capital and organizational commitment. A model was proposed from a sample of 1008 hospital employees, and the data were analyzed using PLS-SEM.

One of the main findings of this paper is the importance of investing in and managing employees' psychological capital, which is consistent with those of previous studies conducted among university teaching staff in China (e.g. Sun and Huang, 2019). In addition, the study found organizational commitment to be a consequence of employee innovative behavior at work. The findings of this study contribute to knowledge of employee innovative behavior in PSSs by showing IMOCs to be a crucial accelerator of innovative capabilities that yields outcomes such as organizational commitment. Cultivating an IMOC welcomes innovative activities at work. This study adds to our current understanding of fostering factors such as psychological capital and IMOC and their consequences, such as organizational commitment, of employee innovative behavior in PSSs. This paper was a pioneering study that empirically examined the consequences of public health employee innovative behavior in PSSs.

4.4 Paper IV

Slåtten, T., Mutonyi, B. R. & Lien, G. (2020). The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour. *BMC Health Services Research*, 20(1), 1096.

The purpose of this study was to examine factors that may foster public health employees' innovative behavior in public health sector. A conceptual model was developed and tested on 1008 health employees. Using PLS-SEM, the empirical data were analyzed, and conclusions drawn.

The findings of this paper revealed the vital role of individual creativity on employee innovative behavior at work. The findings were consistent with those of previous studies of health workers in Jimma zone and Jimma town administration (e.g. Mesfin et al., 2020). Interestingly, the role of leadership autonomy support was revealed to be crucial as it mediated several hypothesized relationships. The findings of this study contribute knowledge about employee innovative behavior in PSSs by investigating the effect of perceived leadership autonomy support on the implementation of novel ideas at work. Thus, this paper contributed knowledge on the complex pattern of links in the hypothesized relationships and the influential and multifaceted role of leadership autonomy support in public employees' innovative behavior in the public health sector.

4.5 Connections of the four papers linked in this dissertation

The four appended papers and their main findings are summarized below in Table 4, which shows the author's name(s), the title of the paper, the main findings, the contributions, and the author's (individual) contributions to the papers of this dissertation. As mentioned above, it is

important to note that Paper I focused on public transportation, Paper II focused on higher education, and Papers III and IV focused on public health. The common factor is employee innovative behavior in PSSs. Therefore, and as shown in Table 4, these papers reflect the overall aim of this dissertation: *to contribute new knowledge and understanding of employee innovative behavior in PSSs*.

Table 4: Summary of the four appended papers

Paper	Title	Findings	Contribution	Author's (individual) contributions to the four papers of this dissertation
I	Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: empirical evidence from Norway	Empowering leadership and learning orientation are related to innovative behavior. Individual learning orientation mediates the relationships between empowering leadership and individual innovative behavior.	Offers new insights into the factors that foster individual innovative behavior in the public transportation sector. The findings reveal the importance of using a balanced leadership style and encouraging learning in the workplace for individual innovativeness by public leaders.	First author. Contributed to the preparation, development, and draft of the manuscript, as well as being responsible for all revisions.
II	Employees' psychological capital and innovative behavior in higher education	Psychological capital and psychological empowerment have a direct positive relationship with innovative behavior. Psychological capital mediates the relationship between innovative behavior and psychological empowerment.	Adds to knowledge of psychological capital in the context of the public higher education sector. The findings in this paper highlight the importance of investing in and managing employees' psychological capital in higher education.	Sole author. Single-handedly prepared, developed and drafted the manuscript, conducting all statistical analyses, interpreting of data, and revising the manuscript.
III	Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees	Organizational culture and psychological capital are related to innovative behavior.	Extends and adds to current research on the consequences of public health employees' innovative behavior, namely organizational commitment.	First author. Contributed to the preparation, development, and draft of the manuscript, as well as leading the revisions of the manuscript.

IV	The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour	Leadership autonomy support has an influential and multifaceted impact on employees' innovative behavior.	Reveals a complex pattern of links between innovative behavior and leadership autonomy support, creativity and psychological capital among public health employees.	Second author. Contributed to the development of the questionnaire, data collection and general input into the manuscript, in addition to primary responsibility for all revisions.

The purpose of this chapter was to present the main findings of these papers and provide an overview of how they are linked. The next chapter discusses the theoretical, practical and policy implications of this dissertation in relation to the overall model shown in Figure 1 (see Chapter 1).

5 Discussion and implications

This chapter summarizes the contributions of this dissertation by discussing the theoretical implications, practical implications, and implications for policymakers. First, the overall theoretical contributions of this dissertation are introduced. Second, the practical implications are discussed, and implications for policymakers are considered. Note that for a detailed understanding of the contributions, I recommend reading the four appended papers.

As mentioned in Chapter 1, the overall aim of this dissertation *is to contribute new knowledge and understanding of employee innovative behavior in PSSs*. As discussed in Chapter 3 and 4, there are far fewer studies of employee innovative behavior in PSSs in the public sector than in the private sector (Jiang and Iles, 2011; Lim, 2010). Therefore, Cho and Song (2021) called for more research focusing on PSSs employees and the importance of facilitating employee innovative behavior for nurturing service quality delivery and improving the performance of public organizations. In addition, Suseno et al. (2019) called for more research on employee innovative behavior in PSSs, in arguing the vital role it plays in improving PSSs organizations' "ability to operate and deliver efficient and high-quality services in an increasingly challenging climate" (p. 41).

To the best of author's knowledge, and as revealed in the literature review (see Chapter 2.5), this dissertation is a pioneering empirical contribution on fostering factors and the consequences of employee innovative behavior in PSSs. Consequently, this dissertation contributes new knowledge and understanding to the ongoing conversation on employee innovative behavior in PSSs (Bos-Nehles et al., 2017b; Kwon and Kim, 2020; Kör et al., 2021; Nazir et al., 2019; Vivona et al., 2021). Specifically, this dissertation offers three contributions: i) a better understanding of the fostering factors of employee innovative behavior in PSSs; ii) new knowledge on the consequences of this behavior; and iii) new knowledge on the benefits of

advanced research techniques in this area. Each of the three contributions is elaborated below, under their respective subchapters. It is important to note that the contributions of this dissertation are based on the main findings in Chapter 4.

5.1 Research contributions—fostering factors of employee innovative behavior in PSSs

The contributions of this dissertation and papers relate to the first of the secondary objectives (see Chapter 1), *to extend our understanding of the fostering factors of employee innovative behavior in PSSs.*

Innovation in PSSs is intended to achieve various goals, such as increased effectiveness and efficiency in service delivery (Eun, 2020). PSSs organizations must also address societal issues such as unemployment or obesity, increase customer satisfaction, involve citizens and private partners in decision-making processes and pursue other major or minor goals (De Vries et al., 2016). Many of these "roadblocks" can be removed through innovation (Bason, 2018), specifically by employee innovative behavior in PSSs (Miao et al., 2018; Palmer, 2006). For example, in their recent book on public employees, Sullivan et al. (2021) argued that it is crucial to extend our understanding of factors that foster this behavior to recognize how to cultivate, nurture, and encourage it. Consequently, by empirically examining fostering factors, this dissertation improves our understanding of their role.

Kwon and Kim (2020) argued that it is advantageous to study employee innovative behavior at various levels, contending that employee innovative behavior, although it is studied as an individual-level factor, is influenced by fostering factors at three levels, i), organizational, ii), environmental, and iii), individual. This is because the vital outputs of employee innovative behavior can be key strategic tools for successful innovation, service quality delivery,

efficiency, performance, and competitive edge in modern PSSs (Sullivan et al., 2021; Sung and Kim, 2021). In line with Kwon and Kim (2020), this dissertation contributes with fostering factors at these three levels as discussed below. It is important to note that details regarding definition and theories of the fostering factors are elaborated in depth in the four papers that constitute this dissertation.

5.1.1 Organizational fostering factors

As shown in Table 2 (Chapter 2.5), studies of the fostering factors of employee innovative behavior in PSSs at the organizational level have examined factors such as lack of organizational support (Cho and Song, 2021), organizational climate (Carlucci et al., 2020), innovative culture (Nazir et al., 2018), and organization justice (Nazir et al., 2019). Previous studies have devoted insufficient attention to the role of organizational-level fostering factors (Kwon and Kim, 2020). Consequently, Cho and Song (2021), Günzel-Jensen et al. (2018), and Bos-Nehles et al. (2017a) have called for more research on employee innovative behavior in PSSs.

Previous studies of these topics have claimed that much remains to be learned (Rafique et al., 2021; Sung and Kim, 2021). Hence, this dissertation and its four papers extend the literature on four distinct organizational-level fostering factors of employee innovative behavior in PSSs: i) empowering leadership, Paper I (Mutonyi et al., 2020); ii) organizational culture, Paper II (Mutonyi, 2021); iii) IMOC, Paper III (Mutonyi et al., 2021); and iv) leadership autonomy support, Paper IV (Slåtten et al., 2020). These factors were found to be positively related to employee innovative behavior in PSSs. Their relationships reveal the central role of these four organizational-level fostering factors in nurturing employee innovative behavior in PSSs, which in turn can improve overall service innovation and service quality delivery in PSSs. For

instance, Kabasheva et al. (2015) maintained that although some organizational barriers to employee innovative behaviors can be overcome given the proper environment, others can lead to long-term interference with innovative activities at work. Therefore, organizational factors that promote the innovative behavior of employees are vital for the adoption and implementation of novel ideas at work (Chao et al., 2011).

Furthermore, the relationships proposed in the four papers were further supported by previous studies in both the private and public sectors. However, in terms of PSSs, and to the best of author's knowledge, no previous studies of PSSs had examined these relationships. Thus, previous studies that supported the proposed findings in the private and public sectors sparked a much-requested conversation on employee innovative behavior in PSSs (Suseno et al., 2019; Vivona et al., 2021; Xerri, 2013). For instance, this dissertation and papers observe that empowering leadership and leadership autonomy support can be very beneficial for employee innovative behavior in PSSs because they reduce dependency on superiors for ongoing decision-making, directives, and management in daily work (Mutonyi et al., 2020). Furthermore, the influence of empowerment in PSSs benefits the relationship between leaders and their subordinates because subordinates perceive the potential barriers to innovation being removed by their leaders (Slåtten et al., 2020). Moreover, the contributions of this dissertation and papers demonstrate that through mediating factors, collaborative or competitive organizational cultures have positive relationships with employee innovative behavior in PSSs (Mutonyi, 2021). In addition, studies of IMOC have revealed that the visible and tangible characteristics of an organizational culture require not only training and opportunities but also a genuine interest in employees' work lives (Mutonyi et al., 2021).

The findings of this dissertation and papers in examining organizational-level fostering factors is consistent with previous scholarly discussions on the importance of empowering employees in PSSs (e.g. Günzel-Jensen et al., 2018). The papers advance knowledge on how public

managers can cultivate empowered employees who improve PSSs organizations' innovation activities (Battistelli et al., 2014).

In summary, this dissertation extends the literature by demonstrating how the four distinct organizational-level factors outlined in the four papers can foster employee innovative behavior in PSSs.

5.1.2 Environmental fostering factors

Employees in PSSs must navigate the "service triangle," which is the complex power relationship between employees, managers, and customers (Rinne et al., 2012; Sullivan et al., 2021). These employees may have a higher risk of experiencing negative interactions with others, such as coworkers (Van Knippenberg et al., 2004). Therefore, to maintain the organizational capacity to innovate while encouraging and nurturing employee innovative behavior in PSSs, cohesiveness among workers is required (Arshad et al., 2019). Therefore, this dissertation considered environmental-level fostering factors, as recommended by Kwon and Kim (2020).

As Table 2 (Chapter 2.5) shows, previous studies were concerned with environmental factors, such as organizational climate (Carlucci et al., 2020), social support (Suseno et al., 2019), and creative collective self-efficacy (Oppi et al., 2019). There has been limited research on environmental fostering factors; therefore, it is unsurprising that in their recent book, Sullivan et al. (2021) call for further research on such factors.

In a work setting, previous studies have revealed both negative and positive aspects of environmental fostering factors, such as work group cohesiveness (Hogg, 1992). For instance, Mullen and Copper (1994) found that the quality and the cohesion of a work group could

significantly alter employee innovative behavior at work. Moreover, (Pierce and Delbecq, 1977) maintained that employees' attitudes and behaviors could predict organizational innovation; therefore, the quality and cohesion of work groups would greatly influence the positive or negative outcomes of innovative activities at work (Amabile et al., 2005). Studies on work group cohesiveness and its role in employee innovative behavior have mainly focused on private organizations (Forsyth, 2018; Scott and Bruce, 1994; Wang et al., 2006). To the best of author's knowledge, Paper I (Mutonyi et al., 2020) was a pioneering empirical examination of the relationship between work group cohesiveness and employee innovative behavior in PSSs. Notably, despite previous findings showing a generally positive relationship (Amabile et al., 2005; Anderson and West, 1998; Hülsheger et al., 2009), this hypothesis in Paper I (Mutonyi et al., 2020) was not supported.

Research on environmental-level fostering factors has requested further investigation into the relationship between work group cohesiveness and employee innovative behavior in PSSs (Mutonyi et al., 2020), on the grounds that theory and knowledge on these proposed relationships in PSSs remain scarce (Hogg, 1993; Mutonyi et al., 2020). In addition, scholars have argued that to create positive work group cohesion, workers must feel psychologically safe in their workplace (Hülsheger et al., 2009). This is one of many challenges faced by employees in PSSs because such organizations are often known to embody a culture of control, rules and bureaucracy, instead of trust, learning and autonomy (Podger, 2015). Therefore, the cohesion of the group will not lead to positive outcomes as long as its members experience performance inadequacy issues (Mutonyi et al., 2020). Consequently, the role of environmental factors such as work group cohesiveness needs further exploration.

The contribution of the empirical examination of work group cohesiveness on employee innovative behavior in PSSs in this dissertation and Paper I (Mutonyi et al., 2020) advances knowledge on how public managers can develop and improve a psychologically safe

environment that promotes and inspires positive work group cohesiveness. The paper and dissertation thus demonstrate the importance of creating a culture and a climate of trust, learning, and autonomy that increase the cohesion of the work environment of PSSs.

5.1.3 Individual fostering factors

Employee innovative behavior is a valuable strategic tool for maintaining organizational competitiveness and performance in PSSs by leveraging their dynamic capabilities (Kör et al., 2021). Consequently, employee innovative behavior in PSSs is regarded as vital for improving innovative capabilities and successful organizational innovation (Bos-Nehles et al., 2017b; Mutonyi et al., 2020). Therefore, Li and Hsu (2016b) state that when these employees perceive their workplace to be a learning organization that is supportive, innovative, creative, and autonomous, employees may feel safe and free to generate, adopt, and implement novel ideas without fear of punishment or failure. However, individual fostering factors are key in strengthening, cultivating, and nurturing such behavior. Thus, consistent with the recommendations of Kwon and Kim (2020), this dissertation and papers studied three individual fostering factors: individual learning orientation, in Paper I (Mutonyi et al., 2020); psychological capital, in Papers II and III (Mutonyi, 2021; Mutonyi et al., 2021); and individual creativity, in Paper IV (Slåtten et al., 2020).

As Table 2 (Chapter 2.5) shows, previous studies have explored individual factors such as job involvement (Peng, 2020), proactive personality (Suseno et al., 2019), creative self-efficacy (Oppi et al., 2019), and psychological empowerment (Miao et al., 2018; Schermuly et al., 2013). Although previous studies have accounted for various individual factors in employee innovative behavior, PSSs studies call for yet more empirical work on the subject (Rafique et al., 2021; Sung and Kim, 2021; Vivona et al., 2021). In addition, to the best of author's knowledge, the

appended papers of this dissertation are unique pioneering studies. As such, their contributions extend our current knowledge and understanding of individual factors in employee innovative behavior.

The four papers found positive relationships between individual factors and employee innovative behavior in PSSs, revealing their vital role in improving service quality and delivery, service efficiency, productivity, and increased service innovation (Arundel et al., 2019; Bason, 2018; Shanker et al., 2017; Sullivan et al., 2021). For example, Choi and Chang (2009) found that an organization's ability to adapt to the continuous changes in modern economies and environments is largely dependent on individual employees and their innovative behavior at work. The contributions of this study reveal the positive and significant role of individual learning orientation in employee innovative behavior in PSSs (Mutonyi et al., 2020). This is consistent with Sujan et al. (1994), who suggested that individual learning orientation can foster employee innovative behavior at work through learning. Facilitating a learning environment where employees feel encouraged and motivated to engage in innovative activities and behaviors is of great value to organizational performance and sustainability (Aboobaker and Ka, 2021). Therefore, Paper I (Mutonyi et al., 2020) investigates individual learning orientation and its effect on cultivating employee innovative behavior in PSSs.

This study reveals that the individual-level fostering factor of psychological capital is positively and significantly related to employee innovative behavior in PSSs in multifaceted ways (Mutonyi, 2021; Mutonyi et al., 2021; Slåtten et al., 2020). This is consistent with the findings of Sun and Huang (2019), who explored Chinese teachers' psychological capital and employee innovative behavior. Sun and Huang (2019) maintained that to foster employee innovative behavior in PSSs, the psychological capital of employees is key. This study explores the proposed relationships and offers a broader understanding of the role of psychological capital in employee innovative behavior in PSSs. Similarly, Luthans et al. (2007) and Sullivan et al.

(2021) cautioned that the challenge of finding creative sources of novel ideas at work could prevent organizations from discovering innovative ways to benefit from and cultivate the psychological capabilities of employees that nurture innovative behavior. Moreover, Hsu and Chen (2015) proposed that encouraging positive employee innovative behavior reduces this risk. Therefore, Papers II, III, and IV (Mutonyi, 2021; Mutonyi et al., 2021; Slåtten et al., 2020), find that individual fostering factors in PSSs, such as psychological capital, are of great importance in cultivating the employee innovative behavior on which successful innovation largely depends (Choi and Chang, 2009).

The four papers appended to this dissertation reveal that the role of the individual factor of individual creativity in employee innovative behavior in PSSs is positive and significant. This conclusion is further supported by previous studies in both the private and public sectors. However, to the best of author's knowledge, no previous studies have examined the proposed relationship in PSSs, as Paper IV does (Slåtten et al., 2020), or considered the same study context. Nevertheless, previous studies on the relationship between individual creativity and employee innovative behavior are important, as studies on individual-level fostering factors of employee innovative behavior in PSSs are much needed. For instance, Rego et al. (2012) argued that for private sector service organizations to benefit fully from their employees' capabilities, it is essential to tap into their creative potential. In addition, Slåtten and Mehmetoglu (2015) have emphasized the importance of individual creativity and termed it a primary source of employee innovative behavior at work. The same is true in the PSSs sector. For example, Gilmartin (1999) illustrates the criticality of creativity by describing it as "the fuel of innovation" in PSSs organizations. Therefore, Paper IV (Slåtten et al., 2020) on individual creativity sheds light on its important role in cultivating employee innovative behavior in PSSs, as individual creativity encourages employee innovative behavior. Hence, Paper IV explains

how public managers in PSSs can acquire and nurture employees who are confident in their innovative capabilities at work (Yan et al., 2020).

In conclusion, based on the discussion above, this dissertation and the four published papers show how organizational, environmental, and individual fostering factors can cultivate employee innovative behavior in PSSs.

The next section is a theoretical discussion of how this dissertation and Paper III (Mutonyi et al., 2021) elucidate the consequences of employee innovative behavior in PSSs.

5.2 Research contributions—consequences of employee innovative behavior in PSSs

The contributions of this dissertation and its four appended papers relate to the second of the secondary objectives of this dissertation (see Chapter 1), *to add new knowledge on the consequences of employee innovative behavior in PSSs.*

It has been claimed that successful innovation in PSSs is achieved by employees and their innovative behavior at work (Rafique et al., 2021; Vivona et al., 2021). An empirical examination of the consequences of employee innovative behavior may offer insights into why this is the case (Kwon and Kim, 2020). Through an empirical examination, this dissertation extends current knowledge on these consequences. It is important to note that the definitions and theoretical discussion of such consequences are found in the four appended papers.

As revealed in Table 2 (Chapter 2.5), studies of the consequences of employee innovative behavior in PSSs have mainly been concerned with scholarly theoretical debates over the importance of empirical examinations (Asurakkody and Shin, 2018; Kwon and Kim, 2020; Miao et al., 2018; Vivona et al., 2021). To the best of author's knowledge, previous studies

have been purely theoretical, and the topic remains underexplored (Asurakkody and Shin, 2018; Mutonyi et al., 2021), despite the many debates and calls for empirical studies (Asurakkody and Shin, 2018; Kwon and Kim, 2020; Li and Hsu, 2018). Although previous studies have treated employee innovative behavior as "the endpoint of their study" (Li and Hsu, 2016b, p. 2827), Asurakkody and Shin (2018) maintained that it is crucial to provide public managers with comprehensive implications, understanding and knowledge on both the fostering factors and consequences of employee innovative behavior in PSSs.

As with fostering factors, Kwon and Kim (2020) suggested that the consequences of employee innovative behavior be studied at the organizational, environmental, and individual levels. This dissertation takes the individual-level perspective. Specifically, this dissertation and Paper III (Mutonyi et al., 2021), studied organizational commitment. Paper III (Mutonyi et al., 2021) focused on affective commitment, a type of organizational commitment involving a psychological state that binds employees to the organization in a positive manner (Mutonyi et al., 2021). In other words, employees commit to their organizations because they are willing to do so, and not because it is necessary or a result of monetary obligations (Tang et al., 2019). Paper III (Mutonyi et al., 2021) studies individual-level consequences and offers a springboard for future research ventures. To the best of author's knowledge, this dissertation and papers are pioneering empirical analytical studies on the consequences of employee innovative behavior in PSSs by showing the importance of maintaining an IMOC that celebrates individual innovation and sustains employee affective commitment to their organization. The empirical contribution of Paper III (Mutonyi et al., 2021) is consistent with previous theoretical research on the importance of instilling voluntary organizational commitment (Montani et al., 2012; Van der Voet et al., 2016). Thus, this dissertation and Paper III (Mutonyi et al., 2021) suggest how public sector managers can align their organizational culture to encourage innovative activities at work and thus cultivate employees who willingly commit to their PSSs organization.

In conclusion, this dissertation and Paper III (Mutonyi et al., 2021) reveal how and when employee innovative behavior in PSSs is properly fostered and cultivated to produce positive outcomes, such as increased organizational commitment. Especially, the findings reveal that when employees perceive their organizational culture to facilitate innovation, they are more likely to stay and commit to their current organizations because they want to (Nazir et al., 2018).

5.3 Research contributions—knowledge on the benefits of advanced research techniques

The contributions of this dissertation and its four appended papers relate to the third of the secondary objectives of this dissertation (see Chapter 1), *to contribute new knowledge on the benefits of using advanced quantitative research techniques to study employee innovative behavior in PSSs.*

Public innovation scholars are increasingly devoting their attention to employee innovative behavior in PSSs (e.g. Bos-Nehles et al., 2017b; Kwon and Kim, 2020; Li and Hsu, 2016b). Following this increased attention, scholars increasingly call for additional model complexity in the literature (Carlucci et al., 2020; Rafique et al., 2021). For example, Carlucci et al. (2020) argued that studies of employee innovative behavior in PSSs frequently employed only simple models. For example, as shown in Table 2 (Chapter 2.5), the latest study by Günzel-Jensen et al. (2018) of the effect of combined leadership on employee innovative behavior in PSSs utilized hierarchal linear regression. Moreover, Suseno et al. (2019) examined the role of task characteristics, social support, and proactive personality on innovative work behavior. By employing CPA to evaluate the results, Suseno et al. (2019) found proactive personality to be a moderator in the relationship between task characteristic and innovative work behavior. Therefore, Carlucci et al. (2020) and Rafique et al. (2021) urged future studies on the topic of innovative behavior to adopt more multifaceted and complex models, in addition to advanced

statistical techniques. This dissertation and the four papers used PLS-SEM, which is an advanced research technique, and makes a unique contribution on the benefits of advanced quantitative research techniques in the study of employee innovative behavior in PSSs.

In presenting an evolving approach to SEM, Hair et al. (2014) recommended the PLS-SEM method for research analysis because it provides ample opportunities to run more multifaceted and complex models. Currently, PLS-SEM is an advanced statistical technique that has become the preferred approach for analyzing statistical data (Hair et al., 2020). The scholarly interest is because PLS-SEM is excellent for responding to the challenges of nonnormal data, small sample sizes, and the use of formative and reflective measurement models (Benitez et al., 2020). Thus, PLS-SEM not only accommodates more complex model structures, but also addresses inadequacies in the validity and the reliability of research methods (Hair et al., 2019). Although most PLS-SEM studies have focused on business-related fields (Sarstedt et al., 2014), there are good reasons to assume its usefulness as a research technique for employee innovative behavior in PSSs. For example, the use of the technique by Arshad et al. (2019) and Rafique et al. (2021), shows the possibility of a new era.

Several studies have noted the numerous benefits of the PLS-SEM research technique (Hair et al., 2021b; Mehmetoglu and Venturini, 2021; Purwanto, 2021; Sarstedt et al., 2020; Sarstedt et al., 2022; Venturini and Mehmetoglu, 2017). In PSSs research (Table 2, Chapter 2.5), only Carlucci et al. (2020) employed it. Recent studies of employee innovative behavior in PSSs by Rafique et al. (2021) and Farrukh et al. (2021) have called for greater use of the PLS-SEM technique in empirical theoretical models. Moreover, studies have noted the various benefits of employing such techniques in the study of employee innovative behavior in PSSs (Carlucci et al., 2020; Farrukh et al., 2021; Mutonyi, 2021; Mutonyi et al., 2020; 2021; Rafique et al., 2021; Slåtten et al., 2020). Consequently, this dissertation and papers demonstrate the benefits of the PLS-SEM technique.

Furthermore, Mehmetoglu and Venturini (2021) and Hair et al. (2021a) claim PLS-SEM has various advantages as a research technique in research on a wide range of areas, such as innovation. For example, studies can take advantage of PLS-SEM as a nonparametric method that is highly robust in analysis results, copes easily with both formative and reflective measurement models, and estimates complex models with several structural relationships simultaneously (Hair et al., 2020; Mehmetoglu and Venturini, 2021). Studies employing the PLS-SEM technique can minimize issues with their data and results, such as unexplained variance, statistical power, data inadequacies in the construct scores, and inconsistencies in parameter estimates (Hair et al., 2021a; Sarstedt et al., 2014). Therefore, this dissertation contributes to the current public innovation literature by answering the calls from Carlucci et al. (2020), Rafique et al. (2021), and Farrukh et al. (2021) to employ the PLS-SEM technique as an advanced statistical approach to the study of employee innovative behavior research in PSSs.

Given its advantages, it is important to investigate the complex interactions in employee innovative behavior research in PSSs using PLS-SEM as the basic research technique (Hair et al., 2018). A strength of the PLS-SEM approach is that it can conduct a permutation test while avoiding errors such as distributional assumptions (Sarstedt et al., 2019). Previous studies have called for methodical research using PLS-SEM in employee innovative behavior research in PSSs (Carlucci et al., 2020; Rafique et al., 2021; Ringle et al., 2020). This is a strength of this dissertation and the four appended papers. This study should prompt further research on the complex interactions found in PSSs, public sector organizations, and their employees.

In summary, the theoretical implications (discussed in Chapter 5.1–3) are seen in the three secondary objectives of this dissertation and its four appended papers in relation to employee innovative behavior in PSSs. First, it extends our current understanding of the fostering factors. Second, it contributes new knowledge on the consequences of such behavior. Third, it offers

fresh insights into the benefits of more advanced quantitative research techniques. Therefore, this entire study extends previously scarce research and contributes to an ongoing conversation on the vital role of employee innovative behavior in PSSs.

The next section will detail the practical implications of this dissertation.

5.4 Practical implications

As public sector innovation is a powerful factor in performance (Osborne and Brown, 2013), and organizations achieve long-term competitive advantage through people (Luthans and Youssef-Morgan, 2017), it follows logically that innovative individuals and their innovation are vital (Vivona et al., 2021). Public managers play a crucial role in motivating innovation among employees (Javed et al., 2019); therefore, PSSs managers are urged to develop the necessary tools to take advantage of this innovative behavior. The fruitful outcomes will spill over onto the organization as whole in increased effectiveness and efficiency, service quality, and service delivery (Sullivan et al., 2021). For this reason, this dissertation offers three practical implications for managers.

First, although the empirical findings of this dissertation reveal the many benefits of cultivating employee innovative behavior in PSSs, public organizations are often in environments that are hostile to innovation because of public scrutiny, unclear goals, and risk-neutral behavior (Flemig et al., 2016). Therefore, public managers may be torn between applying leadership styles that foster employee dependency (Amundsen, 2019) and managing employees' commitment to the organization in a balanced way (Cook et al., 2013). Consequently, this could result in various negative impacts on the duration of innovative behavior. However, the findings of this dissertation and the four appended papers show that public managers with an

empowering leadership style are far more beneficial for nurturing innovation. Therefore, public managers are urged to empower and motivate employees through their leadership and by removing possible obstacles and unnecessary barriers to innovation (Hansen and Pihl-Thingvad, 2019). Specifically, public managers should take time to listen to their subordinates, assign them responsibilities at work, and actively encourage them in their work. In this way, the managers will be better equipped to influence them by creating and sustaining an organization that encourages employee innovative behavior at work.

Second, the structural challenges, value, power dynamics, innovation, and management of public organizations differ from those in the private sector (Bason, 2010). For example, Rønning (2021) argued that public sector innovation is politics and maintained that public discontent with public services leads to solutions such as NPM, which arose in the 1980s, and other innovations or solutions in the 21st century. Moreover, public sector organizations, especially those in PSSs, have special characteristics that differ from those of the private sector. For instance, PSSs organizations are subject to scrutiny according to established and accepted criteria relating to processing and distribution, whereby goal achievement often takes precedence over cost effectiveness, and public services and public resource allocation are subject to democratic control (Rønning, 2021). Value in public sector innovation differs from that of public sector innovation. For instance, the goal for PSSs innovation is to create value for citizens. Public value creation must be ensured or supported through legitimacy and support from decision-makers in the public environment (Rønning, 2021), which is a challenge that can result in what Fuglsang and Rønning (2014, p. 233) term "conflicting innovation."

In addition, PSSs organizations are under pressure to deliver quality services to citizens (Rafique et al., 2021), which hinge on successful public innovation (Garg and Dhar, 2017). However, Rønning (2021) argues that power dynamics in the PSSs organizations can take various forms, such as structural power and political power, which are interlinked. PSSs

organizations are found in environments where the public leaders hold most of the formal power, although it is constrained by their job description and ultimately governed by political leaders. These challenges and others can often lead employees to avoid innovative activities, distance themselves from their leaders, and suffer from workaholism (Kwon and Kim, 2020; Líbano et al., 2012; Rinne et al., 2012). Thus, these challenges can have devastating long-term effects at both the individual and organizational levels. Consequently, to address these challenges, public managers are advised to be aware of factors, such as organizational structural challenges, power dynamics, perceived public value, and individualism, which can affect successful nurturing of employee innovative behavior in their PSSs organization. Then the organizational practices that facilitate innovativeness by the employees may flourish, as employees' feelings of alienation at work will decrease (Líbano et al., 2012). For example, public managers can establish organization-wide practices and develop human capital by instilling confidence, optimism, resilience, and hope to encourage employee innovative behavior in PSSs. This will enhance public employees' innovative capabilities, establish strong bonds, and commitment and be a source of sustainable competitive advantage.

Third, in seeking to understand the role of fostering factors and consequences of employee innovative behavior in PSSs, public managers may face a dilemma in terms of resource management and the delivery of quality services (Osborne and Brown, 2013). For instance, because there are various forms of innovation, such as service innovation, social innovation, political innovation, innovation driven by employees, and user-driven innovation (Rønning, 2021), PSSs organizations, as well as public managers, are expected to be dexterous in managing resource management and service quality (Osborne and Brown, 2013; Podger, 2015; Windrum and Koch, 2008). Therefore, the increasing significance of public employees' innovative behavior (Vivona et al., 2021) has prompted public managers to seek strategic sustainable solutions to respond to challenges (Trong Tuan, 2017). Public managers can

improve their organizations' service delivery, effectiveness, performance, and workplace environment by promoting an organizational culture that celebrates individual innovativeness, demonstrates empowering leadership, and develops strategic bonds to improve organizational commitment. Therefore, it is important that public managers are properly trained to encourage employee innovative behavior.

In summary, "public servants of the future would require the following skills for effective and efficient delivery of public service: a 'tech-savvy' approach to work, a collaborative mindset and flexibility, mobility, data centricity, emotional intelligence and motivation, autonomy, and social responsibility" (Vivona et al., 2021, p. 10). It may be seen the role of public managers is momentous. Therefore, it is also important to look at the implications for policymakers and factors that impede or assist public managers actions in cultivating, nurturing, and encouraging employee innovative behavior in PSSs. This is discussed in the next section.

5.5 Implications for policymakers

The findings reported in this dissertation and papers are particularly relevant to policymakers who consider PSSs innovation to be indispensable for organizational adaptation, survival, and long-term success (Arundel et al., 2019; Koch et al., 2006).

The diversity of public sector organizations means that PSSs and their approaches to innovation may differ (Rønning, 2021). In addition, PSSs play a central role in public service delivery, efficiency, and effectiveness (Osborne and Brown, 2013). This is especially evident in the increased reliance on innovative solutions to solve complex policy problems (Demircioglu and Audretsch, 2020). For this reason, it is more important now than ever that policy is properly supported (Flemig et al., 2016) to nurture individual innovation, specifically employee

innovative behavior in PSSs (Vivona et al., 2021). Moreover, “policy to support public sector innovation requires data on how public sector organizations innovate” (Arundel et al., 2019, p. 789) and this information is required to determine how innovative behavior can be cultivated in PSSs employees (Demircioglu and Audretsch, 2020).

Khalid et al. (2019, p. 18) argued that “a growing number of public sector organizations are now reaching out for good ideas from around the world for new ways to deliver public services.” This entails public sector organizations seeing value in the cross-fertilization of innovations as well as the use of external and internal knowledge sources to increase public value. Policymakers are urged to restructure their public organizations to foster innovation more effectively (Lee et al., 2012) because the traditional approaches are deemed inadequate for promoting innovation and encouraging employee innovative behavior at work (Vivona et al., 2021; Yeazdanshenas, 2014).

Based on the findings of this dissertation and its appended papers, policymakers are advised to conduct internal surveys and use the results to create guidelines and regulations to promote an enabling environment for innovation. This will in turn provide public managers with the appropriate tools and methods to drive innovation at work, while encouraging employee innovative behavior in PSSs.

This chapter has provided an overview of the theoretical contribution of this dissertation as well as providing practical implications for public managers and policymakers. The next chapter will conclude this dissertation with limitations and suggestions for future research.

6 Limitations and future research

This chapter concludes the dissertation by describing its limitations and suggestions for future research. Note that for detailed suggestions on future research, the author recommend reading the four appended papers.

The overall aim of this dissertation was to contribute new knowledge and understanding of employee innovative behavior in PSSs. The overall aim of this dissertation was further divided into three secondary objectives: i) to extend our understanding of the fostering factors of employee innovative behavior in PSSs; ii) to add new knowledge on the consequences; and iii), to contribute new knowledge on the benefits of using advanced quantitative research techniques. The theoretical contributions and the practical implications for managers and policymakers of this dissertation, along with its appended papers, supplement and extend current knowledge on the fostering factors and consequences of employee innovative behavior in PSSs. However, the goal of this dissertation was not to study all fostering factors and consequences of employee innovative behavior in PSSs. Therefore, the main limitations of this dissertation offer four opportunities for future research.

First, although this dissertation offers fresh insights into the intricacies of employee innovative behavior in PSSs, the data in the four empirical papers were drawn from three PSSs: transport, higher education, and health. For this reason, the generalizability and robustness of the data are limited. Several limitations concern the methodological foundations, such as cross-sectional studies and online survey research, may create self-selection bias and make inference of causality difficult (Hair et al., 2018; Podsakoff et al., 2012). These limitations, however, offer opportunities for future research because PSSs researchers can employ longitudinal studies, panel data, or explore variations in PSSs organizations to further understanding of employee innovative behavior.

Second, important agents of innovation in the public sector are managers (Li et al., 2018). This dissertation and its appended papers drew conclusions about the importance of public managers adopting an empowering leadership style to encourage innovative behavior. However, there is still a significant void in identifying and understanding how various leadership styles can strategically and effectively cultivate employee innovative behavior in PSSs. These limitations mean that future research can explore the extent to which various leadership styles promote or discourage employee innovative behavior in PSSs. For example, Zacher et al. (2016) proposed ambidextrous leadership as a way to balance two contradictory leadership styles that ultimately had positive outcomes for individual innovation at work. In addition, the scarcity of research on the benefits of various leadership styles for employee innovative behavior in PSSs is an encouragement for future research endeavors.

Third, as discussed in Chapter 2, public sector innovation has several ambitions, such as to increase effectiveness, increase efficiency, manage societal issues, increase customer satisfaction, and involve citizens, among other macro and micro goals (De Vries et al., 2016). Nevertheless, this implies that PSSs offer a vast number of services. This dissertation and its four appended papers, as mentioned, have focused on three PSSs sectors. Although the findings contribute new knowledge and understanding, the limitations of the chosen contexts offer favorable circumstances for future research. There is a particular need for empirical research on employee innovative behavior in PSSs (Osborne and Brown, 2013; Rønning, 2021; Sullivan et al., 2021) and its consequences (Carlucci et al., 2020; Rafique et al., 2021).

Fourth, in focusing on PSS-specific organizations and employees, this study did not account for the complexity often found in public sector settings in terms of organizational structures, power dynamics, structural challenges, public value, policy, and public risk or the lack of it (Rønning, 2021). Consequently, as shown in Table 2 (see Chapter 2.5), the literature on employee innovative behavior in PSSs remains in its infancy (Vivona et al., 2021), the

limitations of this dissertation provide ample opportunities for future research into exploring how the complexity of public organizations nurtures and encourages employee innovative behavior in PSSs. These objectives can be accomplished through both statistical and comparative methods.

To conclude, it is the author's hope that these limitations will provide inspiration and motivation to expand on the findings of this dissertation and explore untouched areas of employee innovative behavior in PSSs. This is because wisdom is not a product of schooling but of the lifelong attempt to acquire it (Einstein, 1955).

7 References

Aaltonen, S. & Hytti, U. 2014. Barriers to employee-driven innovation. *The International Journal of Entrepreneurship and Innovation*, 15(3), 159–168.

Abbey, A. & Dickson, J. W. 1983. R&D work climate and innovation in semiconductors. *Academy of Management Journal*, 26(2), 362–368.

Abdullah, I., Omar, R. & Panatik, S. A. 2016. A literature review on personality, creativity and innovative behavior. *International Review of Management and Marketing*, 6(1S), 177–182.

Aboobaker, N. & Ka, Z. 2021. Digital learning orientation and innovative behavior in the higher education sector: Effects of organizational learning culture and readiness for change. *International Journal of Educational Management*, 35(5), 1030–1047.

Acs, Z. J. & Audretsch, D. B. 2010. Knowledge spillover entrepreneurship. In: Z. J., Acs & D. B. Audretsch (Eds.), *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction*. 2nd Ed. (pp. 273–301). New York, NY, USA. Springer.

Adams, R., Bessant, J. & Phelps, R. 2006. Innovation management measurement: A review. *International Journal of Management Reviews*, 8(1), 21–47.

Afsar, B. & Badir, Y. 2017. Workplace spirituality, perceived organizational support and innovative work behavior: The mediating effects of person-organization fit. *Journal of Workplace Learning*, 29(2), 95–109.

Albury, D. 2005. Fostering innovation in public services. *Public Money & Management*, 25(1), 51–56.

Albury, D. 2011. Creating the conditions for radical public service innovation. *Australian Journal of Public Administration*, 70(3), 227–235.

Alexopoulos, E. C. 2010. Introduction to multivariate regression analysis. *Hippokratia*, 14(Suppl 1), 23–28.

Amabile, T. M. 1988. A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10(1), 123–167.

Amabile, T. M., Barsade, S. G., Mueller, J. S. & Staw, B. M. 2005. Affect and creativity at work. *Administrative Science Quarterly*, 50(3), 367–403.

Amundsen, S. 2019. *Empowerment i Arbeidslivet - Et Myndiggjøringsperspektiv på Ledelse, Selvledelse og Medarbeiderskap* [Empowerment at Work – An Empowerment Based View on Leadership, Self-Leadership and Coworkership]. Oslo, Norway: Cappelen Damm Akademisk.

Andersen, S. 2021. Nettundervisning i matematikk - hva skal til for å lykkes? *Nordic Journal of STEM Education*, 5(1). [Online] MNT Konferansen – Conference submissions. Available: https://doi.org/10.5324/njsteme.v5i1.3945. [Accessed 03.12.2021]

Anderson, N., Potočnik, K. & Zhou, J. 2014. Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, 40(5), 1297–1333.

Anderson, N. & West, M. 1998. Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19(3), 235–258.

Arrow, K. J. & Lind, R. C. 1970. Uncertainty and the evaluation of public investment decisions. *The American Economic Review*, 60(3), 364–378.

Arshad, M. A., Khan, Q. & Khan, S. 2019. Empirical analysis of HPO framework in public sector organizations of Pakistan. *International Journal of Public Leadership*, 15(2), 78–93.

Arundel, A., Bloch, C. & Ferguson, B. 2019. Advancing innovation in the public sector: Aligning innovation measurement with policy goals. *Research Policy*, 48(3), 789–798.

Arundel, A., Casali, L. & Hollanders, H. 2015. How European public sector agencies innovate: The use of bottom-up, policy-dependent and knowledge-scanning innovation methods. *Research Policy*, 44(7), 1271–1282.

Asurakkody, T. A. & Shin, S. Y. 2018. Innovative behavior in nursing context: A concept analysis. *Asian Nursing Research*, 12(4), 237–244.

Atabani, A. E., Badruddin, I. A., Mekhilef, S. & Silitonga, A. S. 2011. A review on global fuel economy standards, labels and technologies in the transportation sector. *Renewable and Sustainable Energy Reviews*, 15(9), 4586–4610.

Bagozzi, R. P. & Yi, Y. 2012. Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science*, 40(1), 8–34.

Bani-Melhem, S., Zeffane, R. & Albaity, M. 2018. Determinants of employees' innovative behavior. *International Journal of Contemporary Hospitality Management*, 30(3), 1601–1620.

Barcet, A. 2010. *Innovation in Services: A New Paradigm and Innovation Model.* Cheltenham, UK: Edward Elgar.

Baregheh, A., Rowley, J. & Sambrook, S. 2009. Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323–1339.

Bason, C. 2010. *Leading Public Sector Innovation: Co-Creating for A Better Society*. Bristol, UK: Policy Press.

Bason, C. 2018. *Leading public sector innovation: Co-creating for a better society.* Bristol, UK: Policy Press.

Battistelli, A., Montani, F., Odoardi, C., Vandenberghe, C. & Picci, 2014. Employees' concerns about change and commitment to change among Italian organizations: The moderating role of innovative work behavior. *The International Journal of Human Resource Management*, 25(7), 951–978.

Benitez, J., Henseler, J., Castillo, A. & Schuberth, F. 2020. How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information & Management*, 57(2), 103168.

Bird, A. 2007. What is scientific progress? *Noûs*, 41(1), 64–89.

Blustein, D. L., Duffy, R., Ferreira, J. A., Cohen-Scali, V., Cinamon, R. G. & Allan, B. A. 2020. Unemployment in the time of COVID-19: A research agenda. *Journal of Vocational Behavior*, 119, 103436.

Borins, S. 2002. Leadership and innovation in the public sector. *Leadership & Organization Development Journal*, 23(8), 467–476.

Borins, S. 2006. *The Challenge of Innovation in Government: Endowment for The Business of Government*. Arlington, VA: PricewaterhouseCoopers.

Bos-Nehles, A., Bondarouk, T. & Nijenhuis, K. 2017a. Innovative work behaviour in knowledge-intensive public sector organizations: The case of supervisors in the Netherlands fire services. *The International Journal of Human Resource Management*, 28(2), 379–398.

Bos-Nehles, A., Renkema, M. & Janssen, M. 2017b. HRM and innovative work behaviour: A systematic literature review. *Personnel Review*, 46(7), 1228–1253.

Bos-Nehles, A. C. & Veenendaal, A. A. 2017. Perceptions of HR practices and innovative work behavior: The moderating effect of an innovative climate. *The International Journal of Human Resource Management*, 30(18), 1–23.

Bowen, J. & Ford, R. C. 2002. Managing service organizations: Does having a "thing" make a difference? *Journal of Management*, 28(3), 447–469.

Brewer, D. & Brewer, K. L. 2010. Knowledge management, human resource management, and higher education: A theoretical model. *Journal of Education for Business*, 85(6), 330–335.

Brown, T. A. 2015. *Confirmatory Factor Analysis for Applied Research.* New York, NY: Guilford Press.

Bryman, A. 1984. The debate about quantitative and qualitative research: A question of method or epistemology? *British Journal of Sociology*, 35(1), 75–92.

Bryson, J. M., Crosby, B. C. & Bloomberg, L. 2014. Public value governance: Moving beyond traditional public administration and the new public management. *Public Administration Review*, 74(4), 445–456.

Burns, D. J. 2007. Toward an explanatory model of innovative behavior. *Journal of Business and Psychology*, 21(4), 461–488.

Bysted, R. & Jespersen, K. R. 2014. Exploring managerial mechanisms that influence innovative work behaviour: Comparing private and public employees. *Public Management Review*, 16(2), 217–241.

Carlborg, P., Kindström, D. & Kowalkowski, C. 2013. The evolution of service innovation research: A critical review and synthesis. *The Service Industries Journal*, 34(5), 373–398.

Carlucci, D., Mura, M. & Schiuma, G. 2020. Fostering employees' innovative work behavior in healthcare organisations. *International Journal of Innovation Management*, 24, 2050014-1–28.

Carnevale, J. B., Huang, L., Crede, M., Harms, & Uhl-Bien, M. 2017. Leading to stimulate employees' ideas: A quantitative review of leader–member exchange, employee voice, creativity, and innovative behavior. *International Association of Applied Psychology*, 66(4), 517–552.

Casebourne, J. 2014. *Why Motivation Matters in Public Sector Innovation*. London: Nesta.

Casida, J. J. & Pinto-Zipp, G. 2008. Leadership-organizational culture relationship in nursing units of acute care hospitals. *Nursing Economics*, 26(1), 7–15.

Chan, L. & Daim, T. 2012. Sectoral innovation system and technology policy development in China. *Journal of Technology Management in China*, 7(2), 117–135.

Chao, C.-Y., Lin, Y.-S., Cheng, Y.-L. & Liao, S.-C. 2011. A research on the relationship among market orientation, absorptive capability, organizational innovation climate and innovative behavior in Taiwan's manufacturing industry. *African Journal of Business Management*, 5(19), 7855–7863.

Checkbox Survey. 2021. *Checkbox Survey: Professional, flexible & secure* [Online]. Checkbox Survey Inc. Available: https://www.checkbox.com/ [Accessed 25.07.2021].

Cherryholmes, C. H. 1992. Notes on pragmatism and scientific realism. *Educational Researcher*, 21(6), 13–17.

Cho, Y. J. & Song, H. J. 2021. How to facilitate innovative behavior and organizational citizenship behavior: Evidence from public employees in Korea. *Public Personnel Management*, 50(4), 509–537.

Choi, J. N. & Chang, J. Y. 2009. Innovation implementation in the public sector: An integration of institutional and collective dynamics. *Journal of Applied Psychology*, 94(1), 245–253.

Cınar, F. & Toker, K. 2019. An examination of the effect of loneliness on the innovative behavior of health science faculty students. *Chinese Medical Journal*, 132(2), 171–182.

Cole, M. & Parston, G. 2006. *Unlocking Public Value: A New Model for Achieving High Performance in Public Service Organizations*. Hoboken, NJ: John Wiley & Sons.

Cook, K. S., Cheshire, C., Rice, E. R. W. & Nakagawa, S. 2013. Social exchange theory. In: J. Delamater & A. Ward (Eds.), *Handbook of Social Psychology* (pp. 61–88). Dordrecht: Springer Netherlands.

Creswell, J. W. & Creswell, J. D. 2018. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* Los Angeles, CA: Sage Publications.

Crossan, M. M. & Apaydin, M. 2010. A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, 47(6), 1154–1191.

Dahl, A. & Soss, J. 2014. Neoliberalism for the common good? Public value governance and the downsizing of democracy. *Public Administration Review*, 74(4), 496–504.

Damanpour, F., Szabat, K. A. & Evan, W. M. 1989. The relationship between types of innovation and organizational performance. *Journal of Management Studies*, 26(6), 587–602.

Damanpour, F., Walker, R. M. & Avellaneda, C. N. 2009. Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies*, 46(4), 650–675.

Davcik, N. S. 2014. The use and misuse of structural equation modeling in management research. *Journal of Advances in Management Research*, 11(1), 47–81.

Davidson, D. 1963. Actions, reasons, and causes. *The Journal of Philosophy*, 60(23), 685–700.

Davino, C. & Fabbris, L. 2013. *Survey Data Collection and Integration.* Berlin, Heidelberg: Springer.

De Jong, J. & Den Hartog, D. 2005. Determinants of innovative behaviour: Research on knowledge workers in SME [Determinanten van innovatief gedrag: een onderzoek onder kenniswerkers in het MKB]. *Gedrag Organ*, 18, 235–259.

De Jong, J. & Den Hartog, D. 2010. Measuring innovative work behaviour. *Creativity and Innovation Management*, 19(1), 23–36.

De Jong, J. & Kemp, R. 2003. Determinants of co-workers' innovative behaviour: An investigation into knowledge intensive services. *International Journal of Innovation Management*, 7(2), 189–212.

De Jong, J. P. & Den Hartog, D. N. 2007. How leaders influence employees' innovative behaviour. *European Journal of Innovation Management*, 10(1), 41–64.

De Jong, F. 1999. Hierarchical regression analysis in structural equation modeling. *Structural Equation Modeling*, 6(2), 198–211.

De Leede, J. & Looise, J. K. 2005. Innovation and HRM: Towards an integrated framework. *Creativity Innovation Management,* 14(2), 108–117.

De Spiegelaere, S., Van Gyes, G. & Van Hootegem, G. 2014. The innovative work behaviour concept: Definition and orientation. *Gedrag og Organisatie*, 27(2), 139–156.

De Vries, H., Bekkers, V. & Tummers, L. 2016. Innovation in the public sector: A systematic review and future research agenda. *Public Administration*, 94(1), 146–166.

Decramer, A., Smolders, C. & Vanderstraeten, A. 2013. Employee performance management culture and system features in higher education: Relationship with employee performance management satisfaction. *The International Journal of Human Resource Management,* 24(2), 352–371.

Delanty, G. & Strydom, P. (eds) 2003. *Philosophies of Social Science: The Classic and Contemporary Readings.* Maidenhead: Open University Press

Dell'Olio, L., Ibeas, A. & Cecin, 2011. The quality of service desired by public transport users. *Transport Policy*, 18(1), 217–227.

Demircioglu, M. A. & Audretsch, D. B. 2017. Conditions for innovation in public sector organizations. *Research Policy*, 46(9), 1681–1691.

Demircioglu, M. A. & Audretsch, D. B. 2020. Conditions for complex innovations: evidence from public organizations. *The Journal of Technology Transfer*, 45(3), 820–843.

Dempster, A. P., Schatzoff, M. & Wermuth, N. 1977. A simulation study of alternatives to ordinary least squares. *Journal of the American Statistical Association*, 72(357), 77–91.

Deng, L., Yang, M. & Marcoulides, K. M. 2018. Structural equation modeling with many variables: A systematic review of issues and developments. *Frontiers in Psychology*, 9, 580.

Deshpandé, R. & Farley, J. U. 2004. Organizational culture, market orientation, innovativeness, and firm performance: An international research odyssey. *International Journal of Research in Marketing*, 21(1), 3–22.

Di Fabio, A. & Kenny, M. E. 2016. From decent work to decent lives: Positive Self and Relational Management (PS&RM) in the twenty-first century. *Frontiers in Psychology*, 7, 361.

Ding, H., Lin, X. & Su, W. 2021. Employee strengths use and innovative behavior: A moderated mediation model. *Chinese Management Studies*, 15(2), 350–362.

Drejer, I. 2004. Identifying innovation in surveys of services: A Schumpeterian perspective. *Research Policy*, 33(3), 551–562.

Dulal, H. B., Brodnig, G. & Onoriose, C. G. 2011. Climate change mitigation in the transport sector through urban planning: A review. *Habitat International*, 35(3), 494–500.

Duradoni, M. & Di Fabio, A. 2019. Intrapreneurial self-capital and sustainable innovative behavior within organizations. *Sustainability*, 11(2), 322.

Edler, J. & Georghiou, L. 2007. Public procurement and innovation—Resurrecting the demand side. *Research Policy*, 36(7), 949–963.

Einstein, A. 1955. Old man's advice to youth: 'Never lose a holy curiosity.' *Life Magazine*, 2, 64.

Ellström, E. 2010. Practice-based innovation: A learning perspective. *Journal of Workplace Learning*, 22(1/2), 27–40.

Enz, C. A. 2012. Strategies for the implementation of service innovations. *Cornell Hospitality Quarterly*, 53(3), 187–195.

Eun, J. 2020. Innovative behavior in public sector services public service motivation and private sector experience. *Korean Journal of Policy Studies*, 35(3), 67–86.

Fagerberg, J., Mowery, D. C., Nelson, R. R., Asheim, B. T., Bruland, K. & Grodal, S. 2005. *The Oxford Handbook of Innovation.* Oxford, UK: Oxford University Press.

Farrukh, M., Ansari, N. Y., Raza, A., Meng, F. & Wang, H. 2021. High-performance work practices do much, but H.E.R.O does more: An empirical investigation of employees' innovative behavior from the hospitality industry. *European Journal of Innovation Management*, https://doi.org/10.1108/EJIM-11-2020-0448.

Feng, C., Ma, R. & Jiang, L. 2021. The impact of service innovation on firm performance: A meta-analysis. *Journal of Service Management*, 32(3), 289–314.

Fernandez, S. & Moldogaziev, T. 2013. Using employee empowerment to encourage innovative behavior in the public sector. *Journal of Public Administration Research and Theory*, 23(1), 155–187.

Finn, J. D. 1974. *A General Model for Multivariate Analysis*. Holt, Rinehart & Winston.

Fitjar, R. D. 2015. Innovasjon for utvikling i offentlig og privat sektor – prinsipielle forskjeller. [Innovation for development in public and private secotr – principal differences] In: E. Willumsen & A. Ødegård (Eds.), *Sosial Innovasjon: Fra Politikk til Tjenesteutvikling [Social innovation: From Politics to Service Development]* (pp. 63–84). Fagbokforlaget.

Flemig, S., Osborne, S. & Kinder, T. 2016. Risky business—Reconceptualizing risk and innovation in public services. *Public Money & Management*, 36(6), 425–432.

Forsyth, D. R. 2018. *Group Dynamics*. Boston, MA: Cengage Learning.

Friman, M. 2004. Implementing quality improvements in public transport. *Journal of Public Transportation*, 7(4), 49–65.

Fuglsang, L. 2008. *Innovation and The Creative Process: Towards Innovation With Care*. Edward Elgar Publishing.

Fuglsang, L. & Rønning, R. 2014. Public value and conflicting innovation. In: L. Fuglsang, R. Rønning & B. Enquist (Eds.), *Framing innovation in public sector services* (pp. 227–233). New York, NY: Routledge.

Gale, G. 1984. Science and the philosophers. *Nature*, 312(5994), 491–495.

Garg, S. & Dhar, R. 2017. Employee service innovative behavior. *International Journal of Manpower*, 38(2), 242–258.

Gates, B. 2021. *How to Avoid a Climate Disaster: The Solutions We Have and The Breakthroughs We Need*. New York, NY: Knopf.

Ghasemy, M., Teeroovengadum, V., Becker, J.-M. & Ringle, C. M. 2020. This fast car can move faster: A review of PLS-SEM application in higher education research. *Higher Education*, 80(6), 1121–1152.

Gilmartin, M. J. 1999. Creativity: The fuel of innovation. *Nursing Administration Quarterly*, 23(2), 1–8.

Goertzen, M. J. 2017. Introduction to quantitative research and data. *Library Technology Reports*, 53(4), 12–18.

Günzel-Jensen, F., Hansen, J. R., Jakobsen, M. L. F. & Wulff, J. 2018. A two-pronged approach? Combined leadership styles and innovative behavior. *International Journal of Public Administration*, 41(12), 957–970.

Hair, J. F., Howard, M. C. & Nitzl, C. 2020. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, 109, 101–110.

Hair, J. F., Hult, G. T. M., Ringle, C. & Sarstedt, M. 2017. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* London: SAGE.

Hair, J. F., Hult, G. T. M., Ringle, C. M. & Sarstedt, M. 2021a. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* Sage Publications.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P. & Ray, S. 2021b. *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook.* Springer Nature.

Hair, J. F., Ringle, C. M. & Sarstedt, M. 2011. PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–152.

Hair, J. F., Risher, J. J., Sarstedt, M. & Ringle, C. M. 2019. When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24.

Hair, J. F., Sarstedt, M., Hopkins, L. & G. Kuppelwieser, V. 2014. Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review*, 26(2), 106–121.

Hair, J. F., Sarstedt, M., Ringle, C. M. & Gudergan, S. P. 2018. *Advanced Issues in Partial Least Squares Structural Equation Modeling*. London: SAGE.

Hansen, J. A. & Pihl-Thingvad, S. 2019. Managing employee innovative behaviour through transformational and transactional leadership styles. *Public Management Review*, 21(6), 918–944.

Harris, M. & Albury, D. 2009. *The Innovation Imperative.* London: NESTA.

Hartley, J. 2005. Innovation in governance and public services: Past and present. *Public Money and Management*, 25(1), 27–34.

Hayes, A. F. 2017. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: The Guilford Press.

Heinonen, K. & Strandvik, T. 2020. Reframing service innovation: COVID-19 as a catalyst for imposed service innovation. *Journal of Service Management*, 32(1), 101–112.

Hempel, C. G. 1966. Scientific inquiry: Invention and test. In: Marx, M. (ed.) *Philosophy of Natural Science* (pp. 193–208). Englewood Cliffs, NJ: Prentice Hall.

Hofstede, G. 1998. Attitudes, values and organizational culture: Disentangling the concepts. *Organization Studies*, 19(3), 477–493.

Hogg, M. A. 1992. *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity*. Michigan, MI: Harvester Wheatsheaf.

Hogg, M. A. 1993. Group cohesiveness: A critical review and some new directions. *European Review of Social Psychology*, 4(1), 85–111.

Hsu, M. L. & Chen, F. H. 2015. The cross-level mediating effect of psychological capital on the organizational innovation climate–employee innovative behavior relationship. *The Journal of Creative Behavior*, 51(2), 128–139.

Hult, G. T. M., Hurley, R. F. & Knight, G. A. 2004. Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management*, 33(5), 429–438.

Hume, D. 1748/2000. *An Enquiry Concerning Human Understanding: A Critical Edition* (Vol. 3). Millican Oxford University Press on Demand. (Original work published in 1748.)

Hwang, H., Sarstedt, M., Cheah, J. H. & Ringle, C. M. 2020. A concept analysis of methodological research on composite-based structural equation modeling: Bridging PLSPM and GSCA. *Behaviormetrika*, 47(1), 219–241.

Hülsheger, U. R., Anderson, N. & Salgado, J. F. 2009. Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, 94(5), 1128.

Imai, K. 2011. Multivariate regression analysis for the item count technique. *Journal of the American Statistical Association*, 106(494), 407–416.

Jafri, M. H. 2010. Organizational commitment and employee's innovative behavior: A study in retail sector. *Journal of Management Research*, 10(1), 62–68.

Janssen, O. 2000. Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, 73(3), 287–302.

Janssen, O. 2004. How fairness perceptions make innovative behavior more or less stressful. *Journal of Organizational Behavior*, 25(2), 201–215.

Javed, B., Naqvi, S. M. M. R., Khan, A. K., Arjoon, S. & Tayyeb, H. H. 2019. Impact of inclusive leadership on innovative work behavior: The role of psychological safety. *Journal of Management & Organization*, 25(1), 117–136.

Jiang, T. & Iles, 2011. Employer-brand equity, organizational attractiveness and talent management in the Zhejiang private sector, China. *Journal of Technology Management in China*, 6(1), 97–110.

Kabasheva, I. A., Rudaleva, I., Bulnina, I. & Askhatova, L. 2015. Organizational factors affecting employee innovative behavior. *Mediterranean Journal of Social Sciences*, 6(1 S3), 435–435.

Kaiser, S. & Ringlstetter, M. J. 2010. *Strategic Management of Professional Service Firms: Theory and Practice*. Springer Science & Business Media.

Karatepe, O. M., Aboramadan, M. & Dahleez, K. A. 2020. Does climate for creativity mediate the impact of servant leadership on management innovation and innovative behavior in the hotel industry? *International Journal of Contemporary Hospitality Management*, 32(8), 2497–2517.

Kesting, & Ulhøi, J. P. 2010. Employee-driven innovation: Extending the license to foster innovation. *Management Decision*, 48(1), 65–84.

Khalid, N., Ahmed, U., Islam, D., Lee, H. & Salykova, L. 2019. Public sector universities and performance in the 21st century: Underlining high time for entrepreneurship in the higher education sector. *International Journal of Innovation, Creativity and Change*, 6(10), 11–26.

Kleysen, R. F. & Street, C. T. 2001. Toward a multi-dimensional measure of individual innovative behavior. *Journal of Intellectual Capital*, 2(3), 284–296.

Klomp, L. & Van Leeuwen, G. 1999. The importance of innovation for company performance. *Netherlands Official Statistics*, 14(2), 26–35.

Koasidis, K., Karamaneas, A., Nikas, A., Neofytou, H., Hermansen, E. A. T., Vaillancourt, K. & Doukas, H. 2020. Many miles to Paris: A sectoral innovation system analysis of the transport sector in Norway and Canada in light of the Paris Agreement. *Sustainability*, 12(14), 5832.

Koch, P., Cunningham, P., Schwabsky, N. & Hauknes, J. 2006. *Innovation in The Public Sector: Summary and Policy Recommendations.* 2nd ed. Oslo, Norway: NIFU STEP.

Koch, & Hauknes, J. 2005. On innovation in the public sector–Today and beyond.2nd ed. *Publin Report*, N0. D20. Oslo, Norway NIFU STEP.

Kruyen, M. & Van Genugten, M. 2020. Opening up the black box of civil servants' competencies. *Public Management Review*, 22(1), 118–140.

Kwon, K. & Kim, T. 2020. An integrative literature review of employee engagement and innovative behavior: Revisiting the JD-R model. *Human Resource Management Review*, 30(2), 100704.

Kör, B., Wakkee, I. & Van Der Sijde, 2021. How to promote managers' innovative behavior at work: Individual factors and perceptions. *Technovation*, 99, 102127.

Lee, A., Legood, A., Hughes, D., Tian, A. W., Newman, A. & Knight, C. 2020. Leadership, creativity and innovation: a meta-analytic review. *European Journal of Work and Organizational Psychology*, 29(1), 1–35.

Lee, H. & Choi, B. 2003. Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), 179–228.

Lee, S.-H. 2008. The effect of employee trust and commitment on innovative behavior in the public sector: An empirical study. *International Review of Public Administration*, 13(1), 27–46.

Lee, S. M., Hwang, T. & Choi, D. 2012. Open innovation in the public sector of leading countries. *Management Decision*, 50(1), 147–162.

Legge, K. 1978. *Power, innovation, and problem-solving in personnel management*. McGraw-Hill Book Company.

Leplin, J. 1984. *Scientific Realism*. University of California Press.

Levin, K. A. 2006. Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, 7(1), 24–25.

Li, M. & Hsu, C. H. C. 2016a. Linking customer-employee exchange and employee innovative behavior. *International Journal of Hospitality Management*, 56, 87–97.

Li, M. & Hsu, C. H. C. 2016b. A review of employee innovative behavior in services. *International Journal of Contemporary Hospitality Management*, 28(12), 2820–2841.

Li, M. & Hsu, C. H. C. 2018. Customer participation in services and employee innovative behavior. *International Journal of Contemporary Hospitality Management*, 30(4), 2112–2131.

Li, W., Bhutto, T. A., Nasiri, A. R., Shaikh, H. A. & Samo, F. A. 2018. Organizational innovation: The role of leadership and organizational culture. *International Journal of Public Leadership*, 14(1), 33–47.

Li, X. & Zheng, Y. 2014. The influential factors of employees' innovative behavior and the management advices. *Journal of Service Science and Management*, 7(06), 446.

Líbano, M. D., Llorens, S., Salanova, M. & Schaufeli, W. B. 2012. About the dark and bright sides of self-efficacy: Workaholism and work engagement. *The Spanish Journal of Psychology*, 15(2), 688–701.

Lim, T. 2010. Relationships among organizational commitment, job satisfaction, and learning organization culture in one Korean private organization. *Asia Pacific Education Review*, 11(3), 311–320.

Locke, J. 1847. *An Essay Concerning Human Understanding*. Kay & Troutman.

Lukes, M. & Stephan, U. 2017. Measuring employee innovation: A review of existing scales and the development of the innovative behavior and innovation support inventories across cultures. *International Journal of Entrepreneurial Behavior & Research*, 23(1), 136–158.

Lusch, R. F. & Nambisan, S. 2015. Service innovation: A service-dominant logic perspective. *MIS Quarterly*, 39(1), 155–176.

Luthans, F. & Youssef-Morgan, C. M. 2017. Psychological capital: An evidence-based positive approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 339–366.

Luthans, F., Youssef, C. M. & Avolio, B. J. 2007. *Psychological Capital: Developing the Human Competitive Edge*. Oxford, UK: Oxford University Press.

Luthans, K. W., Luthans, B. C. & Palmer, N. F. 2016. A positive approach to management education: The relationship between academic PsyCap and student engagement. *Journal of Management Development*, 35(9), 1098–1118.

Länsisalmi, H., Kivimäki, M., Aalto, & Ruoranen, R. 2006. Innovation in healthcare: A systematic review of recent research. *Nursing Science Quarterly*, 19(1), 66–72.

Machamer, P. 1998. Philosophy of science: An overview for educators. *Science and Education*, 7, 1–11.

MacKinnon, D. P., Fairchild, A. J. & Fritz, M. S. 2007. Mediation analysis. *Annual Review of Psychology*, 58, 593–614.

Marsden, P. V. & Wright, J. D. 2010. *Handbook of Survey Research*. Bingley, UK: Emerald Group.

Mateos-Aparicio, G. 2011. Partial least squares (PLS) methods: Origins, evolution, and application to social sciences. *Communications in Statistics - Theory and Methods*, 40(13), 2305–2317.

McNeish, D., Stapleton, L. M. & Silverman, R. D. 2017. On the unnecessary ubiquity of hierarchical linear modeling. *Psychological Methods*, 22(1), 114.

Mehmetoglu, M. & Jakobsen, T. G. 2017. *Applied Statistics Using Stata: A Guide for The Social Sciences*. London, UK: Sage.

Mehmetoglu, M. & Venturini, S. 2021. *Structural Equation Modelling with Partial Least Squares Using Stata And R*. Abingdon, Oxon: CRC Press.

Mesfin, D., Woldie, M., Adamu, A. & Bekele, F. 2020. Perceived organizational culture and its relationship with job satisfaction in primary hospitals of Jimma zone and Jimma town administration, correlational study. *BMC Health Services Research*, 20(1), 438.

Messmann, G. & Mulder, R. H. 2012. Development of a measurement instrument for innovative work behaviour as a dynamic and context-bound construct. *Human Resource Development International*, 15(1), 43–59.

Miao, Q., Newman, A., Schwarz, G. & Cooper, B. 2018. How leadership and public service motivation enhance innovative behavior. *Public Administration Review*, 78(1), 71–81.

Midgley, D. F. & Dowling, G. R. 1978. Innovativeness: The concept and its measurement. *Journal of Consumer Research*, 4(4), 229–242.

Mintzberg, H. 1983. *Power in and Around Organizations*. Englewood Cliffs, NJ: Prentice-Hall.

Montani, F., Odoardi, C. & Battistelli, A. 2012. Explaining the relationships among supervisor support, affective commitment to change, and innovative work behavior: The moderating role of coworker support. *BPA-Applied Psychology Bulletin (Bollettino di Psicologia Applicata)*, 1(264), 43–57.

Montani, F., Odoardi, C. & Battistelli, A. 2014. Individual and contextual determinants of innovative work behaviour: Proactive goal generation matters. *Journal of Occupational and Organizational Psychology*, 87(4), 645–670.

Moses, J. & Knutsen, T. 2012. *Ways of Knowing: Competing Methodologies in Social and Political Research*. Macmillan International Higher Education.

Moss, G., Kubacki, K., Hersh, M. & Gunn, R. 2007. Knowledge management in higher education: A comparison of individualistic and collectivist cultures. *European Journal of Education*, 42(3), 377–394.

Mouwen, A. 2015. Drivers of customer satisfaction with public transport services. *Transportation Research Part A: Policy and Practice*, 78, 1–20.

Mufeed, S. & Gurkoo, F. 2006. Enhancing educational institutions effectiveness through HRD climate: An empirical assessment. *Management & Change*, 10(2), 25–63.

Mulgan, G. & Albury, D. 2003. *Innovation in The Public Sector*. London, UK: Cabinet Office.

Mullen, B. & Copper, C. 1994. The relation between group cohesiveness and performance: An integration. *Psychological Bulletin*, 115(2), 210.

Mutonyi, B. R. 2021. Employees' psychological capital and innovative behavior in higher education. *International Journal of Quality and Service Sciences*, 13(2), 198–215.

Mutonyi, B. R., Slåtten, T. & Lien, G. 2020. Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: Empirical evidence from Norway. *International Journal of Public Leadership*, 6(2), 175–197.

Mutonyi, B. R., Slåtten, T. & Lien, G. 2021. Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees. *BMC Health Services Research*, 21(1), 470.

Nazir, S., Qun, W., Hui, L. & Shafi, A. 2018. Influence of social exchange relationships on affective commitment and innovative behavior: Role of perceived organizational support. *Sustainability*, 10(12), 4418.

Nazir, S., Shafi, A., Atif, M. M., Qun, W. & Abdullah, S. M. 2019. How organization justice and perceived organizational support facilitate employees' innovative behavior at work. *Employee Relations*, 41(6), 1288–1311

Nijhof, A., Krabbendam, K. & Looise, J. C. 2002. Innovation through exemptions: Building upon the existing creativity of employees. *Technovation*, 22(11), 675–683.

Nitzl, C., Roldan, J. L. & Cepeda, G. 2016. Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. *Industrial Management & Data Systems*, 116(9), 1849–1864.

Nsenduluka, E., Shee, H. K. 2009. Organisational and group antecedents of work group service innovativeness. *Journal of Management & Organization*, 15(4), 438–451.

Nyeng, F. 2010. *Vitenskapsteori for Økonomer* [Scientific theory for economists].. Abstrakt.

Ogunmokun, O. A., Unverdi-Creig, G. I., Said, H., Avci, T. & Eluwole, K. K. 2021. Consumer well-being through engagement and innovation in higher education: A conceptual model and research propositions. *Journal of Public Affairs*, 21(1), e2100.

Okasha, S. 2016. *Philosophy of Science: Very Short Introduction*. Oxford, UK: Oxford University Press.

Oke, A. 2007. Innovation types and innovation management practices in service companies. *International Journal of Operations & Production Management*, 27(6), 564–587.

Ong, H. C., Mahlia, T. M. I. & Masjuki, H. H. 2012. A review on energy pattern and policy for transportation sector in Malaysia. *Renewable and Sustainable Energy Reviews*, 16(1), 532–542.

Oppi, C., Bagheri, A. & Vagnoni, E. 2019. Antecedents of innovative work behaviour in healthcare: Does efficacy play a role? *International Journal of Public Sector Management*, 33(1), 45–61.

Orcutt, L. H. & AlKadri, M. Y. 2009. Barriers and enablers of innovation: A pilot survey of transportation professionals. *Transportation Research Record.* California PATH Program.

Osborne, J. W. 2000. Advantages of hierarchical linear modeling. *Practical Assessment, Research, and Evaluation*, 7(1), 1.

Osborne, S. P. & Brown, K. 2005. *Managing Change and Innovation in Public Sector Organisations.* New York, NY: Routledge.

Osborne, S. P. & Brown, L. 2011. Innovation, public policy and public services delivery in the UK. The word that would be king? *Public Administration*, 89(4), 1335–1350.

Osborne, S. P. & Brown, L. 2013. *Handbook of Innovation in Public Services.* Cheltenham, UK: Edward Elgar Publishing.

Osborne, S. P., Radnor, Z., Kinder, T. & Vidal, I. 2015. The SERVICE framework: A public-service-dominant approach to sustainable public services. *British Journal of Management*, 26(3), 424–438.

Palmer, J. W. 2006. *Innovative Behavior of Frontline Employees in The Public Sector.* Ph.D. Dissertation. University of Cincinnati: Umi Microform.

Panfiluk, E. 2020. Determinants of SME innovativeness in Poland on the example of the market of aesthetic medicine tourism. In: M. H. Bilgin, H. Danis, G. Karabulut & G. Gözgor (Eds.), *Eurasian economic perspectives* (pp. 387–406). Cham, Switzerland: Springer.

Park, S. & Jo, S. J. 2018. The impact of proactivity, leader–member exchange, and climate for innovation on innovative behavior in the Korean government sector. *Leadership & Organization Development Journal*, 39(1), 130–149.

Peng, Y.-P. 2020. Relationship between job involvement, leader–member exchange, and innovative behavior of public librarians. *Journal of Librarianship and Information Science*, 52(2), 441–450.

Pierce, J. L. & Delbecq, A. L. 1977. Organization structure, individual attitudes and innovation. *Academy of Management Review*, 2(1), 27–37.

Pine, B. J., Gilmore, J. H. & Pine, B. J. 2011. *The Experience Economy*. Boston, MA: Harvard Business School Press.

Podger, A. 2015. Innovation in the public sector: Beyond the rhetoric to a genuine 'learning culture'. *Managing Under Austerity, Delivering Under Pressure* (pp. 119–130). Canberra, Australia: ANU Press.

Podsakoff, M., MacKenzie, S. B. & Podsakoff, N. P. 2012. Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63(1), 539–569.

Porter, L. W., Steers, R. M., Mowday, R. T. & Boulian, V. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology*, 59(5), 603.

Purc, E. & Laguna, M. 2019. Personal values and innovative behavior of employees. *Frontiers in Psychology*, 10, 865.

Purwanto, A. 2021. Partial least squares structural equation modeling (PLS-SEM) analysis for social and management research: A literature review. *Journal of Industrial Engineering & Management Research*, 2(4), 114–123.

Rafique, M. A., Hou, Y., Chudhery, M. A. Z., Gull, N. & Ahmed, S. J. 2021. The dimensional linkage between public service motivation and innovative behavior in public sector institutions; the mediating role of psychological empowerment. *European Journal of Innovation Management*, ahead-of-print (ahead-of-print).

Rainey, H. G. 2009. *Understanding and Managing Public Organizations.* San Francisco, CA: John Wiley & Sons.

Ramamoorthy, N., Flood, C., Slattery, T. & Sardessai, R. 2005. Determinants of innovative work behaviour: Development and test of an integrated model. *Creativity and Innovation Management*, 14(2), 142–150.

Rego, A., Sousa, F., Marques, C. & Cunha, M. P. E. 2012. Authentic leadership promoting employees' psychological capital and creativity. *Journal of Business Research*, 65(3), 429–437.

Riaz, S., Xu, Y. & Hussain, S. 2018. Understanding employee innovative behavior and thriving at work: A Chinese perspective. *Administrative Sciences*, 8(3), 46.

Ricard, L. M., Klijn, E. H., Lewis, J. M. & Ysa, T. 2017. Assessing public leadership styles for innovation: A comparison of Copenhagen, Rotterdam and Barcelona. *Public Management Review*, 19(2), 134–156.

Richter, N. F., Sinkovics, R. R., Ringle, C. M. & Schlägel, C. 2016. A critical look at the use of SEM in international business research. *International Marketing Review*, 33(3), 376–404.

Ricoeur, P. 1981. What is a text? Explanation and understanding. In: Thompson, J.B (Ed.), *Hermeneutics and The Human Sciences: Essays on Language, Action and Interpretation* (pp. 145–164. Cambridge, UK: Cambridge University Press.

Rindfleisch, A., Malter, A. J., Ganesan, S. & Moorman, C. 2008. Cross-sectional versus longitudinal survey research: Concepts, findings, and guidelines. *Journal of Marketing Research*, 45(3), 261–279.

Ringdal, K. 2013. *Enhet og mangfold: samfunnsvitenskapelig forskning og kvantitativ metode*. Fagbokforlaget.

Ringholm, T., Teigen, H. & Aarsæther, N. 2013. *Innovative Kommuner*. Livonia, Latvia: Cappelen Damm Akademisk.

Ringle, C., da Silva, D. & Bido, D. 2015a. Structural equation modeling with the SmartPLS. *Bido, D., da Silva, D., & Ringle, C.(2014). Structural equation modeling with the Smartpls. Brazilian Journal Of Marketing*, 13(2), 56–73.

Ringle, C. M., Sarstedt, M., Mitchell, R. & Gudergan, S. P. 2020. Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, 31(12), 1617–1643.

Ringle, C. M., Wende, S. & Becker, J.-M. 2015b. *SmartPLS 3* [Online]. Available: https://www.smartpls.com/ [Accessed 19.11.2020].

Rinne, T., Steel, G. D. & Fairweather, J. 2012. Hofstede and Shane revisited: The role of power distance and individualism in national-level innovation success. *Cross-Cultural Research*, 46(2), 91–108.

Romero, I. & Martínez-Román, J. A. 2012. Self-employment and innovation. Exploring the determinants of innovative behavior in small businesses. *Research Policy*, 41(1), 178–189.

Ryghaug, M. & Toftaker, M. 2016. Creating transitions to electric road transport in Norway: The role of user imaginaries. *Energy Research & Social Science*, 17, 119–126.

Rylander, A. & Peppard, J. 2005. What really is a knowledge-intensive firm. *Royal Institute of Technology*, 3, 1–28.

Rønning, R. 2021. *Innovasjon i Offentlig Sektor. Innover Eller Bli Innovert.* [Innovation in Public Sector. Innovate or Be Innovated] Oslo, Norway: Universitetsforlaget.

Sanchez, G. 2013. *PLS Path Modeling with R*. Berkeley, CA: Trowchez Editions.

Santo, S. A. 2005. Knowledge management: An imperative for schools of education. *TechTrends*, 49(6), 42–49.

Sarros, J. C., Cooper, B. K. & Santora, J. C. 2008. Building a climate for innovation through transformational leadership and organizational culture. *Journal of Leadership & Organizational Studies*, 15(2), 145–158.

Sarstedt, M. & Cheah, J.-H. 2019. Partial least squares structural equation modeling using SmartPLS: A software review. *Journal of Marketing Analytics*, 7(3), 196–202.

Sarstedt, M., Hair, J. F., Nitzl, C., Ringle, C. M. & Howard, M. C. 2020. Beyond a tandem analysis of SEM and PROCESS: Use of PLS-SEM for mediation analyses! *International Journal of Market Research*, 147078532091568.

Sarstedt, M., Henseler, J. & Ringle Christian, M. 2011. Multigroup analysis in partial least squares (PLS) path modeling: Alternative methods and empirical results. In: S. Marko, S. Manfred & R. T. Charles (Eds.), *Measurement and Research Methods In International Marketing* (pp. 195–218). Emerald Group Publishing Limited.

Sarstedt, M., Ringle, C. M., Cheah, J.-H., Ting, H., Moisescu, O. I. & Radomir, L. 2019. Structural model robustness checks in PLS-SEM. *Tourism Economics*, 26(4), 531–554.

Sarstedt, M., Ringle, C. M. & Hair, J. F. 2022. Partial least squares structural equation modeling. In: Homburg, C., Klarmann, M., & Vomberg, A. (eds), *Handbook of Market Research*. 1st Ed. (pp. 587–632). Cham, Switzerland, Springer International Publishing. https://doi.org/10.1007/978-3-319-57413-4_15

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R. & Hair Jr, J. F. 2014. Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105–115.

Schafer, W. D. 1991. Reporting hierarchical regression results. *Measurement and Evaluation in Counseling and Development*, 24(3), 98–100.

Schei, V. 2020. *Koronastudentlivet* [Corona student life]. *Tidsskrift for Den norske legeforening* [Online]. Available: https://tidsskriftet.no/2020/05/legelivet/korona-studentlivet [Accessed 03.01.2022].

Schermuly, C. C., Meyer, B. & Dämmer, L. 2013. Leader–member exchange and innovative behavior. *Journal of Personnel Psychology*, 12(3), 132–142.

Schumpeter, J. A. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle (1912/1934).* Cambridge, MA: Harvard University Press.

Scott, G. & Falcone, S. 1998. Comparing public and private organizations: An exploratory analysis of three frameworks. *The American Review of Public Administration*, 28(2), 126–145.

Scott, S. G. & Bruce, R. A. 1994. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580–607.

Seok-Hwan, L. 2008. The effect of employee trust and commitment on innovative behavior in the public sector: An empirical study. *International Review of Public Administration*, 13(1), 27–46.

Shah, T. & Mulla, Z. R. 2013. Leader motives, impression management, and charisma: A comparison of Steve Jobs and Bill Gates. *Management and Labour Studies*, 38(3), 155–184.

Shane, S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11(4), 448–469.

Shanker, R., Bhanugopan, R., van der Heijden, B. I. J. M. & Farrell, M. 2017. Organizational climate for innovation and organizational performance: The mediating effect of innovative work behavior. *Journal of Vocational Behavior*, 100, 67–77.

Sindakis, S., Depeige, A. & Anoyrkati, E. 2015. Customer-centered knowledge management: Challenges and implications for knowledge-based innovation in the public transport sector. *Journal of Knowledge Management*, 19(3), 559–578.

Skålén, P., Gummerus, J., von Koskull, C. & Magnusson, R. 2015. Exploring value propositions and service innovation: A service-dominant logic study. *Journal of the Academy of Marketing Science*, 43, 137–158.

Sloan, M. M. 2012. Unfair treatment in the workplace and worker well-being. *Work and Occupations*, 39(1), 3–34.

Slåtten, T. & Mehmetoglu, M. 2015. The effects of transformational leadership and perceived creativity on innovation behavior in the hospitality industry. *Journal of Human Resources in Hospitality & Tourism*, 14(2), 195–219.

Slåtten, T., Mutonyi, B. R. & Lien, G. 2020. The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour. *BMC Health Services Research*, 20(1), 1096.

Smart, J. J. C. 2014. *Philosophy and Scientific Realism.* Routledge.

Smith, M. K. 2018. High-involvement innovation: Views from frontline service workers and managers. *Employee Relations*, 40(2), 208–226.

Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339.

Spender, J. & Strong, B. 2010. Who has innovative ideas? Employees. *The Wall Street Journal* (Online]. Available: https://www.wsj.com/articles/SB10001424052748704100604575146083310500518 [Accessed: 03.12.2021].

Stanton, J. M. 1998. An empirical assessment of data collection using the Internet. *Personnel Psychology*, 51(3), 709–725.

Stone-Romero, E. F. & Rosopa, J. 2008. The relative validity of inferences about mediation as a function of research design characteristics. *Organizational Research Methods*, 11(2), 326–352.

Streukens, S. & Leroi-Werelds, S. 2016. Bootstrapping and PLS-SEM: A step-by-step guide to get more out of your bootstrap results. *European Management Journal*, 34(6), 618–632.

Sujan, H., Weitz, B. A. & Kumar, N. 1994. Learning orientation, working smart, and effective selling. *The Journal of Marketing*, 58(3), 39–52.

Sullivan, H., Dickinson, H. & Henderson, H. 2021. *The Palgrave Handbook of The Public Servant*. Cham, Switzerland: Palgrave Macmillan.

Sultan, & Yin Wong, H. 2012. Service quality in a higher education context: an integrated model. *Asia Pacific Journal of Marketing and Logistics*, 24(5), 755–784.

Sun, Y. & Huang, J. 2019. Psychological capital and innovative behavior: Mediating effect of psychological safety. *Social Behavior and Personality*, 47(9), 1–7.

Sung, W. & Kim, C. 2021. A study on the effect of change management on organizational innovation: Focusing on the mediating effect of members' innovative behavior. *Sustainability*, 13(4), 2079.

Suseno, Y., Standing, C., Gengatharen, D. & Nguyen, D. 2019. Innovative work behaviour in the public sector: The roles of task characteristics, social support, and proactivity. *Australian Journal of Public Administration*, 79(1), 41–59.

Swedberg, R. 2000. *Entrepreneurship: The Social Science View*. Oxford, UK: Oxford University Press.

Tan, C. S., Lau, X. S., Kung, Y. T. & Kailsan, R. A. L. 2019. Openness to experience enhances creativity: The mediating role of intrinsic motivation and the creative process engagement. *The Journal of Creative Behavior*, 53(1), 109–119.

Tang, Y., Shao, Y.-F. & Chen, Y.-J. 2019. Assessing the mediation mechanism of job satisfaction and organizational commitment on innovative behavior: The perspective of psychological capital. *Frontiers in Psychology*, 10, 2699.

Tejedor, S., Cervi, L., Pérez-Escoda, A., Tusa, F. & Parola, A. 2021. Higher education response in the time of coronavirus: Perceptions of teachers and students, and open innovation. *Journal of Open Innovation*, 7(1), 43.

Tether, B. S. 2003. The sources and aims of innovation in services: Variety between and within sectors. *Economics of Innovation and New Technology*, 12(6), 481–505.

Tews, M. J., Michel, J. W. & Ellingson, J. E. 2013. The impact of coworker support on employee turnover in the hospitality industry. *Group & Organization Management*, 38(5), 630–653.

The Explorer. 2020. *The Norwegian transport sector puts climate in the driving seat* [Online]. Available: https://www.theexplorer.no/stories/transportation2/the-norwegian-transport-sector-puts-climate-in-the-driving-seat/ [Accessed 17.07 2021].

Thompson, V. A. 1965. Bureaucracy and innovation. *Administrative Science Quarterly*, 10(1), 1.

Thrane, C. 2020a. *Applied Regression Analysis: Doing, Interpreting and Reporting Regression*. New York, NY: Routledge.

Thrane, C. 2020b. Surveyeksperimentet: Et underutnyttet forskningsdesign for sosiologisk kausalanalyse. [Survey experiment: An underutilized research design for sociological causal analysis] *Norsk sosiologisk tidsskrift*, 4(06), 324–337.

Thurlings, M., Evers, A. T. & Vermeulen, M. 2015. Toward a model of explaining teachers' innovative behavior: A literature review. *Review of Educational Research*, 85(3), 430–471.

Thye, S. R. 2014. Logical and philosophical foundations of experimental research in the social sciences. In: M. Webster & J. Sell (Eds.), *Laboratory Experiments in the Social Sciences (Second Edition)* (pp. 53–82). San Diego, CA: Academic Press.

Tierney, W. G. 1988. Organizational culture in higher education. *The Journal of Higher Education*, 59(1), 2–21.

Toivonen, M. & Tuominen, T. 2009. Emergence of innovations in services. *The Service Industries Journal*, 29(7), 887–902.

Trong Tuan, L. 2017. Reform in public organizations: The roles of ambidextrous leadership and moderating mechanisms. *Public Management Review*, 19(4), 518–541.

University of Oslo. 2021. *Hjelp og veiledninger for Nettskjema* [Online]. Available: https://www.uio.no/tjenester/it/adm-app/nettskjema/hjelp/ [Accessed 25.07.2021 2021].

Van de Ven, A., Polley, D. E., Garud, R. & Venkataraman, S. 1999. *The Innovation Journey*. New York, NY: Oxford University Press.

Van der Voet, J., Kuipers, B. S. & Groeneveld, S. 2016. Implementing change in public organizations: The relationship between leadership and affective commitment to change in a public sector context. *Public Management Review*, 18(6), 842–865.

Van Knippenberg, D., De Dreu, C. K. & Homan, A. C. 2004. Work group diversity and group performance: an integrative model and research agenda. *Journal of Applied Psychology*, 89(6), 1008–1022.

Venturini, S. & Mehmetoglu, M. 2017. plssem: A Stata package for structural equation modeling with partial least squares. *Journal of Statistical Software*, 88(8), 1–34.

Verhoest, K., Verschuere, B. & Bouckaert, G. 2007. Pressure, legitimacy, and innovative behavior by public organizations. *Governance*, 20(3), 469–497.

Vivona, R., Demircioglu, M. A. & Raghavan, A. 2021. Innovation and innovativeness for the public servant of the future: What, why, how, where, and when. In: H. Sullivan, H. Dickinson & H. Henderson (Eds.), *The Palgrave Handbook of The Public Servant* (pp. 1–22). Cham, Switzerland: Palgrave Macmillan.

Voss, C., Tsikriktsis, N., Funk, B., Yarrow, D. & Owen, J. 2005. Managerial choice and performance in service management–A comparison of private sector organizations with further education colleges. *Journal of Operations Management*, 23(2), 179–195.

Walker, R. M., Avellaneda, C. N. & Berry, F. S. 2011. Exploring the diffusion of innovation among high and low innovative localities: A test of the Berry and Berry model. *Public Management Review*, 13(1), 95–125.

Walters, A. C. & Ramiah, V. 2016. Is it possible to be too risk averse? Considerations for financial management in the public sector. *Applied Economics Letters*, 23(17), 1210–1214.

Wang, E. T., Ying, T.-C., Jiang, J. J. & Klein, G. 2006. Group cohesion in organizational innovation: An empirical examination of ERP implementation. *Information and Software Technology*, 48(4), 235–244.

Webster, M. & Sell, J. 2014. Why do experiments? In: M. Webster & J. Sell (Eds.), *Laboratory Experiments in the Social Sciences (Second Edition)* (pp. 5–21). San Diego, CA: Academic Press.

West, M. A. & Farr, J. L. 1989. Innovation at work: Psychological perspectives. *Social Behaviour*, 4, 15–30.

West, M. A. & Farr, J. L. 1990. *Innovation and Creativity at Work: Psychological and Organizational Strategies.* Chichester, UK: Wiley.

Windrum, & Koch, M. 2008. *Innovation in Public Sector Services: Entrepreneurship, Creativity and Management*. Cheltenham, UK: Edward Elgar Publishing.

Witell, L., Gebauer, H., Jaakkola, E., Hammedi, W., Patricio, L. & Perks, H. 2017. A bricolage perspective on service innovation. *Journal of Business Research*, 79, 290–298.

Witell, L., Snyder, H., Gustafsson, A., Fombelle, & Kristensson, 2016. Defining service innovation: A review and synthesis. *Journal of Business Research*, 69(8), 2863–2872.

Woltman, H., Feldstain, A., MacKay, J. C. & Rocchi, M. 2012. An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology*, 8(1), 52–69.

Wu, C.-H., De Jong, J. P. J., Raasch, C. & Poldervaart, S. 2020. Work process-related lead userness as an antecedent of innovative behavior and user innovation in organizations. *Research Policy*, 49(6), 103986.

Xerri, M. 2013. Workplace relationships and the innovative behaviour of nursing employees: A social exchange perspective. *Asia Pacific Journal of Human Resources*, 51(1), 103–123.

Xerri, M. J. & Brunetto, Y. 2013. Fostering innovative behaviour: The importance of employee commitment and organisational citizenship behaviour. *The International Journal of Human Resource Management*, 24(16), 3163–3177.

Yan, D., Wen, F., Li, X. & Zhang, Y. 2020. The relationship between psychological capital and innovation behavior in Chinese nurses. *Journal of Nursing Management*, 28(3), 471–479.

Yeazdanshenas, M. 2014. Designing a conceptual framework for organizational entrepreneurship in the public sector in Iran. *Iranian Journal of Management Studies*, 7(2), 365–390.

Yuan, F. & Woodman, R. W. 2010. Innovative behavior in the workplace: The role of performance and image outcome expectations. *Academy of Management Journal*, 53(2), 323–342.

Zacher, H., Robinson, A. J. & Rosing, K. 2016. Ambidextrous leadership and employees' self-reported innovative performance: The role of exploration and exploitation behaviors. *The Journal of Creative Behavior*, 50(1), 24–46.

Zahra, S. A. & Covin, J. G. 1994. The financial implications of fit between competitive strategy and innovation types and sources. *The Journal of High Technology Management Research*, 5(2), 183–211.

Zeng, N., Liu, Y., Gong, P., Hertogh, M. & König, M. 2021. Do right PLS and do PLS right: A critical review of the application of PLS-SEM in construction management research. *Frontiers of Engineering Management*, 8(3), 356–369.

Zhang, X. & Bartol, K. M. 2010. Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, 53(1), 107–128.

Zhao, X., Lynch, J. G., Jr. & Chen, Q. 2010. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197–206.

APPENDED PAPERS

I

Paper I

Mutonyi, B. R., Slåtten, T. & Lien, G. (2020).

Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: Empirical evidence from Norway. *International Journal of Public Leadership*, 6(2), 175–197. Awarded Outstanding Paper in the 2021 Emerald Literati Awards. NSD level 1

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Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: empirical evidence from Norway

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Abstract

Purpose – This study clarifies the factors that foster individual innovative behaviour in the public sector by examining the effects and roles of empowering leadership, work group cohesiveness and individual learning orientation. This study also explores the direct effect of empowering leadership on work group cohesiveness and individual learning orientation, the influence of work group cohesiveness on individual learning orientation and the mediating roles of work group cohesiveness and individual learning orientation.

Design/methodology/approach – Data were collected from an online survey of respondents working in a public sector organization. Partial least squares structural equation modelling and mediation analysis by the bootstrap method were used for the data analysis.

Findings – Empowering leadership and individual learning orientation had significant direct effects on individual innovative behaviour. Both empowering leadership and work group cohesiveness have significant direct effects on individual learning orientation. Empowering leadership was positively related to work group cohesiveness. The mediation analysis revealed that individual learning orientation mediates the relationships between empowering leadership and individual innovative behaviour and between work group cohesiveness and individual innovative behaviour.

Research limitations/implications – The study focuses on three factors that foster individual innovative behaviour in a public sector organization.

Originality/value – This study offers new insights into the factors that foster individual innovative behaviour in the public sector. The findings reveal the importance of using a balanced leadership style and encourage learning in the workplace for individual innovativeness by public leaders.

Keywords Individual innovative behaviour, Empowering leadership, Work group cohesiveness, Individual learning orientation, Public sector

Paper type Research paper

Introduction

Increased attention to innovative behaviour by innovation researchers has strengthened the focus on employees, prompting more studies of successful factors in human resource

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development and drawing greater attention to innovation at the individual level in the public sector (Borins, 2002; Bason, 2010, 2018; Podger, 2015; Suseno *et al.*, 2019). While it is generally believed that public sector innovation improves organizational outcomes, the individual innovative behaviour of employees remains underexplored (Rhee *et al.*, 2010; Bos-Nehles *et al.*, 2017a). Individual innovative behaviour is defined as adoption, implementation or use of new ideas by employees to solve problems at work (Scott and Bruce, 1994). Scholars have identified individual innovative behaviour as a key factor for public organizations seeking to maintain organizational success, effectiveness and a competitive advantage (Imran *et al.*, 2010; De Vries *et al.*, 2016; Bason, 2018; Hansen and Pihl-Thingvad, 2019) as this contributes to work performance, motivation, effectiveness and other outcomes.

Recent studies have indicated that despite the growing interest in innovation at the firm level (Isaksen and Tidd, 2007), there is still little focus on the individual level (Montani *et al.*, 2014). A recent systematic review by Bos-Nehles *et al.* (2017b) argued that there is limited knowledge on how modern organizations can foster individual innovation, specifically in the public sector. This is a critical issue because public sector employees are currently experiencing a shift in their contextual work conditions, as well as in new work roles that affect individuals differently (Bason, 2018). This calls for empirical investigation into how factors such as leadership – specifically, empowering leadership – influence, encourage and facilitate innovative employee behaviour. Another recent review by Lukes and Stephan (2017) on the state of innovative behaviour called for a deeper understanding of the factors that foster individual innovativeness at work. Although Thurlings *et al.* (2015) focused on explaining innovative behaviour by teachers, they also called for more cross-sectional studies to explore the complexity and distinct nature of individual innovative behaviour at work.

Mulgan and Albury (2003) recognized that public needs and expectations are constantly growing; thus, public employees are under pressure to be innovative and efficient in resolving challenges at work. The challenge for public sector organizations is that they often operate under competitive pressure that impedes individual innovativeness (Bysted and Jespersen, 2014; Hartley, 2005). Scholars who have studied the influence of innovative behaviour have found that it is likely to be restrained by barriers in the public sector (Borins, 2002; Fernandez and Moldogaziev, 2012; Damanpour *et al.*, 2009). These barriers are erected by "a political environment that lacks the competitive pressures and demands for performance improvement seen in private firms" (Bos-Nehles *et al.*, 2017a, p. 380). Such barriers impede – and in the worst cases, decrease – the fostering of individual innovativeness by empowerment and empowering leadership. Organizations of this type often face obstacles such as a lack of non–profit-related goals, a high degree of political control and a variety of social and political interventions (Suseno *et al.*, 2019).

The goal of this paper is to address the knowledge gap identified by Shanker *et al.* (2017) and Bos-Nehles *et al.* (2017a) regarding the factors that foster individual innovative behaviour in the public sector. To achieve this goal, the study examines such behaviours by individuals in a public sector organization in terms of the following three influential factors: (1) empowering leadership, (2) work group cohesiveness and 3) individual learning orientation. Specifically, the value of testing these relationships in the public sector is that employees often use the available resources to innovate (Bysted and Jespersen, 2014). In a hierarchal system – i.e. the government system – the forms of creative and innovative outputs are restricted (Bos-Nehles *et al.*, 2017a, b; Bysted and Jespersen, 2014). In addition, as this study investigates individual innovative behaviour in the public sector, it adds to the currently limited knowledge on how to foster individual innovative behaviour.

This study makes four specific contributions to public sector innovation research on individual innovative behaviour. First, it responds to calls for more research on innovative behaviour at the individual level in the public sector (Bos-Nehles *et al.*, 2017b). Second, it focuses on individual innovative behaviour by junior employees (Choi and Chang, 2009). Third, it examines the combined influence of empowering leadership, work group

cohesiveness and individual learning orientation on individual innovative behaviour in organizations and offers new insights (Lukes and Stephan, 2017). Fourth, it uses advanced quantitative research techniques such as partial least squares structural equation modelling (PLS-SEM) (Thurlings *et al.*, 2015) to examine the role of individual innovativeness in the public sector. Overall, the study extends the sparse literature on individual innovative behaviour in the public sector, highlights the distinctive nature of individual innovative behaviour and explores how it may be fostered at work.

The structure of this paper is as follows. We start by defining the concept of individual innovative behaviour, and then discuss the role of empowering leadership, work group cohesiveness and individual learning orientation on individual innovative behaviour. Next, we present the conceptual model of the study, followed by the methodology. We proceed by reporting the findings and implications of the study. The paper concludes with insights for leaders and organizations in the public sector, as well as suggestions for future research.

Literature review and hypotheses

Individual innovative behaviour

According to Hult *et al.* (2004), an "innovation can be a new product or service, a new production process, or a new structure or administrative system" (p. 430). The general agenda of innovation in organizations seems to overlook a crucial but complex phenomenon, i.e. individual innovative behaviour.

Scott and Bruce (1994) proposed three main factors that foster individual innovative behavior as follows: leadership, work groups and individual attributes. Although there has been much research on these factors (e.g. Rhee *et al.*, 2010; Slåtten and Mehmetoglu, 2015; Hülsheger *et al.*, 2009), there has been little attention to the combined effect of all three on individual innovative behaviour in the public sector. Therefore, this paper proposes that empowering leadership concerns leadership style, work group cohesiveness corresponds to work groups and individual learning orientation is an individual attribute.

The definition of individual innovative behaviour proposed by Scott and Bruce (1994) has laid the foundation for various other definitions (e.g. Zhou and George, 2001; Yuan and Woodman, 2010). Some scholars have defined individual innovative behaviour as a multi-stage process of implementing new and novel ideas (Scott and Bruce, 1994; Amabile *et al.*, 1996). Others have defined it as the way an individual recognizes a problem, generates ideas or solutions and sets a course to implement the perceived solution (Waheed *et al.*, 2016). Individual innovative behaviour has also been described as a process with a variety of activities requiring different individual behaviours at each stage (Scott and Bruce, 1994). Part of the basis of individual innovative behaviour is formed by empowering leadership, work group cohesiveness and individual learning orientation (Amundsen, 2019; Bos-Nehles *et al.*, 2017b; Mullen and Copper, 1994; Gong *et al.*, 2009).

In this paper, individual innovative behaviour is defined as the ways in which employees adopt, implement or use creative ideas to solve problems in their work role, unit or organization (Yuan and Woodman, 2010). Therefore, the nucleus of individual innovative behaviour is individual behaviour before and during the implementation of a creative idea (Janssen, 2005). Examples of such behaviours include individuals' search for new technology or processes, suggestions for new ways of achieving goals, finding the necessary resources to implement new ideas and applying new working methods.

Empowering leadership

In a review of empowering leadership, Amundsen and Martinsen (2014) noted that it "emerged as a particular form of leadership, distinct from other approaches such as directive, transactional, and transformational leadership" (p. 487). Although this management style has received some attention (e.g. Slåtten *et al.*, 2011; Cheong *et al.*, 2016), the influence of

empowering leadership on an individual employee's innovative behaviour in the public sector remains uncharted. Empowering leadership is defined in this paper as subordinates' belief that their leaders have transferred, shared or delegated power (Zhang and Bartol, 2010; Amundsen and Martinsen, 2014) to enable subordinates to make independent choices in their work roles (Slåtten *et al.*, 2011).

Organizational theorist(s) have previously studied empowerment as a form of self-efficacy or self-determination that enhances employee motivation at work (Houghton and Yoho, 2005; Amundsen and Martinsen, 2014). Scholars have recognized two main perspectives on empowerment as follows: socio-structural empowerment and psychological empowerment (Amundsen, 2019). Psychological empowerment focuses on the micro level (individuals) and refers to intrinsic task motivation engendered by meaning, choice, competence and impact. Socio-structural empowerment is studied at a macro level (organizations and leaders) and focuses on the socio-structural/contextual conditions that allow employees at lower levels of the organization a high degree of autonomy. Socio-structural empowerment is where the empowering leadership style is found (Amundsen, 2019). Empowerment is derived from the belief that subordinates who are given more opportunities for autonomous self-leadership will achieve great outcomes that benefit the long-term performance of an organization. Thus, scholars have argued that modern organizations would benefit greatly from the outcomes of empowering leadership (Humborstad *et al.*, 2014; Amundsen, 2019; Cheong *et al.*, 2016). Empowerment can provide many positive results, such as increased power sharing, support, decentralization, flexible organizational structure and work design, autonomy in work tasks and human resource development, to name a few.

Carmeli *et al.* (2006) recognized that this new line of thinking about leadership, especially in the public sector, would benefit individual innovative behaviour as "subordinates are not controlled, influenced and managed by a single individual leader" (p. 75). Srivastava *et al.* (2006) and Houghton and Yoho (2005) supported this notion by arguing that empowering leadership influences individuals to lead themselves and empower individuals. Moreover, Cheong *et al.* (2016) found that the complexity of empowerment could be both enabling and burdensome. For example, empowered employees may take greater initiative in implementing ideas at work. However, owing to the increased responsibilities of their work roles, empowered employees may also face various challenges (Humborstad *et al.*, 2014).

Few studies have indicated a positive link between empowerment and innovative behaviour in the public sector (e.g. Fernandez and Moldogaziev, 2012), and more research is needed. In addition, Humborstad *et al.* (2014) urged further study on the multifaceted nature of empowerment in organizations. While exploring the effects of empowering leadership on frontline service employees in a hospitality organization, Slåtten *et al.* (2011) found an indirect relationship between empowering leadership and innovative behaviour through creativity. Similarly, Cheong *et al.* (2016) found that once individuals are empowered to take independent action, they are more likely to demonstrate innovative behaviour.

The overall performance of empowered employees at work improves because they are quick to try new ways of resolving issues and are confident in their ability to generate and implement useful ideas (Fernandez and Moldogaziev, 2012). Consequently, we argue that failure to encourage such behaviour may have devastating consequences, such as reduced effectiveness, poor performance and low internal motivation. For example, while investigating the role of empowerment among US federal government employees, Fernandez and Moldogaziev (2012) found that too much autonomy could hinder innovative behaviour as it resulted in a lack of clearly defined goals and performance expectations. Moreover, Humborstad *et al.* (2014) observed that too little empowerment for certified accountants could limit their performance or result in negative outcomes for expected work tasks. However, as current research on the role of empowering leadership in the public sector is insufficient, scholars have recommended further research on the influence

of empowering leadership on individual innovative behaviour in the public sector (Fernandez and Moldogaziev, 2012; Chang and Liu, 2008). The public sector is known to suffer from various issues, such as high levels of formalization, that can hamper empowerment (see Rainey, 2009). Consequently, there are good reasons to examine the positive influence of empowering leadership on individual innovative behaviour in the public sector. Hence, this study proposes the following hypothesis:

H1. Empowering leadership is positively related to individual innovative behaviour.

Work group cohesiveness

According to Anderson and West (1998), a work group consists of a "permanent or semi-permanent team to which individuals are assigned" (p. 236), and these individuals interact on a regular basis to perform work tasks. In their study, Amabile *et al.* (2005) found that the quality and cohesiveness of the given work group can determine the level at which individuals feel and believe themselves to be creative. Mudrack (1989) argued that cohesiveness is a critical group-level variable; i.e. it is not only challenging to define but also dynamic in nature. Consequently, definitions of work group cohesiveness vary, and many functions have been attributed to it. For example, according to Forsyth (2018), work group cohesiveness can include group behaviour, support, trust and attraction. Although the focus areas of scholars vary (see Mudrack, 1989), this study has chosen to incorporate group behaviour, group support and group attraction into one factor, i.e. work group cohesiveness.

Amabile *et al.* (1996) acknowledged the significance and the influence of work groups, as well as their influence on people's experiences of the work environment. In addition, Anderson and West (1998) argued that working in a group has both advantages and disadvantages, according to which of the various individuals perform which roles. Pierce and Delbecq (1977) found that the attitudes and behaviours of employees predict innovation in organizations. In practice, the size, quality and cohesiveness of a work group affects individual innovative behaviour at work (Amabile *et al.*, 2005).

Scholars have defined a cohesive work group as one that "sticks together", is bonded into a whole and the members experience feelings of solidarity, harmony and commitment (Mudrack, 1989, p. 39). Drawing on Van der Vegt and Janssen (2003) and Mudrack (1989), we define a cohesive work group as a group of individuals in a permanent or semi-permanent team who interact on a regular basis and feel their group to be highly competent at solving problems creatively. Instead of understanding work group cohesiveness on a macro-organizational level, we have shifted our focus to the micro-organizational level (Barile *et al.*, 2016), such as the individual dynamics in innovative behaviour in the public sector.

Mudrack (1989) found that although cohesiveness in a work group is highly beneficial, not all perspectives have been equally appreciated. Wang *et al.* (2006) noted that "group cohesion is the best summary representation of the social–psychological variables present in the study of groups" (p. 236). West and Farr (1989) explored the relationship between work group cohesiveness and individual innovative behaviour in the private sector and found that the cohesion of a work group was strongly correlated with individual innovation. Hülsheger *et al.* (2009) demonstrated that work group cohesiveness is a vital precondition for individual innovative behaviour as it "creates a psychologically safe environment in which team members feel free to challenge the status quo and explore new ways of doing things" (p. 1132). However, group cohesion can also influence group members negatively as some may feel inadequate in terms of solving problems, sharing knowledge or exchanging advice (Van Woerkom and Sanders, 2010). Therefore, the pressure to perform collectively may have a negative influence on individual innovative behaviour.

Previous studies reporting a positive relationship between teams, work groups and individual innovative behaviour have focused on organizations in the private sector.

For example, for knowledge-intensive services, De Jong and Kemp (2003) found that the quality of a work group determines improvement and the successful implementation of novel and useful ideas. In other words, the consistent determination of a work group was found to influence individuals' belief in their ability to introduce and implement new ideas without personal censure (Scott and Bruce, 1994; Amabile *et al.*, 2005). However, public sector innovation research has revealed variations in organizational performance in terms of workforce quality (see Arshad *et al.*, 2019); therefore, we argue that it is important to propose hypotheses concerning the relationship between work group cohesiveness and individual innovative behaviour in the public sector. This study proposes a positive relationship between work group cohesiveness and individual innovative behaviour because previous research has shown that group cohesion is strongly related to innovation at work (Hülsheger *et al.*, 2009). Therefore, we propose the following:

H2a. Work group cohesiveness is positively related to individual innovative behaviour.

Employees are currently expected to go beyond their formal work roles (Rego *et al.*, 2012). Thus, employee empowerment has found an important place in organizational research because "it enables employees to increase effectiveness of their formal work roles by fostering autonomy and self-responsibilities" (Cheong *et al.*, 2016, p. 1). The augmentation effect of empowering leadership has been linked to an empowering leader's ability to motivate and inspire followers to perform beyond expectations. Although Cheong *et al.* (2016) cautioned that although empowerment is widely associated with positive effects and outcomes, such as greater internal motivation, unregulated empowerment can have negative outcomes such as overconfidence. However, Mullen and Copper (1994) observed the influence of work group cohesiveness and found that it predicts group performance. Research has found that its influence on performance depends on leadership style. For example, in their study on organizational innovation, Li *et al.* (2018) found that transformational leaders were better at inspiring or stimulating innovation at work, whereas transactional leaders had a positive influence on organizational culture and innovation. Transformational leaders recognize subordinates' needs "through personal attention and [use] them to motivate their followers" (Harun *et al.*, 2019, p. 186). On the one hand, their goal is to increase positive outcomes, such as increased resilience and self-efficacy at work. On the other hand, empowering leaders distribute power to entrust subordinates with additional responsibilities and autonomy that may instil self-leadership skills (Humborstad *et al.*, 2014). This study has chosen to focus on the role of empowering leadership on work group cohesiveness because the objective for an empowering leader is to encourage independence by removing the limitations of powerlessness to boost motivation and inspire self-development (Lee *et al.*, 2018). Therefore, we predict that an empowering leadership style will influence work group cohesiveness positively because leaders influence the harmony and the well-being of their employees (Barile *et al.*, 2016). Therefore, we propose the following hypothesis:

H2b. Empowering leadership is positively related to work group cohesiveness.

The comprehensive meta-analysis by Hülsheger *et al.* (2009) called for more research on the mediating role of work group cohesiveness at the individual level as this is "a necessary precondition for" (p. 1132) individual innovative behaviour. Mediation is an underlying mechanism whereby an independent factor predicts a dependent factor through an intervening factor (for more details, see Mathieu *et al.*, 2008). We believe that work group cohesiveness may function as an important mediator between empowering leadership and individual innovative behaviour. As suggested above, empowering leadership positively influences and motivates individual innovative behaviour at work. For this reason, employees who experience a high level of work group cohesion because of an empowering leader will encourage colleagues to seek out and implement new ideas at work. As such, it

may be assumed that work group cohesion could mediate the relationship between empowering leadership and individual innovative behaviour. This conceptualization is consistent with that of Evans and Dion (1991), who argued that "within real organizations there are a number of sources of variance" (p. 694). We believe that these sources of variance can strengthen the relationship between empowering leadership and individual innovative behaviour. There are other variables that have generally been ignored in group cohesion research (Van Knippenberg *et al.*, 2004). The view of work group cohesiveness as a mediator may resolve some inconsistent findings from previous group cohesion research. Consistent with this view, Slåtten and Mehmetoglu (2011) suggested exploring different levels of relationships between empowering leadership and individual innovative behaviour at work and examining whether other factors could indirectly influence these relationships. For example, Jung and Sosik (2002) found a positive link between transformational leadership and group cohesiveness and advocated further studies to "expand other types of potential mediating/moderating variables" (p. 329). In addition, examining the role of group cohesion on management goals, Wang *et al.* (2006) noted that more research is needed on the moderating role of group cohesion. Consequently, when the cohesion of a work group is increased by an empowering leader, the overall level of innovative behaviour should improve. Therefore, the following hypothesis is proposed:

H2c. The relationship between empowering leadership and individual innovative behaviour is mediated by work group cohesiveness.

Individual learning orientation

The conceptualization of individual learning orientation has two focus areas. One group of scholars has broadly defined learning orientation as knowledge development (e.g. Huber, 1991), while another sees it as the application of knowledge to problem-solving (e.g. Senge, 1990). In line with Huber (1991), this study views individual learning orientation as knowledge development, defining it as "the development of new knowledge or insights that have the potential to influence behaviour" (Hult *et al.*, 2004, p. 431) and as the drive of individuals to be creative and innovative in their work (Gong *et al.*, 2009).

Three types of orientation have been proposed to explain learning as an important variable in the development of knowledge and skills as follows(Jha and Bhattacharyya, 2013): learning orientation (Wang, 2008), performance orientation (Lu *et al.*, 2012) and work avoidance orientation (Meece *et al.*, 1988). Individuals with learning orientation are highly motivated to learn and perceive knowledge to be valuable and treasured (Jha and Bhattacharyya, 2013). In contrast, individuals with performance orientation have a "strong desire to impress others with their achievements and avoid negative evaluations" (Lu *et al.*, 2012, p. E180). Individuals with work avoidance orientation have a strong inclination to accomplish their work tasks with minimal effort (Meece *et al.*, 1988). Because individual innovative behaviour focusses on the adoption and implementation of ideas, rather than finding the fastest route to accomplish a task or concerns about performance, it is best to evaluate the influence of individual learning orientation on an individual employee's innovative behaviour. This argument is supported by Lu *et al.* (2012), who noted that more research into the relationship between individual learning orientation and innovativeness is needed.

As individual innovative behaviour concerns the adoption and implementation of creative ideas, employees are required "to update relevant skills and knowledge continually" (Park *et al.*, 2014, p. 81). Similarly, Rhee *et al.* (2010) observed that "a continuous commitment to learning is central to innovativeness" (p. 66). In contrast to Park *et al.* (2014), who focused on the effect of a learning organization on individual innovative behaviour in the private sector, this paper offers new insights into the relationship between individual learning orientation and individual innovative behaviour in the public sector.

In their study, Gong *et al.* (2009) demonstrated that individual employees' learning orientation is positively related to their creativity. Although Gong *et al.* (2009) focussed on employee creativity, Weisberg (1999) considered that learning was indispensable for creativity. Creative idea generation is a stepping stone to individual innovative behaviour (Scott and Bruce, 1994). Research on individual learning orientation has highlighted the advantages of individual learning orientation in employees' innovativeness (e.g. Hult *et al.*, 2004). While previous reports have indicated a positive association between learning and individual innovative behaviour in the private sector (e.g. Calantone *et al.*, 2002; Rhee *et al.*, 2010), few studies have examined the linkages between the constructs of individual learning orientation and individual innovative behaviour in the public sector.

Despite the paucity of empirical evidence in the literature on the relationship between individual learning orientation and individual innovative behaviour, there are reasons to anticipate a direct link between individual learning orientation and individual innovative behaviour in the public sector. For example, examining employees and their supervisors in diverse industries in China, Lu *et al.* (2012) found a positive and significant relationship between learning orientation and innovative performance. Sujan *et al.* (1994) and Hess (2014) found that individuals with learning orientation often seek challenges that increase their individual motivation, stimulate personal growth and provide opportunities to master any given task. Calantone *et al.* (2002) examined the direct influence of individual learning orientation on factors such as firm innovativeness and performance. They found that the learning orientation of senior executives was associated with the innovativeness of their firms. In addition, examining the determinants and effects of employees' creative self-efficacy on innovative activities in hospitality organizations in Norway, Slåtten (2014) found an indirect link between individual learning orientation and innovative activities.

In line with previous research, this study posits that individual learning orientation should have a positive influence on individual innovative behaviour at work because learning encourages people to "exert extra effort to acquire new knowledge and experiment with various solutions" (Lu *et al.*, 2012, p. E182). For example, scholars have found that individual learning orientation increases knowledge, competence, commitment and motivation, which all are linked to innovation (Jha and Bhattacharyya, 2013; Gong *et al.*, 2009; Lu *et al.*, 2012). Bates and Khasawneh (2005) emphasized that "learning and its application are principal processes in innovation" (p. 98), and because innovative behaviour is a process of idea adoption and implementation, the acquisition of new knowledge is crucial for problem-solving. Individual learning orientation emphasizes the opportunity to develop and acquire new knowledge that facilitates problem-solving at work. In effect, individual learning orientation is a crucial facilitator of creativity and innovation because it supports inquiry, experimentation and motivation to try new ways of resolving issues at work. Therefore, this study proposes the following hypothesis:

H3a. Individual learning orientation is positively related to individual innovative behaviour.

At present, expert competence in hierarchies is shifting. Some knowledge-intensive organizations are learning to rely more on their employees because subordinates possess far more expert skills and competence than their leaders (Amundsen, 2019). Therefore, the roles of leaders are shifting as they are encouraged to focus more on empowering rather than just leading their subordinates. Such leaders have been found to promote strong and healthy learning environments (Amundsen, 2019). Thus, Cheong *et al.* (2016) urged further study of the role of empowering leadership in factors such as learning orientation.

The complex nature of empowerment as a leadership style provides autonomy for employees to learn and receive support to grow (Fernandez and Moldogaziev, 2012; Afsar and Badir, 2016). For example, Chang and Liu (2008) found that employee empowerment had little

influence on the job productivity of public health nurses in Taiwan, but those with high competence showed higher job productivity. This highlights the important role of leaders in empowering, supporting and giving autonomy to their followers to foster learning at work. For instance, Jung and Sosik (2002) found empowerment to be positively related to collective efficacy. Likewise, Laschinger *et al.* (2001) found both structural and psychological empowerment to be positively related to job satisfaction, which in turn facilitates innovative behaviour at work (Sinha *et al.*, 2016) and is an outcome of learning (Lim, 2010).

Research on the relationship between empowering leadership and individual learning orientation is rather scarce, and the influence of empowerment on learning has had varying outcomes. For example, Fernandez and Moldogaziev (2012) argued that empowerment is vital for motivating employees' learning. In addition, Humborstad *et al.* (2014) found a positive link between empowering leadership and goal orientation. Although goal orientation focuses on the reasons for knowledge acquisition, learning orientation focusses on the motivation for it; a meta-analysis by Lee *et al.* (2018) identified a need for further exploration of the effects of empowering leadership on various outcomes. There are good reasons to suspect a positive relationship between empowering leadership and individual learning orientation. Therefore, the following hypothesis is proposed:

H3b. Empowering leadership is positively related to individual learning orientation.

Learning orientation is presumed to be one of many motivational orientations. According to Sujan *et al.* (1994), it leads the individual employee to participate in activities that support innovation at work. Therefore, work provides many opportunities to learn, and work groups in particular are becoming a source of motivation and inspiration to learn (Hogg, 1992). For instance, a work group may consist of individuals with varying backgrounds, skills and experiences that benefit a group's overall performance and efficiency (Wang *et al.*, 2006). Hogg (1993) observed that work groups can influence the attitudes and behaviours of their members, while Barile *et al.* (2016) reported that group cohesiveness would have varying outcomes. For example, Tekleab *et al.* (2009) found that the cohesiveness of a work group had negative outcomes, such as a lack of communication affecting the perceived safety of knowledge-sharing among members. However, Evans and Dion (1991) observed that group cohesiveness had positive outcomes, such as improved performance and greater satisfaction at work. Accordingly, Slåtten (2014) called for further research on "whether the sources of individual learning orientation are located to sources within the organization (co-workers)" (p. 343).

Wang *et al.* (2006) considered that there were two ways to build work group cohesiveness as follows: willing participation by group members and commitment to learning orientation. The positive association between group cohesion and learning orientation in the private sector provides reasons to explore the relationship between work group cohesiveness and individual learning orientation in the public sector (Wang *et al.*, 2006). Consequently, this study investigates whether the cohesiveness of a work group encourages learning at work and therefore proposes the following hypothesis:

H3c. Work group cohesiveness is positively related to individual learning orientation.

Most studies have focused on the direct influence of learning orientation on factors such as firm innovation (Calantone *et al.*, 2002), employee creativity (Gong *et al.*, 2009), performance orientation (Jha and Bhattacharyya, 2013) and innovation (Lu *et al.*, 2012). However, few studies have considered learning orientation as a mediator. For example, examining the mediating role of learning orientation in UK firms, Wang (2008) found that it was key in maximizing the effects of entrepreneurial orientation on firm performance. In addition, Rhee *et al.* (2010) examined the mediating effects of learning orientation in firms in South Korea, finding that it was a crucial mediator of the relationships between market orientation,

entrepreneurial orientation and innovativeness. Therefore, it is reasonable to assume that individual learning orientation can mediate the relationship between empowering leadership and individual innovative behaviour.

Gong *et al.* (2009) observed that employee learning orientation and transformational leadership positively influenced employee creativity and self-efficacy and that employees' belief in their capacity to innovate mediated these relationships. In addition, Lu *et al.* (2012) called for more research on the diverse nature of the learning orientation and its effect on innovation, as well as the indirect effects of the learning orientation in various types of organizations. Similarly, Rhee *et al.* (2010) observed that a strong desire to learn increased employee knowledge and competence, which in turn stimulated employee innovativeness. In this way, fear of failure decreases as internal motivation and open-mindedness increase (Lu *et al.*, 2012).

Amundsen (2019) maintains that as autonomy is fundamental in empowering leadership, promoting learning at work is the key to innovation. Thus, as a mediator, individual learning orientation varies in its effects on relationships; therefore, this study proposes that the relationships both between work group cohesiveness and individual innovative behaviour and between empowering leadership and individual innovative behaviour are mediated by individual learning orientation. The following hypotheses are proposed:

H3d. The relationship between empowering leadership and individual innovative behaviour is mediated by individual learning orientation.

H3e. The relationship between work group cohesiveness and individual innovative behaviour is mediated by individual learning orientation.

In summary, this study tests nine hypotheses as follows: three concerning mediators and six regarding direct relationships. The conceptual framework of the study (Figure 1) shows the six direct relationships.

Methodology

In view of the aim of this paper, data were collected from Norway's largest public transportation organization to investigate how individual innovative behaviour is fostered in

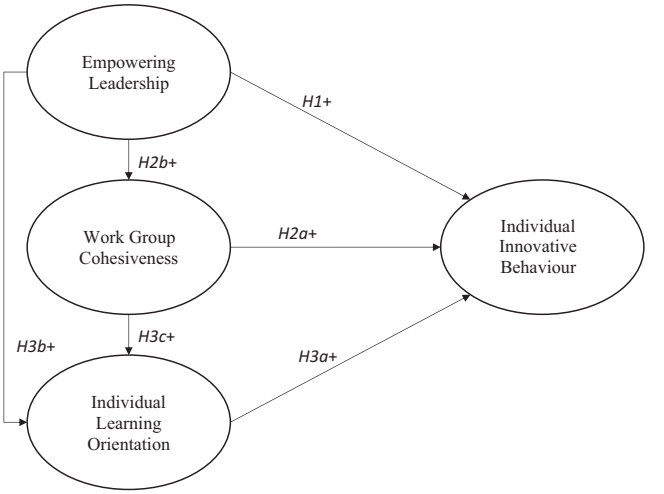


Figure 1.
Conceptual model of the study

the public sector. Although this organization is a state-controlled government agency, it acts independently. The organization offers nationwide land transportation services for passengers and goods. Today, the organization has become one of the leading transportation corporations in Norway, with innovation at its core. Employees come from various occupational backgrounds, including customer service, finance, human resources, marketing and operations. Following the guidelines of Huber and Power (1985) for gathering data from individual respondents, a pre-test was completed by two experts in the field with eight randomly selected respondents to ensure the quality of the overall research design.

This study utilized a structured questionnaire in which all the validated variables required individuals to respond to statements on a seven-point Likert scale, ranging from (1) "strongly disagree" to (7) "strongly agree". The respondents were asked to assess their innovative behaviour in their current work role, their leaders, their motivation to acquire new knowledge and their work group cohesion. The five items used to measure individual innovative behaviour were adopted from Scott and Bruce (1994). The three items used to measure empowering leadership at the individual level were adopted from Amundsen and Martinsen (2014). The three items used to measure work group cohesiveness were adopted from Amabile *et al.* (1996), and the three items used to measure individual learning orientation were adopted from Sujan *et al.* (1994).

The online questionnaire was distributed to 256 employees in 2016, who returned 96 completed useable surveys, representing a 37.7% response rate. To avoid non-response bias, the respondents were assured of anonymity. Furthermore, to focus exclusively on the viewpoint of ordinary employees, individuals in management or leadership positions were excluded.

Of the respondents, 56.3% were women, 60.4% held a bachelor's/master's degree, 67.7% worked in sales and 80% were full-time workers. The average participant (32.3%) was between 41 and 50 years of age, and their organizational tenure was between 1 and 5 years (30%).

Following data collection, a two-step analysis (Ringle *et al.*, 2018) was conducted using PLS-SEM with Stata software (version 15.0; StataCorp, College Station, TX, USA). First, a confirmatory factor analysis was performed to calculate the significance, means, standard deviations and composite reliability – also known as Dillon–Goldstein's rho – and average variance extracted (AVE) for the standardized indicator loadings. The results are summarized in Table 1, below.

The study tested the discriminant validity of the squared inter-factor correlations in relation to the AVE of the latent variables and checked for multicollinearity issues (Venturini and Mehmetoglu, 2017). As shown in Table 2, the structural model was not biased as all variance inflation factor values were less than the 2.5 threshold (Venturini and Mehmetoglu, 2017). The results of the cross-loadings (not reported here) of the latent variables showed that the reflective variables shared more variance with their own indicators than with other indicators in the structural model (Hair *et al.*, 2016).

The results of the measurement model indicated good model quality. As a second step of PLS-SEM, the structural model was estimated and evaluated (Ringle *et al.*, 2018). We followed the recommendation of Hair *et al.* (2019) concerning model fit statistics in PLS-SEM. Therefore, we measured the coefficient of determination (R^2), effect size f^2, goodness-of-fit (GoF) and average cross-validated redundancy to determine the fit statistics of the PLS-SEM model. The results are reported below.

Control variables

This study included control variables (see attachment). However, tests of independent hypotheses found no significant results to report. Hence, the control variables were removed from the study.

Constructs	Indicators	Loadings	Mean	SD	CR(DG)	AVE	*A*
Individual innovative behaviour			4.65	1.20	0.896	0.634	0.85
	I try out new technology, processes and techniques to complete my work	0.750					
	I promote my ideas so that others might use them in their work	0.783					
	I investigate and find ways to implement new ideas	0.878					
	I develop plans and schedules to realize my ideas	0.719					
	I try out new ideas in my work	0.842					
Empowering leadership			5.45	1.27	0.898	0.746	0.83
	My leaders assigns me responsibility	0.834					
	My leader encourages me to take initiative	0.879					
	My leader listens to me	0.879					
Work group cohesiveness			5.45	1.01	0.814	0.589	0.66
	There is open communication within my work group	0.730					
	It is permitted for employees to solve the same problem in different ways	0.729					
	There is high «ceiling» for making mistakes among colleagues	0.838					
Individual learning orientation			5.82	0.99	0.840	0.636	0.71
	I learn new things in my work	0.749					
	It is worth spending a great deal of time learning new ways to accomplish my work	0.818					
	I acquire new knowledge when it is necessary	0.823					

Table 1.
Measurement model results

Note(s): SD: Standard deviations CR(DG): Composite reliability or Dillon-Goldstein's rho; AVE: average variance extracted; α: Chronbach alpha All of the loadings are statistically significant

Data analysis and results

The results from evaluating the fit of the SM model to the data showed good predictive power ($R^2 = 0.41$) and a small effect size ($f^2 = 0.06$). The structural model's predictive relevance had an average redundancy value of 0.25, and the model yielded an acceptable fit (GoF = 0.515).

The results from bootstrapping the conceptual model (as hypothesized in Figure 1 and summarized in Figure 2) reveal both significant and non-significant findings. Specifically, empowering leadership is positively and significantly related to individual innovative behaviour ($\beta = 0.411$, $p < 0.000$), which supports H1. H2b, which states that empowering leadership is positively related to work group cohesiveness, was also supported ($\beta = 0.574$, $p < 0.000$). H2a, which concerns the relationship between work group cohesiveness and individual innovative behaviour, was not supported by our results ($\beta = 0.047$, $p <$ ns). H3b,

Latent variable	IIB	EL	WGC	ILO
IIB	1.000	0.367	0.200	0.307
EL	0.367	1.000	0.330	0.380
WGC	0.200	0.330	1.000	0.365
ILO	0.307	0.380	0.365	1.000
AVE	0.634	0.747	0.589	0.636

Multicollinearity check of the structural model (VIFs)

Variable	IIB	WGC	ILO
EL	1.799	1.000	1.492
WGC	1.757		1.492
ILO	1.899		

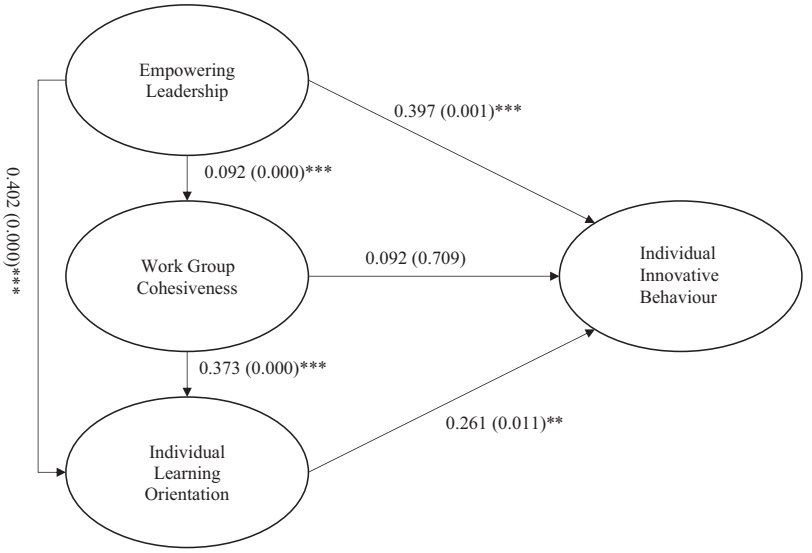
Note(s): IIB, individual innovative behaviour; EL, empowering leadership; WGC, work group cohesiveness; ILO, individual learning orientation

Table 2.
Discriminant validity - squared interfactor correlation vs average variance extracted (AVE)

which concerns the relationship between empowering leadership and individual learning orientation, was supported ($\beta = 0.402$, $p < 0.000$). H3a, which states that individual learning orientation is positively related to individual innovative behavior, was supported ($\beta = 0.272$, $p < 0.008$). H3c, which concerns the relationship between work group cohesiveness and individual learning orientation, was supported ($\beta = 0.373$, $p < 0.000$).

Mediation analysis results

To test the proposed mediation relations, we followed the steps of estimating the indirect effect and then testing the statistical significance of both work group cohesiveness and



Note(s): Standardized path coefficients (Bootstrap by PLS-SEM) *p*-values in parentheses. ** $p < 0.05$, ***$p < 0.01$, $n = 96$

Figure 2.
Structural model results

individual learning orientation as mediating factors. The results revealed that H2c was not supported by our study ($\beta = 0.027$, $p <$ ns). In addition, the results revealed that H3d was supported as individual learning orientation partially mediated the relationship between empowering leadership and individual innovative behaviour ($\beta = 0.109$, $p < 0.009$). Moreover, H3e was supported as individual learning orientation fully mediated the relationship between work group cohesiveness and individual innovative behaviour ($\beta = 0.101$, $p < 0.052$).

Discussion and implications

The aim of this paper has been to examine factors that foster individual innovative behaviour in the public sector, thereby advancing the individual innovative behaviour literature by providing a different perspective on the relationships between empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector. We found that some of these relationships are ambiguous in the public sector, contrary to a common assumption about innovative behaviour in the private sector literature. This finding contributes to a diverse view on the influence of leadership, work group and learning on innovation in general. More specifically, empowering leadership, work group cohesiveness and individual learning orientation influence individual innovative behaviour in the public sector, both theoretically and practically.

The empirical findings of this study imply that fostering innovative behaviour at the individual level is important for the overall innovative success of an organization in the public sector. Many public organizations are situated in environments that are hostile to innovation because of greater scrutiny of risk-taking behaviour and unclear goals (Flemig *et al.*, 2016; Van der Voet *et al.*, 2016). Therefore, leaders who behave in a transformative way are more likely to increase their employees' dependence (Amundsen, 2019). They are also expected to act in visionary and charismatic ways to influence their employees' emotions and instil a commitment to fulfil the organization's vision or goals (Kark *et al.*, 2003). This may very well have a negative impact on the duration of employees' individual innovative behaviour at work. However, we observe that empowerment in leadership can be far more beneficial for public sector organizations as it reduces dependency on superiors for ongoing decision-making, directives and management in daily work, as well as the emotional aspects of charismatic leadership. Furthermore, the influence of empowering leadership in the public sector benefits the relationship between leaders and their subordinates because the potential barriers to innovation that subordinates perceive are removed by their leaders.

In addition, recent research highlights the important role of leaders in motivating their employees through their behaviour, as well as by removing obstacles and unnecessary barriers to innovation (Hansen and Pihl-Thingvad, 2019). These findings demonstrate that taking time to listen to subordinates, assigning them responsibility and actively encouraging them in their work were the main tools by which leaders could motivate innovation. Subsequently, barriers and obstacles to employee innovativeness were minimized as a result of leaders focussing on developing and empowering their subordinates' individual innovative behaviour. That is, regardless of innovation in the public sector being viewed as an oxymoron (Borins, 2002), leaders should still seek support and motivate subordinates in on-the-job innovation (Bysted and Jespersen, 2014).

A further contribution of our study is that it shows the important role of leadership influence in creating and sustaining an organizational climate conducive to innovative behaviours. Specifically, the findings shown in Figure 2 suggest that leaders need to be aware of both empowering leadership and individual learning orientation as they were found to have a significant and positive effect in fostering individual innovative behaviour in the public sector. Furthermore, the results show the important role of leaders in empowering subordinates and their influence on work group cohesiveness and individual learning

orientation. In addition, the study found that perceived work group cohesiveness had a positive and significant effect on employees' individual learning orientation. In addition, the study found no direct influence of work group cohesiveness on individual innovative behaviour. Moreover, the findings suggest that a combination of empowering leadership, work group cohesiveness and individual learning orientation explained 40% of the variance in individual innovative behaviour. Empowering leadership explained 32% of the variance in work group cohesiveness, and empowering leadership and work group cohesiveness explained 46% of the variance in individual learning orientation. Therefore, these findings indicate that leaders who wish to foster individual innovative behaviour at work need to understand that to leverage the distinct nature of empowering leadership and extend its influence across work groups, learning and innovative behaviour, they should adopt this leadership style and implement it at high levels.

The results of the individual factors shown in Figure 2 revealed that empowering leadership appeared to be the most important overall determinant of individual innovative behaviour. In previous research, leadership – and specifically empowering leadership – has been viewed as an important influence on innovative behaviour (Slåtten *et al.*, 2011; Borins, 2002). Given that empowering leaders delegate power and share authority in the workplace (Amundsen and Martinsen, 2014), the findings in this study suggest that employees who believe that they are empowered at work, or that their ideas are supported by their leaders, show greater perceived individual innovative behaviour. This finding indicates that the values emphasized in empowering leadership drive individual innovative behaviour. These findings support the empowering leadership and self-leadership hypotheses that the visibility, autonomy, support and acknowledgment that individual employees receive from their leaders could encourage them to act and motivate them to implement innovative ideas at work (Carmeli *et al.*, 2006; Zhang and Bartol, 2010). On the other hand, leaders need to be mindful of allowing too much empowerment as it can overburden subordinates with responsibilities. Therefore, it is crucial that leaders find a balanced empowering leadership style that is nurturing, encouraging and mentoring and allows employees to develop the confidence necessary to show individual innovative behaviour at work.

Previously, individual learning orientation has been viewed as necessary for individual innovativeness (Wang, 2008). Although our findings do not negate this view, they suggest that individual learning orientation plays an important role in maintaining and fostering innovative behaviour. These findings support the current learning orientation theory that when employees learn or are given opportunities to do so, their organization increases in innovativeness as a result (Gong *et al.*, 2009). This suggests that the values emphasized by learning orientation are those of individual employees seeking to implement innovative ideas, which drive individual innovativeness. As learning is essential to knowledge development, the use and implementation of that knowledge is crucial for individual innovativeness. For that reason, leaders are encouraged to create a learning environment that emphasizes and motivates learning by valuing it. This is because innovativeness requires employees to keep their skills and knowledge current (Park *et al.*, 2014), and leaders can establish a learning culture that motivates knowledge acquisition and boosts innovative behaviour. Although few studies have explored how individual learning orientation fosters individual innovative behaviour in the public sector, especially when it is closely linked to innovation (Calantone *et al.*, 2002), this study offers a fresh outlook on the important relationship between individual learning orientation and innovative behaviour.

In the literature review, Thurlings *et al.* (2015) call for the exploration of indirect relationships between individual innovative behaviour and other mediating factors. This study answers that call and considers the three mediating relationships proposed in H2c, H3d and H3e. The findings indicate that individual learning orientation mediates the relationships between empowering leadership and individual innovative behaviour and between work

group cohesiveness and individual innovative behaviour. The findings also suggest that individuals with a strong learning orientation tend to demonstrate more innovative behaviour under strong empowering leadership and that leaders who empower their subordinates influence the cohesiveness of work groups, which in turn positively influences individual innovative behaviour. Hence, leaders need to pay attention to the multifarious nature and role of individual learning orientation as a mediator. Leaders should place great emphasis on creating, cultivating and motivating a learning culture conducive to innovative behaviour. For example, leaders can design work tasks or offer courses in skills that employees consider important to solve problems at work and which are valuable for subordinates to acquire to increase their self-confidence, which in turn drives empowerment.

Indeed, the findings shown in Figure 2 do not support the hypothesis concerning a relationship between work group cohesiveness and individual innovative behaviour, H2c. Therefore, the relationship between work group cohesiveness and individual innovative behaviour is fully mediated by individual learning orientation. Accordingly, the findings add fresh insights into public sector innovation research on the challenges of work group cohesiveness. This is consistent with the findings of a meta-analysis by Hülsheger *et al.* (2009) that members of a group need to feel psychologically safe in their environment to create positive group cohesion. However, public sector employees face the challenges of a culture of control instead of one of trust and learning (Podger, 2015). This makes their environment feel less psychologically safe as they may feel controlled by the rules and the regulations of public sector organizations, which impedes innovative behaviour. As a result, the cohesion of the group will not lead to positive outcomes as long as group members face performance inadequacy issues. Consequently, leaders should create a culture and climate of trust and learning that help group members feel psychologically safe.

These additional outcomes can help leaders across sectors understand the complex processes and possible outcomes of work group cohesiveness in their organizations, as well as the mediating role of individual learning orientation at work. Specifically, to foster individual innovative behaviour at work, leaders are advised to look at both direct and indirect influences on the innovative behaviour of their employees.

Limitations and suggestions for future research

To the best of the authors' knowledge, this is the first empirical study to examine how individual innovative behaviour can be fostered in the public sector. More research is essential to understand the multifaceted relationship between individual innovative behaviour and its key factors in this domain. Thus, the results of this study should be interpreted in light of several limitations.

First, the present study is limited to one public sector organization, making it challenging to generalize the findings. This is recognized in its cross-sectional nature, as cross-sectional studies are rather stringent. Therefore, the limitations of the current study offer future research opportunities. In addition, further study could explore potential discrepancies in a variety of contexts. For example, Miao *et al.* (2018) note that process and regulations, if implemented correctively, can drive innovative behaviour.

Second, as with our online survey, issues of self-selection bias can occur, as well as possible reversal of causality in relationships. For that reason, the results of this study should be interpreted carefully as they may be subject to bias. For example, the characteristics of the relationships studied in this study could result in preferences for prediction control. If so, self-selection bias may have distorted the results of the study. To avoid this, future researchers could compare their findings with population data, use other means of gathering data or weight their results. In addition, future research may include other important factors, such as individual innovative behaviour that could influence the public sector. For example, factors

such as organizational commitment (Mangundjaya and Mufidah, 2018) and employer attractiveness (Slåtten *et al.*, 2019) are potential outcome variables of individual innovative behaviour.

Third, this study focused on three factors (empowering leadership, work group cohesiveness and individual learning orientation) and their relationship with individual innovative behaviour. To our knowledge, this is the first empirical study to propose a direct relationship between these factors in the public sector. Future research should add other variables and compare the public and private sectors in terms of leadership style or support.

Fourth, this study emphasized the important role of leaders and empowering leadership in creating, facilitating and investing in a culture and climate conducive to innovative behaviour. To expand existing theories about factors that foster or impede individual innovative behaviour in the public sector, future studies should explore the influence of factors such as organizational vision (see Liu, 2006) or internal market orientation (see Slåtten *et al.*, 2019).

Fifth, the findings of this study may be a stepping stone to a much larger discussion. For example, empowering leadership may share features of collaborative governance, whereby employees with high degrees of autonomy and self-confidence experience outcomes such as job satisfaction and commitment. While investigating the value of collaborative governance empowerment, Erickson *et al.* (2003) observed that support was necessary to initiate collaborative governance, and to succeed in collaborative governance, members need to feel that they have a say in decisions at work. These two key factors in empowering leadership – autonomy and support – influence employee innovativeness.

Conclusions

To conclude, this study extends our current understanding of ways to foster individual innovative behaviour in the public sector. It reveals the value of practising an empowering leadership style and encouraging learning for public leaders who wish to foster positive individual innovative behaviour. In addition, the study shows the value of employing factors such as work group cohesiveness to mediate the relationships between leadership and behaviour and thus stimulate innovation by employees. To empower employees, it is critical that leaders pay attention to the empowering leadership style to ensure a balance between nurturing, encouragement and support. Thus, more innovative behaviour by employees can be fostered, motivated and inspired in a very competitive market.

References

Afsar, B. and Badir, Y. (2016). "The mediating role of psychological empowerment on the relationship between person–organization fit and innovative work behaviour", *Journal of Chinese Human Resource Management*, Vol. 7 No. 1, pp. 5-26.

Amabile, T.M., Conti, R., Coon, H., Lazenby, J. and Herron, M. (1996), "Assessing the work environment for creativity", *Academy of Management Journal*, Vol. 39 No. 5, pp. 1154-1184.

Amabile, T.M., Barsade, S.G., Mueller, J.S. and Staw, B.M. (2005), "Affect and creativity at work", *Administrative Science Quarterly*, Vol. 50 No. 3, pp. 367-403.

Amundsen, S. (2019), *Empowerment i arbeidslivet—Et myndiggjøringsperspektiv på ledelse, selvledelse og medarbeiderskap,* Cappelen Damm Akademisk, Oslo, English translation of title: Empowerment at work – an empowerment based vie won leadership, self-leadership and employeeship.

Amundsen, S. and Martinsen, Ø.L. (2014), "Empowering leadership: construct clarification, conceptualization, and validation of a new scale", *The Leadership Quarterly*, Vol. 25 No. 3, pp. 487-511.

Anderson, N. and West, M. (1998), "Measuring climate for work group innovation: development and validation of the team climate inventory", *Journal of Organizational Behavior*, Vol. 19 No. 3, pp. 235-258.

Arshad, M.A., Khan, Q. and Khan, S. (2019), "Empirical analysis of HPO framework in public sector organizations of Pakistan", *International Journal of Public Leadership*, Vol. 15 No. 2, pp. 78-93.

Barile, S., Riolli, L. and Hysa, X. (2016), "Modelling and measuring group cohesiveness with consonance: intertwining the sociometric test with the picture apperception value test", *Systems Research and Behavioral Science*, Vol. 35 No. 1, pp. 1-21.

Bason, C. (2010), *Leading Public Sector Innovation: Co-creating for a Better Society*, Policy Press, Bristol.

Bason, C. (2018), *Leading Public Sector Innovation: Co-creating for a Better Society*, 2nd ed, Policy Press, Bristol.

Bates, R. and Khasawneh, S. (2005), "Organizational learning culture, learning transfer climate and perceived innovation in Jordanian organizations", *International Journal of Training and Development*, Vol. 9 No. 2, pp. 9-109.

Borins, S. (2002), "Leadership and innovation in the public sector", *Leadership and Organization Development Journal*, Vol. 23 No. 8, pp. 467-476.

Bos-Nehles, A., Bondarouk, T. and Nijenhuis, K. (2017a), "Innovative work behaviour in knowledge-intensive public sector organizations: the case of supervisors in The Netherlands fire services", *The International Journal of Human Resource Management*, Vol. 28 No. 2, pp. 379-398.

Bos-Nehles, A., Renkema, M. and Janssen, M. (2017b), "HRM and innovative work behaviour: a systematic literature review", *Personnel Review*, Vol. 46 No. 7, pp. 1228-1253.

Bysted, R. and Jespersen, K.R. (2014), "Exploring managerial mechanisms that influence innovative work behaviour: comparing private and public employees", *Public Management Review*, Vol. 16 No. 2, pp. 217-241.

Calantone, R.J., Cavusgil, S.T. and Zhao, Y. (2002), "Learning orientation, firm innovation capability, and firm performance", *Industrial Marketing Management*, Vol. 31 No. 6, pp. 515-524.

Carmeli, A., Meitar, R. and Weisberg, J. (2006), "Self-leadership skills and innovative behavior at work", *International Journal of Manpower*, Vol. 27 No. 1, pp. 75-90.

Chang, L.-C. and Liu, C.-H. (2008), "Employee empowerment, innovative behavior and job productivity of public health nurses: a cross-sectional questionnaire survey", *International Journal of Nursing Studies*, Vol. 45 No. 10, pp. 1442-1448.

Cheong, M., Spain, S.M., Yammarino, F.J. and Yun, S. (2016), "Two faces of empowering leadership: enabling and burdening", *The Leadership Quarterly*, Vol. 27 No. 4, pp. 602-616.

Choi, J.N. and Chang, J.Y. (2009), "Innovation implementation in the public sector: an integration of institutional and collective dynamics", *Journal of Applied Psychology*, Vol. 94 No. 1, p. 245.

Damanpour, F., Walker, R.M. and Avellaneda, C.N. (2009), "Combinative effects of innovation types and organizational performance: a longitudinal study of service organizations", Vol. 46 No. 4, pp. 650-675.

De Jong, J. and Kemp, R. (2003), "Determinants of co-workers' innovative behaviour: an investigation into knowledge intensive services", *International Journal of Innovation Management*, Vol. 7 No. 2, pp. 189-212.

De Vries, H., Bekkers, V. and Tummers, L. (2016), "Innovation in the public sector: a systematic review and future research agenda", *Public Administration*, Vol. 94 No. 1, pp. 146-166.

Erickson, J.I., Hamilton, G.A., Jones, D.E. and Ditomassi, M. (2003), "The value of collaborative governance/staff empowerment", *JONA: The Journal of Nursing Administration*, Vol. 33 No. 2, pp. 96-104.

Evans, C.R. and Dion, K.L. (1991), "Group cohesion and performance: a meta-analysis", *Small Group Research*, Vol. 22 No. 2, pp. 175-186.

Fernandez, S. and Moldogaziev, T. (2012), "Using employee empowerment to encourage innovative behavior in the public sector", *Journal of Public Administration Research and Theory*, Vol. 23 No. 1, pp. 155-187.

Flemig, S., Osborne, S. and Kinder, T. (2016), "Risky business—reconceptualizing risk and innovation in public services", *Public Money & Management*, Vol. 36 No. 6, pp. 425-432.

Forsyth, D.R. (2018), *Group Dynamics*, 7th ed., Cengage Learning, Boston, MA.

Gong, Y., Huang, J.-C. and Farh, J.-L. (2009), "Employee learning orientation, transformational leadership, and employee creativity: the mediating role of employee creative self-efficacy", *Academy of Management Journal*, Vol. 52 No. 4, pp. 765-778.

Hair, J.F., Hult, G.T.M., Ringle, C. and Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed., Sage Publications, Thousand Oaks, CA.

Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019), "When to use and how to report the results of PLS-SEM", *European Business Review*, Vol. 31 No. 1, pp. 2-24.

Hansen, J.A. and Pihl-Thingvad, S. (2019), "Managing employee innovative behaviour through transformational and transactional leadership styles", *Public Management Review*, Vol. 21 No. 6, pp. 918-944.

Hartley, J. (2005), "Innovation in governance and public services: past and present", *Public Money and Management*, Vol. 25 No. 1, pp. 27-34.

Harun, S., Sürücü, L. and Maşlakçı, A. (2019), "On the relation between leadership and positive psychological capital in the hospitality industry", *International Journal of Business*, Vol. 24 No. 2, pp. 182-197.

Hess, J.D. (2014), "Enhancing innovation processes through the application of emotional intelligence skills", *Review of Public Administration and Management*, Vol. 2 No. 1, p. 143.

Hogg, M.A. (1992), *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity*, Harvester Wheatsheaf, Michigan, MI.

Hogg, M.A. (1993), "Group cohesiveness: a critical review and some new directions", *European Review of Social Psychology*, Vol. 4 No. 1, pp. 85-111.

Houghton, J.D. and Yoho, S.K. (2005), "Toward a contingency model of leadership and psychological empowerment: when should self-leadership be encouraged?", *Journal of Leadership and Organizational Studies*, Vol. 11 No. 4, pp. 65-83.

Huber, G.P. (1991), "Organizational learning: the contributing processes and the literatures", *Journal of Organization Science*, Vol. 2 No. 1, pp. 88-115.

Huber, G.P. and Power, D.J. (1985), "Retrospective reports of strategic-level managers: guidelines for increasing their accuracy", *Strategic Management Journal*, Vol. 6 No. 2, pp. 171-180.

Hülsheger, U.R., Anderson, N. and Salgado, J.F. (2009), "Team-level predictors of innovation at work: a comprehensive meta-analysis spanning three decades of research", *Journal of Applied Psychology*, Vol. 94 No. 5, pp. 1128-1145.

Hult, G.T.M., Hurley, R.F. and Knight, G.A. (2004), "Innovativeness: its antecedents and impact on business performance", *Industrial Marketing Management*, Vol. 33 No. 5, pp. 429-438.

Humborstad, S.I.W., Nerstad, C.G.L. and Dysvik, A. (2014), "Empowering leadership, employee goal orientations and work performance: a competing hypothesis approach", *Personnel Review*, Vol. 43 No. 2, pp. 246-271.

Imran, R., Saeed, T., Anis-Ul-Haq, M. and Fatima, A. (2010), "Organizational climate as a predictor of innovative work behaviour", *African Journal of Business Management*, Vol. 4 No. 15, pp. 3337-3343.

Isaksen, S.G. and Tidd, J. (2007), *Meeting the Innovation Challenge: Leadership for Transformation and Growth*, Wiley, West Sussex.

Janssen, O. (2005), "The joint impact of perceived influence and supervisor supportiveness on employee innovative behaviour", *Journal of Occupational and Organizational Psychology*, Vol. 78 No. 4, pp. 573-579.

Jha, S. and Bhattacharyya, S.S. (2013), "Learning orientation and performance orientation: scale development and its relationship with performance", *Global Business Review*, Vol. 14 No. 1, pp. 43-54.

Jung, D.I. and Sosik, J.J. (2002), "Transformational leadership in work groups: the role of empowerment, cohesiveness, and collective efficacy on perceived group performance", *Small Group Research*, Vol. 33 No. 3, pp. 313-336.

Kark, R., Shamir, B. and Chen, G. (2003), "The two faces of transformational leadership: empowerment and dependency", *Journal of Applied Psychology*, Vol. 88 No. 2, pp. 246-255.

Laschinger, H.K.S., Finegan, J., Shamian, J. and Wilk, P. (2001), "Impact of structural and psychological empowerment on job strain in nursing work settings: expanding kanter's model", *Journal of Nursing Administration*, Vol. 31 No. 5, pp. 260-272.

Lee, A., Willis, S. and Tian, A.W. (2018), "Empowering leadership: a meta-analytic examination of incremental contribution, mediation, and moderation", *Journal of Organizational Behavior*, Vol. 39 No. 3, pp. 306-325.

Li, W., Bhutto, T.A., Nasiri, A.R., Shaikh, H.A. and Samo, F.A. (2018), "Organizational innovation: the role of leadership and organizational culture", *International Journal of Public Leadership*, Vol. 14 No. 1, pp. 33-47.

Lim, T. (2010), "Relationships among organizational commitment, job satisfaction, and learning organization culture in one Korean private organization", *Asia Pacific Education Review*, Vol. 11 No. 3, pp. 311-320.

Liu, C.M. (2006), "The effect of organisational vision on service quality delivery", *The Service Industries Journal*, Vol. 26 No. 8, pp. 849-859.

Lu, L., Lin, X. and Leung, K. (2012), "Goal orientation and innovative performance: the mediating roles of knowledge sharing and perceived autonomy", *Journal of Applied Social Psychology*, Vol. 42, pp. E180-E197.

Lukes, M. and Stephan, U. (2017), "Measuring employee innovation: a review of existing scales and the development of the innovative behavior and innovation support inventories across cultures", *International Journal of Entrepreneurial Behavior and Research*, Vol. 23 No. 1, pp. 136-158.

Mangundjaya, W.L. and Mufidah, M. (2018), "The impact of psychological capital and psychological empowerment on employee's affective commitment to change", *Global Journal of Business and Social Science Review*, Vol. 6 No. 1, pp. 9-14.

Mathieu, J.E., DeShon, R.P. and Bergh, D.D. (2008), "Mediational inferences in organizational research: then, now, and beyond", *Organizational Research Methods*, Vol. 11 No. 2, pp. 203-223.

Meece, J.L., Blumenfeld, P.C. and Hoyle, R.H. (1988), "Students' goal orientations and cognitive engagement in classroom activities", *Journal of Educational Psychology*, Vol. 80 No. 4, pp. 514-523.

Miao, Q., Newman, A., Schwarz, G. and Cooper, B. (2018), "How leadership and public service motivation enhance innovative behavior", *Public Administration Review*, Vol. 78 No. 1, pp. 71-81.

Montani, F., Odoardi, C. and Battistelli, A. (2014), "Individual and contextual determinants of innovative work behaviour: proactive goal generation matters", *Journal of Occupational and Organizational Psychology*, Vol. 87 No. 4, pp. 645-670.

Mudrack, P.E. (1989), "Defining group cohesiveness: a legacy of confusion?", *Small Group Behavior*, Vol. 20 No. 1, pp. 37-49.

Mulgan, G. and Albury, D. (2003), *Innovation in the Public Sector*, Cabinet Office, London.

Mullen, B. and Copper, C. (1994), "The relation between group cohesiveness and performance: an integration", *Psychological Bulletin*, Vol. 115 No. 2, pp. 210-227.

Park, Y.K., Song, J.H., Yoon, S.W. and Kim, J. (2014), "Learning organization and innovative behavior: the mediating effect of work engagement", *European Journal of Training and Development*, Vol. 38 Nos 1-2, pp. 75-94.

Pierce, J.L. and Delbecq, A.L. (1977), "Organization structure, individual attitudes and innovation", *Academy of Management Review*, Vol. 2 No. 1, pp. 27-37.

Podger, A. (2015), "Innovation in the public sector: beyond the rhetoric to a genuine 'learning culture'", in Wanna, J., Lee, H.A. and Yates, S. (Eds), *Managing Under Austerity, Delivering Under Pressure*, ANU Press, Canberra, pp. 119-130.

Rainey, H.G. (2009), *Understanding and Managing Public Organizations*, 4th Ed., Jossey Bass, San Francisco, CA.

Rego, A., Sousa, F., Marques, C. and Pina e Cunha, M. (2012), "Authentic leadership promoting employees' psychological capital and creativity", *Journal of Business Research*, Vol. 65 No. 3, pp. 429-437.

Rhee, J., Park, T. and Lee, D.H. (2010), "Drivers of innovativeness and performance for innovative SMEs in South Korea: mediation of learning orientation", *Technovation*, Vol. 30 No. 1, pp. 65-75.

Ringle, C.M., Sarstedt, M., Mitchell, R. and Gudergan, S.P. (2018), "Partial least squares structural equation modeling in HRM research", *The International Journal of Human Resource Management*, pp. 1-27, doi: 10.1080/09585192.2017.1416655.

Scott, S.G. and Bruce, R.A. (1994), "Determinants of innovative behavior: a path model of individual innovation in the workplace", *Academy of Management Journal*, Vol. 37 No. 3, pp. 580-607.

Senge, P. (1990), *The Fifth Discipline: The Art and Science of the Learning Organization*, Currency Doubleday, New York, NY.

Shanker, R., Bhanugopan, R., van der Heijden, B.I.J.M. and Farrell, M. (2017), "Organizational climate for innovation and organizational performance: the mediating effect of innovative work behavior", *Journal of Vocational Behavior*, Vol. 100, pp. 67-77.

Sinha, S., Priyadarshi, P. and Kumar, P. (2016), "Organizational culture, innovative behaviour and work-related attitude: role of psychological empowerment", *Journal of Workplace Learning*, Vol. 28 No. 8, pp. 519-535.

Slåtten, T. (2014), "Determinants and effects of employee's creative self-efficacy on innovative activities", *International Journal of Quality and Service Sciences*, Vol. 6 No. 4, pp. 326-347.

Slåtten, T. and Mehmetoglu, M. (2011), "What are the drivers for innovative behavior in frontline jobs? A study of the hospitality industry in Norway", *Journal of Human Resources in Hospitality & Tourism*, Vol. 10 No. 3, pp. 254-272.

Slåtten, T. and Mehmetoglu, M. (2015), "The effects of transformational leadership and perceived creativity on innovation behavior in the hospitality industry", *Journal of Human Resources in Hospitality and Tourism*, Vol. 14 No. 2, pp. 195-219.

Slåtten, T., Svensson, G. and Sværi, S. (2011), "Empowering leadership and the influence of a humorous work climate on service employees' creativity and innovative behaviour in frontline service jobs", *International Journal of Quality and Service Sciences*, Vol. 3 No. 3, pp. 267-284.

Slåtten, T., Lien, G. and Svenkerud, P.J. (2019), "The role of organizational attractiveness in an internal market-oriented culture (IMOC): a study of hospital frontline employees", *BMC Health Services Research*, Vol. 19 No. 1, p. 307.

Srivastava, A., Bartol, K.M. and Locke, E.A. (2006), "Empowering leadership in management teams: effects on knowledge sharing, efficacy, and performance", *Academy of Management Journal*, Vol. 49 No. 6, pp. 1239-1251.

Sujan, H., Weitz, B.A. and Kumar, N. (1994), "Learning orientation, working smart, and effective selling", *The Journal of Marketing*, Vol. 58 No. 3, pp. 39-52.

Suseno, Y., Standing, C., Gengatharen, D. and Nguyen, D. (2019), "Innovative work behaviour in the public sector: the roles of task characteristics, social support, and proactivity", *Australian Journal of Public Administration*, pp. 1-19, doi: 10.1111/1467-8500.12378.

Tekleab, A.G., Quigley, N.R. and Tesluk, P.E. (2009), "A longitudinal study of team conflict, conflict management, cohesion, and team effectiveness", *Group and Organization Management*, Vol. 34 No. 2, pp. 170-205.

Thurlings, M., Evers, A.T. and Vermeulen, M. (2015), "Toward a model of explaining teachers' innovative behavior: a literature review", *Review of Educational Research*, Vol. 85 No. 3, pp. 430-471.

Van der Vegt, G.S. and Janssen, O. (2003), "Joint impact of interdependence and group diversity on innovation", *Journal of Management*, Vol. 29 No. 5, pp. 729-751.

Van der Voet, J., Kuipers, B.S. and Groeneveld, S. (2016), "Implementing change in public organizations: the relationship between leadership and affective commitment to change in a public sector context", *Public Management Review*, Vol. 18 No. 6, pp. 842-865.

Van Knippenberg, D., De Dreu, C.K. and Homan, A.C. (2004), "Work group diversity and group performance: an integrative model and research agenda", *Journal of Applied Psychology*, Vol. 89 No. 6, pp. 1008-1022.

Van Woerkom, M. and Sanders, K. (2010), "The romance of learning from disagreement, The effect of cohesiveness and disagreement on knowledge sharing behavior and individual performance within teams", *Journal of Business and Psychology*, Vol. 25 No. 1, pp. 139-149.

Venturini, S. and Mehmetoglu, M. (2017), "plssem: a Stata package for structural equation modeling with partial least squares", *Journal of Statistical Software*, Vol. 88 No. 8, pp. 1-34.

Waheed, M., Klobas, J.E. and Kaur, K. (2016), "The importance of actual use in defining and measuring innovative behaviour: comparison of e-book reader users and non-users", *Journal of Librarianship and Information Science*, Vol. 49 No. 4, pp. 368-379.

Wang, C.L. (2008), "Entrepreneurial orientation, learning orientation, and firm performance", *Entrepreneurship Theory and Practice*, Vol. 32 No. 4, pp. 635-657.

Wang, E.T., Ying, T.C., Jiang, J.J. and Klein, G. (2006), "Group cohesion in organizational innovation: an empirical examination of ERP implementation", *Information and Software Technology*, Vol. 48 No. 4, pp. 235-244.

Weisberg, R.W. (1999), "Creativity and knowledge: a challenge to theories", in Sternberg, R.J., (Ed.), *Handbook of Creativity*, Cambridge University Press, Cambridge, pp. 226-250.

West, M.A. and Farr, J.L. (1989), "Innovation at work: psychological perspectives", *Social Behaviour*, Vol. 4 No. 1, pp. 15-30.

Yuan, F. and Woodman, R.W. (2010), "Innovative behavior in the workplace: the role of performance and image outcome expectations", *Academy of Management Journal*, Vol. 53 No. 2, pp. 323-342.

Zhang, X. and Bartol, K.M. (2010), "Linking empowering leadership and employee creativity: the influence of psychological empowerment, intrinsic motivation, and creative process engagement", *Academy of Management Journal*, Vol. 53 No. 1, pp. 107-128.

Zhou, J. and George, J.M. (2001), "When job dissatisfaction leads to creativity: encouraging the expression of voice", *Academy of Management Journal*, Vol. 44 No. 4, pp. 682-696.

Further reading

De Jong, J. and Den Hartog, D. (2010), "Measuring innovative work behaviour", *Creativity and Innovation Management*, Vol. 19 No. 1, pp. 23-36.

Appendix
Respondents' sample characteristics (n = 96)

Section	Frequent	%	Mean	SD
Gender			1.44	0.50
Male	54	56.25		
Female	42	43.75		
Age			2.58	1.14
21–30	23	23.96		
31–40	19	19.79		
41–50	31	32.29		
51–60	21	21.88		
61 +	2	2.08		
Department			9.66	3.09
Sales	65	67.71		
IT	12	12.50		
Market	9	9.38		
HR	3	3.13		
Finance	7	7.29		
Education level			3.02	2.83
Primary school	1	1.04		
High school	27	28.13		
Certificate of apprenticeship	10	10.42		
Bachelor/Master	58	60.42		
Employment type			3.41	1.20
Full-time	77	80.21		
Part-time	19	19.79		
Tenure			4.76	3.10
Under a year	10	10.42		
1–5 years(s)	29	30.21		
6–10 years	15	15.63		
11–15 years	14	14.58		
16–20 years	11	11.46		
20 +	17	17.71		

About the authors

Barbara Rebecca Mutonyi is a PhD candidate at the Inland School of Business and Social Sciences, Inland Norway University of Applied Sciences. With a keen focus on individual innovative behaviour, Barbara explores its diverse nature in the public sector. Her latest curiosity examines how organizations and leaders today can foster and benefit from employees' innovative behaviour. Barbara has a M.Sc. in innovation from Inland Norway University of Applied Sciences. Barbara Rebecca Mutonyi is the corresponding author and can be contacted at: barbara.lappalainen@inn.no

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II

Paper II

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Due to copyright infringements, this article is available at https://doi.org/10.1108/IJQSS-02-2020-0024. As such, the full article is not appended accordingly in this dissertation.

III

Paper III

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BMC Health Services Research

RESEARCH ARTICLE Open Access

Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees

Barbara Rebecca Mutonyi*, Terje Slåtten and Gudbrand Lien

Abstract

Background: Health organization research is experiencing a strong refocus on employees' individual innovative behavior (IIB), revealing that many of the influential factors at work remain uncertain. Hence, this study empirically examines fostering of hospital employees' IIB by focusing on direct and indirect relationships of organizational culture (here labeled *internal market-oriented culture*, IMOC), psychological capital (PsyCap), and organizational commitment (OC).

Methods: The study focused on a sample of 1008 hospital employees, using a partial least squares–structural equation modeling method to analyze and test the relationships hypothesized in this study. A multigroup comparison was performed to test the heterogeneity of personal characteristics. The indirect relationships of PsyCap were tested using mediator analyses.

Results: Our results reveal that IMOC has a positive and significant correlation to employees' PsyCap and IIB. PsyCap is directly related to IIB and indirectly related to IMOC and IIB. Furthermore, the study found that IIB is related to OC.

Conclusions: This study extends the current debate on how IIB is fostered at work by examining PsyCap and IMOC as antecedents of IIB. The study has added to the IIB research area by examining the role of IIB on OC. The study is among the first attempts in its category to contribute to health organizations and managers by empirically examining the role of IMOC on employees' PsyCap and IIB—and, in turn, their OC.

Keywords: Internal market-oriented culture, Psychological capital, Individual innovative behavior, Organizational commitment, Hospital employees

Background

Individual innovative behavior (IIB) has been termed a vital asset that enables organizations to thrive in a dynamic business environment [1]. Today, employees are progressively expected to "actively contribute to their organization's success" [2], such as through idea generation and implementation [3]. Idea generation refers to creativity; in contrast, idea implementation refers to IIB and involves the successful implementation of creative ideas and solutions at work [4, 5]. Thus, IIB relies on both the generation of novel ideas (creativity) and their active application at work (innovation). IIB is understood to be the intentional use of a creative idea at work to perform tasks well, for the benefit of the group and the organization [6].

Worldwide, with the current technological advances and increased performance expectations for hospital employees [7], there has been an apparent increase in the challenges faced by health sector organizations [8].

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Hospital employees' IIB has been identified as a key factor in increasing innovation at work [7], improving effectiveness and performance [9] as well as efficiency [10]. Therefore, their creative and innovative solutions are crucial in responding to growing challenges [11].

As the study of IIB steadily gains attention [7, 12, 13], some consider that employees' IIB is a key factor in improving overall job performance [14]. We build on this notion by investigating the direct and the indirect relationships of IIB among hospital employees. Specifically, this study examines how an organizational culture, here labeled *internal market-oriented culture* (IMOC) correlates to psychological capital (PsyCap) and IIB, and how, in turn, IIB correlates to organizational commitment (OC).

Despite the criticality of fostering IIB to promote innovation at work, particularly in health organizations [10, 14], few studies have explored its direct and indirect relationships among hospital employees [7, 14]. A literature review reveals three main areas that have been addressed repeatedly: job productivity, commitment, and empowerment. For instance, Xerri and Brunetto [15] examined the relationship of nursing employees' commitment and organizational citizenship behavior on IIB. Other previous research explored the relationships of IIB on frontline hospitality employees' feelings of joy [16]. Moreover, Knol and Van Linge [17] examined the correlation of structural and psychological empowerment on nursing employees' IIB. To the best of the authors' knowledge, this is a pioneering empirical study in health services research on the direct and indirect relationships of IIB among hospital employees. It responds to calls to investigate the conditions that encourage innovation and factors that relates to individual process innovation [7]. Few studies have adequately examined the IIB of hospital employees [7] and even fewer have empirically examined its direct and indirect relationships in a health sector context [8].

Consequently, more research on this topic is required. Specifically, recent research has argued that because IMOC is still in its infancy, more research on its correlation on employees' PsyCap and IIB is necessary [18]. Moreover, a systematic review of innovation in health care by Länsisalmi et al. [19] has revealed the scarcity of studies of individual-level innovations. Nevertheless, it is clear that few empirical health service researchers have examined the links between IMOC, PsyCap, and IIB or the relationship between IIB and OC.

In response to calls for such research, this study has two unique implications. First, it expands the current theoretical knowledge pool and provides insight into the value of fostering IIB at work. Second, it provides further practical knowledge for managers desiring competitive advantage from their employees.

The present study makes three important contributions. First, it contributes new knowledge about fostering IIB in health organizations. Second, it empirically examines the close relationship between hospital employees' perceptions of their organizations' IMOC and their PsyCap and IIB. It offers new insights for health managers into the value of IMOC for engendering positive thoughts and actions. Third, the study contributes unique knowledge on the assumed causal relationship between IIB and OC. To the authors' knowledge, no previous empirical health organization research has focused on these relationships. Consequently, this paper seeks to provide fresh knowledge on fostering hospital employees' IIB at work.

Below, a conceptual model and relationships are proposed, followed by the theoretical background and hypotheses. Then, the methodology and results of the partial least squares–structural equation modeling (PLS-SEM) analyses are described. The paper concludes with a discussion of the empirical results and their implications for health managers, as well as the limitations of the study.

Conceptual model

As illustrated in Fig. 1, the conceptual model of this study includes both direct and indirect relationships. Specifically, this study proposes that IMOC is directly related to PsyCap and IIB, PsyCap is directly related to IIB, IIB is directly related to OC, and PsyCap is indirectly related to, or mediates the assumed relationship of IMOC and IIB. Therefore, Fig. 1 depicts the role of environmental factors such as IMOC on PsyCap, a personal resource. Figure 1 further illustrates how IMOC and PsyCap promote employees' IIB. Furthermore, Fig. 1 shows how IIB promotes hospital employees' OC. In addition, in the conceptual model of the study, we propose that a personal resource, PsyCap, mediates the assumed relationship between IMOC and IIB.

In the following sections, we discuss each of the elements and hypothesize linkages between them.

Individual innovative behavior

The established and complex concept of IIB [4, 20–22] refers to the adoption, implementation, or use of novel ideas and solutions by employees to solve problems at work [20]. It is comprised of individual behaviors and intentions to generate, promote, and implement these ideas or solutions [6, 23]. Given the crucial role that it plays in overall organizational performance [24], success [25], competence [1], and effectiveness [26], fresh knowledge of hospital employees' IIB is vital for modern health organizations to sustain their competitive advantage in the current turbulent environment [7].

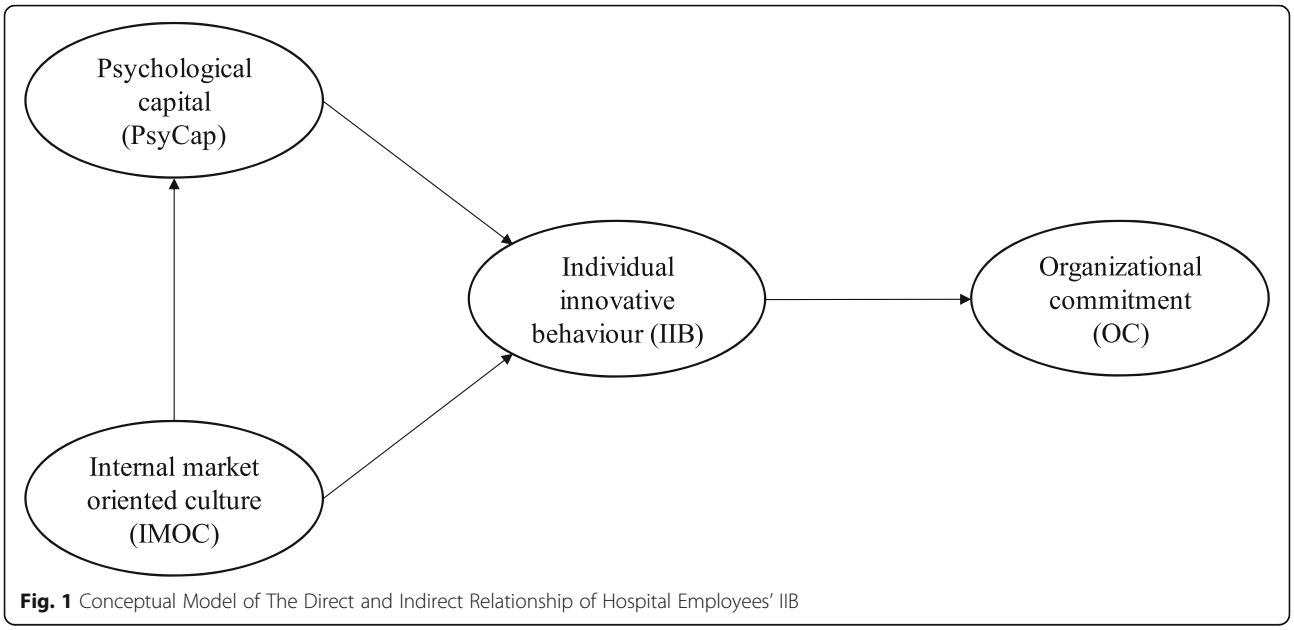

Fig. 1 Conceptual Model of The Direct and Indirect Relationship of Hospital Employees' IIB

Managers can improve their organizations' competitive advantage in various ways [27], one of which is through employees' IIB [28]. For instance, health organizations are advised to "encourage and develop the innovative potential of all their employees" [7]. In addition, because innovation is fundamental for an organization's success and survival [8, 29], it is crucial to consider that in Industry 4.0 technologies, the psychological aspects of innovation such as IIB, are key strategic elements for successful global competition [30]. Therefore, organizations actively seek employees who are both innovative [7] and flexible in their approach to innovation [8]. Improving their psychological states and the internal culture of the organization are key factors in encouraging innovation, innovativeness, and IIB. This, in turn, brings fruitful results, such as greater commitment to the organization.

Although several individual factors shown in Fig. 1 have previously been linked to IIB in various studies [31–33], the direct and indirect relationships (such as PsyCap, IMOC and OC) of hospital employees' IIB have yet to be studied. It is important to note that this limited research is detrimental because hospital employees are primary agents in implementing innovation at work [12, 34]. Furthermore, numerous studies have focused on nurses [35], doctors [14], or medical students [36]. However, studying IIB from a partial perspective limits our general understanding of its role on all hospital employees [7]. Carlucci et al. [7] expanded the focus of their study to include all hospital employees for the same reasons as this study. By including all employees, regardless of their role, one may capture not only the overall role of IIB but also the variance in each group (i.e., doctors and nurses). Health organizations pursue innovation through both management strategies [34] and their employees [12], which provides continuous growth and adaptation in the rapidly changing work environment [37]. Given the important roles of hospital employees in health organizations [14], specifically in terms of overall organizational innovation [7], it is vital to examine the direct and indirect relationships of IIB to understand how to engage them in active innovation processes.

Current empirical evidence shows that the dynamics between employees and organizations are far more complex than previously acknowledged [22], in that hospital employees do not always complete tasks in a straightforward fashion [14]. Consequently, Bos-Nehles et al. [20] and Mutonyi et al. [6] argued for further research on IIB at the individual level. Moreover, Slåtten et al. [30] recently called for an empirical exploration of the relationship of IMOC on employees' IIB. Thus, there remains a significant gap in our current knowledge of IIB at work—specifically, the role of IMOC on employees' PsyCap and IIB, the relationship of IIB on OC, and the assumed mediating role of PsyCap. The following sections will elaborate on the direct and indirect relationships of IIB, its relationships, as well as the hypotheses proposed in Fig. 1.

Psychological capital

Figure 1 indicates that PsyCap promotes IIB. Previous research contends that to improve overall work performance, employees should possess the personal attribute of PsyCap [38]. With its roots in positive psychology, PsyCap has previously been described as a meaningful and important construct in both psychological and organizational literature [38, 39]. As mentioned above,

while prior research has mainly focused on three areas (productivity, commitment, and empowerment), it has largely been concerned with structural working conditions rather than personal conditions. Therefore, we devote our attention to personal characteristics such as PsyCap that may foster IIB at work. PsyCap is the relatively recently recognized concept of individuals' positive assessment of their work settings and likelihood of success based on motivational efforts and perseverance [39]. PsyCap is understood to be "the positive psychological state of the individual towards positive development" [40], characterized by the acronym HERO, which stands for hope, efficacy, resilience, and optimism. Briefly, hope is a belief that determines an individual's sense of purpose and success in a work role. Efficacy, or self-efficacy, is the conviction that one can mobilize motivation and cognitive resources to succeed at work tasks. Resilience is the ability to improvise and adapt in times of change. Finally, optimism is an individual's permanence and pervasiveness. In other words, optimism is an individual's positive expectations about the future, whereby one hopes for the best. In essence, PsyCap is who the individual is, either at work or personally. Thus, this study focuses on PsyCap to represent who health employees are at work. Luthans et al. [41] argue that PsyCap should encompass all of the HERO characteristics to capture employees' positive psychological states fully. For instance, confidence, optimism, perseverance, and resilience are all positive states that can greatly relate to employees' capability to innovate.

Although PsyCap has previously been studied in the health sector [42, 43], these studies focused strongly on factors such as well-being and burnout [44]. However, previous research has revealed PsyCap to be an important feature of employee attitudes, behavior, and performance [45], concluding that as a state attribute, it can relate to employees' behaviors and attitudes towards implementing or promoting novel ideas. Other studies have explored PsyCap as a source of employees' creativity [46], work engagement [47], and morale [48]. Nonetheless, the psychological state of employees can alter their feelings of psychological safety [40, 48] in promoting their ideas to others or seeking new working methods. It is important to point out that PsyCap in this study relates to a context and participants, namely hospital employees. Moreover, while examining the links between PsyCap, social capital, and the work performance of service sales representatives, Slåtten et al. [38] found positive direct and indirect correlation to innovative behavior. They call for further study in this area. Thus, this study improves the limited understanding of PsyCap among hospital employees [38]. In addition, examining working adults in the USA, Sweetman et al. [49] found that PsyCap and all its HERO components were positively related to creative performance. Sweetman et al. [49] recognized the infrequent attention given its importance at work, as it strongly relates to overall work performance. Moreover, studying business graduates, leaders, and employees, Lan [31] found PsyCap to be positively related to IIB. In this study, however, the focus on PsyCap is twofold: its role on hospital employees' IIB and on employees in the Norwegian context. According to previous studies, it is plausible that there is a positive link between PsyCap and innovative behavior [32, 38, 49, 50]. Tcs the following hypothesis.

Hypothesis 1: *PsyCap is positively related to IIB.*

Internal market-oriented culture

A review by Scott et al. [51] revealed that organizational culture and structural change together produce improvements in quality and performance. An organizational culture is the shared values and beliefs that improve the understanding of operations [52]. For health organizations, these values and beliefs orient their employees toward achieving productivity, efficiency, development, and performance [31, 53, 54]. In the search for long-term profitability and successful implementation of an organizational culture, it has been proposed that IMOC should guide human resource management [55]. While market orientation entails an organizational culture where employees are committed to the continuous creation of value for their customers [56], internal market orientation describes one in which employees are internal customers, and the organization focuses on their wants and needs. Previous research has found that such organizations have generally benefited from improved overall performance [18, 31, 57]. Better job performance is related to long-term organizational success and competitive advantage [54]. We refer to the type of organizational culture that considers employees to be internal customers as an IMOC, which is comprised of three connected systems that create a logical flow of information [31]. The first, termed *internal market intelligence generation*, relates to gathering information on employees' wants and needs. The second, termed *internal intelligence dissemination*, relates to whether managers understand these desires. The third, termed *response to internal intelligence* refers to the implementation of measures to satisfy them.

Previously, organizations have mainly focused on external factors (e.g., agents) that create and maintain superior value for their customers [55]. They use education programs and organizational changes to achieve the desired norm and learn from their efforts to develop and adapt. While both approaches increase the organization's market orientation, it remains unclear how the internal market (e.g., employees) is related to their innovation capability. A recent study argued that health managers

must pay attention to both approaches by considering both the external market (e.g., patients) and the internal market (e.g., employees) to build an organizational culture that drives innovation [31]. Research has proposed that organizational culture is a key variable in innovation success [58].

Therefore, this paper focuses on the importance of promoting IMOC in health organizations in relation to overall organizational performance and competitive advantage [18, 59]. Specifically, this study examines the value of IMOC on employees' IIB at work, as there is a need to extend current knowledge of how it can be developed and promoted in health organizations.

In this study, IMOC is viewed in terms of hospital employees. Based on established literature in marketing [60–62] and organizational culture [62–64], IMOC is a rather new reconceptualization [31]. IMOC reflects the "more tangible or visible aspects of organizational culture … the observable norm-based behavior that constitutes organizational culture" [31]. Therefore, employees, especially hospital employees, must be "motivated not only by their own sense of self … but also by the contextual conditions of the organization" [24]. Previous research has examined the role of internal market orientation [65] and organizational culture [66] on IIB. As mentioned above, market orientation has traditionally focused on customers [65], whereas an internal market orientation focuses on employees' wants and needs [67]. With IMOC, the attention is on employees' perceptions of the degree of genuine care they receive from managers [31]. Previous research has explored the direct and indirect relationships of hospital frontline employees' IMOC and found it to be positively related to the attractiveness of organizations to employees [31]. However, research into IMOC and its role on the work environment remains in its early stages [18, 31].

Because it is based on employees' beliefs and expectations, IMOC can play a big role on their IIB in the work environment. For instance, previous research has argued that culture relates to and defines employee attitudes and behavior [1, 57, 63]. Moreover, organizational culture has been found to foster innovation and overall organizational performance [54]. For this reason, it is reasonable to assume that health employees' perceptions of their organization's IMOC is closely related to their willingness to implement new ideas and solutions because their needs and wants are addressed first. In addition, this study answers the call of Slåtten et al. [18, 30] to explore the role of IMOC in employees' IIB. Conversely, IMOC is related to employee perceptions that an organization promotes the implementation of new ideas. Similar to the perceived relationship between the work environment and IIB [6], IMOC can be a powerful determinant of long-term organizational efficiency and performance.

As IIB refers to the adoption of novel ideas at work [20], the role of IMOC on employees' perceptions of their organization being a desirable employer [31] is underestimated. To sustain organizational success and effectiveness in the long term [68, 69], it is essential to explore the potential correlations of IMOC on IIB. In other words, a good internal hospital culture that focuses on and cares about its employees can improve its efficiency and performance through its employees' IIB. This relationship can be formally stated in the following hypothesis.

Hypothesis 2: *IMOC is positively related to IIB.*

As mentioned above, PsyCap (consisting of the HERO attributes) refers to the positive psychological state of individual development. PsyCap is the employees' evaluation of who they are, their confidence, their dedication to their roles, their level of perseverance in the face of hardships, and their resilience [40]. Based on this evaluation, an employee may develop positive or negative associations, experiences, and attitudes towards their organization's IMOC, with varying significance for their work life. To the best of the authors' knowledge, this is one of the few novel studies in health service research to explore the direct role of IMOC on PsyCap, especially with a focus on hospital employees. Exploring this relationship is important because employees' well-being is has a great impact on organizational performance and success [70]. In addition, IMOC has previously been found to add value to employees' positive behaviors [65], showing that overall organizational culture is influential at all levels [71], especially the individual level [57]. For example, Luthans et al. [72] noted that a strong (internal) organizational culture can correlate internal behaviors positively or negatively. In addition, there has been a call to examine the role of IMOC on PsyCap in health organizations to add knowledge on and offer insight into its role and value [18]. Consequently, to build trust between the organizational leadership and individual employees, it is necessary to invest in and foster employees' PsyCap proactively. Therefore, this study proposes the following hypothesis.

Hypothesis 3: *IMOC is positively related to PsyCap.*

Organizational commitment

In the literature, two approaches to the study of OC can be found: the one-dimensional approach and the multidimensional approach [73]. The one-dimensional approach focuses on the strength of the employees' identification and involvement with the organization [73]. In contrast, in the multidimensional approach, OC is seen as a psychological state consisting of a combination of three factors: affective, continuance, and normative commitment [74, 75]. These three factors are often referred to as the three-component model of OC. A comparison of the popularity of the two

approaches suggests that the multidimensional approach has been the most frequently used since it was introduced. OC in this study is rooted in the multidimensional approach. There are two main reasons for this choice. First, as mentioned above, this approach is most often used to study the OC of employees. Second, in the multidimensional approach, each of the three OC components is considered to be a psychological state. Studying OC as a trait implies that the construct is dynamic rather than static; therefore, it is changeable. This latter aspect is important as it is in line with one aim of this study, i.e., to explore the links between IIB and OC, and specifically whether IIB can have a positive correlation on the OC (trait) of employees. Although this study is rooted in the multidimensional approach to OC, it includes only one of the three components—affective commitment. The reason for this choice is that affective commitment in its nature and content is clearly the most positive of the three. This is true of OC whether from an employee or organizational point of view. Affective commitment refers to a psychological state that binds employees to the organization in a positive manner. Specifically, it is "the employee's positive emotional attachment to the organization" [76]. Consequently, OC as an affective component captures a desire-based or "wants to" reason to commit to the organization. Studying OC as an affective component clearly contrasts with the other two components (in the multidimensional approach), which capture the obligation-based or "has to" (normative) or the "ought to" or cost-based (continuance) commitment [77]. Clearly, it is reasonable to assume that the affective component of OC is the most desirable type because it provides insight into employees' perceptions of what is "good," creating positive bonds with the organization. It is, therefore, not surprising that a substantial amount of research on OC has been concerned with its affective component [76].

As shown in Fig. 1, IIB is linked to OC. There are several examples in previous studies exploring the direct or indirect linkages between IIB and OC [33, 77, 78]. However, to the authors' knowledge, no study has examined the linkage between IIB and OC in the domain of health services. Furthermore, previous studies on this topic have limited their focus to OC as a correlation to IIB. None has examined OC as a reversed correlation of IIB, as this study suggests. Although several plausible arguments have been proposed in the literature that OC relates to IIB, there are good reasons to expect the converse. This study defines OC as a "positive emotional attachment to the organization" [76]. Research has shown that emotions are always caused by something or someone [79]. Consequently, there must be one or more identifiable reason(s) for a person's emotional attachment. Based on this logic, it is natural to expect triggering or motivational factors in the organizational sphere or context that are the true cause of OC. One such factor could be IIB.

IIB, as mentioned above, concerns employees' freedom or autonomy to adopt or implement novel creative ideas to solve problems [25, 80]. Is it reasonable to assume that employees consider this freedom and autonomy to be positive and good? The converse would be a highly specific and controlled work situation in which employees had no freedom or autonomy to solve problems creatively. Naturally, employees' IIB ranges from low to high. However, it may be assumed that the more the employees use their ability to experiment and be proactive in finding creative solutions, the more they perceive their organization to be an exciting and enjoyable workplace to which they will commit (in a positive way). Consequently, the expected relationship can be formally stated by the following hypothesis.

Hypothesis 4: *IIB is positively related to employees' OC.*

The mediating role of psychological capital

PsyCap originated in the positive psychology literature [40], and mediation is prominent in psychological research [81]. In addition, it has previously been argued that to capture the actual internal mechanism to explain the linkage between IMOC and IIB [38], certain individual factors need to be included in the equation. For this reason, PsyCap is a proposed mediator for the assumed casual model Fig. 1. A mediating factor is in an intermediate position between an independent and a dependent variable. The conceptual model (Fig. 1) also proposes that PsyCap functions as a mediating factor in the relationship between IMOC and IIB. As argued by MacKinnon et al. [81], "attitudes cause intentions, which then cause behavior … memory processes mediate how information is transmitted into a response." In other words, employees' attitudes and beliefs, specifically about IMOC, will relate to how they perceive themselves at work, which in turn will affect their response—in this case to the implementation of novel ideas. This also implies that when organizational cultural values meet employees' expectations [57], employees will feel more inclined to promote and implement novel solutions. Consequently, the following hypothesis is proposed.

Hypothesis 5: *The direct relationship between IMOC and IIB is mediated by PsyCap.*

Methods

Data were collected in February 2020 from an online questionnaire survey of 2000 hospital employees in the inland counties of Norway. The health organization covers over 40 sites, with close to 10,000 employees, and is one of the largest health expert communities in its region. It services both psychiatric and somatic illnesses. Initial contact with the hospitals was sought through the Director of Research (DOR), followed by several meetings

and email exchanges. With the help of the DOR, an information email was sent to division managers to inform their employees of the study. The survey information and URL were distributed by the DOR through emails to division managers, who passed them to their employees. To maintain participant anonymity and avoid nonresponse bias, the study used a platform called *Nettskjema*, which ensured full anonymity, such as automatic deletion of IP addresses when each participant had completed the survey. While there were some minor differences among divisions, it is important to note that the focus of the study is on individual behavior rather than divisional differences. As such, this study offers fresh insights on analyses at the individual level and the issues related to IIB among hospital employees. Through convenience sampling, the study collected a total of 1008 completed questionnaires—a response rate of 50.4%. Of the respondents in the study, 73% were women, reflecting the Norwegian context where the health sector is dominated by female workers and 84% of all employees [82] are women. In this study, about 37% of the hospital employees were under the age of 45, 77% worked full time, and over 55% had been employed at the organization for more than 10 years, amassing considerable work experience. The study's respondents' characteristics are summarized in Table 1.

Instruments

Four main instruments derived from the current literature were used to measure the conceptual model of the study (Fig. 1): PsyCap, IMOC, IIB, and OC. All participants responded to the validated survey items on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). In addition to survey statements, the demographic characteristics shown in Table 1 were included. As the survey was conducted in the Norwegian language, several workshops with academic experts and employees were held to verify the back translation. Moreover, to ensure quality in the overall research design, two experts in the field, with 34 randomly selected hospital employees, completed a pre-test.

Table 1 Personal characteristics of the study sample (N = 1008)

		Percent
Sex	Female	73.0
	Male	27.0
Work	Nurse	33.0
	Doctor	8.7
	Others (admin. Staff, other health professionals, etc.)	58.3
Employed	< 5 years	26.9
	6–10 years	18.0
	11–20 years	30.3
	> 20 years	24.8
Part-time or full-time	Part-time job	22.5
	Full-time job	77.5
Age	< 45 years	37.3
	46–55 years	32.2
	> 55 years	30.5

PsyCap was measured using four items adopted from Luthans et al. [39]. IMOC was measured using eight items from Slåtten et al. [30]. IIB was measured using five items from Janssen [83] and Scott and Bruce [4]. Finally, OC was measured using five items from Allen and Meyer [74]. All items used in this study, summarized in Table 2, were adjusted to the context of hospital employees in inland Norway. In addition, the survey used in this study is part of a larger survey research project focusing on various aspects of employee relations in health organizations. The statements used in this study are appended accordingly (see Additional file 1: Appendix 1).

Data analysis

The conceptual models and the hypothesized relationships were tested using PLS-SEM through SmartPLS 3 software [84]. The first step in evaluating the PLS-SEM results involved examining a set of criteria for the measurement model. Reflective measurement model specifications were applied, meaning that the direction of causality is from the constructs to their observed variables or claims. When the measurement model assessment was satisfactory, the next step was to assess the structural model. Then, mediating relationships were estimated and analyzed based on the PLS-SEM results. Finally, to check the robustness of the PLS-SEM results, we tested for observed and unobserved heterogeneity [85]. We followed the "rules of thumb" of Hair et al. [85, 86] to assess the quality of the measurement and structural model results.

Results

Measurement model

To assess the reflective measurement model, we examined convergent validity, internal consistency reliability, and discriminant validity. Convergent validity is the extent to which a variable correlates positively with alternative variables used to measure the same construct, and it was evaluated using variable loadings and average variance extracted (AVE). Internal consistency reliability provides estimates of a construct's reliability based on the magnitudes of the intercorrelations of the observed variables, which were evaluated with composite reliability and Cronbach's alpha. Discriminant validity is the extent to which a construct is distinct from other constructs and, as suggested by Hair et al. [86, 87], this was assessed with the heterotrait–monotrait (HTMT) ratio

Table 2 Latent variables and claims used in the study

Latent variable	Statement label	Statements
PsyCap	PsyCap1	I feel confident that I can set goals for myself in my work area.
	PsyCap2	I am optimistic about my future at this organization.
	PsyCap3	When faced with challenges in my job, I can find alternative solutions to them.
	PsyCap4	I can find alternative ways to achieve my goals.
IMOC	IMOC1	Employees have the opportunity to discuss their needs with management.
	IMOC2	Training is seen in the context of individual needs.
	IMOC3	Management spends time talking to their employees when needed.
	IMOC4	Management wants employees to enjoy their work.
	IMOC5	Management shows a sincere interest in any problems faced by employees.
	IMOC6	Management understands that personal problems may affect my performance.
	IMOC7	The division's policies help meet employees' individual needs.
	IMOC8	Management meets regularly to discuss issues related to employees' challenges.
IIB	IIB1	I create new ideas to solve problems in my job.
	IIB2	I search out new working methods or techniques to complete my work.
	IIB3	I investigate and find ways to implement my ideas.
	IIB4	I promote my ideas so others might use them in their work.
	IIB5	I try out new ideas in my work.
OC	OC1	I am proud to tell others that I work here.
	OC2	I feel I belong in this organization.
	OC3	I feel personally attached to my organization.
	OC4	I envision a career at this organization.
	OC5	I want to continue my career here.

of correlations between constructs. The test is to ascertain that the 95% confidence interval of the HTMT value does not include the value of 1, as was the case for all four constructs in this study (IMOC, PsyCap, IIB, and OC). The remaining rule-of-thumb assessment criteria, all based on Hair et al. [86, 87], are reported in Table 3. As can be seen, all criteria were met, providing evidence of a measurement model that is both reliable and valid.

Structural model

Before the structural model was assessed, collinearity between the latent variables was examined using the variance inflation factor (VIF) values. All VIF values were lower than 2, indicating no multicollinearity problems. The direct relationships in the structural model are shown in Fig. 2. All direct relationships were statistically significant and positive. To identify any misspecifications in our PLS-SEM structural model, we followed three guidelines proposed by Hair et al. [86] for testing model fit indices against the empirical data. First, the model's in-sample predictive power for the endogenous constructs was examined with the coefficient of determination, R^2. Based on the rules of thumb of Hair et al. [86, 87], the R^2 values for PsyCap (0.24) and IIB (0.34) were moderate and weak for OC (0.17).

Second, to evaluate changes in the R^2 when a claim is omitted from its latent variable, effect size f^2 was used to determine the impact on latent variables. According to the guidelines of Hair et al. [86], the impact values differ. For example, a value of 0.02 is small, 0.15 is moderate, 0.35 is large, and values below 0.02 indicate no impact. The f^2 effect size values in our models were between 0.02 and 0.31, ranging from small to moderate (see Fig. 2).

Third, after assessing the model's in-sample predictive power, we evaluated its out-of-sample predictive power Q^2. As mentioned above, we used the PLS-SEM method to analyze our reflective model. Thus, to obtain Q^2 values, the blindfolding method was used to obtain cross-validated redundancy values. Moreover, predictive relevance values differ when measuring Q^2, where 0.02, 0.15, and 0.35 indicate small, moderate, or large effects, respectively. Our structural model showed moderate values for PsyCap (0.17), IIB (0.26), and OC (0.12), indicating overall medium predictive power (see Fig. 2).

The standardized path coefficient between PsyCap and IIB was the highest at 0.51, the second highest of 0.49 was between IMOC and PsyCap, and the third highest, 0.42, was between IIB and OC. There was also a statistically significant positive relationship between IMOC and

Table 3 Results of the measurement model for the constructs of PsyCap, IMOC, IIB, and OC

		Convergent validity		Internal consistency reliability		Discriminant validity
Latent variable	Claims label	Indicator reliability	AVE	Composite reliability	Cronbach's alpha	HTMT criterion
Rule of thumb		Loading > 0.7	> 0.5	0.7–0.95	0.7–0.95	HTMT interval does not include 1
PsyCap	PsyCap1	0.82	0.74	0.92	0.88	Yes
	PsyCap2	0.82				
	PsyCap3	0.89				
	PsyCap4	0.90				
IMOC	IMOC1	0.84	0.73	0.95	0.94	Yes
	IMOC2	0.76				
	IMOC3	0.89				
	IMOC4	0.86				
	IMOC5	0.90				
	IMOC6	0.84				
	IMOC7	0.83				
	IMOC8	0.90				
IIB	IIB1	0.85	0.77	0.94	0.92	Yes
	IIB2	0.88				
	IIB3	0.90				
	IIB4	0.88				
	IIB5	0.87				
OC	OC1	0.85	0.72	0.93	0.90	Yes
	OC2	0.88				
	OC3	0.84				
	OC4	0.85				
	OC5	0.83				

Note: *AVE* Average variance extracted, *HTMT* Heterotrait–monotrait ratio of correlations

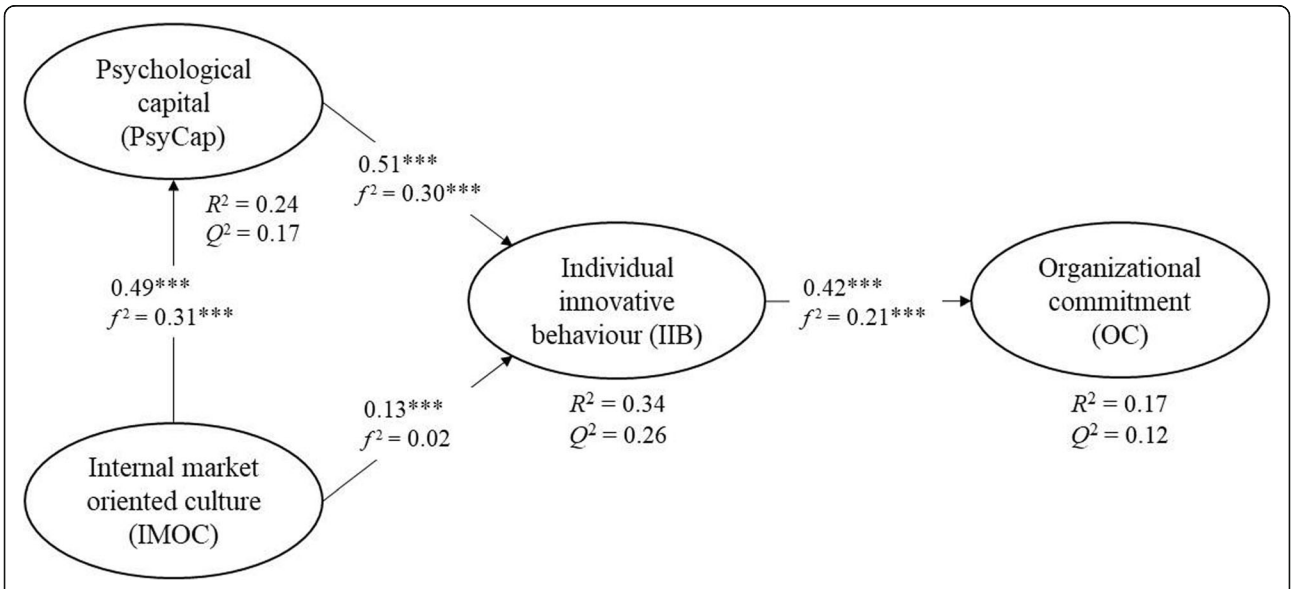

Fig. 2 Results of the Structural Model of The Direct and Indirect Relationships of Hospital Employees' IIB. Standardized coefficients (*** < 0.01)

IIB, but it was lower, at 0.13. The findings support all four proposed direct relationships (see Fig. 1) and the hypotheses of this study.

To test whether IMOC relates the proposed mediator variable PsyCap, resulting in a change in IIB in our PLS-SEM model, we used the mediation by bootstrapping method [86]. By testing the mediation relationships using PLS-SEM analysis, we can improve the understanding of the relationship between IMOC and IIB. Therefore, it makes sense to include individual positive assessments of the work setting, PsyCap, in modeling considerations. In testing the assumed mediator relationship of PsyCap, we followed the guidelines of Hair et al. [86] in regard to PLS-SEM models by bootstrapping the sampling distribution of indirect relationship. Based on variation accounted for (VAF) values, three types of mediation can be identified: complementary (partial), competitive (partial), and indirect-only (full mediation). VAF is the size of the indirect effect in relation to the total effect. Almost no mediation relationship is observed when VAF values are less than 0.20. VAF values > 0.20 and < 0.80 can be characterized as partial mediation and those ≥ 0.80 can be regarded as full mediation [86]. We tested the mediator relationship, i.e., whether PsyCap intervenes between IMOC and IIB, and found an indirect correlation of 0.25 (Table 4). We concluded that PsyCap partially mediated (complementary mediation) the relationship between IMOC and IIB.

Additionally, while testing the hypothesized relationships, we examined the differences between identical models tested on different groups of respondents, with the objective of exploring any statistically significant differences. Therefore, we tested for observed heterogeneity [85] in three groups of respondents. First, we tested for observed heterogeneity [85] by dividing the sample into two groups: those employed at a hospital for ≤10 years and those employed for > 10 years. We then performed a multigroup analysis/permutation test. For these two groups, we found full measurement invariance and no statistically significant differences in the parameters of the structural model, suggesting that the data could be pooled. The test for unobserved heterogeneity using the finite mixture PLS-SEM technique [85] found the optimal number of segments to be one, suggesting that unobserved heterogeneity was not prevalent. Second, we completed a multigroup analysis to test for occupation differences. Accordingly, we tested for heterogeneity [85] using two subsamples: nurses and doctors. For these two groups, we found full measurement invariance. Both the permutation test and the multigroup analysis showed statistically significant differences in the parameters for the PsyCap–IIB relationship between these two groups. Third, we tested for differences between full-time and part-time employees. Both the permutation test and the multigroup analysis yielded statistically insignificant differences in the parameters of the structural model.

Ultimately, both the permutation test and the multigroup analysis for all three tests showed statistically insignificant differences in the parameters for the two subsamples, except for the relationship between PsyCap and IIB in the nurse and doctor groups (see Additional file 2: Appendix 2, Fig. A1). Nevertheless, the results of the overall model still applied, indicating robust results.

Discussion

The results of our PLS-SEM analyses revealed five significant findings. First, IMOC was related to both PsyCap and IIB. Second, PsyCap was related to IIB. Third, IIB was related to OC. Fourth, PsyCap partially mediated the relationship between IMOC and IIB. Fifth, PLS-SEM was a strength of this study. The implications of these findings are discussed below.

Theoretical implications

Our first finding that PsyCap is positively and significantly related to IIB highlights the importance of employees' positive psychological development. Although this finding is consistent with previous studies of the role of PsyCap on IIB among graduate students [e.g., 32], these studies did not examine the role of PsyCap among hospital employees or its role in IIB. Additionally, our finding is consistent with those of Sun and Huang [88], who studied university teaching staff in China. Furthermore, the findings of Sameer [50] on Egyptian professionals was consistent with ours on the relationship between PsyCap and IIB. Consequently, our findings add new knowledge in the context of hospital employees in Norway. The findings of this study suggest that in organizations seeking long-term effectiveness and success, innovative employees' IIB will be increased through PsyCap, rather than through prescribed work roles.

Second, our finding that IMOC has a positive and significant relationship with both PsyCap and IIB

Table 4 Test of mediation relationship of PsyCap

Effect[a]	Mediator[a]	Indirect effect[b]	Total effect[b]	VAF[c]	Mediator effect
IMOC → IIB	PsyCap	0.249**	0.383***	0.65	Partial

IMOC Internal market-oriented culture, *IIB* Individual innovative behavior, *PsyCap* Psychological capital
[a]Latent variables are IMOC, IIB and PsyCap
[b]** $p < 0.05$, *** $p < 0.01$ are significance levels
[c]*VAF* Variation accounted for

underscores the relevance of employees' perceptions of their internal organizational culture. In particular, the visible and tangible characteristics of an organizational culture require not only training and opportunities but also a genuine interest in employees' work life to satisfy their individual needs and wants. Because IMOC does this, they are motivated by the organizational environment. Although prior research [31] found IMOC to be related to the attractiveness of organizations to employees, it did not examine its role in their PsyCap or IIB. This study is the first to examine the role of IMOC for all types of health organization employees, complementing previous findings regarding the central role of IMOC in employees' perceptions that their organization promotes innovation.

Third, our finding that IIB is positively and significantly related to OC indicates that employees' positive emotional attachment to their organization is a result of their cognitive motivation to implement novel ideas at work. This study, which is among the first to examine the role of IIB on OC, underscores the key role of hospital employees' IIB on their desire to remain in the organization. Additionally, our focus on IIB as a variable related to OC sheds light on the driving motivational force of IIB on employees' "positive emotional attachment to the organization" [76], while providing fresh and valuable insights into the role of IIB in OC at work.

Fourth, our findings showed that PsyCap partially mediates and strengthens the relationship between IMOC and IIB. The findings are consistent with the assumed causal model shown in Fig. 1, but can also be consistent with a number of other causal models. In other words, the contextual conditions, or IMOC, have a positive and significant correlation to the psychological state of hospital employees, or PsyCap, which in turn positively correlates to IIB. Previous research has examined PsyCap as a mediating factor between management support and readiness for change [89] and between organizational innovation climate and IIB [90]. However, our focus on the relationship between IMOC and IIB underscores the importance of focusing on and caring about employees to foster IIB.

Fifth, the use of PLS-SEM method to examine the hypothesized relationships illustrated in Fig. 1 is a strength of this study because it furthers our understanding of the current complexity of the interactions between health organizations and their employees that affect innovation at work. PLS-SEM analysis makes a valuable contribution concerning the fostering of IIB in health organizations. Health managers are situated in complex environments where they must often attend to a range of issues, so they regularly depend on their subordinates to deliver high quality patient care [91]. In addition, several health organizations are situated in environments that may be hostile to innovative behavior because of time constraints and the scrutiny of risk-taking behavior related to patient care [14]. Therefore, it is important to gain a better understanding of the complex interactions in fostering IIB at work, as this study does, using the PLS-SEM method and multigroup analysis [85]. The strength of this approach is that it is possible to conduct a permutation test while avoiding errors such as distributional assumptions [92]. Previous studies have called for methodical research using PLS-SEM [93], with a specific call for more mediation [94] and multigroup analyses [92]. Although the results of the multigroup analysis (see Additional file 2: Appendix 2) demonstrated that the overall model still applied, indicating robust results, there were noteworthy differences between nurses and doctors in terms of the PsyCap–IIB relationship.

Practical limitations

The empirical findings of this study depicted in Fig. 2 and the mediation analysis shown in Table 4 suggest that health organizations must seek to understand the direct and indirect relationships of employees' IIB, in addition to understanding the role of IIB on OC. While we acknowledge the quandary that this poses for health organizations in terms of resource management and quality service [8], the increased attention to the importance of IIB at work suggests that health managers should encourage individual implementation of novel ideas to promote autonomy in the delivery of high-quality health care.

Furthermore, the findings of this study suggest that IIB may be fostered through the psychological state of employees and an internally coherent IMOC equipped to develop the framework and the competence necessary to motivate IIB at work and sustain competitive advantage. In contrast to an emotion, PsyCap is a state-like resource that is flexible and open to development [40, 95]. As such, managers can invest in it to improve their organization's effectiveness and performance. This study shows the strength of PsyCap, both in its direct relationships to IIB and how it relates indirectly to IMOC and IIB. This is particularly important given the various calls for health organization research to help health managers understand the implications of IIB [15, 17]. These implications include how to foster IIB at work [7], strategically invest in employees' psychological state [96], promote a culture where employees perceive management to be present [31], and develop strategic bonds to increase their emotional attachment to their organization [97]. The increasing need for innovative employees [6], especially in health organizations [7], has resulted in managers seeking strategic sustainable solutions to current challenges [9, 10]. Consequently, these findings provide fresh insights into the creation of organizational settings that instill the HERO

attributes to promote idea implementation at work. In addition, health managers are advised to nurture employees by listening, showing interest, and discussing issues with them. As important as it is for employees to feel emotionally motivated to implement novel ideas, it is also vital that health managers develop positive perceptions of their organizations to strengthen employee commitment.

This study also found that the indirect relationship of PsyCap partially mediated the assumed relationship between IMOC and IIB. The implications for health managers are that IMOC predicts positive PsyCap, which in turn raises IIB among hospital employees. Failing to recognize the predictive power of this personal resource can reduce the HERO attributes. Thus, this study reveals the importance of possessing tools and skills to develop ideal workplace environments, or IMOCs, that improve employees' practical IIB and boost their cognitive PsyCap, which in turn generates commitment to the organization. Consequently, health managers should be suitably trained to ensure the desired outcomes for the organization.

The findings reported in this study expand our current understanding of the intricacy of fostering IIB in health organizations. This knowledge is particularly relevant to policymakers [98] who view innovation as indispensable for organizational adaptation, survival, and long-term success [99]. Based on these findings, policymakers are advised to conduct internal surveys and use these results to create guidelines and regulations to promote an enabling environment. This, in turn, will provide health managers with the appropriate tools and methods to drive innovation at work, while increasing employees' confidence, optimism, resilience, and efficacy. Such methods will improve employees' capability to resolve problems and provide them with an organizational culture they may be proud of and to which they will feel a sense of belonging.

Limitations and future research

The limitations of the current study offer opportunities for future research. First, although we followed the steps and guidelines for a cross-sectional study [100], the design has various limitations. For example, the data obtained in this study were collected at one time from one region: inland Norwegian counties. Therefore, the results have limited generalizability to other health organizations. Scholars who undertake future cross-sectional studies are advised not only to test the causality of the relationships in this study but also to collect data from a range of sites. However, support for the partial mediation of PsyCap in the relationship between IMOC and IIB suggests that our results are not entirely attributable to method bias. Nevertheless, to minimize method bias, future research may broaden the sample across regions and nations.

Second, the online survey in this research may suffer from self-selection bias, in addition to the possibility of reversed causality. In addition, IIB in this study was measured using self-report measures, a limitation that has previously been criticized because of the possibility of shared response bias among the variables [101, 102]. However, recent studies suggest that surveys can be used in research exploring direct and indirect relationships in an assumed causal model [103]. In addition, several past studies have elicited employees' perceptions of their IIB [12, 25, 104–106] through self-report measures. Nevertheless, while this study maintained respondent anonymity to minimize self-report bias [103, 107], future research can gather data at different times with varying foci. For example, future research can explore self-reported data on employees' IIB, but also examine whether actual innovation has taken place to compare actual and perceived innovative behavior.

Third, although IMOC and PsyCap are grounded in previous research, we did not measure their discrepancies and variations to explain the positive relationship with IIB. As the first study of its kind to examine the relationship between hospital employees' IIB and OC, we consider the findings to be stepping stones to further exploration. In addition, while previous research has focused on IIB as an outcome variable [21], there is limited understanding of its workplace outcomes, especially in health organizations. Given the strategic role of employees' IIB in the overall innovation success of an organization [108], it will be crucial for researchers to uncover competitive advantage.

Fourth, the findings in this study receive further credibility not only from our focus on the positive aspects of employee behavior, such as IIB, but also because we included all types of hospital employees to investigate the role of PsyCap. Therefore, future research can explore further its mediating role and discrepancies in this context, as well as the role of health managers in the implementation of IIB.

Conclusions

In this study, we proposed and tested a conceptual model to analyze the direct and indirect relationships of IIB among hospital employees in inland Norwegian counties. Our findings revealed that IMOC correlates to both PsyCap and IIB. Furthermore, PsyCap directly relates to employees' IIB. We examined the relationship of IIB and OC at work, and found a positive and significant relationship. In addition, we explored the indirect role of PsyCap and found that it partially mediates the assumed relationship between IMOC and IIB. We hope the findings of this study inspire future research into how health managers can invest in employees' PsyCap, develop an IMOC with long-term benefits, foster IIB at work, and improve employees' emotional attachment to their organization. In this way, health managers will be equipped with the required skills and competence to develop capabilities to sustain competitive advantage.

Abbreviations
AVE: Average variance extracted; DOR: Director of research; f^2: Effect size; HTMT: Heterotrait–monotrait; IIB: Individual innovative behavior; IMOC: Internal market-oriented culture; OC: Organizational commitment; PLS-SEM: Partial least squares–structural equation modeling; PsyCap: Psychological capital; Q^2: Predictive relevance; VAF: Variation accounted for; VIF: Variance inflation factor

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-021-06505-1.

Additional file 1: Appendix 1. Questionnaire Developed For This Study.

Additional file 2: Appendix 2. Multigroup Analysis. **Figure A1.** Multigroup analysis of: 1) number of years employed at the hospital (upper panel); 2) part-time or full-time (in the middle); and 3) occupation type (lower panel) (** < 0.05, *** < 0.01).

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Authors' contributions
BRM: preparation, development, and draft of the manuscript. TS: development and draft of the manuscript. GL: Statistical analyses, interpretation of data, draft of the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The Personal Data Act §§2–7 and 8 no. 1 entails that participants in online surveys should freely consent to participation in a study. Accordingly, information about the project and voluntary participation was provided. In addition, consent was required prior to participation in the online questionnaire. They consented to the data being used for research purposes and were informed that all data would be anonymized. The Norwegian Centre for Research Data (NSD) in Norway approved the study (ref no. 239029). Additionally, the Data Protection Official at the Innlandet Hospital Trust approved the study to be conducted among its employees (ref nr. 126,325).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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References

1. Korzilius H, Bücker JJLE, Beerlage S. Multiculturalism and innovative work behavior: the mediating role of cultural intelligence. Int J Intercult Relat. 2017;56:13–24. https://doi.org/10.1016/j.ijintrel.2016.11.001.
2. Carnevale JB, Huang L, Crede M, Harms P, Uhl-Bien M. Leading to stimulate employees' ideas: a quantitative review of leader–member exchange, employee voice, creativity, and innovative behavior. Int Assoc Appl Psychol. 2017;66(4):517–52. https://doi.org/10.1111/apps.12102.
3. Anderson N, Potočnik K, Zhou J. Innovation and creativity in organizations: a state-of-the-science review, prospective commentary, and guiding framework. Aust J Manag. 2014;40(5):1297–333.
4. Scott SG, Bruce RA. Determinants of innovative behavior: a path model of individual innovation in the workplace. Acad Manag J. 1994;37(3):580–607.
5. Amabile TM. A model of creativity and innovation in organizations. Res Organ Behav. 1988;10(1):123–67.
6. Mutonyi BR, Slåtten T, Lien G. Organizational climate and creative performance in the public sector. Eur Bus Rev. 2020;32(4):615–31. https://doi.org/10.1108/EBR-02-2019-0021.
7. Carlucci D, Mura M, Schiuma G. Fostering employees' innovative work behavior in healthcare organisations. Int J Innov Manag. 2020;24(02):2050014. https://doi.org/10.1142/S1363919620500140.
8. Glover W, Nissinboim N, Naveh E. Examining innovation in hospital units: a complex adaptive systems approach. BMC Health Serv Res. 2020;20(554):1–26.
9. Asurakkody TA, Shin SY. Innovative behavior in nursing context: a concept analysis. Asian Nurs Res. 2018;12(4):237–44. https://doi.org/10.1016/j.anr.2018.11.003.
10. Saleem M, Tufail MW, Atta A, Asghar S. Innovative workplace behavior, motivation level, and perceived stress among healthcare employees. Pak J Commer Soc Sci. 2015;9(2):438–46.
11. Chang S-C, Lee M-S. The linkage between knowledge accumulation capability and organizational innovation. J Knowl Manag. 2008;12(1):3–20. https://doi.org/10.1108/13673270810852359.
12. Mutonyi BR, Slåtten T, Lien G. Empowering leadership, work group cohesiveness, individual learning orientation and individual innovative behaviour in the public sector: empirical evidence from Norway. Int J Public Leadersh. 2020;6(2):175–97.
13. Bos-Nehles A, Bondarouk T, Nijenhuis K. Innovative work behaviour in knowledge-intensive public sector organizations: the case of supervisors in the Netherlands fire services. Int J Hum Resour Manag. 2017;28(2):379–98. https://doi.org/10.1080/09585192.2016.1244894.
14. Oppi C, Bagheri A, Vagnoni E. Antecedents of innovative work behaviour in healthcare: does efficacy play a role? Int J Public Sect Manage. 2019;33(1):45–61. https://doi.org/10.1108/IJPSM-12-2018-0267.
15. Xerri MJ, Brunetto Y. Fostering innovative behaviour: the importance of employee commitment and organisational citizenship behaviour. Int J Hum Resour Manag. 2013;24(16):3163–77. https://doi.org/10.1080/09585192.2013.775033.
16. Slåtten T. Antecedents and effects of employees' feelings of joy on employees' innovative behaviour. Int J Qual Serv Sci. 2011;3(1):93–109. https://doi.org/10.1108/17566691111115108.
17. Knol J, Van Linge R. Innovative behaviour: the effect of structural and psychological empowerment on nurses. J Adv Nurs. 2009;65(2):359–70. https://doi.org/10.1111/j.1365-2648.2008.04876.x.
18. Slåtten T, Lien G, Lupina E, Gravingen KA. Promoting an internal market-oriented culture (IMOC) in healthcare services. J Serv Sci Res. 2019;11(2):157–82. https://doi.org/10.1007/s12927-019-0008-3.
19. Länsisalmi H, Kivimäki M, Aalto P, Ruoranen R. Innovation in healthcare: a systematic review of recent research. Nurs Sci Q. 2006;19(1):66–72. https://doi.org/10.1177/0894318405284129.
20. Bos-Nehles A, Renkema M, Janssen M. HRM and innovative work behaviour: a systematic literature review. Pers Rev. 2017;46(7):1228–53. https://doi.org/10.1108/PR-09-2016-0257.
21. Burns DJ. Toward an explanatory model of innovative behavior. J Bus Psychol. 2007;21(4):461–88. https://doi.org/10.1007/s10869-007-9037-x.
22. Janssen O. The joint impact of perceived influence and supervisor supportiveness on employee innovative behaviour. J Occup Organ Psychol. 2005;78(4):573–9. https://doi.org/10.1348/096317905X25823.
23. Suseno Y, Standing C, Gengatharen D, Nguyen D. Innovative work behaviour in the public sector: the roles of task characteristics, social support, and proactivity. Aus J Pub Admin. 2019;79(1):41–59.
24. Yuan F, Woodman RW. Innovative behavior in the workplace: the role of performance and image outcome expectations. Acad Manag J. 2010;53(2):323–42. https://doi.org/10.5465/amj.2010.49388995.
25. Battistelli A, Montani F, Odoardi C, Vandenberghe C, Picci P. Employees' concerns about change and commitment to change among Italian organizations: the moderating role of innovative work behavior. Int J Hum

Resour Manag. 2014;25(7):951–78. https://doi.org/10.1080/09585192.2013.809012.
26. Pieterse AN, Van Knippenberg D, Schippers M, Stam D. Transformational and transactional leadership and innovative behavior: the moderating role of psychological empowerment. J Organ Behav. 2010;31(4):609–23.
27. Li X, Zheng Y. The influential factors of employees' innovative behavior and the management advices. J Serv Sci Manag. 2014;7(06):446.
28. Lee A, Legood A, Hughes D, Tian AW, Newman A, Knight C. Leadership, creativity and innovation: a meta-analytic review. Eur J Work Organ Psychol. 2020;29(1):1–35. https://doi.org/10.1080/1359432X.2019.1661837.
29. Duradoni M, Di Fabio A. Intrapreneurial self-capital and sustainable innovative behavior within organizations. Sustainability. 2019;11(2):322. https://doi.org/10.3390/su11020322.
30. Slåtten T, Lien G, Svenkerud PJ. The role of organizational attractiveness in an internal market-oriented culture (IMOC): a study of hospital frontline employees. BMC Health Serv Res. 2019;19(1):307. https://doi.org/10.1186/s12913-019-4144-8.
31. Lan X. How psychological capital promotes innovative behavior: a mutilevel modeling. Am J Ind Bus Manag. 2019;9(12):2202–19.
32. Marques T, Galende J, Cruz P, Ferreira MP. Surviving downsizing and innovative behaviors: a matter of organizational commitment. Int J Manpow. 2014;35(7):930–55. https://doi.org/10.1108/IJM-03-2012-0049.
33. Slåtten T, Mutonyi BR, Lien G. The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour. BMC Health Serv Res. 2020;20(1):1096. https://doi.org/10.1186/s12913-020-05954-4.
34. Kim S-J, Park M. Leadership, knowledge sharing, and creativity: the key factors in nurses' innovative behaviors. J Nurs Admin. 2015;45(12):615–21. https://doi.org/10.1097/NNA.0000000000000274.
35. Yan D, Wen F, Li X, Zhang Y. The relationship between psychological capital and innovation behavior in Chinese nurses. J Nurs Manag. 2020;28(3):471–9. https://doi.org/10.1111/jonm.12926.
36. Çinar F, Toker K. An examination of the effect of loneliness on the innovative behavior of health science faculty students. Chin Med J. 2019;132(2):171–82. https://doi.org/10.1097/CM9.0000000000000031.
37. Amabile TM, Conti R, Coon H, Lazenby J, Herron M. Assessing the work environment for creativity. Acad Manag J. 1996;39(5):1154–84.
38. Slåtten T, Lien G, Horn CMF, Pedersen E. The links between psychological capital, social capital, and work-related performance—a study of service sales representatives. Total Qual Manage Bus. 2019;30(Supp. 1):S195–209.
39. Luthans F, Youssef CM, Avolio BJ. Psychological capital: developing the human competitive edge. Oxford: Oxford University Press; 2007.
40. Luthans F, Youssef-Morgan CM. Psychological capital: an evidence-based positive approach. Annu Rev Organ Psych Organ Behav. 2017;4(1):339–66. https://doi.org/10.1146/annurev-orgpsych-032516-113324.
41. Luthans F, Youssef-Morgan CM, Avolio BJ. Psychological capital and beyond. New York: Oxford University Press; 2015.
42. Laschinger HKS, Fida R. New nurses burnout and workplace wellbeing: the influence of authentic leadership and psychological capital. Burn Res. 2014;1(1):19–28. https://doi.org/10.1016/j.burn.2014.03.002.
43. Luthans KW, Jensen SM. The linkage between psychological capital and commitment to organizational mission: a study of nurses. J Nurs Admin. 2005;35(6):304–10.
44. Luthans F, Youssef CM, Sweetman DS, Harms PD. Meeting the leadership challenge of employee well-being through relationship PsyCap and health PsyCap. J Leadersh Org Stud. 2013;20(1):118–33. https://doi.org/10.1177/1548051812465893.
45. Avey JB, Reichard RJ, Luthans F, Mhatre KH. Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. Hum Resour Dev Q. 2011;22(2):127–52. https://doi.org/10.1002/hrdq.20070.
46. Rego A, Sousa F, Marques C, Cunha MPE. Authentic leadership promoting employees' psychological capital and creativity. J Bus Res. 2012;65(3):429–37. https://doi.org/10.1016/j.jbusres.2011.10.003.
47. du Plessis M, Boshoff AB. Authentic leadership, followership, and psychological capital as antecedents of work engagement. J Psychol Afr. 2018;28(1):26–32. https://doi.org/10.1080/14330237.2018.1438832.
48. Paek S, Schuckert M, Kim TT, Lee G. Why is hospitality employees' psychological capital important? The effects of psychological capital on work engagement and employee morale. Int J Hosp Manag. 2015;50:9–26. https://doi.org/10.1016/j.ijhm.2015.07.001.
49. Sweetman D, Luthans F, Avey JB, Luthans BC. Relationship between positive psychological capital and creative performance. Can J Adm Sci. 2011;28(1):4–13. https://doi.org/10.1002/cjas.175.
50. Sameer YM. Innovative behavior and psychological capital: does positivity make any difference? J Econ Manage. 2018;32(2):75–101. https://doi.org/10.22367/jem.2018.32.06.
51. Scott T, Mannion R, Davies H, Marshall M. The quantitative measurement of organizational culture in health care: a review of the available instruments. Health Serv Res. 2003;38(3):923–45. https://doi.org/10.1111/1475-6773.00154.
52. Cameron KS, Quinn RE. Diagnosing and changing organizational culture: based on the competing values framework. San Francisco: Wiley; 2011.
53. Cerqueira ADS, Mainardes EW, De Oliveira JLB. Dimensions of internal market orientation related to job satisfaction and appreciation in Brazilian healthcare service. J Health Manag. 2018;20(3):291–308. https://doi.org/10.1177/0972063418779903.
54. Naranjo-Valencia JC, Jiménez-Jiménez D, Sanz-Valle R. Studying the links between organizational culture, innovation, and performance in Spanish companies. Rev Latinoam Psicol. 2016;48(1):30–41.
55. Lings IN, Greenley GE. Measuring internal market orientation. J Serv Res. 2005;7(3):290–305. https://doi.org/10.1177/1094670504271154.
56. Narver JC, Slater SF, Tietje B. Creating a market orientation. J Mark-Foc Manage. 1998;2(3):241–55.
57. Mesfin D, Woldie M, Adamu A, Bekele F. Perceived organizational culture and its relationship with job satisfaction in primary hospitals of Jimma zone and Jimma town administration, correlational study. BMC Health Serv Res. 2020;20(1):438. https://doi.org/10.1186/s12913-020-05319-x.
58. Büschgens T, Bausch A, Balkin DB. Organizational culture and innovation: a meta-analytic review. J Prod Innov Manag. 2013;30(4):763–81. https://doi.org/10.1111/jpim.12021.
59. Baneshi E, Rezaei B. Depicting favorite organizational culture: an empirical case study. Manage Sci Lett. 2013;3(11):2839–46.
60. Gounaris SP. Internal-market orientation and its measurement. J Bus Res. 2006;59(4):432–48. https://doi.org/10.1016/j.jbusres.2005.10.003.
61. Yu Q, Asaad Y, Yen DA, Gupta S. IMO and internal branding outcomes: an employee perspective in UK HE. Stud High Educ. 2016;43(1):37–56.
62. Ouchi WG, Wilkins AL. Organizational culture. Annu Rev Sociol. 1985;11(1):457–83. https://doi.org/10.1146/annurev.so.11.080185.002325.
63. Hofstede G. Attitudes, values and organizational culture: disentangling the concepts. Organ Stud. 1998;19(3):477–93. https://doi.org/10.1177/017084069801900305.
64. Alvesson M. Understanding organizational culture. 2nd ed. London: Sage; 2013.
65. Chao C-Y, Lin Y-S, Cheng Y-L, Liao S-C. A research on the relationship among market orientation, absorptive capability, organizational innovation climate and innovative behavior in Taiwan's manufacturing industry. Afr J Bus Manag. 2011;5(19):7855–63.
66. Sinha S, Priyadarshi P, Kumar P. Organizational culture, innovative behaviour and work-related attitude: role of psychological empowerment. J Work Learn. 2016;28(8):519–35. https://doi.org/10.1108/JWL-06-2016-0055.
67. Lings IN. Internal market orientation: construct and consequences. J Bus Res. 2004;57(4):405–13. https://doi.org/10.1016/S0148-2963(02)00274-6.
68. Hansen JA, Pihl-Thingvad S. Managing employee innovative behaviour through transformational and transactional leadership styles. Public Manag Rev. 2019;21(6):918–44. https://doi.org/10.1080/14719037.2018.1544272.
69. Hartnell CA, Ou AY, Kinicki A. Organizational culture and organizational effectiveness: a meta-analytic investigation of the competing values framework's theoretical suppositions. J Appl Psychol. 2011;96(4):677–94. https://doi.org/10.1037/a0021987.
70. Harun S, Sürücü L, Maşlakçı A. On the relation between leadership and positive psychological capital in the hospitality industry. Int J Bus. 2019;24(2):182–97.
71. Li W, Bhutto TA, Nasiri AR, Shaikh HA, Samo FA. Organizational innovation: the role of leadership and organizational culture. Int J Public Leadersh. 2018;14(1):33–47. https://doi.org/10.1108/IJPL-06-2017-0026.
72. Luthans F, Vogelgesang GR, Lester PB. Developing the psychological capital of resiliency. Hum Resour Dev Rev. 2006;5(1):25–44. https://doi.org/10.1177/1534484305285335.
73. Porter LW, Steers RM, Mowday RT, Boulian PV. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. J Appl Psychol. 1974;59(5):603–9. https://doi.org/10.1037/h0037335.

74. Allen NJ, Meyer JP. Affective, continuance, and normative commitment to the organization: an examination of construct validity. J Occup Psychol. 1990;63(1):1–18. https://doi.org/10.1111/j.2044-8325.1990.tb00506.x.
75. Wasti SA. Commitment profiles: combinations of organizational commitment forms and job outcomes. J Vocat Behav. 2005;67(2):290–308. https://doi.org/10.1016/j.jvb.2004.07.002.
76. Jafri MH. Organizational commitment and employee's innovative behavior: a study in retail sector. J Manag Res. 2010;10(1):62–8.
77. Meyer JP, Allen NJ. TCM employee commitment survey academic users guide 2004. London: The University of Western Ontario, Department of Psychology; 2004.
78. Slåtten T, Mehmetoglu M. What are the drivers for innovative behavior in frontline jobs? A study of the hospitality industry in Norway. J Hum Resour Hospit Tourism. 2011;10(3):254–72. https://doi.org/10.1080/15332845.2011.555732.
79. Slåtten T. Emotions in service encounters from the perspectives of employees and customers. Universitetstrykkeriet: Karlstad University; 2011.
80. Bos-Nehles AC, Veenendaal AA. Perceptions of HR practices and innovative work behavior: the moderating effect of an innovative climate. Int J Hum Resour Manag. 2017;30(18):1–23.
81. MacKinnon DP, Fairchild AJ, Fritz MS. Mediation analysis. Annu Rev Psychol. 2007;58(1):593–614. https://doi.org/10.1146/annurev.psych.58.110405.085542.
82. Jensen RS, Øistad BS. Det kjønnsdelte arbeidsmarkedet på virksomhetsnivå [The gender-segregated labour market at the workplace level]. Oslo: Fafo-rapport; 2019.
83. Janssen O. Job demands, perceptions of effort–reward fairness and innovative work behaviour. J Occup Organ Psychol. 2000;73(3):287–302. https://doi.org/10.1348/096317900167038.
84. Ringle CM, Wende S, Becker J-M. SmartPLS 3. 2015. https://www.smartpls.com/. Accessed 25 Feb 2021.
85. Hair JF Jr, Sarstedt M, Ringle CM, Gudergan SP. Advanced issues in partial least squares structural equation modeling. London: SAGE; 2018.
86. Hair JF, Hult GTM, Ringle C, Sarstedt M. A primer on partial least squares structural equation modeling (PLS-SEM). 2nd ed. London: SAGE; 2017.
87. Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. Eur Bus Rev. 2019;31(1):2–24. https://doi.org/10.1108/EBR-11-2018-0203.
88. Sun Y, Huang J. Psychological capital and innovative behavior: mediating effect of psychological safety. Soc Behav Pers. 2019;47(9):1–7.
89. Kirrane M, Lennon M, O'Connor C, Fu N. Linking perceived management support with employees' readiness for change: the mediating role of psychological capital. J Chang Manag. 2017;17(1):47–66. https://doi.org/10.1080/14697017.2016.1214615.
90. Hsu ML, Chen FH. The cross-level mediating effect of psychological capital on the organizational innovation climate–employee innovative behavior relationship. J Creat Behav. 2015;51(2):128–39.
91. Hannemann-Weber H, Kessel M, Budych K, Schultz C. Shared communication processes within healthcare teams for rare diseases and their influence on healthcare professionals' innovative behavior and patient satisfaction. Implement Sci. 2011;6(1):40. https://doi.org/10.1186/1748-5908-6-40.
92. Sarstedt M, Henseler J, Ringle Christian M. Multigroup analysis in partial least squares (PLS) path modeling: alternative methods and empirical results. In: Marko S, Manfred S, Charles RT, editors. Measurement and research methods in international marketing. Measurement and research methods in international marketing. Advances in International Marketing, vol. 22. Bingley: Emerald Group Publishing Limited; 2011. p. 195–218.
93. Ringle CM, Sarstedt M, Mitchell R, Gudergan SP. Partial least squares structural equation modeling in HRM research. Int J Hum Resour Manag. 2020;31(12):1617–43. https://doi.org/10.1080/09585192.2017.1416655.
94. Sarstedt M, Hair JF, Nitzl C, Ringle CM, Howard MC. Beyond a tandem analysis of SEM and PROCESS: use of PLS-SEM for mediation analyses! Int J Mark Res. 2020;62(3):288–99. https://doi.org/10.1177/1470785320915686.
95. Peterson SJ, Luthans F, Avolio BJ, Walumbwa FO, Zhang Z. Psychological capital and employee performance: a latent growth modeling approach. Pers Psychol. 2011;64(2):427–50. https://doi.org/10.1111/j.1744-6570.2011.01215.x.
96. Bitmiş MG, Ergeneli A. How psychological capital influences burnout: the mediating role of job insecurity. Procedia Soc Behav Sci. 2015;207:363–8. https://doi.org/10.1016/j.sbspro.2015.10.106.
97. Vandenberghe C, Bentein K, Panaccio A. Affective commitment to organizations and supervisors and turnover: a role theory perspective. Aust J Manag. 2017;43(7):2090–117.
98. Tricco AC, Zarin W, Rios P, Nincic V, Khan PA, Ghassemi M, et al. Engaging policy-makers, health system managers, and policy analysts in the knowledge synthesis process: a scoping review. Implement Sci. 2018;13(1):31.
99. Wang Z, Wang N. Knowledge sharing, innovation and firm performance. Expert Syst Appl. 2012;39(10):8899–908. https://doi.org/10.1016/j.eswa.2012.02.017.
100. Levin KA. Study design III: cross-sectional studies. Evid Based Dent. 2006;7(1):24–5. https://doi.org/10.1038/sj.ebd.6400375.
101. Jackson M, Cox DR. The principles of experimental design and their application in sociology. Annu Rev Sociol. 2013;39(1):27–49. https://doi.org/10.1146/annurev-soc-071811-145443.
102. Thye SR. Logical and philosophical foundations of experimental research in the social sciences. In: Webster M, Sell J, editors. Laboratory experiments in the social sciences. 2nd ed. San Diego: Academic Press; 2014. p. 53–82. https://doi.org/10.1016/B978-0-12-404681-8.00003-0.
103. Thrane C. Surveyeksperimentet: et underutnyttet forskningsdesign for sosiologisk kausalanalyse. Nor Sosiol Tidsskr. 2020;4(06):324–37. https://doi.org/10.18261/issn.2535-2512-2020-06-01.
104. Carmeli A, Meitar R, Weisberg J. Self-leadership skills and innovative behavior at work. Int J Manpow. 2006;27(1):75–90. https://doi.org/10.1108/01437720610652853.
105. Nazir S, Shafi A, Atif MM, Qun W, Abdullah SM. How organization justice and perceived organizational support facilitate employees' innovative behavior at work. Empl Relat. 2019;41(6):1288–311.
106. Vinarski-Peretz H, Carmeli A. Linking care felt to engagement in innovative behaviors in the workplace: the mediating role of psychological conditions. Psychol Aesthet Creat Arts. 2011;5(1):43–53. https://doi.org/10.1037/a0018241.
107. Schmitt N. Method bias: the importance of theory and measurement. J Organ Behav. 1994;15(5):393–8. https://doi.org/10.1002/job.4030150504.
108. De Jong J, Den Hartog D. Measuring innovative work behaviour. Creat Innov Manag. 2010;19(1):23–36. https://doi.org/10.1111/j.1467-8691.2010.00547.x.

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IV

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The impact of individual creativity, psychological capital, and leadership autonomy support on hospital employees' innovative behaviour

Terje Slåtten*, Barbara Rebecca Mutonyi and Gudbrand Lien

Abstract

Background: There is growing interest in and focus on healthcare services research to identify factors associated with innovation in healthcare organizations. However, previous innovation research has concentrated primarily on the organizational level. In contrast, this study focuses on innovation by individual employees. The specific aim is to examine factors with potential impact on individual employee innovation in hospital organizations. Thus, the study significantly deepens and broadens previous research on innovation in the domain of health services.

Methods: A conceptual model was developed and tested on a sample of hospital employees ($n = 1008$). Partial least-squares structural equation modelling (PLS-SEM) was used to analyse the data with SmartPLS 3 software in two steps involving a measurement model and a structural model. Mediation analysis was used to test the proposed indirect effects.

Results: Hospital employees' individual innovative behaviour is directly and positively associated with individual creativity ($\beta = 0.440$), psychological capital ($\beta = 0.34$) and leadership autonomy support ($\beta = 0.07$). The relationships between leadership autonomy support, psychological capital and individual innovative behaviour are all mediated by employees' creativity. Psychological capital mediates the relationship between leadership autonomy support and individual innovative behaviour. Overall, the proposed model explains 50% of the variance in hospital employees' innovative behaviour.

Conclusions: This study reveals a complex pattern of links between innovative behaviour and leadership autonomy support, employees' creativity and employees' psychological capital. However, the findings indicate that leadership autonomy support has an influential and multifaceted impact on hospital employees' innovative behaviour.

Keywords: Innovative behaviour, Creativity, Psychological capital, Leadership autonomy support, Hospital, Employees

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Background

Innovation is a desirable objective for successful modern companies. Because innovation is relatively difficult to achieve but considered to be of high value, in many ways it can be said to represent a modern version of the Greek word 'Eureka' (which means, 'I have found it'). Most companies and organizations realize the need to be proactive in their approach to 'finding it' or being innovative. Healthcare organizations, whether public or private, are no exception in their desire for innovation. To attain their goals such as organizational efficiency or effective responses to healthcare needs, these organizations consider innovations to play a pivotal role [1]. A current example of this, illustrating the need for innovation, is the Coronavirus disease 2019 (COVID-19) pandemic. Facing this extreme health crisis, health organizations around the world are forced to be innovative for at least two reasons. First, and most obviously, there is an urgent need for a vaccine that hinders or stops the spread of COVID-19. Second, pending a vaccine, health organizations are searching for innovative effective and safe solutions to the ongoing health threat. This latter point is well illustrated in Norway. The Norwegian Institute of Public Health recently introduced an innovative electronic app, named *Smittestopp*, to fight the pandemic. According to the institute, the Smittestopp app 'will help the health authorities to limit the transmission of coronavirus. Anonymized data about movement patterns in society from the app are used to develop effective infection control measures' (for more about this app, see [2]). This example demonstrates the need for innovation in healthcare organizations.

Like most organizations, health organizations face constant change and unpredictable challenges [3]. Specifically, healthcare organizations are under continuous pressure to find novel ways to reduce costs and increase the effectiveness of their healthcare services. Because there are various alternative health services to choose from, patients have become more demanding in their expectations for health service quality [4]. These aspects highlight the importance of seeking incremental or radical innovations in almost every area of healthcare. Therefore, it is an urgent need for healthcare organizations to identify and cultivate factors that have a positive impact on innovative behaviour. As Länsisalmi et al. noted, 'innovation has become a critical capability of all healthcare organizations' [4].

Although there is a growing body of literature on innovative behaviour in general, very few studies seem to have been undertaken in healthcare organizations. Moreover, in a review on healthcare innovation, Länsisalmi et al. [4] found a large proportion of previous studies (45%) limited their focus to the organizational level of innovations. In their review, the authors found that 'only 13% of the studies focused on individual level innovations' [4]. The very few previous studies undertaken have focused on employees' innovative behaviour in relation to aspects such as employee empowerment and job productivity [5], structural and psychological empowerment [6], motivation and perceived stress [7]. This limited research on individual innovation behavior in healthcare research is surprising because it is reasonable to assume that (individual) employees in organizations are primary and fundamental drivers of the implementation of new ideas, and they are the first to practise innovative behaviour in their work. Xerii and Brunetto, referring to the lack of research on innovative behaviours in healthcare organizations, noted, 'it is clear that hospitals stand to gain from innovative employees' [8]. In a similar vein, Kim and Park noted 'innovative behavior among members of an organization is important … because these individuals are the primary agents to develop and execute innovative ideas' [9]. Although the literature strongly emphasizes the role of innovation, there is a lack of research on individual innovation in healthcare [4]. Consequently, more research is needed on the potential factors associated with innovative behaviour from an employee perspective in health services research. It is important to point out however, despite creativity being used identically with innovation, in this study, the concept of creativity is separated from that of innovative behavior.

For the reasons above, this paper has three aims. First, an overall aim and contribution is to study innovative behaviour from an employee perspective using healthcare organizations as an empirical setting. Second, according to the literature 'innovative behaviour [is] influenced by personal characteristics' [9]. This study addresses two personal characteristics: (i) employee creativity and (ii) psychological capital (PsyCap). According to Yu 'only a few studies have attempted to determine the impact of PsyCap on employee creativity in the workplace context' [10]. Third, 'innovative behaviour is also influenced by … organizational characteristics' [9]. This study limits its focus to one aspect of leadership. Specifically, it examines whether and how leadership autonomy support is associated with employee PsyCap, creativity and innovative behaviour. By focusing on these three constructs, the study contributes to a relatively neglected domain of health services research.

The paper is structured as follows. First, the conceptual model is briefly described. Second, the content and links between the concepts are discussed. Third, the methods, statistical analysis and results of the empirical hypothesis tests are presented. The paper concludes with a discussion of findings and recommendations for further research. The final part also includes an overall conclusion from this study.

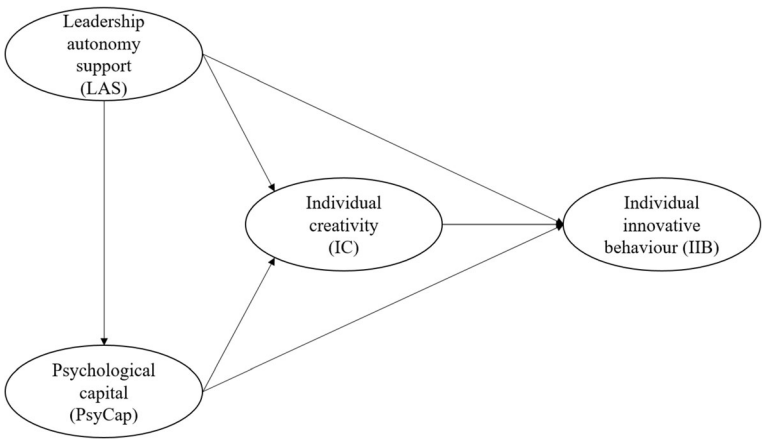

Fig. 1 Conceptual model to analyse impacts on hospital employees' individual innovative behaviour

Conceptual model of the study

Figure 1 illustrates the conceptual model. As noted in the introduction, the overall aim of this study is to contribute to research on employees' individual innovative behaviour (IIB) in healthcare setting.

Figure 1 indicates two distinct types of factors that have an impact on IIB: (i) *personal characteristics* and (ii) *organizational characteristics*. Two *personal characteristics* are represented in Fig. 1: (i) individual creativity (IC) and (ii) PsyCap. PsyCap is assumed to be linked directly to both IIB and IC as well as indirectly to IIB through IC. The *organizational characteristics* represented in Fig. 1 of the conceptual model are labelled 'leadership autonomy support' (LAS). LAS is expected to have multiple effects. Specifically, it is assumed that LAS has a direct impact on IIB, IC and PsyCap. Moreover, the linkage between LAS and IIB is expected to be mediated through IC and PsyCap. In addition, the link between LAS and IC is expected to be mediated through PsyCap. All the hypotheses leading this study have been summarized below in Table 1. In the following sections, the concepts and linkages between them, as depicted in Fig. 1, are explained in more detail.

Individual innovative behaviour (IIB)

According to Fuglsang, innovation is 'a difficult phenomenon to define and study, and there is no consensus about how to define innovation' [11]. One of the earliest definitions of innovation was that of Schumpeter. Schumpeter refers to innovation as a 'new combination' of services, work processes, products and markets [12]. In the literature, an innovation can refer to a 'new product or service, a new production process, or a new structure or administrative system' [13]. These diverse definitions of innovation exemplify the potential variety of differences between various types of innovation. Simply stated, innovation can manifest everywhere in an organization. However, this study limits its focus to innovations relevant to individual employees. The innovation type evaluated in this study is IIB in healthcare settings. IIB concerns the implementation of innovations of potential benefit to employee performance.

Table 1 Hypotheses leading this study

Hypothesis	Hypothesized relationships
H1	IC is positively related to IIB.
H2a	PsyCap is positively related to employees' IIB.
H2b	PsyCap is positively related to employees' IC.
H2c	The relationship between PsyCap and IIB is mediated by IC.
H3a	LAS is positively related to IC.
H3b	LAS is positively related to employees' IIB
H3c	The relationship between LAS and employees' IIB is mediated by their IC.
H3d	LAS is positively related to employees' PsyCap.
H3e	The relationship between LAS and IIB is mediated by PsyCap.
H3f	The relationship between LAS and employees' IC is mediated by PsyCap.

Note: *IC* Individual creativity, *IIB* Individual innovative behaviour, *PsyCap* Psychological capital, *LAS* Leadership autonomy support

IIB relates to the behaviour of employees and their ability to adopt and use new and useful ideas in their work environment [14]. As such, IIB is doing something new that represents a behavioural change or discontinuity relative to the ordinary organizational pattern of behaviour in the past. Consequently, the domain of IIB is related to everyday employee practices, and such innovations are implicitly 'a function of learning and knowledge creation, integrated into daily work practices' [15]. Furthermore, there is no explicit focus on the timing of implementation. Innovation may be implemented either as a one-time change (e.g. for a specific patient or situation) or more permanently (e.g. a new procedure that is extended to all future patients). Innovation in a one-time situation is analogous to what the literature terms an ad hoc *innovation* [16]. Similar to ad hoc innovation, IIB may include some temporary innovations. However, the concept of IIB can include 'some element that can be repeated in new situations' [17], to be implemented and generalized more permanently. Consequently, the concept of IIB in this study is open to a wide range of changes relevant to employee performance. Thus, IIB embraces and reflects a ' … specific form of change-oriented activity' [18] that is explicitly manifested in employees' 'implementation of new and useful ideas within a work-role' [18]. Below, some significant factors suggested to have an impact on IIB are addressed.

Individual creativity (IC)

As shown in the conceptual model in Fig. 1, IC is one of two personal characteristics suggested to have an impact on IIB. IC as a personal characteristic reflects the idea that creativity is heterogeneous and distributed across individuals in organizations. Creativity is flexible and dynamic; it varies from one employee to another. Therefore, IC is an individual resource or capability to be creative. Based on this, and specifically for this study, IC is defined as the individual employee's 'production of novel, useful ideas or problem solutions. IC refers to both the process of idea generation or problem solving and the actual idea or solution' [19]. Creativity is sometimes used synonymously with innovation. However, in this study, we separate the concept of IC from that of IIB. Shalley et al. support this distinction, stating: 'it important to distinguish creativity from innovation. Creativity refers to the development of novel, potentially useful ideas. Although employees might share these ideas with others, only when the ideas are successfully implemented at the organization or unit level would they be considered innovation' [20]. As the above definition suggests, IC refers to the production and development of potentially useful and novel ideas. Consequently, IC describes processes and individual cognitive thoughts (referring to creative thinking) and potential associated activities such as (1) defining the problem to be solved, (2) collecting information, (3) generating ideas and (4) evaluating ideas [21]. In contrast to IC, the concept of IIB relates to behaviour, specifically referring to the behavioural implementation of creative ideas. Consequently, there is a natural distinction between IC and IIB, although the two concepts are closely linked or interdependent.

Creativity is most often described as a necessary 'input' to innovation. Slåtten and Mehmetoglu, emphasizing the importance of creativity, characterized it as a 'primary source' [22] of innovative behaviour. Gilmartin illustrates the criticality of creativity by describing it as 'the fuel of innovation' [23]. The 'foundation of innovation ideas is creativity' [24]. Previous research has found a positive link between creativity and innovation at the individual level [22]. In line with previous research, this study sought a positive association between IC and IIB. This leads to the following hypothesis:

Hypothesis 1: *IC is positively related to IIB.*

Psychological capital (PsyCap)

PsyCap in Fig. 1 is the second personal characteristic that may influence IIB. The PsyCap construct is drawn from positive psychology, and concerns 'who you are' as a person [25]. More precisely, PsyCap focuses on the positive aspects and strengths of individuals and labels them collectively as positive psychological resources [26] for the innovative process. Luthans et al. described PsyCap as a higher order construct, which encompasses four first-order positive psychological resources: (i) hope, (ii) self-efficacy, (iii) resilience and (iv) optimism [26]. All four resources included in PsyCap are state-like resources [25]. The hope dimension in PsyCap is a motivational state that describes the extent to which one can progress when facing obstacles. Self-efficacy is individual confidence in one's ability to perform tasks successfully. Resilience refers to the capability to manage setbacks, pursue objectives and achieve good results. Optimism is a person's positive assessment of the future [27]. This defines PsyCap consistent with previous research as an individual's positive psychological state of development characterized by (1) having confidence (self-efficacy) to take on challenging tasks and put in the necessary effort to succeed at them; (2) having a positive feeling (optimism) about future success; (3) persevering towards goals, and when necessary redirecting paths to goals (hope) to succeed; and (4) when beset by problems and adversity, bouncing back, sustaining or increasing one's efforts (resilience) to attain success [27].

Previous research has associated individual PsyCap with work related performance, including IIB. For

example, Slåtten et al. found that PsyCap among service sales employees was positively associated with innovative behaviour [28]. In another study, Abbas and Usman found a positive link between PsyCap and supervisor-rated innovative performance among employees employed in a range of fields [29]. Research has also found that the individual components and resources of PsyCap are linked to innovative behaviour. For example, research has linked the single PsyCap component of self-efficacy to innovative activities [30] and creative performance [31]. Although this study focuses on the collective impact of all (four) resources of PsyCap and does not examine the impact of single components, it supports the assumption of a link between PsyCap and IIB. In line with most previous research, it is expected that PsyCap in such settings will 'provide a necessary repository of psychological resources that help effectively innovative work-related ideas' [29]. Based on this, the following hypothesis is proposed:

Hypothesis 2a: *PsyCap is positively related to employees' IIB.*

Although it has been suggested that PsyCap has a direct impact on IIB, it is also reasonable to assume that PsyCap has an additional direct impact on IC. Previous research has revealed that IC is linked to personal factors [32]. In this study, PsyCap reflects these individual factors. Specifically, it is expected that PsyCap is not limited to its positive impact on an individual employee's adoption of an innovation (referring to IIB) but also of triggering creativity (referring to IC). It is important to remember that IC in the previous discussion was described in terms such as 'primary source' ([22] and 'foundation of innovation' [24]. Simply and directly stated, without creative thoughts, no innovative behaviour will occur. Gilmartin supports this assumption, stating, 'creativity is the basic building block of invention and thus innovation' [23].

Each of the four resources of PsyCap is a potential enabler and helps to trigger IC. Creative thinking is not a quick fix but often involves extensive and intensive cognitive and mental work. It is reasonable to assume that the mental work of IC entails some form of learning process of at least four steps. First, a person must be aware of a problem or challenge that needs to be solved. Second, a person must be interested and motivated to explore the nature of the problem ('What is the real problem to be solved here?'). Third, potential solutions are identified. In this part, there may be several and sometimes even competing solutions, each with its specific obstacles. Fourth, among the list of alternative solutions, one must finally evaluate and identify the most appropriate and practical solution. Based on this four-step IC process, it is easy to imagine that IC is a relatively demanding mental/cognitive process that can be frustrating, time-consuming and stressful. However, a person's PsyCap resources can boost IC. PsyCap is a core resource to achieve IC because it represents 'one's positive appraisal of circumstances and probability for success based on motivated effort and perseverance' [26].

Previous research has revealed that the four resources or 'ingredients' of PsyCap, both individually and collectively, are associated with IC [33, 34]. For example, previous research has linked the hope resource of PsyCap to a person's will to perform creative exploration [35]. Luthans et al. explicitly stated that hopeful employees 'tend to be creative' [35]. Similarly, in regard to optimism Rego et al. found that optimistic people tend to be more creative than their less optimistic counterparts [36]. Research on the other two resources of PsyCap, self-efficacy and resilience, has also found them to be positively linked to the aspect of creativity (see e.g. [30, 31, 37]). Consequently, the four resources of PsyCap are all potentially associated with IC. Scarce research has examined the impact of PsyCap on employees' IC in a healthcare setting, making this study a unique contribution to health services research. Based on previous research, it is expected that the 'combined motivational effects of the four dimensions' [33] of PsyCap will be positively associated with employees' IC. The assumption about this relationship can be summarized in the following hypothesis:

Hypothesis 2b: *PsyCap is positively related to employees' IC.*

The two aforementioned hypotheses propose that PsyCap has a direct impact on employees' IIB and IC. However, as shown in Fig. 1 and summarized in Table 1, it is also expected that the relationship between PsyCap and IIB is mediated by IC. This assumption represents a third alternative way in which PsyCap may be linked to IIB. The main argument for this third route of impact is in the core role IC seems to have in IIB. As emphasized above, IC in the literature is described as a 'primary source' [22] and the 'foundation of innovation' [24]. This implies that from an individual employee perspective, IC is a necessary precondition for IIB. Based on this core role of IC, an increase in employee IC because of a positive shift or change in their PsyCap (as suggested in hypothesis 2b) may encourage employees to experiment with and apply creative ideas if they see a benefit to their work. Consequently, IC is expected to mediate between PsyCap and IIB. This leads to the following hypothesis:

Hypothesis 2c: *The relationship between PsyCap and IIB is mediated by IC.*

Leadership autonomy support (LAS)

In the conceptual model in Fig. 1, LAS represents *organizational characteristics.* In general, leadership is an essential organizational variable because it influences employees' psychological attributes (e.g. PsyCap) and their creative performance [38] in constructs such as IC and IIB. LAS may affect motivation in work contexts [39]. This motivation is interesting for two reasons. First, as mentioned above, IC and IIB are relatively stressful and demans action. Second, IC and IIB can both be described as 'extra-role behaviour' because they are normally not a direct obligation, nor are they explicitly stated in formal contracts or job descriptions. Therefore, creative performance in terms of IC and IIB can be described as voluntary hard work that employees want to do but do not have to. Consequently, employees need a certain level of interest, or more precisely, motivation to be creative and innovative. This latter aspect of employee motivation is interesting and especially relevant to the concept of LAS. The ideas in this concept originally come from self-determination theory (SDT) [40]. SDT focuses on factors that facilitate motivation in humans. In SDT, the inner or self-determined driven type of motivation is emphasized as the ideal type. In SDT, it is labelled 'autonomous motivation', which describes a person who 'behaves with a full sense of volition and choice' [41]. In the literature, autonomous motivation is described as the 'highest quality of regulation' [41], and is closely linked to LAS [41, 42]. Hence, LAS is of special interest to the overall aim of this study.

In this study, LAS refers to employees' perceptions of the quality of their interpersonal relationship with their leader. The domain and focus of LAS is the interpersonal work context and whether employees perceive their leader as one who stimulates, motivates and encourages them to work autonomously. Leaders that are autonomy-supportive provide 'a meaningful rationale for doing the task, emphasise choice … and acknowledge employees' feelings and perspective' [41]. The 'goodness' and 'well-being' of autonomy-supportive leaders become very clear if it is contrasted with the opposite—non-autonomy-supportive leaders. In an organization with non-autonomy-supportive leaders, employees have minimal or zero freedom, are controlled at every step of the way, and their leaders give orders and provide detailed recipes of how the work should be done. Not surprisingly, employees most often feel that non-autonomy-supportive leaders decrease their inner motivation while autonomy-supportive leaders increase it. Therefore, because autonomy at work and autonomy-supportive leaders are closely associated with employees' inner motivation, they are most often appreciated and sought by employees. Individuals who seek autonomy at work 'are often searching for inner motivational environments and situations that provide them the opportunity of self-determination, initiative and choice' [43].

There are several interconnected reasons why LAS should have a direct impact on both employees' IC and employees' IIB. First, LAS potentially 'fuels' employees with an inner motivation that increases their interest and leads them to focus on their work performance. Previous research supports the view that autonomy support is linked to employee motivation in work contexts. Second, because LAS is associated with positive motivation, it is reasonable to assume that employees also become more engaged and dedicated, which increases their IC and their IIB. Consequently, by this reasoning, employees' perceptions of LAS function in tandem with their motivation by promoting IC and IIB. The importance of motivation for creativity and innovation is supported in the componential theory of creativity. By this theory, the motivation of an individual is suggested to be a primary mechanism that affects the creativity of an individual [44]. Furthermore, the creativity of an individual is noted as an predecessor for IIB at work, as the generation of ideas (creativity) is a necessary step towards the implementation (innovation) of ideas [45, 46]. As noted by Hocine and Zhang, 'people are most creative when they feel motivated' [47]. Previous research suggests that autonomy-supportive leaders have an impact on employee performance [44, 47]. Frese and Zapf, for example, found that the more leaders encouraged and supported employees in organizations, the more it promoted new ideas, creativity and the implementation of those ideas [48]. In an empirical study by Slåtten including 345 hospitality employees, the author found that their perceived autonomy influenced both their creative self-efficacy and innovative behaviour [30]. In this paper, the authors suggest that autonomy is a ' … "key factor" and is critical for developing a person's creative self-efficacy' [30]. Previous research has also revealed that when employees experience the opposite of autonomy at work—controlling behaviour from their leader—this has a detrimental impact on creativity and innovation [49]. Consequently, based on previous research, there are several good reasons to assume that when employees perceive LAS in a positive way it will have a positive impact on both IC and IIB. This reasoning leads to the following hypotheses:

Hypothesis 3a: *LAS is positively related to IC.*
Hypothesis 3b: *LAS is positively related to IIB.*

Shalley et al. state that 'the presence of … creative ideas increases the likelihood that other employees will

apply the ideas in their own work' [20]. This statement—like the present study—stresses the importance of IC in achieving IIB. Consequently, creative thinking (or IC) is a precursor for creative acting (or IIB). On the other hand, as previously mentioned, there are studies revealing that autonomy is positively associated with innovative behaviour [45] and creative work involvement [46]. However, in these studies, the impact of autonomy is limited because they do not include both IC and IIB in the same study. Therefore, considering the core role of IC, the true pattern of linkages in the impact of autonomy on IC and IIB has not been fully investigated. In contrast, this study separates IC (as a cognitive concept) from IIB (as a behavioural concept), thus providing a more comprehensive test for mechanisms operating between LAS, IC and IIB. Previous research has yet to explore the linkages between these three concepts. Being creative is demanding for employees and it entails abilities such as 'deep processing of information, and information integration' [50]. Thus, being creative is a complex task. Such 'complex tasks or quality-type tasks tend to require a higher degree of engagement and autonomy' [50]. LAS is, therefore, a leadership tool that may increase employees' IC. Based on this, when employees perceive the LAS to be good it should encourage them and stimulate their IC. However, LAS is not limited to raising employees' creative thinking skills. It is also reasonable to assume that LAS, in the next round can fuel employees with the necessary authority and freedom to transform their creative thoughts (IC) into real action and behaviour (IIB). This is because implementing creative thoughts may benefit work performance. This reasoning assumes that IC acts as the common denominator between LAS and IIB. Specifically, IC is expected to mediate the relationship between LAS and IIB. This leads to the following hypothesis on the pattern of linkages:

Hypothesis 3c: *The relationship between LAS and employees' IIB is mediated by their IC.*

Because of leaders' and managers' formal roles in organizations, they significantly influence their subordinates [51]. Slåtten et al. describe this influence as 'among the most dominant factors' [52]. Leadership is a significant or 'impactful' part of an organizational work environment and 'resource theorists view the work environment as a key management resource that interacts with other resources' [53] such as the resources that comprise PsyCap. As discussed in relation to hypotheses 3a and 3b, leadership is expected to affect employees' IC and IIB. Below, it is suggested that this relationship also works through the impact of LAS (an *organizational characteristic)* on PsyCap (a *personal characteristic*) as shown in Fig. 1 and summarized in Table 1. Consequently, this represents an alternative and complementary route in the pattern of linkages associated with IC and IIB.

The literature defines the concept of PsyCap as 'an individual's positive psychological state' [27]. The definition of it as a 'psychological state' implies that PsyCap is not static or fixed but flexible and dynamic. Consequently, the individual resources that comprise PsyCap change according to certain factors. Luthans et al. support this idea by stating that PsyCap is 'open to development and can be managed for effective work performance' [25]. By this line of reasoning, it is expected that LAS can positively 'develop' or 'manage' employees' PsyCap. Current research has yet to examine this specific relationship in a healthcare setting. Although very little research has been undertaken, previous research indicates a relationship between LAS and PsyCap. First, when employees perceive the LAS in their organization to be positive it reflects a perception of an autonomous work environment. As discussed above, an autonomous work environment (of which LAS is a part) is positively associated with PsyCap. For example, in a study by Choi including 331 employees in a Korean automotive parts manufacturing company, the author found a significant and strong link between autonomous work environments and employees' PsyCap ($\beta = 0.586$) [53]. Interestingly, in this article the author describes an autonomous work environment as partly a place that 'gives employees choices and encourages employees to take personal initiative' [53]. Moreover, to capture employees' perceptions of autonomy the author's questionnaire used items that assessed 'a subordinate's perceptions of the degree of autonomy supportiveness provided by their supervisors' [53]. This way of describing and capturing autonomous work environments is to a large extent similar to how the concept of LAS is used in this study. Stated in another way: Choi provided support for this study's expectation of a positive association between LAS and PsyCap [53]. Second, although the impact of LAS has not been specifically considered, previous research found that positive leadership (e.g. authentic leadership) and supportive organizational climate are positively associated with PsyCap [28, 54]. Consequently, based on the highly relevant research of Choi [53], it is expected in this study that LAS, as a positive environmental resource in organizations, has a positive impact on employees' PsyCap. Therefore, the following hypothesis is proposed:

Hypothesis 3d: *LAS is positively related to employees' PsyCap.*

Innovative behaviour is influenced by both 'personal and external determinants' [55]. As argued throughout

the discussion of the previous hypothesis, both PsyCap and IC—two personal determinants (or *personal characteristics)*—are assumed to be positively associated with IIB. Moreover, in the discussion of hypothesis 3d, it was argued that LAS, as an external determinant (or *organizational characteristic)* develops and increases the 'reservoir' of employee PsyCap resources. Based on this reasoning and assumption, it is reasonable to assume that PsyCap plays a mediating role in the relationship between LAS and IIB. Specifically, when employees' reservoirs of PsyCap increase because of a positive development stemming from LAS, this should increase their IIB. The authors are not aware of any previous study that has specifically tested the interplay between these variables in healthcare settings. However, a previous study has found that PsyCap mediates the relationship between positive leadership and innovative behaviour. For example, in a study of sales-people, it was found that employees' PsyCap mediated the relationship between positive perceptions of the authentic leadership style and innovative behaviour [28]. Furthermore, Choi found that PsyCap fully mediates the relationship between an autonomous work environment (of which LAS is a part) and employees' self-directed behaviour (a concept that is strongly related to the concept of IIB in this study) [53]. Thus, given its prominent role reported in the literature, PsyCap is expected to mediate the relationship between LAS and IIB. This prompts the following hypothesis:

Hypothesis 3e: *The relationship between LAS and IIB is mediated by PsyCap.*

A similar mediating pattern of linkages with PsyCap is predicted between LAS and IC. In this study, IC is defined as a cognitive concept. As noted several times in this paper, creativity is fundamental as the first step to innovation [20, 22, 23]. The logic of this is simply stated: If an individual has no creative thoughts (IC) no innovation will occur (IIB). However, as stated in hypothesis 2b, PsyCap can fuel IC. Similarly, as argued in hypothesis 3d, LAS can fuel PsyCap. In combination, these relationships indicate mediation or what can be described as a 'domino effect' that starts with perceptions of LAS, works through PsyCap and has an impact on IC. Scarse previous research has examined this assumption in a healthcare setting. However, support for the hypothesized mediating relationship can be found in published studies. Gupta and Singh found in their study that PsyCap fully mediates the relationship between leadership and creativity [56]. Similarly, Zubair and Kamal found that PsyCap mediates the relationship between the authentic leadership style and creativeness [57]. In line with previous research, it is assumed that PsyCap mediates the relationship between LAS and IC. This leads to the following and final hypothesis in this study:

Hypothesis 3f: *The relationship between LAS and employees' IC is mediated by PsyCap.*

Methods

The focus of this paper is the IIB of hospital employees. One of the authors initiated contact with the Director of Research at a hospital located inland in Norway to request permission to survey its employees. After acceding to the request, the Director of Research informed the hospital staff unit, the hospital division managers and the hospital department managers about the project. Both the division managers and the department managers undertook to inform the employees in their divisions and departments.

The study was submitted to and approved by the Norwegian Social Science Data Services (NSD), and the Data Protection Officer at the hospital. An informed consent letter was later issued by e-mail to all participants of the study, and was also included on the first page of the questionnaire. All invitations included information about the aim and focus of the study, confidentiality of data, voluntary participation and the estimated time required to complete the questionnaire. Participants were required to give their consent before participating in the survey.

The survey was developed through several workshops, a meeting with experts from academia and the site of the study. This process included several pretests of the questionnaire. Based on the feedback from the pretests, some redundant or ambiguous items were modified or deleted. The final questionnaire was distributed to a sample of 2000 hospital employees across seven staff units and 10 divisions. The selection of the staff units and divisions was made by consultation between the Director of Research, human resource management office and senior hospital management. It was the Director of Research who first disseminated the survey through emails to the hospital division managers and the hospital department managers. Then, in the next round, the managers distributed the questionnaire to the employees in their division. There were two reasons for this. First and foremost, we were able to ensure full anonymity through the platform Nettskjema (www.nettskjema.no) as no e-mail addresses were obtained. Second, because of the complexity of healthcare systems in general, obtaining data can be challenging. As such, healthcare managers (staff unit managers, division managers and department managers) were viewed as great ambassadors who would encourage and motivate employees to participate in the study. A sample size (n = 1008) of hospital employees participated, which gave a response rate of 50.4%.

Table 2 Personal characteristics of the participants ($N = 1008$)

		%
Sex:	Female	73.0
	Male	27.0
Staff role:	Nurse	33.0
	Doctor	8.7
	Others (e.g. admin. Staff, other health professionals)	58.3
Duration of employment:	Less than 5 years	26.9
	Between 6 and 10 years	18.0
	Between 11 and 20 years	30.3
	More than 20 years	24.8
Part-time or full time:	Part-time	22.5
	Full time	77.5
Age:	Younger than 45 years	37.3
	Between 46 and 55 years	32.2
	Older than 55 years	30.5

Table 3 Constructs (LAS, PsyCap, IC and IIB) and items used in this study

Construct	Definition	Claims label	Claims	Source
LAS	LAS refers to employees' perceptions of the quality of their interpersonal relationship with their leader.	LAS1	My leader gives me authority over issues within my area.	Amundsen [43]
		LAS2	My leader listens to me.	
		LAS3	My leader encourages me to take initiative.	
		LAS4	My leader is concerned that my work is goal-oriented.	
		LAS5	My leader instils motivation.	
PsyCap	An individual's positive psychological state of development characterized by self-efficacy, optimism, hope and resilience.	PsyCap1	I feel confident that I can set goals for myself in my work area.	Luthans et al. [27]
		PsyCap2	I am optimistic when it comes to my future at this organization.	
		PsyCap3	When faced with challenges in my job, I can find alternative solutions to them.	
		PsyCap4	I can find alternative ways to achieve my goals.	
IC	The individual employee's 'production of novel, useful ideas or problem solutions. It is both the process of idea generation and the actual idea.	IC1	I contribute creative ideas to solve challenges in my job.	Zhou and George [58]
		IC2	I contribute creative ideas to improve the quality of my job.	
IIB	The behaviour of employees and their ability to adopt and use new and useful ideas in their work.	IIB1	I create new ideas to solve problems in my job.	Jansen [59] and Scott & Bruce [60]
		IIB2	I search out new working methods or techniques to complete my work.	
		IIB3	I investigate and find ways to implement my ideas.	
		IIB4	I promote my ideas so others might use them in their work.	
		IIB5	I try out new ideas in my work.	

Note: *LAS* Leadership autonomy support, *PsyCap* Psychological capital, *IC* Individual creativity, *IIB* Individual innovative behaviour

Table 2 provides information on the personal characteristics of the participants. Because this study focused on hospital employees as a whole, further modifications in personal characteristics of the participants were made. First, in LAS, the term 'leader' for respondents meant their immediate formal leader. Second, all specialized positions or roles were summarized in their respective categories; for example, specialized nurse was summarized in the Nurse category, and specialized doctor, was summarized in the Doctor category. It is noteworthy that this study made no distinction between roles, but focused on all hospital employees employed at the study hospital, regardless of their rank and work title.

Instruments

This study covered four constructs: LAS, PsyCap, IC and IIB. All items used for the constructs are based on previous research. However, because none of the instruments has specifically been used in a structured healthcare analysis studies before, there was a need to adapt items into the study context from previous interdisciplinary studies. The items used to capture the concept of LAS were adopted from Amundsen [43]. The items used to capture the concept of PsyCap were adopted from Luthans et al. [27]. Those for IC items were adopted from Zhou and George [58]. Finally, the IIB were adopted from Janssen [59] and Scott and Bruce [60]. It is important to note that the LAS construct and items included in this study have only been validated in a non-healthcare setting [43]. The PsyCap, IC and IIB constructs have previously been validated in healthcare settings [61–63], but have not been used in a structured analysis, such as in this study. All items included in this study were therefore adapted to fit the healthcare setting in the Norwegian context. The concise definition of the adopted concepts and their items are summarized in Table 3. A Likert scale from (1) strongly disagree to (7) strongly agree was used for all items. The survey used in this study is a part of a larger survey research project focusing on various aspects of employee-relations in health organizations. As such, claims used in this study are appended accordingly (see appendix 1).

Data analysis

Partial least-squares structural equation modelling (PLS-SEM) was used to test the conceptual models and hypothesized relationships, using SmartPLS 3 software [64]. As a first step in evaluating the PLS-SEM results, a set of criteria for the reflective measurement model was assessed; the second step involved evaluating the structural model. Next, we estimated and analysed the hypothesised mediating effects. By following the recommended steps of Hair et al. [65, 66], we were able to assess the quality of the measurement model results and the structural model results.

As a robustness check of the PLS-SEM results, we also tested whether the following socio-demographic control variables influenced IIB: age, sex, education level and type of employment (part-time or full time). No significant differences were found for the socio-demographic variables, so the control variables were excluded from further analysis.

Results

Measurement model

In evaluating the reflective measurement model, we followed the recommendations of Hair et al. [65] by including the following: convergent validity, internal consistency reliability and discriminant validity. In short, convergent validity is measured by the average variance extracted (AVE), and estimates the average variance shared between the studied constructs and their individual indicators. As reported in Table 4, all loadings were above the recommended criterion of 0.7. In addition, the constructs in this study demonstrated AVE values well above the recommended 0.5. Therefore, we could conclude that the measurement model exhibited a satisfactory degree of convergent validity. Further, the reliability of the construct, internally, includes both the composite reliability and the Cronbach's alpha. In short, internal consistency reliability is an estimate that show whether the individual claims are all measuring the same construct, creating issues of redundancy. The results of our measurement model, as indicated in Table 4, revealed a good internal consistency in the constructs with values above the recommended 0.7. Lastly, we tested the measurement model for distinctiveness of the studied constructs. As suggested by Hair et al. [65, 67], we used the heterotrait–monotrait (HTMT) to reveal whether the shared variance within the studied constructs, their AVE, exceeded the shared variance between the studied constructs. As shown in Table 4, the 95% confidence interval of the HTMT statistic, did not include values of 1, signifying that discriminant validity was present. Overall, the tests suggested that the proposed reflective measurement model in this study is reliable and valid.

Structural model

Seeing as the reflective measurement model was confirmed, we then continued to assess the studied structural model. We first evaluated the studied constructs to determine multicollinearity issues. Following the recommended steps of Hair et al. [67], we examined model collinearity issues by observing the variance inflation factor (VIF), to ensure all VIF values were below 3. The results of the structural model collinearity revealed VIF values below 2, suggesting no multicollinearity issues. As

Table 4 Results of the measurement model for the LAS, PsyCap IC and IIB constructs

		Convergent validity		Internal consistency reliability		Discriminant validity
Construct	Claims label	Indicator reliability	AVE[a]	Composite reliability	Cronbach's alpha	HTMT criterion[a]
'Rule of thumb'		Loading > 0.7	> 0.5	0.7–0.95	0.7–0.95	HTMT interval does not include 1
LAS	LAS1	0.84	0.80	0.95	0.94	Yes
	LAS2	0.92				
	LAS3	0.93				
	LAS4	0.86				
	LAS5	0.91				
PsyCap	PsyCap1	0.81	0.74	0.92	0.88	Yes
	PsyCap2	0.82				
	PsyCap3	0.89				
	PsyCap4	0.90				
IC	IC1	0.96	0.93	0.96	0.92	Yes
	IC2	0.96				
IIB	IIB1	0.85	0.77	0.94	0.93	Yes
	IIB2	0.88				
	IIB3	0.90				
	IIB4	0.88				
	IIB5	0.88				

[a]*AVE* Average variance extracted, *HTMT* Heterotrait–monotrait ratio of correlations

such, it allowed us to examine and test the size and significance of the proposed path coefficients, as shown in Fig. 2. In addition, to measure the structural model prediction, we assessed the in-sample prediction of all endogenous constructs using R^2. Following the suggestions of Hair et al. [65, 67], the R^2 values for IIB (0.50), PsyCap (0.27) and IC (0.25) were moderate. The path coefficients values were standardized and revealed statistically significant values at the 1% significance level (the coefficient between LAS and IIB at the 5% level). The relationship between IC and IIB was positive (b = 0.44), supporting H1. H2a and H2b were also supported because the relationships between PsyCap and IIB and between PsyCap and IC were positive (b = 0.34 and b = 0.32, respectively). Finally, the structural model revealed a positive relationship between LAS and PsyCap (b = 0.52), between LAS and IC (b = 0.26) and between LAS and IIB (b = 0.07), supporting H3a, H3b and H3d.

The test of the mediator effects shows that IC complementarily mediates the relationship between PsyCap and IIB, with an indirect effect of 0.14 (Table 5), supporting H2c. Furthermore, IC intervenes between LAS and IIB

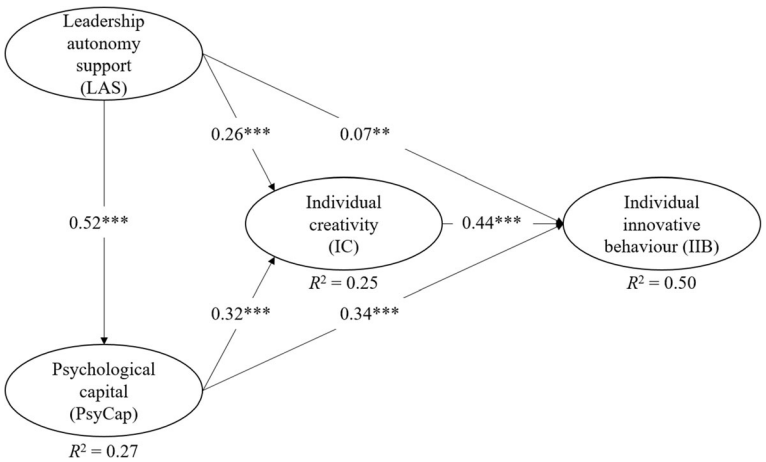

Fig. 2 Results of the structural model of the effect of leadership autonomy support, PsyCap and creativity on hospital employees' IIB. Standardized coefficients (** < 0.05, *** < 0.01)

Table 5 Test of mediation effect of IC and PsyCap

Hypothesis	Effect[a]	Mediator	Indirect effect[a]	Total effect[a]	Mediator effect[b]
H2c	PsyCap → IIB	IC	0.138***	0.477***	Complementary
H3c	LAS → IIB	IC	0.114***	0.436***	Complementary
H3e	LAS → IIB	PsyCap	0.176***	0.436***	Complementary
H3f	LAS → IC	PsyCap	0.165***	0.427***	Complementary
[c]	LAS → IIB	IC, PsyCap	0.362***	0.436***	Complementary

[a]** $p < 0.05$, *** $p < 0.01$ are significance levels
[b]The effect between LAS and IIB is influenced by two mediators, IC (twice) and PsyCap, and we have a triple mediation analysis [65]. The total indirect effect is then the sum of the specific indirect effects
[c]Mediation by bootstrapping method [68]

(indirect effect of 0.11), supporting H3c, and PsyCap also complementarily mediates the relationship between LAS and IIB (indirect effect of 0.18), supporting H3e. Note the 'domino effect' that PsyCap and IC have on the relationship between LAS and IIB, with an overall indirect effect of 0.36. The mediating effect of PsyCap between LAS and IC was 0.17, also indicating a complementary mediator effect, supporting H3f. We used the bootstrapping test of Zhao et al. [68] to test mediation. Briefly, this test uses bootstrapping to assess how a third variable intervenes between two related constructs [65], and whether the direct and indirect effects are statistically significant. As such, the combination of these two tests determines whether there exist direct effects only—without mediation, no-effect non-mediation, complementary mediation, competitive mediation or indirect-only mediation.

Discussion

Innovation is a 'critical capability of all healthcare organizations' [4]. This study aims to increase our understanding of the foundations of innovation in healthcare organizations. The contributions can be summarized in three parts. First, in contrast to most previous research at the organizational level of innovation, this study focuses on innovation from an individual employee perspective. As such, it deepens our insight into employees in healthcare organizations that the literature sometimes describes as 'primary agents' [9] of innovative ideas. Second, previous health services research has been limited to the behavioural manifestations of innovation or what this study labels IIB. Although IIB is an interesting aspect, this study extends previous research as it increases our knowledge regarding factors that have an impact on employees' cognitive processes associated with IIB. By including the concept of IC, this study offers insight into the links between the fundamental premises of IC and IIB. Third, this study also examines whether and how IIB is manageable. Specifically, it reveals how organizational factors (or LAS) combine with personal factors (PsyCap and IC) influence IIB. Consequently, in summary, the study unpacks the apparent 'black box' by revealing a multifaceted pattern of linkages that make up employees' IIB.

In line with previous research, IIB in this study was defined as 'implementation of new and useful ideas within a work role' [18]. As mentioned above, IIB embraces a variety of behavioural manifestations of 'newness' at work. Specifically, 'newness' ranges from incremental (minor) innovations on one hand to radical (major) innovation on the other. Similarly, the aspect referred to as 'within' a work role in the definition of IIB embraces a great variety of 'time and places' where 'newness' or innovation take place. Specifically, 'within' a work role could include innovation by frontline employees (e.g. finding a new way to manage patients) as well as 'within' backstage work (e.g. a new administrative routine or internal work process). Thus, the definition of IIB in this study touches on one of the earliest definitions of innovation, provided by Schumpeter [12], describing innovation in broad terms as the implementation of new combinations of service, processes at work, products and markets.

An organization with a strong focus on innovation is characterized by 'creativity, professional freedom and transformational leadership' [69]. The findings from this study support this idea. As noted above, IC was found to have the greatest impact on IIB, followed by PsyCap and perceived LAS. Studies in health services research has yet to examine the impact of these three factors collectively. In total, the three factors (LAS, PsyCap and IC) explain 50% of the variance of hospital employees' IIB, which can be characterized as substantial. Similar to other studies, IC was found to 'fuel … innovation' [23] represented by IIB. These findings indicate that if the other two factors (LAS and PsyCap) are present, employees who (cognitively) produce novel and useful ideas are both willing and motivated to (behaviourally) implement them at work.

By including PsyCap and LAS, this study also provides new insight into how personal and organizational factors, individually and collectively, can affect employees' IC and IIB. To the best of authors' knowledge, this is one of the few novel studies in health services research

to investigate the impact of LAS and PsyCap on IC and IIB. Although both PsyCap and LAS are associated with IC and IIB, there are differences in their impact on the two variables. First, PsyCap shows a significantly greater direct impact on IIB than LAS (β = 0.34 versus β = 0.07). This does not mean that LAS is unimportant for IIB. LAS provides employees with a necessary autonomy and freedom to take the initiative to perform IIB. LAS can thus be characterized as a precondition for IIB. However, autonomy in itself is insufficient to trigger IIB. Employees must also have a personal inner drive to make use of their freedom to perform IIB. The findings from this study indicate that PsyCap is the motivational factor. Consequently, the comparison of the individual impact of LAS and PsyCap highlights that the potential to release employees' IIB works through their PsyCap. The PsyCap four resources have together a synergistic impact on IIB. This motivational aspect of PsyCap to perform IIB is needed for at least two reasons. First, IIB goes beyond employees' typical in-role responsibility and accordingly constitutes an extra-role effort. Second, there is always a risk of failure in IIB. Most probably there are also obstacles that one must overcome. However, provided that employees have a satisfactory level of PsyCap. It 'fuels' them with energy and goal-directed IIB. The impact of PsyCap on IIB found in this study is supported by previous research [30, 31, 33, 34].

Although LAS has a less direct influence on employees' IIB than PsyCap, this study found a different pattern in their links to IC. In this situation, LAS and PsyCap have an almost identical impact on IIB (β = 0.26 for LAS and β = 0.32 for PsyCap). IC is a cognitive concept that describes employees' 'production of … ideas' [19]. The findings reveal that LAS significantly promotes employees' IC. Thinking creatively can be considered a relatively complex task. The literature states that 'complex tasks … require a higher degree of … autonomy' [50]. This study supports this statement by empirically illustrating how LAS in healthcare organizations can directly stimulate employees' IC.

However, PsyCap is also found to be an important driver of IC. This illustrates the multiple roles of PsyCap, which influences both IC and IIB. PsyCap is characterized as openness to change to achieve 'effective work performance' [25]. As this study reveals, LAS can influence employees' PsyCap. Specifically, LAS explains about 30% ($R^2 = 0.27$) of the variance of PsyCap. Moreover, through the mediation of PsyCap, LAS also simultaneously influences employees' IC.

Although there are differences in the magnitude of LAS and PsyCap, both are directly linked to IC. On the other hand, the findings reveal how personal factors (IC and PsyCap) and an organizational factor (LAS) functioning in tandem, both directly and indirectly, have a complex symbiotic relationship in promoting IIB. There is a scarcity of studies in health services research that have explored the multifaceted relationship between these factors. The important roles of LAS and PsyCap can be seen through the lens of broaden-and-build theory [70]. Both LAS and PsyCap focus on conditions that stimulate employees' personal growth, thriving and positive emotions. As this study reveals, when employees view LAS positively, and their level of PsyCap is satisfactory, these two factors work both individually and collectively to increase IC and IIB.

Implications for practice

The contributions of this study lead to three following practical guidelines for both hospital division managers, as well as hospital unit managers in encouraging positive IIB at work. First, our study encourages healthcare managers, including division managers, department managers and policy maker to view healthcare innovation through a LAS lens. Results of this study shows that LAS seems to have a managing role over employees' PsyCap, IC and IIB. For healthcare managers, the findings suggest that it is of fundamental importance for healthcare organizations to have co-ordinated and pragmatic leadership. This is expressed well by Hocine and Zhang [47]: 'Today leaders are more like employee supporters than employee supervisors. Creating intentionally supportive and motivating environment … in the workplace for employees to be creative and innovative is part of modern leadership' [47]. As such, healthcare managers are encouraged to listen, inspire and motivate their employees, as these fundamental aspects, as shown in the results of this study, improves employees' PsyCap, IC and IIB.

Second, due to the broad definition used in this study on IIB, innovation can be manifested in all types of hospital work. Consequently, a practical managerial implication for healthcare organizations, as well as hospital managers in various roles, is to not narrow their focus simply to motivating those with a single job (e.g. front-line employees) to perform IIB. In contrast, one should take a broad approach and stimulate all employees' IIB no matter what their role in the organization. This suggests a need to take a 'top-down' perspective on IIB in healthcare organizations. This entails that senior managers of healthcare organizations should try their best to stimulate middle managers' IIB at work. In the next round, middle managers should do the same for their subordinates, and so forth. This creates a positive and self-reinforcing IIB spiral that could potentially involve the whole organization and lay the foundation of what Mesfin et al. label 'innovative culture' [69]. Mesfin et al. found that employees' perceptions of 'innovative culture', regardless of their job, was 'the most preferred culture type' [69].

Third, as already mentioned, this study found PsyCap to be a motivational factor. Based on our findings, hospital division managers, as well as hospital unit managers, should be aware of the impact of LAS and navigate employees' IIB by investing in employees' PsyCap. Healthcare is a complex system [71], and the findings of this study reveal the many advantages of capitalizing on PsyCap. As such, healthcare managers (both hospital division and hospital unit managers) are encouraged to pay extra attention to employees' growth and positive emotions at work. For example, healthcare managers are encouraged to show initiative in giving authority in work roles, so that employees are more likely to feel confident in meeting the challenges they face in their work tasks. As a result, employees will be better equipped to contribute creative ideas to solve challenges in their work roles and improve the overall quality of their job.

Additionally, some of the findings in this study are supported by previous studies found in the literature, though previous findings were not reflected in the healthcare environment. This indicates that, although the findings here focused on healthcare organizations, the practical implications for managers independent of healthcare organizations are two-fold. First, managers need to consider the important role of a supportive work environment in their organisation, and the effect this has on employees' IIB [44]. The supportive work environment of an organization should be monitored and 'designed' so that it involves diversity, daily work role challenges in areas such as creativity, skills and knowledge, and where achievable require individuals at work to be involved in problem-solving processes or tasks. Because IIB holds both a cognitive feature as well as behavioural feature [14], managers will benefit from overall human resource development in areas such as creativity, innovativeness, skills and knowledge, inspiring better problem-solving strategies, a sense of ownership among employee's work roles, but also increasing the overall accountability. Problem-solving tasks should be designed to hold variations in complexity, both for higher levels of innovativeness, but also for overall innovative outcomes. As such, LAS would be a key element in positively affecting employees' level of IIB at work, because LAS will function as a key driving force. Second, managers are advised to present authoritative opportunities for employees to be challenged [50], but most importantly to improve the interpersonal relationship, with their leaders, within their organization, and across work roles. This is vital for organizations that seek to improve employee's ability to generate ideas, as well as implement ideas across work roles. In turn, the supportive environment found at a given organization, will function as a promoter for employee's psychological state of development, and thus 'spilling over' innovative outcomes at work.

Limitations and future research

Like most studies, this study has its limitations. However, these limitations offer several opportunities for future research. It is notable that this study makes no distinction between the degree of newness of the innovation, whether the IIB is incremental (e.G. *minor* improvements of service quality) or radical (e.g. the introduction of an entirely new way of providing quality service). Below are seven specific suggestions for future research.

First, as this study looked at a single healthcare organization, its generalizability and robustness in relation to other healthcare organizations are limited. Because the study had a cross-sectional design and used an online survey for data collection, the results might suffer from self-selection bias and inference of causality. As such, future research should employ longitudinal data to examine the potential of the causal relationship among the studied constructs. In addition, future research should explore the variation in leadership roles caused by the complexity of healthcare systems, to assess the differences a leader may experience in a healthcare setting.

Second, leadership is among the most important precursors of innovation. However, more work is needed to identify what leadership style most effectively produces innovation in healthcare organizations. This study limited its focus to a single leadership style as the antecedent to IIB. Although LAS has a significant impact, future research should include other leadership styles. One relatively new leadership style is ambidextrous leadership. Ambidextrous leadership involves two leadership styles, that when interacting with each other, promotes innovation in organizations [72]. There is a scarcity in health services research in examining the impact of ambidextrous leadership on IIB, IC, PsyCap or other factors that potentially associated with innovation. Consequently, more research is needed to reveal the effectiveness of the ambidextrous leadership style and its capability to promote innovative behaviour in healthcare organizations.

Third, as shown in Fig. 1, this study focused on examining the relationship between the studied constructs, LAS, PsyCap, IC and IIB, on a general level. As such, the results are limited to interpretation within the context of common healthcare culture. In addition, this study focused on the personal relationship-dependent IIB, a limitation that prompts a suggestion for future research. Future research may consider a longitudinal research design examining sustainable organizational cultures that promote IIB over time. Future research should also

explore the potential loss of stimulus if and when a leader leaves the organization, and may further examine the various levels on the influence of healthcare culture in fostering IIB at work.

Fourth, employees' PsyCap was found to have a significant impact on both IC and IIB in this study. Consequently, it is important to capitalize on employees' PsyCap to strengthen an organization's ability to innovate. This stresses the continuous need to cultivate and manage PsyCap resources. In this study, LAS was found to be one way to do this. However, future research needs to include other factors to explore a broader system construct that addresses positive organizational culture (e.g. an innovative culture or hierarchical culture). Specifically, future research can explore factors such as leadership style (e.g. ambidextrous or authentic leadership), organizational climate (e.g. co-operative or competitive), learning (e.g. team learning or relationship learning), organizational vision integration, organizational commitment and organizational attractiveness.

Fifth, the study did not take into account the complexity of the healthcare setting. In a recent study, Glover et al. examined how the complexity of healthcare influences innovation performance in complex units [71]. The idea of ambidextrous leadership—that "the complexity of innovation activities needs to be matched by an equally complex leadership approach" [72]—provides opportunities for future research in exploring the influence of complex adaptive systems to IIB in healthcare.

Sixth, the study focused on expanding our current understanding of IIB in healthcare organizations. In professional service firms, such as healthcare organizations, empowered employees are found to drive innovation at work while contributing new and novel ideas to face changes and challenges in the current healthcare environment [5, 6]. However, as the focus on IIB in health service research is still in its early stages, there are great opportunities for future studies. For instance, this study did not explore in detail how IIB, when implemented, can be a strength for work processes or complex work systems. Future research can therefore qualitatively explore IIB in healthcare organizations, to determine its specific justifications and provide examples of the value of IC and IIB when implemented in work processes and work systems, locally or in the overall organization.

Seventh and lastly, the concept of 'thriving' [73] has recently been proposed as a promising and important aspect for organizations. Thriving at work is defined as a 'psychological state in which individuals experience both a sense of vitality and learning at work' [74]. Studies in health services research have yet to explore the connection of employees' perceptions of thriving to PsyCap. Interestingly, thriving has also been directly linked to IIB. Riaz et al. found this strong linkage between employees' thriving at work and their innovative work behaviour [75]. However, scarce studies have examined these relationships in an healthcare context. This indicates great potential and opportunities for future research.

Conclusions

This study contributes to our understanding of innovation in healthcare organizations from the perspective of individual employees. Specifically, it reveals a multifaceted association between IIB, LAS, PsyCap and IC. From a leadership perspective, the findings highlight the core role of LAS in promoting employees' innovative behaviour in healthcare organizations.

Supplementary Information

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Additional file 1. Appendix 1. Questionnaire developed for this study.

Abbreviations

IIB: Individual innovative behaviour; IC: Individual creativity; LAS: Leadership autonomy support; PsyCap: Psychological capital; STD: Self-determination theory; SEM: Structural equation modelling; AVE: Average variance extracted; NSD: Norwegian Social Science Data Services; DPO: Data Protection Official

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Authors' contributions

TS led the development and mainly drafted this manuscript. GL contributed to the development of the questionnaire, statistical analysis, interpretation of data and general input into the manuscript. BRM contributed to the development of the questionnaire, data collection and general input into the manuscript, in addition to mainly being responsible for all revisions. All three authors approved the final draft.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study was approved by the Norwegian Social Science Data Services (NSD) (project number 239029). The NSD is a resource centre and ethics committee for academic research in Norway. In addition, the ethics committee, the Data Protection Official (DPO) at Inlandet Hospital Trust, approved the study as well as the procedure for implied consent (ref nr. 126,325). In accordance with the Personal Data Act §§2–7 and 8 no. 1, the participants were given written information, through email. For the reason that the DPO approved the study and its procedure, participants were provided information about the project and individually had to give consent by "click Next to participate" prior to starting the online questionnaire. As such, consent was a mandatory action prior to the commencement of the online questionnaire.

Consent for publication

Not applicable.

Competing interests
The authors declare that they have no competing interests.

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References

1. Barnett JJ, Vasileiou K, Djemil F, Brooks L, Young T. Understanding innovators' experiences of barriers and facilitators in implementation and diffusion of healthcare service innovations: a qualitative study. BMC Health Serv Res. 2011;11(342):1–12.
2. Together we can fight coronavirus—download the Smittestopp app. https://helsenorge.no/coronavirus/smittestopp (Downloaded 24 April 2020).
3. Anderson N, Potocnik K, Zhou J. Innovation and creativity in organizations: a state-of-the-science review, perspective commentary, and guiding framework. J Manag. 2014;40(5):1297–333.
4. Länsisalmi H, Kivimäki M, Aalto PRN, Ruoranen RRN. Innovation in healthcare: a systematic review of recent research. Nurs Sci Q. 2006;19(1):66–72.
5. Chang LC, Liu CH. Employee empowerment, innovative behavior and job productivity of public health nurses: a cross-sectional questionnaire survey. Int J Nurs Stud. 2008;45:1442–8.
6. Knol J, Linge RV. Innovative behavior: the effect of structural and psychological empowerment on nurses. J Adv Nurs. 2008;65(2):359–70.
7. Saleem M, Tufail MW, Atta A, Asgar S. Innovative workplace behavior, motivation level, and perceived stress among healthcare employees. Pak J Commer Soc Sci. 2015;9(2):438–46.
8. Xerri JM, Brunetto Y. Fostering innovative behavior: the importance of employee commitment and organizational citizenship behavior. Int J Human Res Manag. 2013;24(16):3163–77.
9. Kim JS, Park J. Leadership, knowledge sharing, and creativity – the key factors to nurses' innovative behaviors. J Nurs Adm. 2015;45(12):615–21.
10. Yu X, Li D, Tsai CH, Wang C. The role of psychological capital in employee creativity. Career Dev Int. 2019;24:4.
11. Fuglsang L. Bricolage and invisible innovation in public service innovation. J Innov Eco. 2010;5:67–87.
12. Schumpeter JA. The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle. Cambridge: Harvard University Press; 1934.
13. Hult GTM, Hurley RF, Knight GA. Innovativeness: its antecedents and impact on business performance. Ind Mark Manag. 2004;33(5):429–38.
14. Yuan F, Woodman RW. Innovative behavior in the workplace: the role of performance and image outcome expectations. Acad Manag J. 2010;53(2):323–42.
15. Avby G, Kjellström S. LearnOvation: an intervention to foster exploration and exploitation behavior in health care management in daily practice. BMC Health Serv Res. 2019;19(319):1–9.
16. Gallouj F, Weinstein O. Innovation in services. Res Policy. 1997;26(4/5):537–56.
17. Toivonen M, Touminen T, Brax T. Innovation process interlinked with the process of service delivery: a management challenge in KIBS. Économies et Sociétés. 2007;8(3):355–84.
18. Battistelli A, Montani F, Odoardi C. The impact of feedback from job and task autonomy in the relationship between dispositional resistance to change and innovative work behavior. Euro J Work Org Psy. 2013;22(1):26–41.
19. Amabile TM, Barsade SG, Mueller JS, Staw BM. Affect and creativity at work. Adm Sci Q. 2005;50(3):367–403.
20. Shalley CE, Zhou J, Oldham GR. The effects of personal and contextual characteristics on creativity: where should we go from here? J Manag. 2004;30(6):933–58.
21. Mumford MD, Mobley MI, Uhlman CE, Reiter-Palmon R, Doares L. Process analytic models of creative capacities. Creat Res J. 1991;4:91–122.
22. Slåtten T, Mehmetoglu M. The effects of transformational leadership and perceived creativity on innovation behavior in the hospitality industry. J Hum Res Hos & Tourism. 2015;14(2):195–219.
23. Gilmartin MJ. Creativity: the fuel of innovation. Nurs Adm Q. 1999;23(2):1–8.
24. Van de Ven A. Central problems in the management of innovation. Manag Sci. 1986;32:590–607.
25. Luthans F, Luthans KW, Luthans B. Positive psychological capital: beyond human and social capital. Bus Horizons. 2004;47(1):45–50.
26. Luthans F, Avolio BJ, Avey JB, Norman SM. Positive psychological capital: measurement and relationship with performance and satisfaction. Pers Psychol. 2007;60(3):541–72.
27. Luthans F, Youssef-Morgan CM. Psychological capital: an evidence-based positive approach. Annual Rev Org Psy and Org Beh. 2017;4:339–66.
28. Slåtten T, Lien G, Horn CMF, Pedersen E. The links between psychological capital, social capital, and work-related performance—a study of service sales representatives. Total Qual Manag Bus Excell. 2019;30(1):S195–209.
29. Abbas M, Usman R. Impact of psychological capital on innovative performance and job stress. Can J Adm Sci. 2015;32:128–38.
30. Slåtten T. Determinants and effects of employee's creative self-efficacy on innovative activities. Int J Qual Serv Sci. 2014;6(4):326–47.
31. Tierney P, Farmer SM. Creative self-efficacy: potential antecedents and relationship to creative performance. Acad Manag J. 2002;45(6):1137–48.
32. Oldham GR, Cummings A. Employee creativity: personal and contextual factors at work. Acad Manag J. 1997;39:607–34.
33. Rego A, Sousa F, Marques C, Cunha PM. Authentic leadership promoting employees' psychological capital and creativity. J Bus Res. 2012;65:429–36.
34. Cai W, Lysova EI, Bossink BAG, Khapova SN. Psychological capital and self-reported creativity: the moderating role of supervisor support and job characteristics. Creat Innov Manag. 2019;28:30–41.
35. Luthans F, Youssef CM, Avolio BJ. Psychological capital. New York, NY: Oxford University Press; 2007.
36. Rego A, Sousa F, Marques C, Cunha MP. Optimism predicting employees' creativity: the mediating role of positive affect and positivity ration. Eur J Work Org Psy. 2012;21(2):244–70.
37. Cohler BJ. Adversity, resilience and the study of lives. In: James AE, Cohler BJ, editors. The invulnerable child. New York: Guilford Press; 1987. p. 363–424.
38. Newman A, Ucbasaran D, Zhu F, Hirst G. Psychological capital: a review and synthesis. J Organ Behav. 2014;35:120–38.
39. Gagné M, Deci EL. Self-determination theory and work motivation. J Organ Behav. 2005;26:331–62.
40. Deci EL, Ryan RM. Facilitating optimal motivation and psychological well-being across life's domains. Can Psychol. 2008;49:14–23.
41. Gillet N, Gagné M, Sauvagère S, Fouquereau E. The role of supervisor autonomy support, organizational support, and autonomous and controlled motivation in predicting employees' satisfaction and turnover intention. Eur J Work and Org Psy. 2013;22(4):450–60.
42. Ryan RM, Deci EL. Overview of self-determination theory: an organismic dialectical perspective. In: Deci EL, Ryan RM, editors. Handbook of self-determination research. Rochester: University of Rochester Press; 2002. p. 3–33.
43. Amundsen S. Empowerment i arbeidslivet - Et myndiggjøringsperspektiv på ledelse, selvledelse og medarbeiderskap. Oslo: Cappelen Damm Akademisk; 2019.
44. Amabile TM, Schatzel EA, Moneta GB, Kramer SJ. Leader behaviors and the work environment for creativity: perceived leader support. Leadersh Q. 2004;15:5–32.
45. Slåtten T, Mehmetoglu M. Antecedents and effects of engaged frontline employees—a study from the hospitality industry. Manag Serv Qual. 2011;21(1):88–107.
46. Graen GB, Uhl-Bien M. Relationship-based approach to leadership: development of leader–member exchange (LMX) theory of leadership over 25 years: applying a multi-level multi-domain perspective. Lead Quar. 1995;6:219–47.
47. Hocine Z, Zhang J. Autonomy support: explaining the path from leadership to employee performance. Open J Soc Sci. 2014;2(6):1–7.
48. Frese M, Zapf D. On the importance of the objective environment in stress and attribution theory. Counterpoint to Perrewé and Zellars. J Organ Behav. 1999;20:761–5.
49. Zhou J, Shally CE. Handbook of organizational creativity. Hillsdale: Lawrence Erlbaum; 2008.
50. Maymon YK, Reizer A. Supervisors' autonomy support as a predictor of job performance trajectories. Appl Psychol. 2017;66(3):468–86.
51. Yukl G. Leadership in organizations. Upper Saddle River: Prentice-Hall; 2002.
52. Slåtten T, Lien G, Lupina E, Gravingen KA. Promoting an internal market-oriented culture (IMOC) in healthcare services. J Serv Sci Res. 2019;11:157–82.
53. Choi J. The mediating effect of positive psychological capital between autonomous work environment and self-directed behavior: evidence from South Korea. H Res Develop Int. 2019:1–21.
54. Slåtten T, Lien G, Evenstad SBN, Onshus T. Supportive study climate and academic performance among university students: the role of psychological

capital, positive emotions and study engagement. Forthcoming Int J Qual and Serv Sci. 2020.
55. Abdulla I, Omar R, Panatik SA. A literature review on personality, creativity and innovative behavior. Int Rev Manag Mark. 2016;6(1):177–82.
56. Gupta V, Singh S. Psychological capital as a mediator of the relationship between leadership and creative performance behaviours: empirical evidence from the Indian R&D sector. Int J Hum Resour Manag. 2014;25(10): 1373–94.
57. Zubair A, Kamal A. Perceived authentic leadership, psychological capital, and creative work behaviour in bank employees. Pakistan J Psy Res. 2017; 32(1):35–53.
58. Zhou J, George JM. When job dissatisfaction leads to creativity: encouraging the expression of voice. Acad Manag J. 2001;44(4):682–96.
59. Janssen O. Job demands, perceptions of effort-reward fairness and innovative work behaviour. J Occup Organ Psychol. 2000;73(3):287–302.
60. Scott SG, Bruce RA. Determinants of innovative behavior: a path model of individual innovation in the workplace. Acad Manag J. 1994;37(3):580–607.
61. Luthans KW, Jensen SM. The linkage between psychological capital and commitment to organizational mission: a study of nurses. J Nurs Admin. 2005;35(6):304–10.
62. Farooq N, Rehman A, Bilal H, Saleem K, Hussain A, Zeeshan M. Proactive personality, motivation and employee creativity in the public sector hospitals of Peshawar City. Int Rev Manag Mark. 2020;10(3):16–21.
63. Carlucci D, Mura M, Schiuma G. Fostering employees' innovative work behavior in healthcare organisations. Int J Innov Manag. 2020;24(02): 2050014.
64. Ringle CM, Wende S, Becker J-M. SmartPLS 3. Boenningstedt: SmartPLS GmbH; 2015. http://www.smartpls.com.
65. Hair JF, Hult GTM, Ringle CM, Sarstedt M. A primer on partial least squares structural equation modeling (PLS-SEM). 2nd ed. London: SAGE; 2017.
66. Hair JF Jr, Sarstedt M, Ringle CM, Gudergan SP. Advanced issues in partial least squares structural equation modeling. London: SAGE; 2018.
67. Hair JF Jr, Risher JJ, Sarstedt M. Ringle CM when to use and how to report the results of PLS-SEM. Eur Bus Rev. 2019;31(1):2–24.
68. Zhao X, Lynch JGJ, Chen Q. Reconsidering baron and Kenny: myths and truths about mediation analysis. J Consum Res. 2010;37:197–206.
69. Mesfin D, Woldie M, Adamu A, Bekele F. Perceived organizational culture and its relationship with job satisfaction in primary hospitals of Jimma zone and Jimma town administration, correlational study. BMC Health Serv Res. 2020;20(438):1–9.
70. Fredrickson BL. The role of positive emotions in positive psychology. Am Psychol. 2001;56(3):218–26.
71. Glover W, Nissinboim N, Naveh E. Examining innovation in hospital units: a complex adaptive systems approach. BMC Health Serv Res. 2020;20(554):1–26.
72. Zacher H, Rosing K. Ambidextrous leadership and team innovation. Leadersh Org Dev J. 2015;36(1):54–68.
73. Porath C, Spreitzer G, Gibson C, Garnett FG. Thriving at work: toward its measurement, construct validation, and theoretical refinement. J Organ Behav. 2012;33:250–75.
74. Spreitzer G, Sutcliffe K, Dutton J, Sonenshein S, Grant AM. A socially embedded model of thriving at work. Organ Sci. 2005;16:537–49.
75. Riaz S, Xu Y, Hussain S. Role of relational ties in the relationship between thriving at work and innovative work behavior: an empirical study. Eur J Investig Health Psychol Educ. 2020;10:218–31.

Publisher's Note

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This dissertation adds fresh knowledge and understanding on studies of employee innovative behavior in public sector services (PSSs). This is achieved through empirically investigating the fostering factors and consequences of employee innovative behavior in PSSs. The empirical data was acquired from three branches of the public sector: transport, higher education, and health, through online surveys.

The results of this article-based dissertation contributes to the research literature by extending our current understanding of the three levels of fostering factors — organizational, environmental, and individual— on employee innovative behavior in PSSs, through demonstrating the key strategic drivers of successful innovations in the currently changing economic environment. The dissertation also adds new knowledge on the consequences of employee innovative behavior by revealing the importance of organizational commitment for retaining innovative employees. Lastly, the dissertation contributes knowledge on the benefits of using advanced quantitative research techniques. Naturally, the dissertation offers practical managerial implications for public managers, policy makers, and advances the scholarly debate on employing complex models, analysis and techniques in social science research. May it be an invitation for an ongoing academic debate on the vital role of employee innovative behavior in PSSs.