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THE IMPACT OF BURNOUT ON INNOVATIVE WORK BEHAVIOR UNDER THE INFLUENCE OF INDIVIDUAL RESILIENCE AND ENVIRONMENT EFFECTS

Master Thesis

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Abstract

Burnout is a phenomenon that was found to have negative impact on performance and wellbeing of people, but not many researches have been done on the connection between burnout and innovative work behavior. In this research, a dataset of 302 answers from a panel survey shows a negative connection between burnout and innovative work behavior. Significant moderating effects from individual resilience and social leader-member exchange were found, with resilience making the connection more negative, and SLMX making it less negative. Implications of this finding and suggestions for further studies are presented.

I. Introduction

Innovativeness, both in organizational level and individual level, is highly beneficial. On an organizational scale, focus on innovation has been proven to improve company's performance, including financial success, profitability and achieving competitive advantage in a dynamic environment. (Capon *et al.*, 1992; Han, Kim and Srivastava, 1998; Oldham and Cummings, 1996; Shalley, 1995; Yuan and Woodman, 2010). However, innovativeness always has its root in individuals (Van de Ven, 1986), so it's not possible to build an innovative organization without individual innovativeness. Innovation also helps employees to adapt effectively to the job, leading to anticipated benefits such as demand–ability fit, performance enhancement, job satisfaction, reduced stress levels, better interpersonal relationships, well-being, and personal growth (Janssen, Van de Vliert and West, 2004). In this research, we use innovative work behavior (IWB) as the indicator of individual-level innovative activities. IWB does not stop at having novel ideas, but it also includes the process of championing the ideas, testing and implementing them (Kanter, 1988; Scott and Bruce; 1994).

Burnout is a phenomenon defined in the 1970s. Freudenberger (1974, p.159) first describes burnout as "*to fail, wear out or become exhausted by making excessive demands on energy, strength or resources*". Maslach (1982) expanded the definition of burnout into 3 aspects: Emotional exhaustion, depersonalization and loss of personal accomplishment. Burnout lead to problems such as lower motivation, work engagement and performance. Most researches on burnout were done for highly stressful careers like medical, academic and sport (for example: Glasberg, Eriksson and Norberg, 2007; Gucciardi *et al.*, 2011). Not much has been done on conventional environments, as well as the connection of burnout with innovative outcome. In fact, a search combining "Consequence(s) of burnout" and keywords related to IWB, innovativeness or creativity yields no result on Web of Science.

This research will figure out the impact of burnout on IWB, and also examine the effects of environmental elements, such as leader-member exchange (LMX) and stressors. Another element we will consider is individual resilience, which is defined as emotional stamina, which helps its bearer to adapt and overcome misfortune in life and reduce negative effects from those events (Wagnild and Young, 1993).

In summary, the research questions of this study are: (1) the impact of burnout on innovative work behavior (IWB), and (2) the moderating effect of individual resilience and environmental effects on that impact. The first section of this study will be dedicated to the process of systematic literature review to find out a correct approach and theoretical framework, then proceed on building theories and hypotheses. The second part will explain method of collecting and analyzing data. The data used in this study was kindly provided by a research team supervised by Prof. Dr. De Weerd-Nederhof.

Confirmatory factor analysis was then used to confirm each factors used in the questionnaire, before multiple regression models was run to test the hypotheses. The next section will be spent on discussing the results we got from regression models. We found a negative correlation between burnout and IWB. Social leader-member exchange moderates that correlation and makes it less negative, when individual resilience moderating effect makes it more negative. Work stressors' moderating effects are found to be insignificant. The study fills the gap between burnout and innovative behavior, and provide starting points for further researches. In the final section, we present suggestions for later researches based on result of our analyses, as well as limitations that we figured out in the process of completing this research.

II. Background theories

Systematic literature review

Overview

The original idea of systematic literature review is looking at the connection between Resilience, Burnout and Innovative Work Bevahrior under a Person-Environment fir scope. The literature review was done on the core collection of Web of Science[1]. The searching area was larger than the target of the research to avoid missing potentially useful papers, and irrelevant results can be filter out later in the full-text reading step. The keywords used for resilience were "resilien*", for IWB were "innovat*" or "IWB" or "innovative work behav*" or "Creativ*", for burnout were "burnout" or "burn*out" or "exhaustion" or "depersonaliz*". The wild card (* - asterisk) was added to compensate for difference in spelling, word types or words in plural form. Search terms were combinations of keywords using Boolean method; for example: "resilien*" and ("IWB" or "innovat*" or "innovative work behav*" or "creativ*") for searching papers about both resilience and IWB.

In searching step, we did not add keywords for Person-environment fit because those keywords fall into either of the following 2 categories: (1) the exact phrases for P-E fit concepts are very niche, and when we added them the search only return a very low number of results (under 10 results), and (2) the more conventional words describing P-E fit such as "condition", "environment", "setting", etc. are too common and can be used in any context. Therefore, we scanned through at all returned results and filter out undesired results manually instead.

Web of Science returned 252 results for the search regarding connection between burnout and IWB, 356 results for the search about resilience and IWB, and 308 results for the connection between burnout and resilience. From scanning through all research abstracts, we selected 58 papers about resilience and IWB, 37 papers about resilience and burnout, and 47 papers for IWB and burnout to proceed further full-text reading.

[1] Website: http://apps.webofknowledge.com

Resilience

From existing papers, we figured out that resilience is a rather new concept, with a large portion of researched about this topic done in the last decade. This topic, however, covers a very large and diverse area, including individual resilience, organizational resilience, economy resilience, or even regional resilience. The scope of this study will only cover individual resilience. In the connection with burnout, resilience was used both as moderator and as independent variable (Lu *et al.*, 2016; Guo *et al.*, 2018). In the connection with IWB, however, individual resilience is usually examined as a moderating effect between other constructs and innovative behaviors (Mitchell *et al.*, 2019; Avey, Avolio and Luthans, 2011; Monllor and Murphy, 2017).

In general, resilience is positively correlated with innovative behaviors (Avey, Avolio and Luthans, 2011; Sweetman *et al*., 2011; Fandiño, Formiga and de Menezes, 2019), and negatively correlated to burnout (Gucciardi *et al.*, 2011; Colville *et al.*, 2017). There are also 2 different schools of thought on individual resilience: Resilience as a trait, as some people are always more prone to bounce back from adversity than others; and resilience as a state, as they can be trained and practiced (Moenkemeyer, Hoegl and Weiss, 2012; Liossis *et al.*, 2009; Lebares *et al.*, 2018). Since resilience as a state is more meaningful and practical to organization than resilience as a trait – with a state, organizations can actively change their environment and interactions to nurture and benefits from resilience.

Burnout

Most researches regarding burnout were done in very stressful careers, such as nurses, doctors, or academic workers. Maslach (1982) described burnout with 3 aspects – Exhaustion, depersonalization and loss of personal accomplishment. This depiction is commonly accepted, and the Maslach Burnout Index (MBI) is a conventional tool in measuring burnout in many later researches. Reviewing literatures about burnout reveals that the common predictor of burnout is stress and highly demanding working condition (Glasberg, Eriksson and Norberg, 2007; Lebares *et al.*, 2018). Researches also stressed the importance of social support from colleagues and supervisors to prevent burnout as well as to mitigate the negative consequences of burnout (Zander, Hutton and King, 2010; Lu *et al.*, 2016).

Innovative work behavior

As mentioned above, the connection between resilience and IWB is mostly positive. The connection between burnout and innovativeness, however, is unclear. No research has proven that a higher level of IWB leads to a higher burnout tendency, or that a higher level of burnout will impact innovativeness negatively.

Conclusion

In conclusion, we found more support for resilience acting as a moderating effect than a main effect. Two environmental effects that were repeatedly mentioned were work stress and social support, which can either come from colleagues or leader. From the results of literature review, we chose the effect of burnout on innovative work behavior as our main effect, and individual resilience as well as

environmental effects – including stressors and leader-member exchange – will be moderating variables. A summary of SLR results can be found in Appendix 3.

Burnout and Innovative work behavior

Innovative work behavior

Jong (2007, p.19) defined IWB as "individuals' behaviors directed towards the initiation and intentional introduction (within a work role, group or organization) of new and useful ideas, processes, products or procedures. Innovative work behavior is thus restricted to intentional efforts to provide beneficial novel outcomes. It entails of the initiation and implementation of innovations". In this definition, it is noteworthy that IWB is individuals' intention, and they go beyond creativity, since creativity only suggest new ideas and ignite the process. Innovation requires the ideas to be nutured and implemented. Scott and Bruce (1994) described innovation by dividing it into 3 steps: (1) recognition and generation of ideas/solutions, (2) promoting idea, finding sponsorship and allies and (3) complete the idea by producing "a concrete and tangible object (physical or intellectual) that can be transferred to others" (Kanter, 1988, p.190). In this stage, "[t]he idea becomes a reality; a prototype or model of the innovation is produced that can be touched or experienced, that can now be diffused, mass-produced, turned to productive use, or institutionalized" (Kanter, 1996, p.112). Individuals can be engaged in any one or combination of these different behaviors at any one time. In idea generation, it's necessary to know of available concepts to rearrange and (re)combine them into a new solution (De Jong and den Hartog, 2010).

Burnout

Burnout has been first mentioned in academic literatures in the 1970s. After decades of developing and broadening the concept, the definition of burnout has become overstretched that it is attached to too many phenomena (Maslach, 1982). In his researches, Maslach (1982) pointed out descriptions of burnout which were commonly agreed. Burnout was described as a negative individual problem, which negatively affect a person's work efficiency and daily life. Later studies have improved on this concept by adding elements or putting Maslach's original definition into certain contexts (for example: Skaalvik and Skaalvik, 2009; Montero-Marín *et al.*, 2011)

Maslach (1982) listed 3 core dimensions of burnout: *exhaustion*, *depersonalization* and *low personal accomplishment*. Exhaustion can be displayed both physically and emotionally, ranging from loss of energy, fatigue, to loss of interest in job and working motivation. *Depersonalization* is a collection of inappropriate attitudes toward colleagues and clients. They are shown by detachment, sometimes hate or callousness toward coworkers and a less friendly attitude toward clients, leading to lower customer service quality. People with burnout may depersonalize their connections in a more literal

sense, as they treat their coworkers and supervisors as objects rather than people. *Loss of personal accomplishment* refers to the lack of efficiency, self-esteem and motivation, due to the belief that their efforts are not likely to bear good result (Fogarty *et al.*, 2000).

Burnout directly diminishes the performance of worker at work. With physical and mental exhaustion, employees are unable to function properly at work, leading to a lower job performance and satisfaction (Fogarty *et al*., 2000; Cherniss, 1992). The employees with burnout feel detached from other members, which leads to lower job engagement, and they have a higher tendency to leave the position, or change to another profession (Fogarty *et al.*, 2000; Jackson, Schwab and Schuler, 1986). Work engagement was found to have possitive effect on positively correlates with innovative behaviors (Agarwal et al., 2012; Aryee *et al.*, 2012). In this research, we propose that burnout will leave a negative impact on an employee's innovative work behavior:

Hypothesis 1: Burnout negatively impacts individuals' innovative work behavior

The moderating effect of resilience and environmental factors

Resilience

Resilience can be defined as emotional stamina, which helps its bearer to adapt and overcome misfortune in life and reduce negative effects from those events (Wagnild and Young, 1993). Rutter (1987) treated resilience as a protective mechanism, which may vary depending on different situation as well as aspect of life that the unfortunate event affects. Druss and Douglas (1988) made another research which showed several cases of people facing adversary with positiveness and optimism. They tied resilience to the reaction of "healthy denial", when people deceive themselves in unfortunate events and focus on the positive sides of their situations.

There are different views on the nature of resilience. Some looked at resilience as a personal trait (Wagnild and Young, 1993). At the same time, there are researches defining resilience as a capacity that can be facilitated and fostered by organization (Näswall *et al.*, 2013). There has been numerous studes of employees having their work performance improved as well as stress and burnout reduced after attending training programs about improving resilience and mindfulness (Magtibay *et al.*, 2017; Patricia Potter *et al.*, 2013; Liossis *et al.*, 2009; Mistretta *et al.*, 2018). In this research, we will look at resilience via the perspective that it is a state, which can be influenced by environmental factors and training.

Resilience is expected to be a protective factor against burnout, and people with resilience trait are less likely to suffer from burnout (Glasberg, Eriksson and Norberg, 2007; Guo *et al.*, 2018; Nel and Kotze, 2017), or less severely affected by burnout symptoms (Taku, 2014; Rushton, *et al.*, 2015; Colville

et al., 2017). Empirical studies on workers in medical field show a significant negative correlation between personal resilience and severity of emotional exhaustion, even in a highly stressful working environment (Manzano García and Ayala Calvo, 2012).

Earlier researches suggested that resilience influences IWB indirectly via increasing work engagement, which positively correlates with innovative behaviors (Agarwal et al., 2012). Innovative behaviors require a large amount of effort and risk-taking, as well as a high endurance to uncertainty. Because of this reason, resilience is especially significant for practicing IWB as it gives energy to the individual the courage to fight back in adverse situations in the process of coming up with and implementing new ideas, as well as adapting to new environment when the new idea has been implemented in the organization (Mishra, Bhatnagar and Gupta, 2013; Sweetman *et al.*, 2011)

Individual resilience has also been been found to be an aspect of vigour and Psychological Capital. Researchers have found a positive impact of these constructs on IWB (Schaufeli and Bakker, 2004; Bakker et al., 2007; Sweetman *et al.*, 2011; Gupta and Singh, 2014)

Researches have also suggested moderating effects of resilience. Resilience mitigates the connection from adversity and stressful working conditions to burnout and burnout consequences (Lanz and Bruk-Lee, 2017; Lebares *et al.*, 2018; Lu *et al.*, 2016). Other researches found the moderating effect of resilience to the connection between environmental effect and innovativeness or intention to take risk (Avey, Avolio and Luthans, 2011; Monllor and Murphy, 2017 ; Mitchell *et al.*, 2019).

From the result of literature review, we came up with the second hypothesis:

Hypothesis 2: Individuals' resilience makes the negative effect of burnout on IWB less negative.

Leader-member exchange

Literature suggested that social support from supervisors or coworkers play an important role in mitigating the effect of burnout. Social support can also combine with other aspects such as resilience to reduce the risk of burnout in workers (Glasberg, Eriksson and Norberg, 2007; Lu *et al.*, 2016; Jenkins and Elliott, 2004). Social support can come in form of emotional support, which involves showing sympathy, listening or taking care of other; and instrumental support, which involves tangible assistance such as physical assistance or help in carrying out a task (Fenlason and Beehr, 1994).

Regarding innovative work behavior, leaders and supervisors can directly affect an employee's performance and innovativeness. By requesting innovativeness, encouraging people to search information in a wider range, avoiding premature evaluation, allowing the growth of new ideas and use disagreement to owns advantage, a leader can positively influence working performance and creativity (Mumford & Hunter, 2005). The social connection at workplace has also been found to have

positive interaction with resilience to produce a higher level of innovation (Fandiño, Formiga and de Menezes. 2019). Leaders can also shape their followers' behavior by their own habit, and indirectly increase or mitigate innovativeness or the level of stress (Gelfand *et al.*, 2012)

We use the exchange between leader and member (LMX) as an indicator for the relationship between supervisor and employee. A good LMX relationship is described with high quality, reflecting trust, respect and loyalty (Agarwal et al., 2012). Bakker et al. (2007) showed empirical evidence on a correlation between supervisor support and innovativeness in academic workers. LMX has also been proven to positively correlated with worker's feeling of energy, psychological safety and subsequently creative work involvement (Atwater and Carmeli, 2009; Carmeli, Reiter-Palmon and Ziv, 2010). Researchers divided LMX into 2 constructs: economic leader-member exchange (ELMX) and social leader-member exchange (SLMX). Although many researchers stated that ELMX and SLMX are two opposite ends of a continuum (Walumbwa et al., 2011), others believed that they are instead 2 distinct constructs and are not mutually exclusive or polar opposite (Kuvaas et al., 2012).

ELMX are motivated by short-term self-interest or exchange, and do not focus on long-term, emotional connection (Shore et al., 2006; Walumbwa et al., 2011). Empirical research by Kuvaas et al. (2012) showed a negative correlation between ELMX and employees' performance. ELMX encourages employees to meet the organization's requirements by spending minimum effort with no engagement with the organization (Shore et al., 2006; Song, Tsui and Law, 2009). SLMX, on the other hand, is a connection based on trust and long-term investment between leaders and workers and does not require immediate rewards or financial exchanges (Shore et al., 2006, Kuvaas et al., 2012). Positive relationship between SLMX and performance was found in the study by Kuvaas et al. (2012).

Based on findings from prior literature, we propose the hypothesis:

Hypothesis 3a: A higher SLMX makes the negative relationship between burnout and innovative work behavior less negative.

Hypothesis 3b: A higher ELMX makes the negative relationship between burnout and innovative work behavior more negative.

Stressors

Lazarus and Folkman (1984, p.19) defined stress as a "relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being". Stressors, or job stress, are usually referred to as negative characteristics – or lack of positive characteristics – of a working environment (Etzion, Eden and Lapidot, 1998). Heavy workload and highly demanding working condition are found to be common

predictor of burnout in literatures (Edwards and Burnard, 2003). In high pressure careers such as medical or academic professions, researchers have found positive correlation between high workload and stress or burnout tendency (Lebares *et al.*, 2018; McManus, Winder and Gordon, 2002; Happell, 2008; Jenkins and Elliott, 2004). A stressful working or studying condition also contribute to a lower rate of recovering from burnout symptoms (Dyrbye *et al.*, 2010).

Cavanaugh et al., (2000) argued that they could split this phenomenon into 2 factors: challenge stressors, which are: "*work-related demands or circumstances that, although potentially stressful, have associated potential gains for individuals*" (Cavanaugh et al., 2000, p.68); and hinderance stressors, that are: "*work-related demands or circumstances that tend to constrain or interfere with an individual's work achievement and that do not tend to be associated with potential gains for the individual*" (Cavanaugh et al., 2000, p.68). Researchers argued that challenge stressors have a possitive effect on performance, when hinderance stressors have negative effects (Cavanaugh *et al.*, 2000; LePine *et al.*, 2016). Evidences of challenging stressors improving job satisfaction, engagement, performance and motivation, as well as opposite effects of hinderance stressors can be found in researches by LePine *et al*. (2005), Podsakoff *et al.* (2007). From findings in prior literature, we propose the hypothesis:

Hypothesis 4a: Higher challenge stressors make the negative relationship between burnout and innovative work behavior less negative.

Hypothesis 4b: Higher hinderance stressors make the negative relationship between burnout and innovative work behavior more negative.

To summarize the ideas, we describe the conceptual framework of this research in Figure 1.

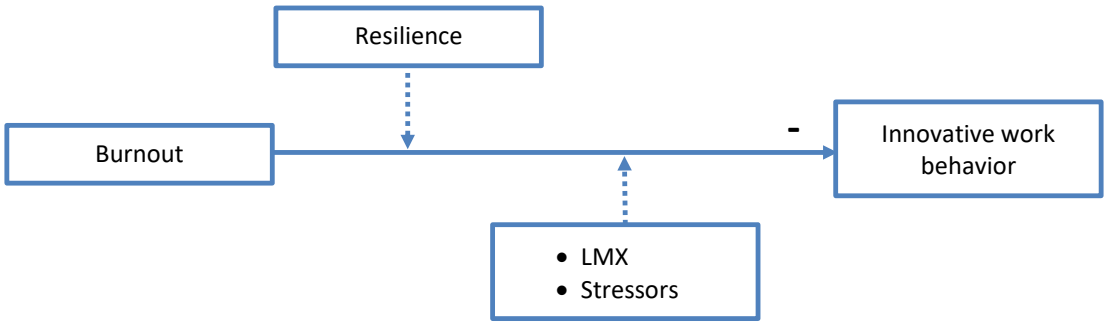

Figure 1: The proposed framework model of this research

III. Method

Data collection

In order to find out the effect of burnout on IWB, as well as the moderating effect of resilience and environmental factors on this connection, we used a dataset that was kindly provided by a research team supervised by Prof. Dr. De Weerd- Nederhof. The questionnaire was developed by the team of Prof. Dr. De Weerd- Nederhof, Drs.Ir. J.C. Kuijpers and Prof. Dr. Isabella Hatak from University of Twente, and Prof. Dr. Marjolein Caniels from Open University of the Netherlands. The dataset is collected via survey distributed through a panel, which is hosted by Kantar Public[2], a company originated in Netherlands and specialized in collecting data, managing and providing database for researches. The key questions of the questionnaire can be found in Appendix 1. The survey was translated to Dutch before sending to participants. The questionnaire was translated back to English by native Dutch speaker before analysis. In total, we collected 302 survey answers without any missing questions.

Dependent variables

Innovative Work Behavior

Our study measures IWB using a 9-item scale developed by Janssen (2000). The scale was based on the 6-items scale created by Scott and Bruce (1994). The scale that Janssen (2000) used had 9 items are divided equally into 3 stages of innovation: idea generation, idea promotion and idea realization, according to the framework of 3 stages of innovative behavior by Kanter (1988). Each question used a seven-point scale. Data in study by Janssen (2000) was collected from both employees as self-rated and from their supervisors. Results of that research showed a high correlation between 3 stages of IWB on both self-report data and data from supervisors, and IWB factor had a Cronbach's Alphas were 0.95 and 0.96 respectively, strongly supported the use of 1 factor to group all 9 questions that represent IWB.

Independent variables

Burnout

For questions regarding burnout evaluation, they were based on Maslach Burnout Inventory (MBI), which is a list of 22 questions regarding 3 different aspects of burnout: emotional exhaustion, depersonalization and personal accomplishment. However, to be able to integrate the burnout scale into the survey, two questions that has the highest loading on emotional exhaustion and

[2] Website: http://www.kantar.com

depersonalization category is be used to represent the evaluation of the full scale. Although 2 questions may not be treated as a complete replacement for MBI, the effectiveness of using these 2 questions was shown in researches by West, Patera and Carsten (2009) and Dolan *et al.,* (2015). The 2 questions below can bring an important information on burnout symptom in general, and the results are consistently associated with the full question list. Each question is displayed on a scale of 1-7, from *1 – "totally disagree"* to *7 – "totally agree".* The questions we used are:

- For Emotional Exhaustion: "*I feel burned out from my work"*
- For Depersonalization: "*I have become more callous toward people since I took this job"*

Resilience

The questionnaire used Employee Resilience scale developed by Näswall *et al.* (2013). The scale was developed and revised under Employee Resilience Research Group, under the main idea that resilience is "something that can be developed, rather than a stable trait" (Näswall *et al.*, 2013, p.3). The research also suggested that "the organisational environment influences the level of employee resilience through the provision of enabling factors" (Näswall *et al.*, 2013, p.3). The purpose of the scale, which was to measure resilience (as a state) of people in workplace, is very appropriate for the purpose of our study. The original scale is consist of 14 questions, each question follows a 7-point scale (Näswall *et al.*, 2015). Through further trials, Näswall *et al.* cut off irrelevant questions and reduced the scale to a list of 9 questions. A test using this 9-question scale on an effective sample size of 295 showed an overall reliability of 0.91, variance explained of 54.07% and all questions have a loading of 0.63 or higher on the construct (Näswall *et al.*, 2015). In this research, we extracted 8 questions from the original scale.

Leader-member exchange

To measure LMX, we use the scale of 8 questions developed by Kuvaas *et al.,* (2012). The scale was based on the work of Shore *et al.* (2006). In their studies, Shore *et al.* (2006, p.847) designed the scale to be consistent with "the conceptual distinctions reflected in the dimensions of trust, investment, duration, and financial/socioemotional" of ELMX and SLMX that they have developed previously. The scale originally had 14 questions, and after further evaluations, Shore *et al.* added 3 questions and removed 1 that had low loading on the construct, resulting in a final list of 16 questions. The final version in the research of Shore *et al.* (2006) proved distiction between economic exchange and social exchange, with alpha of each factor equals 0.78 and 0.87, respectively. Based on that result, Kuvaas *et al.* used the final list of 16 questions – 8 for ELMX and 8 for SLMX, with phrases changed to be more appropriate with their own study. Later the scale was trimmed down to 8 questions – 4 on each category – to increase model fit.

Stressor

This research measures Challenge stressor and Hinderance stressor using a scale developed by LePine *et al.* (2016). LePine *et al.* (2016) combined the scale developed in the research by Cavanaugh *et al.* (2000) and the scaled developed in the research by LePine, LePine and Jackson (2004). Cavanaugh *et al.* (2000) created their scales by reviewing scales of prior researches, and validated them by sending them to 4 independent reviewers as well as conformatory factor analysis and received results highly agreed with the 2-factor categorization. The scale developed by LePine, LePine and Jackson (2004) developed their scales by exploring incidents that caused stress, and group similar incident together into 10 questions divided equally between 2 groups (Challenge and Hinderance). The final scale that LePine *et al.* (2016) used had 20 questions in total - 10 questions about Challenge stressor and 10 question about Hinderance stressor, each question uses a fivepoint Likert scale ranging from 1 for "*never*" to 5 for "*extremely often*". LePine *et al.* (2016) used confirmatory factor analysis to confirm that having 2 separate factors for Challenge stressors and Hinderance stressors is significantly better than having all 20 questions loading on the same factor altogether.

Control variables

Working position

Working time flexibility is found to have positive effects such as reducing exhaustion and work-non work conflicts (Kattenbach, Demerouti and Nachreiner, 2010). However, the effect of flexible working time on job performance is inconsistent. We add question on working position to control this effect, with 3 possible answers: "*full-time*", "*part-time*" and "*other*".

Sick leave

Having days off help employees gain psychological detachment from work, through which workers regain depleted resources and improve wellbeing. A medium level of detachment was also found to improve task performance (Fritz *et al.*, 2010). To control this effect, we use 1 yes/no question regarding whether the parcipant has got any days off in the past year.

Form of employment

The biggest difference between 2 forms of employment - permanent and temporary - is the level of commitment they have for their positions. Lower commitment of temporary workers may lower their innovative intention and subsequently their innovative behavior. To control this, we ask for participant's current form of employment, with 4 possible answers: "*Permanent employment/tenured*", "*temporary, will not be made permanent*", "*temporary with good chance of becoming permanent*" and "*other*".

Tenure/experience

The amount of time a person stay in a position may affect the level of innovativeness of the employee. Ng and Feldman (2010) found a positive relationship between employee embeddedness and the level of innovativeness work behavior. The positive relationship is also proven to be stronger at later stage of an employee's career. There are views supporting a negative causal effect to innovativeness caused by tenure and experience. A paper by Staw (1980) demonstrated that industries with highest tenure are inefficient and hard to get innovative. Newer employees are likely to have new ideas, and they also have more incentive to actually implement their ideas to improve performance (Staw, 1980). To control the effect of tenure, we use 1 question to ask for "*Number of years with current employer*"

Company size.

Researches are inconclusive on the connection between company size and IWB. Companies with larger size has more resources to facilitate innovativeness. Study by Laforet (2008) provides empirical support for a positive correlation between company size and innovative outcome. However, study by Imran *et al.*, (2010) showed that no significant connection between company size and IWB could be found. In this study, we use the number of employee working for the company as an indicator for company size.

Role (supervisor or not)

We expect people in supervisory roles to be more ambitious and more engaging in their career so they could be rewarded with their position. Researches have suggested a connection between work engagement, ambition and innovative behaviors (Agarwal *et al*., 2012; (Mathisen, Martinsen and Einarsen, 2008).

High tech industry.

Companies in high technology sectors are under a high pressure of having new innovation to obtain competitiveness. High tech sector is a highly turbulent sector, where one fortunate innovator can raise with one big idea and seize a large portion of the market; at the same time, companies which invest on innovativeness but receive no result may suffer from heavy losses (Coad and Rao, 2008).

Estimation method

Control Variables

The first model tests the model with only control variables. For question "*form of employment*", there are 4 options: *"Permanent employment/tenured*", *"temporary with a good chance of get a permanent position*", *"temporary, will not be made permanent*", and "*other"*. Because of multicollinearity, the

option "other" is excluded. Similarly, for question "*do you work full-time or part-time*?", there are 3 possible answers: "*full-time*", "*part-time*", and "*other*"; however since "*full-time*" and "*part-time*" answers take up 97.7% of the observations, we only include "*full-time*" in the model, and assume that people who does not choose "*full-time*" are people working part-time.

The variable "*Company size*", which counts the number of employees, is positively skewed (skewness=6.797 and kurtosis=53.521). To make the distribution of this element closer to normal distribution, we use logarithm of the variable's original value. The new values of skewness and kurtosis after the transformation are 0.328 and -0.146, respectively.

For questions with only 2 choices, we compute 1 dummy variable. To make the data analysis more intuitive, we recode "yes" answer of our question to "1" and "no" answer to "0". This is applied to question "*Where you absent through illness/did you take sick leave the past year*?", "*Which role do you fulfill*?" ("supervisor role" as "1") and "*Is your organization working in the High-tech Industry*?"

Confirmatory factor analysis

The study recorded complete data (without missing value) from 302 individuals. Since there are questions using seven-point scale and also questions using five-point scale, we standardized all metric results from the questionnaire to avoid any inconsistency.

From 302 observations and combined with theories from literatures, we run confirmatory factor analysis. On each factor, we priorities achieving a higher Cronbach's Alpha and remove questions that reduce the reliability of the factor.

The first factor is **burnout**. In the questionnaire, there are 2 questions regarding burnout: The first question, "*I feel burned out from my work*", represents the Emotional Exhaustion aspect of burnout. The second question, "*I Have Become More Callous Toward People Since I Took this Job*", represents depersonalization. We ran a confirmatory factor analysis (CFA) on the construct of burnout and got a Cronbach's Alpha of 0.310. This result, combined with a bivariate correlation of 0.184 between 2 questions, suggests that we should examine 2 questions separately instead of grouping them into 1 factor for Burnout.

The second factor is **IWB**. We ran CFA for 9 questions used to measure IWB and found 1 factor that has total variance explained of 66.893%. This is also the only factor with Eigenvalue larger than 1.00. All questions have a high loading on the factor, and Cronbach's Alpha is 0.938. This result supports using 1 factor to represent IWB for further analyses.

Next, we ran CFA for questions regarding **Individual Resilience**. There are 8 questions in this section, and CFA results in only 1 factor with Eigenvalue larger than 1.00. Total variance explained of this factor is 50.584%. This result supports using 1 factor to represent Individual Resilience for next steps of analysis.

Due to the theories and measuring scales about ELMX and SLMX that we based on, we will divide 8 questions in LMX section into 2 factors: One factor to represent ELMX, which consists of questions 1 to 4, and one factor for SLMX which represents questions 5 to 8. We ran CFA for each group of question separately and got the Cronbach's alpha of .719 for ELMX and .818 for SLMX.

For factor of ELMX, the 4th question has a low loading of 0.500. We tried removing this question from our list to improve the reliability of the factor. The result: Cronbach's Alpha improved from 0.719 to 0.775, and total variance explained increased from 55.699% to 69.094%. We construct the new factor without the 4th question to use in our later steps of analysis

Table 1: List of variables used in analysis

Variables	Type of variable
Control variables	
Company size	Metric; Equals common logarithm of number of employees
Absence	Dummy; "1" if having days off in the last year; "0" if not
Permanent position	Dummy; "1" if form of employment is permanent; "0" if not
Temporary position	Dummy; "1" if form of employment is temporary; "0" if not
Temporary with chance to become permanent	Dummy; "1" if form of employment is temporary but have a good chance of becoming permanent employee; "0" if not
Fulltime	Dummy; "1" if working fulltime; "0" if working part time or other
Tenure	Metric; Equals number of years with current employer
Supervisor	Dummy; "1" if working as a supervisor; "0" if not
High-tech	Dummy; "1" if company is in high-tech industry; "0" if not
Independent Variables	
Emotional Exhaustion	Metric; created by confirmatory factor analysis
Depersonalization	Metric; created by confirmatory factor analysis
Individual resilience	Metric; created by confirmatory factor analysis
ELMX	Metric; created by confirmatory factor analysis
SLMX	Metric; created by confirmatory factor analysis
Challenge stressors	Metric; created by confirmatory factor analysis
Hinderance stressor	Metric; created by confirmatory factor analysis
Dependent variable	
Innovative work behavior	Metric; created by confirmatory factor analysis

Finally, for questions about Stressors, we group them into 2 groups – "Challenge stressors" and "hinderance stressors" according to the theories and scale by LePine *et al.* (2016) on which we based our questionnaire. "Challenge Stressors" factor consists of the first 10 questions of the section, and

"Hinderance stressors" involves the later 10 questions. the Cronbach's alphas of factors are .895 for Challenge stressors and .852 for Hinderance stressors.

Detailed factor loading on each factor can be found in Appendix 2. After confirming reliability of factors as well as finalizing how many questions each factor will represent, the factors are calculated using regression method so they can be used in models.

From composing dummy variables and running confirmatory factor analysis, we have a list of variables that we will use in our models in Table 1.

IV. Results

Table 2 shows the result of bivariate correlation between variables and factors used in this research. People with days off come up with a higher level of emotional exhaustion (0.160, $p<0.01$). However, having days off has no effect on level of innovativeness. Permanent working position has positive correlation with burn out ($p<0.05$), while people in temporary positions are less likely to suffer from burn out. ($p<0.01$).

Individual resilience is negatively correlated with emotional exhaustion (-0.343, $p<0.01$). This supports the idea that resilience help people cope with burnout problem. Individual resilience is also found to have positive correlation with IWB (0.572, $p<0.01$). This finding agrees with our earlier findings about effect of individual resilience on working performance.

The correlation matrix also shows a negative correlation between ELMX and burnout tendency, and no significant correlation between ELMX and innovative work behavior. In contrast, SLMX is negatively correlated with burnout, and positively correlated with innovativeness. These results support findings in earlier literature regarding these 2 types of leader-member exchange.

Both types of stressors (challenge stressor and hinderance stressor) are positively correlated with burnout ($p<0.01$). However, only challenge stressor is found to have positively effect on innovativeness (0.267, $p<0.01$)

We tested our hypotheses using multiple regression. The first model (Model 0), we only tested the effects of control variables on IWB. In this model, only "supervisory position" question has significant influence on IWB. The correlation is 0.239 ($p<0.01$) indicates that people in supervisor role are more likely to innovate. This result is consistent through the later tests.

Table 2: Bivariate correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18
Company Size	1																
Absence	.099	1															
Permanent position	.216**	.102	1														
Temporary with good chance to be permanent	-.128*	-.069	-.679**	1													
Temporary position	-.063	-.065	-.373**	-.043	1												
Fulltime	.266**	.030	.207**	-.012	-.132*	1											
Tenure	.254**	.082	.281**	-.284**	-.138*	.188**	1										
Supervisor	-.063	-.071	.098	-.099	-.073	.188**	.063	1									
High-Tech	.135*	-.002	.043	-.030	-.058	.191**	--.063	.002	1								
Emotional Exhaustion	-.063	.160**	.114*	-.011	-.153**	.022	.011	-.036	-.080	1							
Depersonalization	.072	-.025	-.005	.025	.145*	.089	-.050	.025	-.108	.184**	1						
Individual Resilience	.068	-.171**	-.157**	.110	.031	.009	-.014	.185**	.008	-.343**	-.108	1					
ELMX	-.181**	.018	-.157**	.192**	-.029	.027	-.068	.073	.017	.099	.141*	-.072	1				
SLMX	-.120*	-.071	-.152**	.175**	-.052	-.003	-.047	.080	-.047	-.303**	-.187**	.443**	-.019	1			
Challenge Stressor	.141*	.078	.153**	-.040	-.099	.060	.072	.108	-.016	.186**	-.055	.192**	-.130*	.016	1		
Hinderance Stressor	.239**	.093	.175**	-.096	-.036	.118*	.065	.076	-.000	.347**	.214**	-.186**	.017	-.457**	.408**	1	
IWB	-.013	-.105	-.106	.094	.022	.028	-.006	.226**	.045	-.228**	-.058	.572**	-.030	.291**	.267**	.032	1

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 3: Regression analysis results

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Organization Size	.030	.012	.030	-.036	-.041	-.024
Absence	-.078	-.049	-.053	-.058	-.059	-.065
Permanent position	-.082	-.054	-.079	-.103	-.115	-.107
Temporary position	.068	.082	.056	.016	.008	.003
Temporary with chance of becoming permanent	.012	-.003	-.014	.001	-.013	-.014
Fulltime position	-.016	-.007	.005	-.011	.012	.010
Tenure	.021	.018	.003	.016	.010	-.019
Supervisor	.239***	.230***	.224***	.167***	.149***	.147***
High-tech	.048	.029	.024	.056	.036	.033
Emotional exhaustion		-.197***	-.184***	-.220***	-.254***	-.241***
Depersonalization		-.027	-.059	.019	.025	-.007
Resilience * emotional exhaustion			-.111*			-.176***
Resilience * depersonalization			.132			.046
ELMX				-.011	-.011	-.018
SLMX				.247***	.200***	.191***
Challenge stressor				.257***	.277***	.273***
Hinderance stressor				.133*	.143**	.150**
ELMX * emotional exhaustion					-.058	-.067
ELMX * depersonalization					.031	.022
SLMX * emotional exhaustion					.030	.134*
SLMX * depersonalization					.139*	.118*
Challenge stressor * Emotional exhaustion					-.037	-.037
Challenge stressor * Depersonalization					-.031	-.041
Hinderance stressor * Emotional exhaustion					.086	.128*
Hinderance stressor * Depersonalization					-.057	-.051
Adjusted R^2	0.05	0.084	0.102	.214	.229	.246

****: p<0.01; **: p<0.05; *: p<0.1*

The second model (Model 1) tests the connection between burnout and IWB (Hypothesis 1). Two variables "emotional exhaustion" and "depersonalization" are separated. The model results a negative and significant correlation between "emotional exhaustion" and IWB (p<0.01). This result is consistent throughout all later models. On the other hand, "depersonalization" also has negative correlation but insignificant with IWB.

On the next model (Model 2), we tested the interaction term between resilience and 2 aspects of burnout, namely "Resilience*emotional exhaustion" and "Resilience*depersonalization" (Hypothesis 2). Only "Resilience*emotional exhaustion" has a significant connection with IWB, and this connection is negative, which indicates that in a situation of burnout, individual resilience does not help in improving innovative behaviors. This result contradicts the hypothesis this research built.

Model 3 examines the direct impact of environmental factors (LMX and stressors) on IWB Among 2 factors of LMX, only SLMX has a positive and significant effect on IWB (.247, $p<0.01$). ELMX has negative effect, but insignificant. This result partially agrees with earlier theories, which suggested that SLMX provides positive influence, when ELMX does not. In this model, both Challenge stressor and Hinderance stressor have positive effects on IWB. The significance of LMX and stressors' effects are consistent along other models we tested.

Model 4 tested the moderating effect of environmental effects (LMX and stressors) on the connection between burnout and IWB (Hypothesis 3a, 3b, 4a and 4b). We included both the interaction between environmental effects and emotional exhaustion and the interaction with depersonalization. Finally, model 5 includes the variables of models 4 plus the moderating effect of resilience. The result is a positive and significant effect of SLMX * depersonalization on both tests, and SLMX * emotional exhaustion on model 5. This partially supports hypothesis 3a, in which we proposed that SLMX has positive moderating effect in burnout situations. The moderating effect of ELMX are not statistically significant, so hypothesis 3b is not supported. In both model 4 and 5, the moderating effect of challenge stressors is not significant. The moderating effect of hinderance stressor is only found to be significant in model 5 (Hinderance stressor * Emotional exhaustion: 0.128, $p=.094$). This result is not significant enough to support hypothesis 4a and 4b.

V. Discussion

The overall purpose of this study is to find the impact of burnout on innovative work behavior, and how personal resilience and environmental effects influence this impact. Most researches about the topic of burnout have been done on employees of stressful environment, such as academic workers, medical workers or professional sportsmen. In this research, we collected data from people outside of those groups to have a depiction of a more common and more relatable environment. This study contributes to the literature about burnout in more conventional areas, fills the missing gap between burnout and innovative behavior, and supports the importance of context in controlling negative outcome of burnout.

Burnout has been found to have negative impacts on different aspect of an employee's life, from work performance to daily functions (Fogarty *et al*., 2000; Cherniss, 1992; Jackson, Schwab and Schuler,

1986). Results of our study suggest a negative correlation between emotional exhaustion and IWB. The effect of depersonalization, however, was not significant. This finding partially agrees with prior researches which confirmed a negative effect of burnout.

In prior literatures, resilience is a defensive mechanism against burnout (Glasberg, Eriksson and Norberg, 2007; Guo *et al.*, 2018; Nel and Kotze, 2017; Taku, 2014; Rushton, *et al.*, 2015; Colville *et al.*, 2017). Literatures also suggested a positive influence of resilience on personal innovative behaviors, since innovative work behavior requires a high tolerance to risk and uncertainty (Mishra, Bhatnagar and Gupta, 2013; Sweetman *et al.*, 2011). For these reasons, we expected resilience to moderate the connection between burnout and IWB to reduce the negative effect. On bivariate correlation, resilience has a negative correlation with burnout and positive correlation with IWB, which agrees with prior researches. However, the result of regression model suggests that the moderating effect of resilience increases the negative impact of burnout on IWB. Meanwhile, the interaction between SLMX and burnout has a positive result on IWB. These outcomes suggest that in the cases where burnout has already happened, focusing on resilience is not the way to improve an individual's innovative behavior. Although resilience has positive effects in improving work performance and innovative behaviors in general cases, pushing employees to overcome difficulties and bounce back when they have already got burnt out can be counterproductive. Instead, organization should focus on social supports, such as a good relationship between worker and supervisor based on mutual trust and empathy. Maintaining a high level of SLMX within workplace, therefore, does not only improve performance and innovativeness in general, but also mitigate the negative impact of burnout on IWB.

The impact of stressors on IWB as main effect only partially agree with prior researches (Cavanaugh *et al.*, 2000; LePine *et al.*, 2016). Challenge stressors, similar to what researches suggested, has a positive influence on IWB. However, hinderance stressors are also found to have positive impacts on IWB in our regression models – contradicts results of literatures we reviewed. The interaction terms between stressors and 2 aspects of burnout are mostly insignificant, with only 1 significant effect in Model 5. From these results, we are making no conclusion on the moderating effect of challenge and hinderance stressors.

VI. Limitations and suggestions for future researches

This research used cross-section data from one panel survey. Therefore, the analyses can only show a correlation between factors, not causal interactions. The research team is going to conduct second wave of data collection on the same set of participants. 2 waves of data collection can draw a more complete picture of the connections we proposed in this research. For example, this study points out an intriguing connection between resilience, burnout and innovative behavior: When burnout level is

high, focusing on improving individual resilience can lower innovativeness. However, this research cannot answer if higher resilience helps in recovering from burnout. If focusing on resilience can help employees recover from burnout faster, does that counter the negative effect that this study pointed out? Similarly, although this study suggests that interaction between stressors and burnout have insignificant effect on IWB, but can stressors cause burnout to develop faster, which indirectly affect IWB? Since burnout and individual resilience are states, after the second wave of data collection, further researches can examine the trend of burnout, IWB and resilience under environmental effects, and from that draw a more accurate conclusion regarding impacts of context on burnout and IWB.

This study focuses on resilience as state; however, there are papers based on the idea that resilience is a personal trait as well. Literatures have not made a concrete connection between trait-resilience and state-resilience. Further studies can approach the correlation between these 2 factors: does resilience as a trait a prerequisite for state-resilience; and does resilience and mindfulness training have different effects on people with low and people with high trait-resilience? In order to answer this problem, not only data of trait-resilience and state-resilience must be collected, but detailed information of quantity and quality of training programs that survey fillers have participated must be recorded as well.

In this study, the effect of 2 aspects of burnout (emotional exhaustion and depersonalization) had different statistical significance. It is possible that this difference is originated from the biased opinions of people who have not known of burnout theories. In 3 aspects of burnout, emotional exhaustion is the most intuitive and closest to a conventional, non-scientific idea of burnout. This bias may cause people unable to answer about depersonalization and loss of personal accomplishment correctly. Future researches can mitigate problem of this biased perspective by conducting in-depth interview with participants to explain the concept of burnout, asking questions to suggest answers about less intuitive facets of burnout, or use a full scale of Maslach Burnout index (22 questions, which we could not integrate fully into this research because of the length of the questionnaire).

Further examine survey data

Data from the survey covers a larger field than the scope of this study. There are questions in the survey about factors such as exploratory/exploitative, learning climate, etc. that was not included in this thesis.

The survey included 2 different perspective of resilience: Resilience as a trait and resilience as a state. Regression analysis shows positive and significant relation of both types of resilience on innovative work behavior. However, running the interaction between two types of resilience and IWB on ADANCO and SPSS, the effect of resilience as a state on IWB is stronger and more significant than the

effect of resilience as a trait. The figure 2 below is a result of SEM model run in ADANCO, suggesting the mediating effect of resilience as a state.

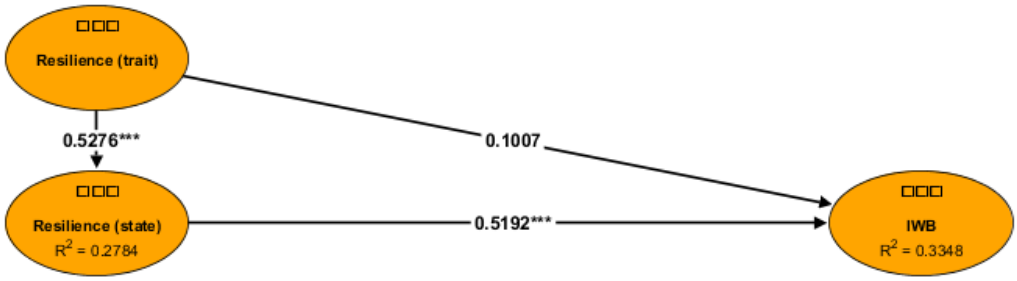

Figure 2: Mediating effect of resilience as a state

I added Team resilience to the SEM model described above and got the result as the figure 3 below. Resilience as a trait does not significantly impact resilience of a team, and the mediating effect of resilience as a state is a complete mediation. Team resilience also has no significant influence on IWB.

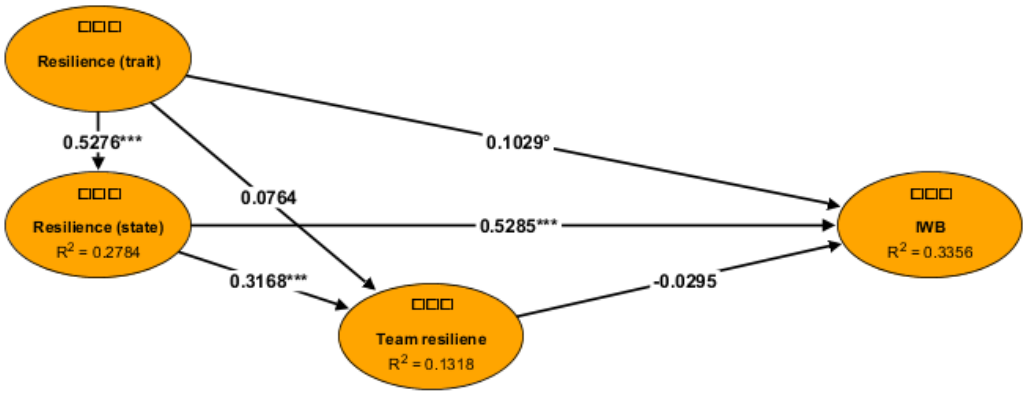

Figure 3: Team resilience in the relationship with resilience as a state and as a trait.

I tested 2 possible options of team IWB: Team IWB is an outcome of IWB, or team IWB influences IWB. Testing both options return significant result. This result suggests that the effect can go either direction, and one particular direction should not be assumed initially.

Based on these findings, next step researches can try to find the causal relationship between resilience as a state and as a trait, and how each of them affects innovative behavior. The relationship between individual level of factors (resilience, IWB) and team level needs more clarification: how the two levels interact with each other, what the causal relationship is, and which combination is optimal for the performance of organization.

Examining the effect of P-E factors (including: Positive/negative adversity, exploratory/exploitative, Team IWB, Team resilience, Autonomy, LMX, learning climate/error avoidance, challenge/hinderance stressors, positive emotion and self-efficacy), found out that question answers are highly correlated. Some questions in the survey are intuitively correlated. For example, Positive events (Q003) are connected to Positive emotions (Q013). Because of high correlation between variables, I suggest further examining the overlap between questions, reduce the number of questions used in analysis, run factor analysis or PLS. The correlation matrix can be seen in Appendix 4.

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