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RELATIONSHIP BETWEEN BIG FIVE PERSONALITY TRAITS AND EMPLOYEE INNOVATIVE BEHAVIOR

Bachelor thesis

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I have written this Bachelor Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

Considering the conditions of the tight competition businesses are constantly challenged to innovate in order to survive and improve their market position (Innovating for growth, 2012). According to Forbes statistics “since 2000, 52% of Fortune 500 companies have "gone bankrupt, been acquired, or ceased to exist due to digital disruption" which illustrates that innovation for businesses is not a matter of choice anymore but rather a key aspect to focus on (Rafi, 2020). With this regard, businesses are forced to reconsider the management of their innovation function as a core determinant of companies’ performance (Dereli, 2015). To maintain competitiveness, they need rapidly to bring in innovative outputs, like products or processes (ibid). Besides, innovation plays an important role among businesses due to interdependence and collaborative innovation capability meaning that the level of innovation in one company may influence the internal operations of another (Adner & Kapoor, 2010). The topic of innovation is relevant not only from a business perspective but also from a societal, as innovations contribute to the development of marketplace and generation of prosperity and employment (Vadastreanu al et., 2015).

However, understanding the value of innovation in the business field one should also consider the importance of the human factor, as companies significantly depend on their workforce who make a crucial input with their actions to the innovation process (Ummi, Ain, Razleena, Harith & Natasya, 2019). The importance of innovation for business performance and society in combination with the significance of employees’ direct input in innovation was the main motivation for the current research. To research this relationship between employee innovative behavior and workers’ personality, which is a derivative of employee behavior in the workplace, the author of this paper considered adopting the Big Five model for the current study (Patterson, Kerrin & Gatto-Roissard, 2009). The reason for this choice is that the Big Five model, which includes such factors as extraversion, neuroticism, agreeableness, openness, and conscientiousness, can be considered as a universal tool to identify and explore a personality frame (ibid).

The current study was conducted in the Ukrainian context, as according to the Global Innovation index (2020), Ukraine demonstrates strong improvement in the field of innovation with human capital as one of the best performing factors. However, Ukraine is still lagging behind even though it has significant potential with a strong base of skilled workers, growth in innovative enterprises that have an incentive to implement new ideas which outline a demand of studying this area (ibid). Also, consideration for the human-related factor of innovation in Ukraine is quite underestimated (Heyets, Gryga, Bazhal & Boiko, 2015).

On the top of that, it is important to mention that there are limited studies on how personal characteristics of employees relate to their will to contribute the process of innovation (Sergeeva, 2014). And even less on how every factor of the Big Five framework relates to employee's innovative behavior. This paper contributes to the literature by testing the relationship between each personality trait of employees and their innovative behavior. For instance, there have been previous studies completed about this relationship, like the one conducted by Hamdy et al. in 2019 testing the relationship between personality and innovative work behavior but in combination with job tenure variable in the UK. Also, the cross-cultural research conducted by Woods, Mustafa, Anderson, and Sayer (2018) also intended to touch the relationship between innovative behavior and the Big Five Model, however, only two factors were taken into account: openness and conscientiousness. Even though there were previous efforts done on this topic, the majority of studies were usually done in the financial sector or tested only a limited number of traits (Woods, Mustafa, Anderson & Sayer, 2018). Besides, there was no evidence of studying this relationship neither in Ukraine nor in Eastern Europe in general. There is a lack of research done in the manufacturing industry where the author of the current paper intends to contribute by testing all five traits in the Ukrainian context.

This study focused on assessing manufacturing firms, as according to the Innovation performance review of Ukraine (United Nations, 2013) the share of manufacturing in country's GDP is decreasing. Nevertheless, 10% of Ukrainian manufacturing companies invest in innovation, which demonstrates the potential for improvement (ibid). So the results of the current paper might contribute not only to enhancing manufacturing sector but also to the development of countries' economic position in perspective.

Regarding the practical value of the current paper, it intended to provide recruiters of Ukrainian manufacturing companies with evidences on the relationship between the Big Five personality traits and innovative behavior in the working environment. The results of this paper might also contribute to innovation management proposing insights on employee innovative behavior.

So this paper aims to identify the relationship between each Big Five personality traits and the employees' innovative behavior in manufacturing Ukrainian firms.

The research tasks set by the author of this paper were:

1. To explain the concept of the Big Five factors of personality as well as employees' innovative behavior.
2. To review previous empirical studies on the relationship of Big Five personality traits on employees' innovative behavior and state hypotheses for this study.

3. To explain the methodology and sample for the current study.

4. To collect the data about IWB (innovative work behavior) and Big Five personality traits of employees of Ukrainian manufacturing companies using online questionnaire.

5. To analyze and discuss the results of this study within the context of the stated hypotheses.

In order to achieve the aim of the current paper, the author structured it as follows. The theoretical part was divided into two parts. The first part will provide a theoretical background of the Big Five personality and innovative work behavior and how they can be related. The second part will review studies on the relationship of the Big Five personality and employees' innovative behavior. First three subchapters, which were associated with these parts, aimed to provide the reader with sufficient theoretical background on this relationship, and propose hypotheses based on theoretical findings which further were tested in the empirical part.

The empirical part firstly contained an explanation of the methodology applied, secondly analyses done with the SPSS software of data collected with the help of two questionnaires: self-reported innovative work behavior and self-reported personality traits completed by employees of three Ukrainian manufacturing companies. The final part of the thesis revealed the discussion of findings within the context of the proposed hypotheses. The main limitations of the current work were related to non-probability sampling, which influenced authors' ability to generalize, and usage of single-source data, namely employees' self-assessment, which could impact the objectivity of collected data.

Keywords: innovative work behavior, personality traits, Big Five model, innovation management, Ukraine.

1.Theoretical framework of the Big Five factors and innovative work behavior

1.1. Definition of the Big Five model in the context of innovative behavior and IWB in innovation process perspective

The Big Five factors (or the Five Factor Model) is positioned in economic theory as one of the interpretations of the personality factor models designed in the frame of trait theory and aimed to identify the specificities of feelings, thoughts and behavior of an individual (Novikova, 2013). It has a long chronology, which dates back to 1930s, and many scholars contributed on different stages to its development (Najm, 2019). Gordon Allport and Henry Odbert are generally considered its authors, as they were the first who in 1936 identified 18000 terms that provided the base for all further researches in the field of personality traits (ibid).

While Lewis Goldberg was the one who in 1980s contributed by identifying the broad range of each trait interpretation and was the first to name this theory, as it is widely known now, the Big Five (ibid). Now the Big Five model is a comprehensive framework, which is widely accepted and can be considered as the least controversial personality traits model (Abdullah, Omar & Panatik, 2016). That is why it is suggested to use it for researching personality traits (ibid).

However, the model also faced criticism for its intention to identify the main personality features and judge according to such broad trait domains, which was considered too ambitious (McCrae, 2002). While, on the other hand, its broadness of traits and behavioral patterns were viewed as an advantage, which makes the model a practical tool for generalization (Najm, 2019). Also, it was argued that the model is objective because the Big Five traits proved to be mutually exclusive and valid in the context of individual assessments due to the fact that traits of personality are stable over time (ibid). Besides, this model is widely used for business purposes, for instance, in the hiring process, which corresponded to the current study aiming to research employees in the working environment (Alhendi, 2019). Hence, due to models' advantages and worldwide acceptance the Big Five model is central for this paper.

As it was previously outlined, in the current highly competitive business environment innovation is an important factor of companies' success. That is why it is crucial for organizations' management teams to involve employees, who tend to innovate and this ability significantly depends on personality factors (Abdullah, Omar & Panatik, 2016). The Big Five model is also considered as an appropriate tool to identify the relationship between personality and individual innovativeness (Patterson, Kerrin & Gatto-Roissard, 2009). Thus, to understand which traits reflect innovative employees, it is needed to define each trait from the perspective of innovative behavior.

The Big Five model covers five extensive factors, such as openness, conscientiousness, extraversion, agreeableness, and neuroticism (Baptiste, 2018). Each trait represents a family of traits, which includes a set of characteristics defining personality (ibid). Openness is a dimension of exploration, and identifies creative people with strong imagination and fantasy (Javed, Khan, Arjoon, Mashkoor & Haque, 2018). Employees with openness as their dominating trait are reflective, curious, open to new experiences, and initiative in idea generation (Roccas, Sagiv, Schwartz & Knafo-Noam, 2002). Compared to those with high conscientiousness, who would most of the time control their impulses, openness, on the contrary, mirrors much more spontaneous and emotional people (ibid). Those who scored high in openness tend to pursue knowledge with interest and flexibly collect any type of information

from different sources (Heinström, 2003). Later they transform it into innovative ideas and their novel implementation (ibid). The majority of empirical studies conducted on this relationship claim that employees with a high degree of openness will most likely demonstrate innovative behavior (Yesil & Sozbilir, 2013).

Extraversion tests which one of the external or internal orientation of personality dominates, and includes such characteristics as confidence and passion (Ali, 2018). This trait is inherent in energetic and confident employees, who are able to lead and enthusiastically engage with the environment (Steel, Rinne & Fairweather, 2011). Extraverted employees tend to often express their opinion out loud, so they can positively impact other workers with regard to innovative initiation (Smollan, Sayers & Sayers, 2010). They freely build their network, exchange knowledge and information which, in turn, drives innovation (ibid).

Regarding the third personality trait, conscientiousness, it reflects workers, who are responsible, trustworthy, and self-disciplined (Heinström, 2003). Such goal orientation and high attention could be helpful if not in idea generation but innovation implementation (ibid). Strongly focused on goal achievement they treat information efficiently and compared to workers with the trait of openness dominating, are more selective regarding sources (ibid). Due to that, they are able to perform an important function, namely fixation and reporting of gained knowledge and information (Hamdy et al., 2019). This aspect of knowledge, how it is captured, ordered and communicated is important in this context, as it is utilized in the innovation process (Vafaie, Rahimi, Rostami & Shad, 2016).

The association of agreeableness with innovative behavior is not obvious as some traits above. Usually, employees who scored high on this trait tend to be patient, benevolent, and have an optimistic attitude (Ülgen, Saglam & Tugsal, 2016). They are successful in projects, which require collaboration with their peers, and are considered to be good communicators, as they are always able to find a compromise (ibid). However, agreeableness also involves toleration and conformity, tendency to act in accordance with others, which may not be in line with innovative behavior, which, in turn, involves seeking new ways (Ali, 2018). It is important to outline that in comparison with agreeableness, extraversion, which is also responsible for communication and networking, has internal orientation meaning that the focus is rather on the effective interaction of an individual with the group (ibid). Whereas, agreeableness emphasizes keeping the group efficiency by accepting the individual, which is a significant factor for innovation to succeed (ibid).

Neuroticism is a predisposition of employees to be less able to cope with a stressful situation and have difficulties with controlling impulses and emotions (Rothmann & Coetzer,

2003). Compared to agreeableness, which involves optimism, neuroticism identifies more pessimistic workers, who are inherent to feel sad and anxious (ibid). On the opposite side of the scale from neuroticism is emotional stability, which determines stress-resistant workers who are balanced and peaceful (ibid). Usually in studies on this relationship neuroticism tends to be a threat to innovative behavior, however, Patterson, Kerrin, and Gatto-Roissard (2009) claim that it is not so straightforward. The authors proposed that the relationship between neuroticism and innovative behavior may be influenced by the studied segment (ibid). For instance, researchers may be more emotionally stable than impulsive impetuous artists (ibid).

This way it can be concluded that the author of this paper considers adopting the Big Five model for the current study, as referring to findings above, employees' behaviors are derived from their personality and it is, therefore, important to study how personality traits are associated with innovative behavior in the workplace. Besides, the Big Five model is one of the universal key models used to identify the fundamental structure behind every personality trait it represents on the organizational level (Ali, 2018). So relying on the theoretical insights of this relationship provided above, the author would proceed further to disclose it more from innovation process perspective.

The concept innovative work behavior (IWB) can be considered relatively new, as it was invented by Scott and Bruce in 1994 and 1998 (Spiegelaere, Gyes & Hootegem, 2014). Since then researchers proposed different alternatives, however, the one by West and Farr (1990) got the highest number of citations (ibid). Cited in the work of Kheng, Mahmood and Beris (2013) authors identified IWB as "an employee's action directed at the generation, application and implementation of novel ideas, products, processes, and methods to his or her job position, departmental unit, or organization" (p.93). This definition is the most appropriate for the current study, as it outlines that innovative work behavior is driven by employees on the workplace (ibid). The author needs to mention that researchers usually distinguish between IWB and workers' creativity, as IWB is not only about the generation of ideas but also idea identification, testing, framing, implementation and estimation (Samma, Zhao, Rasool, Han & Ali, 2020). So, innovative work behavior is a key factor for companies' innovation, which with fast development of technology and growing competition becomes crucial in business environment (Li & Zheng, 2014). However, IWB is still considered extra-role behavior meaning that it is not required for a particular position and usually the remuneration for that is also not provided formally (Bos-Nehles & Veenendaal, 2019). For this reason, organizations should especially focus on their employees as the main asset to drive innovation (ibid).

Referring to innovation process, in which employees are involved with their IWB, it is important to focus not only on the idea generation phase but also on its implementation (Tohidi, 2012). To show how workers' innovative behavior contributes to innovation process, the author of the current paper brings out the linear model introduced in the work of Jong and Hartog (2007). Even though the innovation process in practice is rarely linear due to possible repetitiveness of its stages and occurrence of new opportunities (Tohidi & Jabbari, 2012), this model was used firstly because it is comprehendible for a reader and secondly, because it was designed with regard to the behavior of an employee in the workplace, which corresponds to the current topic (see Figure 1).

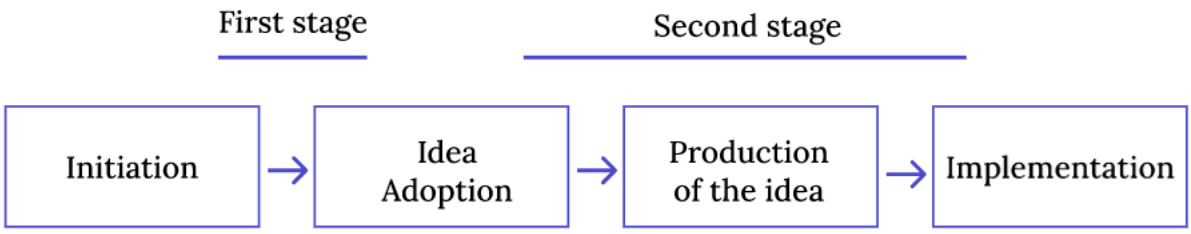


Figure 1. Stages of the innovation process

Source: Compiled by the author based on Jong and Hartog (2007)

According to the depicted above Figure 2 innovation process has two main stages. The first stage includes idea initiation and idea adoption and results in the production of the idea. The second stage starts at the point of idea adoption, which serves as a separating point between two phases, and lasts till its implementation (Jong & Hartog, 2007). Thus, innovative work behavior could be also divided in two stages following the stages of innovation process, creativity-related stage, which identifies the problem and proposes an idea for its solution, and implementation-related stage, which promotes an idea among colleagues and supervisors and brings it out to implement in practice (Leong & Rasli, 2013). Yesil and Sozbilir (2013) similarly outlined three stages of individual innovations, which correspond to innovation process. Namely, they are idea generation, which may refer to the first stage of the innovation process initiation; the building of coalition, which may be in need for the adoption phase, and implementation, which is the core for final idea implementation (ibid).

While Kheng, Mahmood and Beris (2013) outlined already four stages of innovation process, which followed similar pattern of process proposed by Jong and Hartog (2007) but

assigning one stage under each behavioral activity. It included firstly idea generation, secondly creation of a collaboration with other innovation supporters, thirdly production of idea, its prototype and as the last stage ideas' commercialization, distributing it on the market (ibid). In this work it was also emphasized that employees' IWB contributes within the whole innovation process, generating ideas on the first stage and making a purposeful effort on the way to implementation on the second (ibid).

Lendel, Hittmár, and Siantová (2014) similarly outlined the core of the innovation process: idea generation and as the final stage implementation. On the top of that, the authors also stated the reasons why the innovation process may fail, among which were low innovative activity and indifferent employees, which outlined the importance of workers' attitudes and behavior on the way to successful innovation (ibid)**.** Hence, it was suggested to support a significant level of openness in the working environment to let employees' creativity flourish contributing with new ideas on all stages of innovative proses (ibid). In addition to creativity, taking into account that sometimes workers have limited decision-making freedom, it is crucial to possess significant communication skills through all innovation stages (Lukes & Stephan, 2017). Such individual traits would enable employees to successfully communicate their novel thoughts to their supervisors and co-workers (ibid).

Referring to the analysis above, it can be noticed that scholars split the innovation process into a different number of stages, however the content of those stages was often aligned. So it can be concluded that scholars agreed on four main stages of innovation process, namely problem identification, idea generation, idea promotion, and idea implementation, and employees contribute to all of them with their innovative work behavior, which involves an attitude to innovation and willingness to develop it. Also, it was demonstrated that the innovation process depends on the innovative behavior of employees and it is significantly important to identify what stimulates it (Purc & Lagun, 2019). The following subchapter will disclose factors influencing IWB with focus on individual-level to show the role of employees' personality traits. IWB measurement designs will be also disclosed further to propose its two perspectives, one-dimensional and multi-dimensional.

1.2.Factors influencing innovative work behavior within individual-level perspective

There is a significant number of studies that aimed to identify the main factors influencing innovative work behavior. As there is no universal framework of factors for innovative work behavior, the author of the current paper brought out some mostly related studies to provide an overview of the main domains influencing IWB and to outline its

connection with personality concept. Besides, main personality features related to IWB were identified through this theory overview.

Many researchers intended to disclose aspects impacting the innovative work behavior proposing various frameworks. Majority of them, for instance, Li and Zheng (2014) divided all possible factors in two main groups, namely individual and organizational level factors. Such multi-level framework is quite common, as it covers main actors of the innovation process, like managers as leaders responsible for the creation of an encouraging working climate to innovate (Jose & Mampilly, 2017), and employees, their subordinates, who input with their creativity, communication skills and courage to take risks, which is a crucial factor on the way to innovation (Pratoom & Savatsomboon, 2010). They usually go together, as idea generation from even the most creative employees will not lead to the successful implementation of the innovative initiative without proper conditions provided from an organizations' side (Riaz, Xu & Hussain, 2018).

Referring to the previously mentioned framework of Li and Zheng (2014), they grouped six factors that influence innovative work behavior on two levels, individual and organizational. Under organizational level, organizational innovation atmosphere, leadership, social capital, work characteristics were proposed as influential factors (ibid). This level combines factors that influence IWB on company scale, including innovation-supportive climate, constant networking among subordinates, their managers and customers, and motivational leader who recognizes employees' innovative efforts (ibid). While under the individual level, authors grouped such factors as firstly, organizational commitment, which represents a state when employees' values correspond to the ones of an organization, so he is willing to stay devoted towards improving the organizational performance, and secondly, psychological capital, which relates to workers' personality traits to support IWB (ibid). Since the current study is focused on personality factor, it is important to take a closer look at the individual level. To illustrate, psychological capital was found to predict the performance of creativity, which implies an optimistic attitude, hopefulness, ability to be original, resilient, and possessing self-efficacy or, in other words, inner confidence in task achievement (Sameer, 2018). High psychological capital means stronger intention to innovate, which is stimulated if a person is stress-resistant and flexible (resilience), confident to show good performance (self-efficacy), and stays generally positive along the way (ibid). According to Li and Zheng (2014), such a set of personality traits, as psychological capital, has an influence on an organizational innovation atmosphere factor. Similarly, the social capital factor happened to depend on internal communication in enhancing the innovative behavior (ibid). It meant that the need for

employees, who are able to freely share knowledge, communicate, and as a result, generate novel ideas, brought out the importance of the personality aspect again. As a result, it could be claimed that individual-level factors, which include certain employees' personality traits, play a significant role in innovative work behavior (ibid).

Li and Hsu in 2016 in their research on innovative work behavior traditionally outlined organizational and individual levels as the main to influence IWB. It was proposed that organizational-level factors are responsible for motivating workers' initiatives with remuneration, creating an innovation-supportive climate, and inspire positive change through managerial techniques (ibid). In contrast, individual-level factors included energetic personality, which was a novel characteristic in a common set of personality traits on the individual-level among those, which are usually outlined by researchers, such as creativity, positive attitude, and self-efficacy (ibid). This work mostly corresponded to the prior framework above.

Focusing on individual-level factors influencing innovative work behavior Siregar, Suryana, Ahman and Senen (2019) in their work traditionally identified self-efficacy, competency, motivation and commitment. However, they also outlined the importance of employees to possess such traits, as stress-resistance and emotional stability, sociability, collaboration, determination in problem-solving and enthusiasm behind those factors (ibid). These traits, in turn, can be reflected in Big Five personality traits, such as extraversion (sociability, enthusiasm) (Steel, Rinne & Fairweather, 2011), conscientiousness (determination in problem-solving) (Heinström, 2003), agreeableness (collaborativeness) (Munir & Beh, 2016), and stress-resistance (emotional stability) (McCrae, Terracciano, Sánchez-Bernardos & Jocic, 2005).

Meanwhile, the literature review done by Al-Omari, Choo, and Ali in 2020 contributed by proposing three main factor levels influencing innovative work behavior (see Figure 2). The author of the current paper referred to this study's structure, as it is the most representative due to three domains selected and, thus, provides a holistic view on factors' relationship. Even more, it is one of the most recent studies done on this topic, so it can be considered more reliable than other frameworks.

With the factors similar to previously mentioned in the works of and Li and Zheng (2014) and Li and Hsu (2016), Al-Omari, Choo, and Ali in 2020 differentiated a leadership perspective in addition to common factors on individual and organizational level. While usually leadership factor was merged with organizational-level factors (Li & Zheng, 2014).

Figure 2. Factors influencing innovative behavior

Source: Compiled by the author based on Al-Omari, Choo, and Ali (2020)

In the condition of this study, the relationship between supervisors and subordinates outlines the importance to provide employees with more freedom in making decisions in order to stimulate their IWB (Al-Omari, Choo, & Ali, 2020). It is important to distinguish this factor from organizational-level because it can directly influence individual innovative performance through such behaviors, as communication, support of creativity, and leadership from supervisors' side (Taştan & Davoudi, 2015). Regarding organizational-level factors, Al-Omari, Choo, and Ali (2020) made a unique emphasize on its connection to human resource practices responsible for recognition and cooperation in the workplace (ibid). This impact of HRM (human resource management) on the innovative work behavior could be explained by its ability to perform an important function, namely connecting individual values of employees' with the ones of the company making them both move in one direction (Bos-Nehles, Renkema & Janssen, 2017). Here traditionally the personality factor is clearly defined under individual-related factors and summarizes factors representing attitudes, personal characteristics, and workers' competency. This time work engagement in addition to organizational commitment, which was already outlined by Li and Zheng (2014) and Siregar, Suryana, Ahman, and Senen (2019), referred to individual-level factors responsible for the attitude. When defining the main trait for personal characteristics, authors proposed proactivity, which was in line with Li & Hsu (2016) (Al-Omari, Choo & Ali, 2020). In turn, proactive personality is positively related to conscientiousness, extraversion and openness (Major, Turner & Fletcher, 2006), which means that the Big Five can determine some traits, which on individual level can be associated with IWB to be tested in the current study. Regarding workers' competency, emotional intelligence was mentioned as a useful IWB characteristic (Al-Omari, Choo, & Ali, 2020). Employees, who

possess this trait, demonstrate innovative work behavior, as they tend to be supportive, understanding, and emotional, which sustains innovation on all its way (Dincer, Gencer, Orhan & Sahinbas, 2011). Similarly, referring to the Big Five, openness and extraversion can be considered as predictors of emotional intelligence again outlining the association of those traits to IWB (Alghamdi, Aslam & Khan, 2017).

Referring to insights pointed out from each of the literature works provided above the author of the current study may conclude that personality traits of employees were always included in the framework and usually grouped under individual-level factors influencing innovative work behavior. Even though leadership and organizational climate are significant factors influencing IWB (Raja & Chockalingam, 2019), workers' individual characteristics and personality played an important role and sometimes, like in the work of Li and Zheng (2014), even influencing other factors within a framework. So, it proves that personality traits can be a significant domain related to employees' innovative work behavior and it is reasonable to seek for understanding of their relationship with IWB in order to improve businesses performance (Li & Hsu, 2016). From the analysis mentioned above, the results regarding which personality traits on an individual level are related to IWB the most, were inconsistent. However, it could be noted that traditionally creativity, which in the Big Five model is determined by openness, tends to be highly associated with IWB (Javed, Khan, Arjoon, Mashkoor & Haque, 2018). Also enthusiasm, sociability, and proactive personality, which refer to extraversion, were often outlined in these frameworks as significant for IWB performance. The current paper attempts to test whether other personality traits could participate in this relationship.

Currently, there is no generally accepted measurement of innovative work behavior. However, some efforts were still made to shed the light on this complex construct identifying one-dimensional and multi-dimensional designs. Generally, most multi-dimensional IWB measurements, which will be disclosed further, can be grouped under two aspects, creativity production-related behaviors and implementation-related behaviors (Dorenbosch, Engen & Verhagen, 2005). One of the earliest propositions for measuring IWB was made by Janssen (2000), who proposed 9-items measurement with three main activities, namely, idea generation, idea promotion, and idea realization. It is important to mention that according to Scott and Bruce, who in 1994 pioneered in IWB modelling, such tasks follow stages of innovation proses and each worker can be involved in these actions in any combination and at any time. However, due to idea generation activity, which was too widely defined, Jong and Hartog (2010) added opportunity exploration as a task that should be fulfilled before coming up with an idea. So, already four activities were proposed for measurement, idea exploration,

idea generation, idea championing, and idea implementation (ibid). Idea championing activity, which is responsible for the actions that should be taken after the idea was proposed and identifies actions aimed at finding support among others to combine efforts for further idea realization, corresponds to idea promotion of Janssen (2000) (ibid). Finally, idea implementation relates to putting the idea in use in a practical working environment (Siregar, Suryana, Ahman & Senen, 2019). While Messmann and Mulder (2012) argued that such activities are highly linked with feedback, which may be generated during any of those activities adding new viewpoints and insights showing new ways and, as a result, creating more opportunities. Thus, fifth measurement activity, reflection, was proposed by the authors in their measurement with 35 items (ibid).

However, it is also common to identify IWB as one-dimensional when moving from theoretical to empirical research sometimes because of the high intercorrelation of those dimensions or their low reliability as separate domains, which does not let authors clearly distinguish between dimensions (Jong & Hartog, 2010). For instance, Scott and Bruce (1994) suggested grouping all innovative work dimensions under one scale. Kleysen and Street (2001) got evidence of one-dimensionality, however, they argued that it might be mostly due to pitfalls of the measurement model. Janssen (2000) identified significant intercorrelations between idea realization and idea generation and between idea generation and idea promotion and between idea promotion and idea realization (between three stages), which led to support one-dimensional IWB. A similar situation occurred in Jong's and Hartog's (2010) research, in which authors started by claiming there were four IWB dimensions, while their empirical research, which brought out their weak distinctiveness and high intercorrelation, supported one-dimensional IWB. For the current study, the IWB 10-items designed by Jong and Hartog (2010) were adopted and tested within the current works' data set because those items also proved to be reliable and applicable in the business field, where they were initially tested (ibid).

Referring to the theoretical background provided above, innovative work behavior, which can be determined by employees' personality factor, is significant in all four stages of the innovation process. A variety of characteristics including proactivity, stress resistance, confidence in task achievement, and creativity, which can stimulate workers to innovate on the individual level, were identified. Some of those individual characteristics of employees' personalities, in turn, can be defined by the Big Five factors. It was also revealed that there is still no generally accepted IWB measurement design, which might be explained by the relative recency of the concept. Even though it may be concluded that two types of measurements were practiced by scholars, such as multi-dimensional and one-dimensional measurements. In light

of the above, this study intends to examine how each dimension of the Big Five model of personality would relate to employees' innovative behavior.

1.3. Review of related studies on the relationship between the Big Five personality traits and employees' innovative behavior

As it was previously mentioned, the relationship between personality traits and employee innovative behavior in the workplace, as a topic, is still not fully researched, which also leads to a limited number of previously done empirical works. However, the empirical analyses of three studies will be presented below to present the relationship from practical side. Besides, selected papers provide a holistic view on the issue as assessed from different perspectives in different business fields. In this subchapter, the main findings and insights were brought out, which closely relate to the aim of this paper, and contributed to the creation of the theoretical background of the relationship (see Table 1). The current paper outlines three studies that previously explored the relationship between innovative work behavior and the Big Five personality traits, which were conducted in three different countries, namely Turkey, the UK, and Malaysia. In order to provide the reasoning behind using these three studies, the author brought out the cultural dimensions of Hofstede theory. This concept, designed by Geert Hofstede (1984, 2011) can be considered as a universal technique, which aims to clarify the effect of culture on the working environment, and is widely applied in business management, which makes it useful for the current purpose (Gonzalez, 2008). Including six relative cultural dimensions, namely individualism-collectivism, power distance, masculinity-femininity, long-short term orientation, uncertainty avoidance and indulgence, this model enables cultural comparison (ibid). According to Hofstede Insights country comparison tool, it becomes clear that Ukraine being an Eastern European nation, Turkey southeastern European country, Malaysia, as a country of South-East Asia, share several similarities, like high level of power distance, which outlines the acceptance of unequal power distribution, which on an organizational level reflects the importance of status and certain hierarchy (Hofstede insight.com, n.d.). Another similarity was strong collectivist background meaning that people tend to be interdependent and prioritize relationship in the workplace (ibid). Similar level of femininity again reflects that for all three nations there is higher importance of status rather than individual achievements in the working environment (ibid). While the UK is a vivid representative of the Western Europe and individualistic culture, it also has similarly high level of long-term orientation (ibid).

Table 1

Overview of previous empirical literature

Author, year of publication	Aim of the research	Methods used	Big Five personality traits assessed	Findings
Yesil & Sozbilir, 2013	**"**aims to explore the effect of personality characteristics on individual innovation behavior." (p.540)	Self-assessment; questionnaire distributed through random sampling; assessed with structural equation modelling; results were evaluated via Smart PLS.	Neuroticism, extraversion, openness, agreeableness, conscientiousness.	Significant, positive relationship between openness and IWB; insignificant relationship between agreeableness, conscientiousness, neuroticism, extraversion and IWB.
Woods, Mustafa, Anderson & Sayer, 2018	"to report a study of the moderating effects of tenure on the associations of traits and IWB, and apply a theoretical lens based on the trait-activation theory." (p. 29)	Self-reported traits with supervisor-rated innovative work behavior; assessed with hierarchical regression analyses.	Conscientiousness and openness.	Insignificant relationship between openness and IWB; insignificant relationship between conscientiousness and IWB.
Hamdy et al., 2019	**"**to discuss the impact of big five personality traits of the Islamic banks on their employees' innovative work behavior." (p. 1)	Self-assessment; stratified sampling; assessed with multiple regression analysis.	Openness, extraversion, agreeableness, conscientiousness, and emotional stability (opposite for neuroticism).	Significant, positive relationship between openness and employee innovative behavior; insignificant relationship between agreeableness, emotional stability, extraversion, conscientiousness and IWB.

Source: compiled by the author

It means that both Ukraine and the UK are countries of pragmatic orientation, which identifies orientation on results and traditions in the workplace (ibid). This way it becomes clear that the three countries brought out for the review of previous studies have similar cultural dynamics and similarities in working environments, which makes generalization based on their results applicable for the current study of Ukrainian firms.

Referring to the first study conducted by Yesil and Sozbilir in 2013 in Turkey, the target group of hotel employees was used to assess the relationship between personality traits and individual innovative behavior relying on the Big Five model. The usable sample size of this study was 57 responses gained from hotels in one Turkish region, Kahramanmaras. This study is useful, as it assessed all Big Five personality traits of employees in the working environment, which is in line with the aim of the current paper. Besides, similarly to manufacturing, the hospitality industry has constant innovation as a preference to enable fast and enhanced quality service provision in the condition of growing competition in this sector (Meira, Anjos & Falaster, 2018). So, innovation significantly contributes to quality development and as a competitive advantage for both the hospitality and manufacturing industries. Regarding the methodology, the work of Yesil and Sozbilir used five personality items for personality identification and six items for individual innovation behavior measuring. Also, authors took a self-assessment approach, which is also adopted by the current study, however, may be less accurate compared to supervisor-rating (Donaldson & Grant-Vallone, 2002). Referring to the main findings, this research proved that openness, which is responsible for creativity and imagination, has a positive significant relationship with employee innovative behavior (ibid). However, it also outlined that all other traits, namely extraversion, conscientiousness, agreeableness, and neuroticism do not have a significant relationship with individual innovative behavior (ibid). This finding, even though they are controversial to the theoretical background, may be explained by studies' limitations, like small sample size. Therefore, it may be more efficient for the author of the current paper to expand the sample size to test further if the result will be different. Nevertheless, the work suggests that hotels should consider relevant personality traits in employees' selection. Besides, those who scored high in openness would be a great asset for companies, as their curiosity and openness to new experiences supports changes and, thus, drives innovation. Nevertheless, this is yet to be tested how employees' personality influences innovative behaviors using data from Ukraine on the basis of this study.

Woods, Mustafa, Anderson, and Sayer in their study in 2018 in addition to testing the effect of personality traits on innovative behavior in the workplace also included a third

variable, such as job tenure, which was added to test its moderating effect on the relationship. It mostly refers to employees' experience in the workplace and offers a different perspective for a reader (ibid). The use of multiple dimensions for measuring innovative behavior, namely idea initiation, its promotion and realization, provides a holistic vision on this relationship. Such an approach as self-assessment (seven-point scale range) in combination with a supervisor-rated innovative behavior might be more objective compered to previously disclosed work of Yesil and Sozbilir (2013). However, here authors assessed only openness and conscientiousness differently from current works' task and from ones of Yesil and Sozbilir's (2013) paper, which considered all Big Five traits. In the case of Woods, Mustafa, Anderson, and Sayer (2018) usable sample size was big enough, namely 207 responses. With this study, the relationship was assessed from the financial field perspective, as the target group were graduate trainees of a managerial program in a UK-based company focused on financial services. The sample was drawn from five different types of programs, namely, retail, management academy program, commercial, operations, and executive management (ibid). This study is a great contribution to the current paper, as features of financial services segment are pretty much close to manufacturing. For instance, globalization and technology development shapes financial services and requires to adopt innovations to keep up with modern customers (Mention & Torkkeli, 2014). This corresponds to manufacturing, which in response to the launch of new products, has to constantly improve and adjust its techniques (Mamasioulas, Mourtzis & Chryssolouris, 2020). Besides, currently the distinction between the service and manufacturing sector are disappearing because of increasing competition where manufacturers, in order to outperform their peers, started to add service to their products (Santamarìa, Nieto & Miles, 2012). This enables the author of the current study to generalize on the basis of this work.

As the main findings of this study (Woods, Mustafa, Anderson & Sayer, 2018) authors outlined that the longer the employee stays in the organization being highly conscientious, less innovative behavior (idea initiation, idea promotion and realization) can be expected from them. The results were the opposite for openness personality trait. It was proved that the longer the person, who is creative and open to experiences, stays in the company, more novel ideas he or she initiates (ibid). However, what is more important for the current study, authors surprisingly identified that the relationship between IWB dimensions and personality traits was insignificant. It was also outlined that even though there is a link between personality traits and innovative behavior, it does not play the main role in influencing it (ibid). This way Woods, Mustafa, Anderson and Sayer (2018) suggested to consider the interconnection between job

tenure and personality traits to identify its effect on innovative behavior. In such a combination, personality traits can reflect whether with a longer career path in one company employee may be more or less eager to innovate in the workplace. Referring to these findings of the second study revealed above, the relationship was viewed from the perspective of the moderate effect of tenure variable, so the author of the current paper would not consider it the main source to make assumptions about the relationship. However, it was rather useful proposing insights regarding the relationship between openness, conscientiousness and innovative behavior.

The third study was completed by Hamdy et al. (2019) in Malaysia. This research was conducted in the banking sector with workers of an Islamic bank as a target group. However, similarly to the research of Woods, Mustafa, Anderson, and Sayer (2018), it also partly covered the financial sector, as the sample was taken from four different clusters, namely financial institutions, local banks, banks from abroad located in Malaysia and institutions of the 4 financial departments. Banking industry heavily depends on Information Technology (IT) in value creation and strengthening the relation with customers, which corresponds to previously mentioned characteristics of the manufacturing sector, which are also shaped by technology development (Achimba, Ongonga, Nyarondia & Amos, 2014). The authors gained 397 usable survey results, which makes up the largest sample size among other studies proposed above, thus, can be considered the most reliable one to refer to (ibid). Also, measuring the relationship between the big five and innovative behavior authors used multiple regression (ibid). What is outstanding is that Hamdy et al. (2019) used the combination of wealth objective of Maqasid al Sharia, author of legal doctrine, which was further incorporated in an organizational approach for Islamic organizations (Hurayra, 2015), and Maslow's Hierarchical Needs as a background for their research. From this approach an aspect that may also affect the innovative behavior was brought out. Namely, that employees want to satisfy the ambition to express themselves through creativity as well as performing duties, for instance, as in the case of Hamdy et al. (2019), religion. The authors commonly found out that openness is the only trait that has a significant relationship with innovative behavior outlining its positive direction (ibid). This study by Hamdy et al. (2019) also revealed that other traits, namely conscientiousness, extraversion, agreeableness and emotional stability did not demonstrate significance in the relationship, which was again not in line with theoretical findings. Nevertheless, these relationships were also verified in the current study. It brings out the main practical suggestion to employ workers with high openness scores to drive innovation. Also, the importance of personality traits in employee selection process was claimed.

It might be noticed that in the case of two studies (Yesil & Sozbilir, 2013); Hamdy et al., 2019) only openness out of five traits had a significant relationship with innovative work behavior, while in the case of Woods, Mustafa, Anderson and Sayer (2018) significance was not identified for all two traits researched. Those findings were inconsistent with the theoretical background of the relationship between IWB and Big five traits discovered in the first two subchapters. To understand whether for the current data set the results would be similar or not, this relationship was tested in the Ukrainian context. From the literature reviewed in this theoretical chapter, the author proposed the following hypotheses to be stated:

H1: Openness has a positive relationship with employee innovative behavior.

H2: Emotional stability has a positive relationship with employee innovative behavior.

H3: Conscientiousness has a positive relationship with employee innovative behavior.

H4: Extroversion has a positive relationship with employee innovative behavior.

H5: Agreeableness has a positive relationship with employee innovative behavior.

This work contributed to the identification of the relation between all Big Five personality traits and innovative behavior of employees in the Ukrainian manufacturing segment by testing the hypotheses above. Results of the following empirical part could be also a significant input into human resource management, namely selection process and innovation management by shedding the light on innovative work behavior.

2. Empirical examination of the relationship between the Big Five and innovative behavior of Ukrainian manufacturing firms' workforce

2.1. Methodology

This subchapter was aimed to introduce the reader to how respondents of the current study were sampled, how the data was collected, and which measures were used to achieve the aim before getting to the analysis. The current research aims to identify the relationship between the Big Five personality traits of employees and employee innovative work behavior of sampled three Ukrainian manufacturing firms. The quantitative approach was employed by the researcher, as it may be also brought out from previous empirical studies, the quantitative approach is the most reliable and efficient for the identification of this relationship (Fraley & Marks, 2005). Generally, the quantitative research approach is considered to be less time-consuming compared to the qualitative one, as it involves using statistical software, like in the case of the current paper, SPSS (Rahman, 2016). Besides, it requires a large sample size, which was collected for the current study. This condition allows making the generalization more

freely and on a larger population (ibid). However, such an approach has a disadvantage, namely, its focus is rather related to the identification of relationships and effects rather than underlying meaning behind them when found (ibid). To minimize this downfall, the author of this work included a discussion part where all findings were explained.

Regarding research design and sampling technique the author applied primary data collection and convenient sampling, which refers to the non-probability (nonrandom) sampling technique. Even though it has some disadvantages, like the subjectivity in the selection of the sample, which may lead to outliers, it is still widely used for quantitative research and is reasonable for the current work (Etikan, 2016). Since the population of manufacturing workers in Ukraine is very large, it makes it quite difficult to estimate (ibid). This type of sampling is considered cheap, helpful in estimating available subjects and not time-consuming (ibid). Besides, convenience sampling is common to use when conducting research in social science and business fields, which corresponds to the currently studied area (Galloway, 2005).

To measure the variables of interest, namely, rate innovative behavior and identify the degree of all personality traits, two anonymous questionnaires (both in one google form) were distributed among interviewees as a data-gathering method. The questionnaires were scored on Likert scale format, which is one of the main tools to measure behavior in social science (Joshi, Kale, Chandel & Pal, 2015) and was analogically used in previous studies on this topic by Yesil and Sozbilir (2013), and Hamdy, et. al (2019). In this research, the Likert scale was used to measure such complex concepts, as personality traits and innovative work behavior. In the current study Likert type scale was used with response options ranging from “strongly disagree” to “strongly agree” in case of measuring the Big Five traits and options ranging from “not at all” to “frequently” to measure innovative work behavior.

Both questionnaires are structured and in the format of self-assessment, with the first being the 44-item structured Big Five Inventory (BFI) for personality trait measurement, and the second being the self-assessment questionnaire for an employee to measure IWB.

The first questionnaire was the 44-item structured Big Five Inventory (BFI), reworked by John and Srivastava based on the original BFI by Goldberg (1993) and cited in their work History, Measurement, and Theoretical Perspectives (1999). In this study, the reworked BFI by John and Srivastava was used, because they provided shortened version (44-items) through the exclusion of the downfalls of the original one, such as ambiguity and dual items’ meanings, while keeping its advantages, such as simplicity of items (a form of adjectives) (John & Srivastava, 1999). For this questionnaire, a self-assessment form was used, as the adult population was tested (Ortet, Martínez, Mezquita, Morizot & Ibáñez, 2017). The reasoning

why the Big Five assessment was used, lies in its main advantage, namely that it is universal (ibid).

The questions for IWB questionnaire were retrieved from a previously mentioned research conducted by Jong and Hartog in 2010 on Measuring Innovative Work Behavior. After the assessment of its reliability within the data set gathered for the current study, it was identified that idea exploration, idea generation, idea championing, and idea implementation were not reliable enough to measure the concept as four separate dimensions. Hence, they were grouped under a single IWB dimension, which also corresponded to Jong and Hartog's findings (2010). Initially, Jong's and Hartog's questions were aimed to serve as supervisor-rating, which was modified by the author to serve as self-assessment for the current study to allow self-rating. However, there may lay a limitation, as self-assessment is considered to be less reliable because it is a single-source data, which may be less objective (Harris & Schaubroeck, 2006).

The procedure for data collection was conducted as follows. Regarding selection criteria, the author assessed employees in three Ukrainian manufacturing firms. Those workers rated themselves on the Big Five personality and IWB. Confidentiality and voluntary participation was assured. The research covered such departments, as supply chain, sales, marketing, HR, and IT. The reasoning behind that can be explained as follows. For instance, sales people need to innovate constantly due to increasing customers' demands and complexity of commodities (Matsuo, 2009) same as marketing demands creation and implementation of new ideas for an efficient value communication and building and maintaining relationships with customers and, as a result, improve companies' performance (Tinoco, 2010). And human resource needs to introduce innovative HRM practices to keep up with competitors influencing the environment (Koster, 2006). Innovation technology also faces a necessity to provide innovative inputs to successfully support operations within the company and requesting clients' feedback for further improvement of the product (Naidoo & Hoque, 2018). The supply chain department practices innovation for the improvement of chains' performances, decreases expenses, and increases customers' satisfaction (Artsiomchyk & Zhivitskaya, 2015). Participants were recruited online due to the current pandemic. The same reasoning is behind using online questionnaire, namely Google form with the survey research design, for which the script was written by the author based on the 44-item Big Five Inventory (BFI) (John & Srivastava, 1999) and Innovative work behavior measurement designed by Jong and Hartog (2007). The online questionnaire (Google form) was applied by the author, as it does not require high competence in technology to create and manage and is a financially affordable tool (Wright, 2017). Generally, the technique, which involves surveys done online, has some

downfalls, such as possible bias, which may occur due to the respondents' will to participate (Szolnoki & Hoffmann, 2013). However, such an electronic method is considered engaging, visually appealing, and flexible, which makes it applicable for this study due to the current impossibility of manual primary data collection (ibid).

After collecting the data, the Pearson's correlation coefficient was used to analyze the relationship between Big Five personality and employee innovative behavior and its direction, which is important to achieve the current research's aim (Obilor & Amadi, 2018). In previous empirical studies, which also researched this topic, mostly regression analysis was used (Woods, Mustafa, Anderson & Sayer, 2018; Hamdy et. al., 2019). Even though regression, compared to correlation, has a power of prediction, both correlation and regression as measurements can be used to identify association and the link between variables (Bewick, Cheek & Ball, 2003). Although both methods can estimate relationship, the author chose the correlation analysis, as the current study is being conducted on a bachelor level. This way, it was investigated how each Big Five personality trait, as the independent variable, is related to innovative behavior, which is a dependent variable.

2.2. Analyses of the relationship between Big Five personality traits and IWB in the Ukrainian context

The research started with the coding of demographic data collected from three manufacturing companies assigning all labels with numeric values in order to conduct its further analysis. In the Big Five questionnaire, five demographic questions were included, the results of which were estimated in the following section (see Appendix B). There was a total of 146 individuals in the study ranging in age from 18 to 64 years. The largest proportion fell into the 35- to 44-year-old age group at 38.4% (n = 56). Just under 30% (namely 29.45%) (n = 43) were 25 to 34 year olds, 21.2% (n = 31) were 45 to 64, 8.2% (n = 12) were 55 to 64, and 2.7% (n = 4) of respondents were from 18 to 24 year olds. Of all the participants, 60.3% (n = 88) were female and 39.7% (n = 58) were male. The majority, at 67.8% (n = 99) had achieved a master's degree, while 25.3% (n = 37) had a bachelor's and 6.8% (n = 10) had a high school degree or equivalent. All of the individuals in the study worked in the manufacturing industry but in various departments. The largest proportion, at 33.6% (n = 49), reported they worked in human resources. Approximately 26% (namely 26.71%) (n = 39) worked in information technology and sales each. Just over 10% (namely 10.27%) (n = 15) worked in supply chain, while the remaining 2.7% (n = 4) worked in marketing.

In order to conduct the tests of hypotheses, the survey items related to each scale need to be integrated into a single average scale that represent the underlying concept. To do that the scale's reliability needs to be tested using Cronbach's Alpha. The scales' Alphas were optimized using the SPSS's 'Scale if Item Deleted' option. Whenever the exclusion of an item resulted on an improvement of Alpha, the procedure was executed again without that given item. The results reported below are the final set of items for each scale, after these iterations. For agreeableness, two items were excluded and the resulting Alpha of the remaining seven items was roughly acceptable ($\alpha = 0.70$). For consciousness and emotional stability, no items needed to be excluded. Four items were excluded from extraversion, increasing Alpha from 0.66 to 0.74. Five items were excluded from openness, increasing Alpha from 0.77 to 0.82. With respect to IWB, the different dimensions of the concept were tested separately. The Alphas were barely acceptable ($\alpha > 0.700$). The highest observed Alpha was for idea generation ($\alpha = 0.83$). Idea exploration (2 items) showed a non-acceptable Alpha ($\alpha = 0.52$). A one-dimension scale (10 items) showed an Alpha of 0.88, which increased to 0.89 with the exclusion of one of the items of Idea Exploration. That is why a one-dimensional scale measuring innovative work behavior was used for the current study which was also in line with results of Janssen (2000) and Jong and Hartog (2010). So the scales used in the current work can be considered to be optimized regarding reliability (Pallant, 2010). With all the scales successfully tested for reliability, the analysis proceeded.

Table 2

Reliability Analysis

Construct	Item	Mean	Std. Deviation	Alpha
Innovative Work Behavior	Idea_Generation1	2.66	0.86	0.89
	Idea_Generation2	2.49	0.78	
	Idea_Generation3	2.60	0.70	
	Idea_Implementation1	2.26	0.96	
	Idea_Exploration2	2.92	0.78	
	Idea_Championing2	1.95	0.91	
	Idea_Championing1	2.32	0.93	
	Idea_Implementation2	2.50	0.91	
	Idea_Implementation3	2.62	0.86	
Agreeableness	AGR2	3.79	1.07	0.70
	AGR3R	4.47	1.01	
	AGR4	4.03	0.98	
	AGR5	3.58	1.01	
	AGR6	3.67	1.03	
	AGR7	4.05	0.94	

	AGR8	3.75	1.21	
Consciousness	CN1	4.52	0.78	0.73
	CN2R	3.79	1.16	
	CN3	4.68	0.65	
	CN4	4.4	0.82	
	CN5	3.88	1.15	
	CN6	4.43	0.85	
	CN7	4.05	0.86	
	CN8	4.08	0.84	
	CN9R	3.47	1.05	
Emotional Stability	ES1R	4.17	1.07	0.71
	ES2	3.27	1.07	
	ES3	2.78	1.03	
	ES4	2.93	1.19	
	ES5	3.78	0.99	
	ES6	3.58	1.11	
	ES7	3.84	0.91	
	ES8	3.58	1.14	
Extraversion	EX1	3.47	1.13	0.74
	EX3	3.94	0.93	
	EX4	3.82	0.94	
	EX8	4.20	0.88	
Openness	OP1	3.64	1.08	0.82
	OP3	3.39	1.09	
	OP4	3.73	1.08	
	OP5	3.71	0.92	
	OP8	4.11	0.94	

Source: based on statistical analyses conducted by the author

As the next step, the author of the current paper conducted descriptive statistics. The table below shows the results of the descriptive statistics for the variables of interest.

Table 3
Descriptive Statistics

	n	M	SD	Range	Minimum	Maximum
Innovative Work Behavior	146	2.48	0.63	2.89	0.89	3.78
Agreeableness	146	3.90	0.62	3.57	1.43	5.00
Consciousness	146	4.14	0.52	2.44	2.56	5.00
Emotional Stability	146	3.49	0.61	2.75	1.88	4.63
Extraversion	146	3.86	0.73	3.50	1.50	5.00
Openness	146	3.72	0.78	3.20	1.80	5.00

Source: based on statistical analyses conducted by the author

The total sample size was 146 and the highest mean was observed for consciousness (M = 4.14), while openness, which traditionally identifies innovative employees, had a lower mean (3.72). However, the lowest was shown by IWB (M = 2.48), which meant that on average workers considered their level of innovativeness as quite low on a 5 point-scale used. In

addition, on average employees of researched companies rated themselves as being less emotionally stable compared to the ratings of other traits. The table also shows the standard deviations, minimum and maximum values observed for each scale.

To conduct Pearson's correlation analysis, three assumptions have to be fulfilled, to be more precise, big enough sample (more than 100 respondents), scale data and linearity. Scale data was reported by respondents in a form of scores in both Big Five traits and IWB questionnaires during data collection stage. Since the number of respondents within the scope of the author's work was 146, which is more than 100, the author might assume two first assumptions were met. In addition, as the first two assumptions were met, the author of the work proceeded with the third assumption. Thus, before conducting the correlation analysis, the assumption of a linear relationship between variables was checked using scatter plots. If the pattern of the dots on a scatter plot refers to a non-linear pattern (such as a curvilinear pattern), the assumption of linearity would be violated. The figures below show the results (see Appendix C). According to figures provided in Appendix C there were no patterns of non-linearity identified, which means that assumption was met and the author proceeded with the Pearson's correlation coefficient to find out the relationships between IWB and the Big Five personality traits.

Conducting correlation analysis, it is important to mention that correlation coefficients are indicators of associations between variables (Pallant, 2010). Values between 0.10 and 0.29 indicate a small degree of association, while values between 0.30 and 0.49 are considered medium and values higher than 0.50 represent a high degree of association (Cohen, 1988). A positive coefficient would mean a positive association. That is, when the values of one variable increase, the other variables increase as well. Negative coefficients mean an inverse relationship. Table 8 shows the correlation matrix of a type of analysis, which is appropriate for continuous variables (Pearson's correlation).

Table 4
Correlation Matrix

	n	M	SD	1	2	3	4	5	6
1. Innovative Work Behavior	146	2.48	0.63	-					
2. Agreeableness	146	3.90	0.62	0.10	-				
3. Consciousness	146	4.14	0.52	0.30***	0.29***	-			
4. Emotional Stability	146	3.49	0.61	0.10	0.24**	0.35***	-		
5. Extraversion	146	3.86	0.73	0.40***	0.40***	0.38***	0.34***	-	
6. Openness	146	3.72	0.78	0.67***	0.20*	0.32***	0.13	0.50***	-

*Notes. ***p < .001;*
***p < .01;*
**p < .05.*
Source: based on statistical analyses conducted by the author

As a result, referring to the table above, the author can outline that consciousness shows a moderate positive significant correlation with innovative work behavior (IWB) ($r(146) = .30$, $p < .001$). Extraversion also shows a strong positive and significant association with IWB ($r(146) = .40$, $p < .001$) similarly with openness ($r(146) = .67$, $p < .001$), which demonstrated strong positive and significant correlation with innovative work behavior. However, agreeableness and emotional stability do not have a significant relationship with IWB, which corresponds to previous empirical studies on this relationship (Yesil & Sozbilir (2013); Hamdy et. al (2019)). The table below (Table 5) shows the results of all the hypotheses that were established in the study and which were tested and demonstrated above.

Table 5
Summary of Hypotheses tests

Hypotheses	Null Hypothesis	Alternative Hypothesis
H1: Openness has a positive relationship with employee innovative work behavior.	Rejected	Accepted
H2: Emotional stability has a positive relationship with employee innovative work behavior.	Accepted	Rejected
H3: Conscientiousness has a positive relationship with employee innovative work behavior.	Rejected	Accepted
H4: Extraversion has a positive relationship with employee innovative work behavior.	Rejected	Accepted
H5: Agreeableness has a positive relationship with employee innovative work behavior.	Accepted	Rejected

Source: author's own elaboration from study findings

Concluding these results, the author can claim on the basis of the current data set that openness, extraversion and consciousness can be associated with innovative work behavior, which leads to the rejection of the null hypothesis and acceptance of an alternative hypothesis. Added to it, agreeableness and emotional stability do not have an association with IWB, which does not allow the author to interpret the direction of their relationship and this, in turn, leads to the acceptance of a null hypothesis and the rejection of an alternative hypothesis. In order to reflect the theoretical background and outcomes of previous empirical studies on those findings, the author completed the discussion below.

2.3. Discussion of findings

To discuss the findings of the current study the author referred to the results of previous works researching this relationship. In an empirical research above, it was identified that openness had a significant and positive relationship with innovative work behavior, which corresponded to two out of three works brought out in the theoretical chapter of the current paper (Yesil & Sozbilir, 2013; Hamdy et al., 2019). Besides, the tendency of

openness associated with innovative work behavior was also commonly supported theoretically (Roccas, Sagiv, Schwartz & Knafo-Noam, 2002). Employees who scored high on openness tend to be curious, have a strong imagination, and outside the box thinking, which makes them inventive and, consequently, encourages innovative work behavior (ibid). Open to new experiences they support innovative initiatives in the workplace. Regarding the relationship between conscientiousness and IWB positive association was identified proving that such traits, as a strong sense of responsibility and self-discipline represented by conscientiousness can be related to innovative behavior in the workplace (Heinström, 2003). Workers, who are persistent and results-oriented, can provide innovation with efficient support needed for the successful implementation. However, these trait findings were inconsistent, as all three previously mentioned empirical works found this relationship to be insignificant**.** Extraversion theoretically proved to be an important trait associated with innovative work behavior because it implies enthusiasm, engagement with the environment (Steel, Rinne & Fairweather, 2011), and significant communication skills, which are crucial for successful innovation (Lukes & Stephan, 2017). This might explain why for the current study such a relationship was also identified as being positive. However, the findings brought out from previous two studies, which covered the relationship between extraversion and IWB, were again not in line with theory and current studies' results. Both works conducted by Yesil and Sozbilir (2013) and Hamdy et.al. (2019) identified this relationship as being insignificant.

Such differences between the current study and previous works identifying insignificance of IWB relationship with extraversion and consciousness might be caused by study designs and certain actual population issues. For instance, in the case of Yesil and Sozbilir (2013), the sample size was 57, which could lead to an increase of statistical noise and, thus, to such insignificance of the relationship, while the sample size of the current study was larger, namely 146. Referring to the difference between the current work and the second study conducted by Woods, Mustafa, Anderson and Sayer (2018) regarding the relationship between IWB and consciousness provided above, the author would assume that the reason behind it was that authors applied both self-assessment and supervisor-ratings, while for the current study only self-assessment was used. In the case of Hamdy et.al. (2019), the difference between its results and those of the current paper might lie in the sampling technique. To be more specific, Hamdy et.al. (2019) applied stratified sampling meaning their research population was divided into separate groups based on common features of respondents, which, in turn, belongs to probability sampling and requires a sampling frame

(Parsons, 2017). In contrast, for the current study non-probability convenience sampling was used due to the inability to estimate a sampling frame, which could lead to an inconsistency of findings with ones of Hamdy et.al. (2019). Therefore, it might be suggested that further empirical works should be conducted in order to test the association of IWB with extraversion and consciousness.

Regarding agreeableness, both the current study and previous empirical works by Yesil and Sozbilir (2013) and Hamdy et.al. (2019) identified its relationship with IWB as being insignificant, which was not in line with its theoretical background. Thus, referring to previous studies and the current works' results, it might be assumed that prioritizing compromising (agreeableness) might not lead individuals to the initiation of IWB. Thus, these results suggest that demonstration of innovative work behavior can be less likely associated with those employees, who to a significant extent, possess toleration and cooperation (scored high on agreeableness). The next finding of the current study was an insignificant relationship between emotional stability and IWB. It was a surprising result because even though it was in line with previous works by Yesil and Sozbilir (2013) and Hamdy et.al. (2019), it was quite inconsistent with its theoretical base, which claimed the importance of stress-resistance for the demonstration of innovative work behavior (Siregar, Suryana, Ahman & Senen, 2019). Nevertheless, based on the results of the current work and previous studies mentioned above, the author can assume that the ability to be in control of emotions in tense situations and staying positive is less likely to be related to the IWB of employees.

Referring to the results of the current study, it is important to keep in mind its limitations. Firstly, non-probability sampling was used with no sampling frame estimated, meaning that not all manufacturing companies in Ukraine had an equal chance to be represented. Thus, the author cannot claim that the generalization can be made based on current results. Secondly, IWB was measured in a self-assessment form (single-source data), which may influence the objectivity of responses (Harris & Schaubroeck, 2006). However, it can serve as a contribution to future studies to be conducted on the relationship between Big Five personality traits and innovative work behavior but which would be larger and composed of a variety of individuals in various industries and departments or also in the manufacturing industry but with a sample frame estimated. Besides, it would be a significant input if a future research would identify the effect of personality traits on innovative behavior.

Conclusion

In the current study, the theoretical relationship between each Big Five personality trait and innovative work behavior was tested empirically in the Ukrainian context. Within the theoretical research of the current paper, the author identified Big Five personality traits and innovative work behavior as concepts and with the focus on their relationship. Firstly, all personality traits were defined from the perspective of employee innovative behavior in the workplace. Even though the reader was provided with various viewpoints of researchers on this relationship following patterns were outlined. Openness as a trait revealed to be responsible for active imagination, creativity, outside the box thinking, which, in turn, associates with IWB. Employees, who scored high on consciousness, tended to demonstrate innovative behavior through determination in goal achievement and results-orientation. Also, it was explored that agreeableness as a third trait associates with cooperation and a positive attitude, which improves teamwork and supports employee innovativeness. Literature that researched the relationship between extraversion and IWB demonstrated that such characteristics, as confidence and sociability, are associated with innovative behavior in the workplace. And finally, neuroticism (opposite of emotional stability), as a trait, theoretically proved to be mostly inherent in employees, who have negative emotions dominating, and who have low stress-resistance in the working environment. Such features did not correspond to innovative behavior, while in most cases even a negative relationship was proposed. Secondly, the most cited definition of an innovative work behavior designed by West and Farr (1990) was introduced, which was also the most related to the current topic, as it disclosed the concept from employees' contribution perspective as a key element to drive IWB. Besides, linear model of the innovation process was brought out in order to vividly demonstrate how employee innovative behavior following its stages inputs it. Thirdly, the author discovered factors influencing IWB, where workers' personality was grouped under individual-level factors. By conducting an overview of four different factor frameworks, the author provided evidences on which particular personality characteristics were associated with IWB on an individual level. In addition, such characteristics, as creativity, which falls under openness trait from the Big Five model, and proactivity, which can be defined by conscientiousness, extraversion, and openness, were most frequently outlined by different researchers. Also, the reader was provided with the theoretical background of IWB measurement, where one-dimensional and multi-dimensional designs were introduced, and one of which was tested within the data set of the current study. To shed the light on this relationship from the practical side, the author analyzed three previous empirical studies

conducted on the relationship with the focus on their findings. And finally, based on described above discoveries of theoretical review, five hypotheses were proposed for a further empirical research. After assessing three Ukrainian manufacturing companies, collecting 146 responses, improving scales reliability, checking assumptions, and bringing out descriptive statistics, correlation analysis was conducted. Within this empirical research, it was identified that openness, agreeableness, and consciousness have a positive and significant relationship with IWB, while agreeableness and emotional stability did not have a significant association, which, in turn, suggests they might not be linked with IWB. Following the steps above the aim of the current study was achieved.

A preliminary investigation of how personality traits are associated with IWB was conducted**.** Even though the author cannot claim that the results of the current study are appropriate for a generalization due to its limitations, it can still contribute to further larger studies by providing an insight on the direction of the relationship in the manufacturing industry. It can be suggested that a further investigation on this relationship would be conducted not only in the manufacturing industry but expanding it to other fields with a larger sample size and sampling frame estimated. Besides, future studies could be built up on this work to find causal models that explain the direct and indirect effects of each trait on IWB, which would be also a useful contribution to hiring standards and innovation management.

References

1. Abdullah, I., Omar, R. & Panatik, S.A. (2016). International Review on Personality, Creativity and Innovative Behaviour. *International Review of Management and Marketing, 6*(1), 177-182.

2. Achimba, C., Ongonga, J.O., Nyarondia S.M. & Amos A.L. (2014). Innovation in Banking Industry: Achieving Customer Satisfaction. *Open Journal of Business and Management, 2*(4), 261-274.

3. Adner, R. & Kapoor, R. (2010). Value Creation in Innovation Ecosystems: How the Structure of Technological Interdependence Affects Firm Performance in New Technology Generations. *Strategic Management Journal, 31* (3), 306-333.

4. Alghamdi, N.G., Aslam, M. & Khan, K. (2017). Personality Traits as Predictor of Emotional Intelligence among the University Teachers as Advisors. *Education Research International Article, 3*, 1- 6.

5. Alhendi, O. M. (2019). Personality Traits and Their Validity in Predicting Job Performance at Recruitment: a Review. *International Journal of Engineering and Management Sciences 4*(3), 222-231. DOI:10.21791/IJEMS.2019.3.21.

6. Ali, I. (2018). Personality traits, individual innovativeness and satisfaction with life. *Journal of Innovation & Knowledge, 4* (1), 38-46.

7. Al-Omari, M.A., Choo, L.S. & Ali, M.A. (2020). Innovative Work Behavior A Review of Literature. *International Journal of Psychosocial Rehabilitation*, 23 (2), 39-47.

8. Artsiomchyk, Y. & Zhivitskaya, H., (2015). Designing Sustainable Supply Chain under Innovation Influence. *IFAC-PapersOnLine*, 48 (3), 1695-1699.

9. Baptiste, B. (2018). The Relationship Between the Big Five Personality Traits and Authentic Leadership. *Walden Dissertations and Doctoral Studies*, 1-143.

10. Bos-Nehles, A., Renkema, M. & Janssen, M. (2017). HRM and innovative work behaviour: a systematic literature review. *Personnel Review, 46*(7), 1226-1253.

11. Bos-Nehles, A.C. & Veenendaal, A.R. (2019). Perceptions of HR practices and innovative work behavior: the moderating effect of an innovative climate. *The International Journal of Human Resource Management, 30* (18), 2661-2683, DOI: 10.1080/09585192.2017.1380680

12. Bewick, V., Cheek, L. & Ball, J. (2003). Statistics review 7: Correlation and regression. Crit Care 7,7(6), 451–459. DOI: 10.1186/cc2401

13. Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Erlbaum.

14. Dereli, D.D. (2015). Innovation Management in Global Competition and Competitive Advantage. *Procedia - Social and Behavioral Sciences, 195*, 1365 – 1370.
15. Dincer, H., Gencer, G., Orhan, N. & Sahinbas, K., (2011). The Significance of Emotional Intelligence on the Innovative Work Behavior of Managers as Strategic Decision-Makers. *Procedia Social and Behavioral Sciences, 24*, 909-919.
16. Donaldson, S.I. & Grant-Vallone, E. (2002). Understanding Self-Report Bias in Organizational Behavior Research. *Journal of Business and Psychology, 17*(2), 245-260. DOI:10.1023/A:1019637632584
17. Dorenbosch, L., Engen, M.L. & Verhagen, M. (2005). On-the-Job Innovation: The Impact of Job Design and Human Resource Management through Production Ownership. *Creativity and Innovation Management, 14*(2), 129–141.
18. Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics, 5* (1), 1-4.
19. Fraley, C.R. & Marks, M.J. (2005). *Encyclopedia of Statistics in Behavioral Science* (3rd ed.). Wiley.
20. Galloway, A. (2005). *Encyclopedia of Social Measurement*. Amsterdam: Elsevier.
21. Goldberg, L.R. (1990). An alternative "description of personality": The Big-Five factor structure. *Journal of Personality and Social Psychology, 59*(6), 1216–1229.
22. Gonzalez, C.B. (2008). The Cultures of International Management. *International Business & Economics Research Journal, 7* (7), 95-114.
23. Hamdy, A., et. al (2019). Connecting the dots between the Big Five and innovative work behaviour: Maslow and Maqasid Al-Shari'a Perspectives. *Revista Espacios, 40* (27), 40.
24. Harris, M.M. & Schaubroeck, J. (2006). A meta-analysis of self-supervisor, self-peer, and peer-supervisor ratings. *Personnel Psychology, 41*(1), 43-62.
25. Heyets, V., Gryga, V., Bazhal, I. & Boiko, O. (2015). *Innovative Ukraine 2020: national report*. National academy of science of Ukraine.
26. Heinström, J. (2003). Five personality dimensions and their influence on information behavior. *Information Research 9*(1), 1-24.
27. Hofstede Insights analytical and data-driven. Retrieved on 20th of January from https://www.hofstede-insights.com/
28. Hurayra, M.A. (2015). Achievement of Maqasid-al-Shari`ah in Islamic Banking: An Evaluation of Islami Bank Bangladesh Limited. *Global Journal of Computer Science and Technology: A Hardware & Computation, 15* (1), 9-16.

29. Innovating for growth (2012). *Innovation 2.0 — a spiral approach to business model innovation, Ernst & Young*. Retrieved from https://www.economist.com/sponsor/innovating-for-growth

30. Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behavior. *Jornal of Occupational and Organizational Psychology, 73* (3), 287-302, DOI: 10.1348/096317900167038

31. Javed, B., Khan, A.K., Arjoon, S., Mashkoor, M. & Haque, A. (2018). Openness to Experience, Ethical Leadership, and Innovative Work Behavior. *The Journal of creative behavior 54*(1), 1-13. DOI: 10.1002/jocb.360

32. Jong, P.J. & Hartog, D.D. (2007). How Leaders Influence Employees' Innovative Behaviour. *European Journal of Innovation Management, 10*(1), 41-64. DOI:10.1108/14601060710720546

33. Jong, P.J. & Hartog, D.D. (2010). Measuring Innovative Work Behaviour. *Creativity and Innovation Management 19*(1), 23-36. DOI:10.1111/j.1467-8691.2010.00547.x

34. Joshi, A., Kale, S., Chandel, S. & Pal, D.K. (2015). Likert Scale: Explored and Explained. *Current Journal of Applied Science and Technology, 7*(4), 396-403. DOI: 10.9734/BJAST/2015/14975

35. John, O. P. & Srivastava, S. (1999). The Big-Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives. *Handbook of personality: Theory and research* (2nd ed.). New York: Guilford Press.

36. Jose, S. & Mampilly, S. R. (2017). Innovative Work Behaviour: Propositions on Influence from Within and Without an Individual in the Organisational Context. *Asia-Pacific Journal of Management Research and Innovation, 12*(3–4), 232–237.

37. Kheng, Y.K., Mahmood, R. & Beris, S.J.H. (2013). A Conceptual Review of Innovative Work Behavior in Knowledge Intensive Business Services among Knowledge Workers in Malaysia. *International Journal of Business, Humanities and Technology, 2* (3), 91-99.

38. Kleysen, R.F. & Street, C. (2001). Toward a Multi-Dimensional Measure of Individual Innovative Behavior. *Journal of Intellectual Capital 2*(3), 284-296. DOI: 10.1108/EUM0000000005660

39. Koster, F. (2006). Innovative HRM. A Review of the Literature. *Journal of Technology Management & Innovation, 14* (2), 97-106.

40. Lendel, V., Hittmár, S. & Siantová, E. (2014). Management of Innovation Processes in Company. *Procedia Economics and Finance, 23*, 861 – 866.

41. Leong, C.T. & Rasli, A. (2013). The Relationship between Innovative Work Behavior on Work Role Performance: An Empirical Study. Procedia - Social and Behavioral *Sciences, 129*, 592-600.

42. Li, M. & Hsu, C.C. (2016). A review of employee innovative behavior in services. *International Journal of Contemporary Hospitality Management, 28* (12), 2820-2841. DOI 10.1108/IJCHM-04-2015-0214

43. Li, X. & Zheng, Y. (2014). The Influential Factors of Employees' Innovative Behavior and the Management Advices. *Journal of Service Science and Management, 7*(6), 446-450.

44. 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.

45. Mamasioulas, A., Mourtzis D. & Chryssolouris G. (2020). A manufacturing innovation overview: concepts, models and metrics. *International Journal of Computer Integrated Manufacturing, 33*(8), 769-791.

46. Major, D.A., Turner J.E. & Fletcher, T.D. (2006). Linking Proactive Personality and the Big Five to Motivation to Learn and Development Activity. *Journal of Applied Psychology 91*(4), 927-35. DOI:10.1037/0021-9010.91.4.927

47. Matsuo, M. (2009). The Influence of Sales Management Control on Innovativeness of Sales Departments. *Journal of Personal Selling and Sales Management, 29*(4), 321-33. DOI:10.2753/PSS0885-3134290402

48. McCrae, R. R. (2002). Cross-Cultural Research on the Five-Factor Model of Personality. *Online Readings in Psychology and Culture, 4*(4), 3-14.

49. McCrae, R.R., Terracciano, A., Sánchez-Bernardos, M.L. & Jocic, D. D. (2005). Universal Features of Personality Traits From the Observer's Perspective: Data From 50 Cultures. *Journal of Personality and Social Psychology, 88*(3), 547-561. DOI: 10.1037/0022-3514.88.3.547

50. Meira, J.V.S., Anjos, S.J.G. & Falaster, C. (2018). Innovation and performance in the hotel industry. *Journal of Quality Assurance in Hospitality & Tourism, 20*(1), 1-21.

51. Mention, A., & Torkkeli, M. (2014). *Innovation in financial services: a dual ambiguity.* Cambridge Scholars Publishing.

52. 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. DOI: 10.1080/13678868.2011.646894

53. Munir, R. & Beh, L. (2016). Do personality traits matter in Fostering Innovative Work Behavior? *Medwell Journals, 11* (18), 4393-4398.
54. Naidoo, I.P. & Hoque, M. (2018). Impact of information technology on innovation in determining firm performance. *African Journal of Science Technology Innovation and Development, 10*(1), 1-11. DOI:10.1080/20421338.2018.1496615
55. Najm, N. (2019). Big Five Traits: A Critical Review. *Gadjah Mada International Journal of Business, 21*(2), 159-186.
56. Novikova, I. A. (2013). Big Five (The Five-Factor Model and The Five-Factor Theory). *The Encyclopedia of Cross-Cultural Psychology* (1st ed.). John Wiley & Sons, Inc. DOI:10.1002/9781118339893.wbeccp054
57. Obilor, E. I. & Amadi, E. C. (2018). Test for Significance of Pearson's Correlation Coefficient. *Administration and personnel development in adult and community education, a module, International Journal of Innovative Mathematics, Statistics & Energy Policies, 6*(1), 11-23.
58. Ortet, G., Martínez, T., Mezquita, L., Morizot, J. & Ibáñez, M.I. (2017). Big Five Personality Trait Short Questionnaire: Preliminary Validation with Spanish Adults. *The Spanish Journal of Psychology, 20* (7), 1-11.
59. Pallant, J. (2010). *SPSS Survival Manual* (4th ed.). McGraw-Hill.
60. Parsons, V.L. (2017). Stratified Sampling. In Balakrishnan, N., Colton, T., Everitt, B., Piegorsch, W., Ruggeri, F. & Teugels, J., *Wiley StatsRef: Statistics Reference Online.* DOI:10.1002/9781118445112.stat05999.pub2
61. Patterson, F., Kerrin, M. & Gatto-Roissard, G. (2009). Characteristics & Behaviours of Innovative People in Organisations. *NESTA Policy and Research Unit (NPRU)*, 2-63.
62. Pratoom, K. & Savatsomboon, G. (2010). Explaining factors affecting individual innovation: The case of producer group members in Thailand. *Asia Pac J Manag, 29*, 1063–1087.
63. Rafi, T. (2020). *Why Corporate Innovation Is Essential Today*. Retrieved from https://www.forbes.com/sites/forbesbusinesscouncil/2020/07/01/why-corporate-innovation-is-essential-today/
64. Rahman, M. S. (2016). The Advantages and Disadvantages of Using Qualitative and Quantitative Approaches and Methods in Language “Testing and Assessment”

Research: A Literature Review. *Journal of Education and Learning, 6* (1), 102-112. DOI:10.5539/jel.v6n1p102

65. Raja, S. & Chockalingam, M. (2019). Effect of organization climate on innovative behavior. Investigating the effect organizational climate towards the effect of Innovative work behaviour in manufacturing industries. DOI: 10.13140/RG.2.2.31605.22241
66. Riaz, S., Xu, Y. & Hussain, S. (2018). Understanding employee innovative behaviour and thriving at work: a chinese perspective. *Administrative Sciences, 8* (3), 1-14.
67. Roccas, S., Sagiv, L., Schwartz, S. H. & Knafo-Noam A. (2002). The Big Five Personality Factors and Personal Values. Personality and Social Psychology Bulletin, 28(6),789-801. DOI:10.1177/0146167202289008
68. Rothmann, S. & Coetzer, E. (2003). The big five personality dimensions and job performance. *SA Journal of Industrial Psychology, 29*(1), 68-74.
69. Purc, E. & Lagun, M. (2019). Personal Values and Innovative Behavior of Employees. *Frontiers in Psychology, 10,* 865-867.
70. Sameer, Y. (2018). Innovative Behavior and Psychological Capital: Does Positivity Make any Difference. *Journal of Economics and Management, 32*(32), 75-101. DOI: 10.22367/jem.2018.32.06
71. Samma, M., Zhao, Y., Rasool, S. F., Han, X. & Ali, S. (2020). Exploring the Relationship between Innovative Work Behavior, Job Anxiety, Workplace Ostracism, and Workplace Incivility: Empirical Evidence from Small and Medium Sized Enterprises (SMEs). *Healthcare, 8*(4), 1-15. DOI: 10.3390/healthcare8040508.
72. Santamarìa, L., Nieto, M.J. & Miles, I. (2012). Service innovation in manufacturing firms: Evidence from Spain. *Technovation, 32*(2), 144-155.
73. 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.
74. Sergeeva, N. (2014). Employees and the Innovative Idea Contribution Process: Clarifying Individual and Contextual Characteristics. *International Journal of Innovation Management, 18* (5), 1-32.
75. Siregar, Z.M., Suryana, Ahman, E. & Senen, S.H. (2019). Factors Influencing Innovative Work Behavior: An Individual Factors Perspective. *International Journal of Scientific & Technology Research, 8* (9), 324-327.

76. Smollan, R.K., Matheny, J. & Sayers, J.G. (2010). Personality, affect and organisational change: A qualitative study. *Research on emotions in organizations, 6*, 85-112.

77. Spiegelaere, S. D., Gyes, G. V. & Hootegem G. V. (2014). Innovatief Werkgedrag als concept: Definiëring en Oriëntering - The concept Innovative Work Behavior: Definition and Orientation. *Gedrag en Organisatie, 27*(2), 139-156. DOI:10.5553/GenO/092150772014027001002

78. Steel, G.D., Rinne, T. & Fairweather, J. (2011). Personality, Nations, and Innovation: Relationships Between Personality Traits and National Innovation Scores. *Cross-Cultural Research, 46*(1), 3–30. DOI: 10.1142/S1363919614500364.

79. Szolnoki, G. & Hoffmann, D. (2013). Online, face-to-face and telephone surveys—Comparing different sampling methods in wine consumer research. *Wine Economics and Policy, 2* (2), 57-66.

80. Taştan, S.B. & Davoudi, S.M.M. (2015). An Examination of the Relationship between Leader-Member Exchange and Innovative Work Behavior with the Moderating Role of Trust in Leader: A Study in the Turkish Context. *Procedia - Social and Behavioral Sciences, 181*, 23 – 32.

81. *The global Innovation Index 2020. Who Will Finance Innovation?* (15th ed.). Cornell University, INSEAD, & World Intellectual Property organization.

82. Tinoco, J. K. (2010). Marketing Innovation: The Unheralded Innovation Vehicle to Sustained Competitive Advantage. *International Journal of Sustainable Strategic Management, 2*(2), 1-27.

83. Tohidi, H. (2012). Different Stages of Innovation Process. Procedia Technology, 1, 574 – 578. DOI:10.1016/j.protcy.2012.02.125

84. Tohidi, H. & Jabbari, M.M. (2012). The importance of Innovation and its Crucial Role in Growth, Survival and Success of Organizations. *Procedia Technology, 1*, 535-538.

85. Ummi, N.S., Ain, Z.B., Razleena, R., Harith, A. & Natasya, R. (2019). Factors Affecting Innovative Work Behavior: A Case of Manufacturing Company in Malaysia. *International Journal of Advanced Science and Technology, 28* (8), 645-652.

86. United Nations (2013). *Innovation performance review of Ukraine*. New York and Geneva. Retrieved from https://unece.org/DAM/ceci/publications/icp7.pdf

87. Ülgen, B., Sağlam, M. & Tuğsal, T. (2016). Managers' Personality Traits Over Management Styles and Decision-Making Styles. *International Journal of Commerce and Finance, 2* (1), 125-136.

88. Vadastreanu, A., Bot, A., Felix, F. & Szabo, I. (2015). Innovation capability — The main factor for wealth creation. Conference Grid, Cloud & High Performance Computing in Science (ROLCG). DOI:10.1109/ROLCG.2015.7367430

89. Vafaie, V., Rahimi, E., Rostami, N.A. & Shad, F.S. (2016). The importance of knowledge management on innovation. *Applied mathematics in engineering, management and technology, 5*(1), 68-73.

90. Woods, S. A., Mustafa M. J., Anderson, N. R. & Sayer, B. (2018). Innovative Work Behavior and Personality Traits: Examining the Moderating Effects of Organizational Tenure. *Journal of Managerial Psychology 33*(1), 29-42.

91. Wright, K.B. (2017). Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. *Journal of Computer-Mediated Communication, 10* (3), DOI:10.1111/j.1083-6101.2005.tb00259.x

92. Yesil, S. & Sozbilir, F. (2013). An Empirical Investigation into the Impact of Personality on Individual Innovation Behaviour in the Workplace. *Procedia - Social and Behavioral Sciences, 81* (28), 540-551.

Appendix A

Questionnaire form as displayed to the respondent.

Dear Colleagues,

You are invited to take part in a study to determine the relationship between personality traits and employee innovative behavior. The participation is completely voluntary and the contribution of each employee is very valuable for this study. Please, be as objective as possible. The anonymity of your responses is guaranteed, only aggregated data will be used for this study.

It would be very much appreciated if you would fill out an online google form which contains 1) demographic questions 2) The Big Five factor test on personality traits (44 statements) and 3) test on the identification of innovative behavior in the workplace (10 questions). To indicate your answer, please, tick the appropriate box on a 5-point scale. The questionnaire will approximately take 15 minutes in total.

If you have any questions, please contact the researcher via this email address:

Thank you in advance for your time and participation in this research!

Questionnaire 1: The Big Five Inventory (BFI)

The questions below are characteristics that describe people's personality. Please select the number under each statement to indicate the extent to which you agree or disagree with that statement. All of your responses will be anonymous.

1 –__Disagree Strongly
2 –__Disagree a little
3 –__Neither agree nor disagree
4 –__Agree a little
5 –__Agree Strongly

A. Demographics part

1. Age

18 - 24 years old
25 - 34 years old
35 - 44 years old
45 - 54 years old
55 - 64 years old
65 - 74 years old

2. Gender

Male
Female
Other

3. Level of education

Less than high school
High school degree or equivalent
Bachelor's degree
Master's degree
Doctorate
Other

4. Industry of your company

Manufacturing
Information Technology (IT)
Other

5. Department
Marketing
Supply chain
Information Technology (IT)
Human resources (HR)
Sales

B. Opinions part

I see Myself as Someone Who...

№		SD	D	N	A	SA
1	Is talkative	*1*	*2*	*3*	*4*	*5*
2	Tends to find fault with others	*1*	*2*	*3*	*4*	*5*
3	Does a thorough job	*1*	*2*	*3*	*4*	*5*
4	Is depressed, blue	*1*	*2*	*3*	*4*	*5*
5	Is original, comes up with new ideas	*1*	*2*	*3*	*4*	*5*
6	Is reserved	*1*	*2*	*3*	*4*	*5*
7	Is helpful and unselfish with others	*1*	*2*	*3*	*4*	*5*
8	Can be somewhat careless	*1*	*2*	*3*	*4*	*5*
9	Is relaxed, handles stress well	*1*	*2*	*3*	*4*	*5*
10	Is curious about many different things	*1*	*2*	*3*	*4*	*5*
11	Is full of energy	*1*	*2*	*3*	*4*	*5*
12	Starts quarrels with others	*1*	*2*	*3*	*4*	*5*
13	Is a reliable worker	*1*	*2*	*3*	*4*	*5*
14	Can be tense	*1*	*2*	*3*	*4*	*5*
15	Is ingenious, a deep thinker	*1*	*2*	*3*	*4*	*5*
16	Generates a lot of enthusiasm	*1*	*2*	*3*	*4*	*5*
17	Has a forgiving nature	*1*	*2*	*3*	*4*	*5*
18	Tends to be disorganized	*1*	*2*	*3*	*4*	*5*
19	Worries a lot	*1*	*2*	*3*	*4*	*5*
20	Has an active imagination	*1*	*2*	*3*	*4*	*5*
21	Tends to be quiet	*1*	*2*	*3*	*4*	*5*
22	Is generally trusting	*1*	*2*	*3*	*4*	*5*
23	Tends to be lazy	*1*	*2*	*3*	*4*	*5*
24	Is emotionally stable, not easily upset	*1*	*2*	*3*	*4*	*5*
25	Is inventive	*1*	*2*	*3*	*4*	*5*
26	Has an assertive personality	*1*	*2*	*3*	*4*	*5*
27	Can be cold and aloof	*1*	*2*	*3*	*4*	*5*
28	Perseveres until the task is finished	*1*	*2*	*3*	*4*	*5*
29	Can be moody	*1*	*2*	*3*	*4*	*5*
30	Values artistic, aesthetic experiences	*1*	*2*	*3*	*4*	*5*
31	Is sometimes shy, inhibited	*1*	*2*	*3*	*4*	*5*
32	Is considerate and kind to almost everyone	*1*	*2*	*3*	*4*	*5*
33	Does things efficiently	*1*	*2*	*3*	*4*	*5*

34	Remains calm in tense situations	*1*	*2*	*3*	*4*	*5*
35	Prefers work that is routine	*1*	*2*	*3*	*4*	*5*
36	Is outgoing, sociable	*1*	*2*	*3*	*4*	*5*
37	Is sometimes rude to others	*1*	*2*	*3*	*4*	*5*
38	Makes plans and follows through with them	*1*	*2*	*3*	*4*	*5*
39	Gets nervous easily	*1*	*2*	*3*	*4*	*5*
40	Likes to reflect, play with ideas	*1*	*2*	*3*	*4*	*5*
41	Has few artistic interests	*1*	*2*	*3*	*4*	*5*
42	Likes to cooperate with others	*1*	*2*	*3*	*4*	*5*
43	Is easily distracted	*1*	*2*	*3*	*4*	*5*
44	Is sophisticated in art, music, or literature	*1*	*2*	*3*	*4*	*5*

Source: Compiled by the author based on John and Srivastava (1999).

Questionnaire 2: Innovative Work Behavior

The questions below are characteristics that measure the innovative behavior of employees at the workplace. Please select the number under each question to rate to which extent you perform innovative work behavior. All of your responses will be anonymous.

Not at all – *0*

Once in a while – *1*

Sometimes – *2*

Fairly Often – *3*

Frequently, If not away – *4*

№		NA	OW	S	FO	F
1	How often do you search out new working methods, techniques, or instruments?	*0*	*1*	*2*	*3*	*4*
2	How often do you generate original solutions for problems?	*0*	*1*	*2*	*3*	*4*
3	How often do you find new approaches to execute tasks?	*0*	*1*	*2*	*3*	*4*
4	How often do you systematically introduce innovative ideas into work practices?	*0*	*1*	*2*	*3*	*4*
5	How often do you pay attention to issues that are not part of your daily work?	*0*	*1*	*2*	*3*	*4*
6	How often do you wonder how things can be improved?	*0*	*1*	*2*	*3*	*4*
7	How often do you make important organizational members enthusiastic for innovative ideas?	*0*	*1*	*2*	*3*	*4*
8	How often do you attempt to convince people to support an innovative idea?	*0*	*1*	*2*	*3*	*4*
9	How often do you contribute to the implementation for new ideas?	*0*	*1*	*2*	*3*	*4*
10	How often do you put effort in the development of new things?	*0*	*1*	*2*	*3*	*4*

Notes. NA not at all; OW once in a while; S sometimes; FO fairly often; F frequently, If not away

Source: Compiled by the author based on Jong and Hartog (2010).

Appendix B

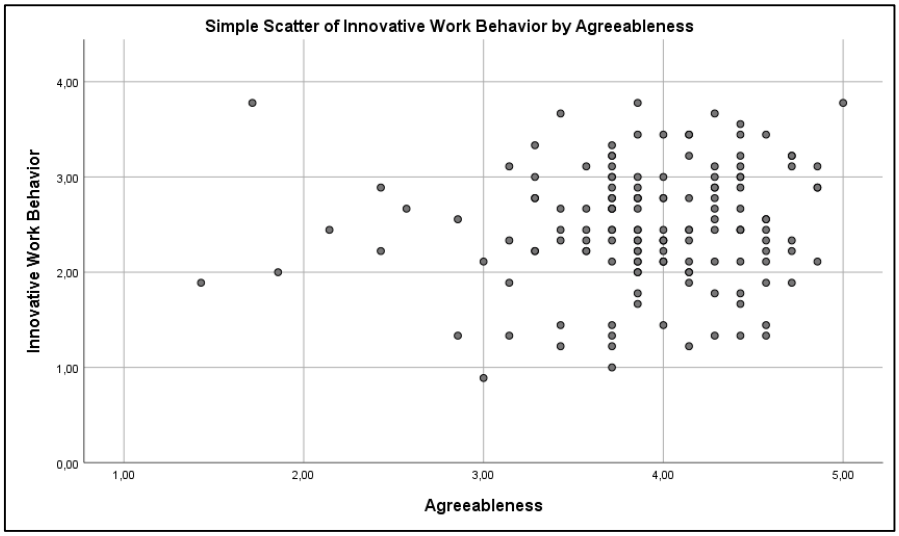
Summary of demographic variables by age group.

	18-24 (n)	25-34 (n)	35-44 (n)	45-54 (n)	55-64 (n)	Total (n)
Gender	4	43	56	31	12	146
Male	2	22	15	13	6	58
Female	2	21	41	18	6	88
Educational Attainment	4	43	56	31	12	146
High School or Equivalent	1	5	4	0	0	10
Bachelors	1	9	18	7	2	37
Masters	2	29	34	24	10	99
Industry	4	43	56	31	12	146
Manufacturing	4	43	56	31	12	146
Department	4	43	56	31	12	146
Human Resources	1	12	23	10	3	49
Information Technology	3	13	11	8	4	39
Marketing	0	1	2	0	1	4
Sales	0	12	13	11	3	39
Supply Chain	0	5	7	2	1	15

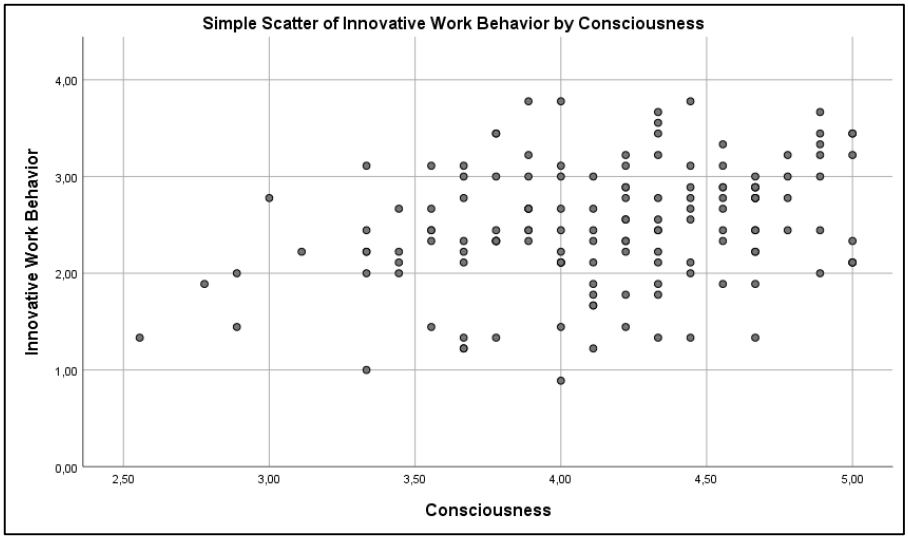
Source: author’s own elaboration from study findings

Appendix C

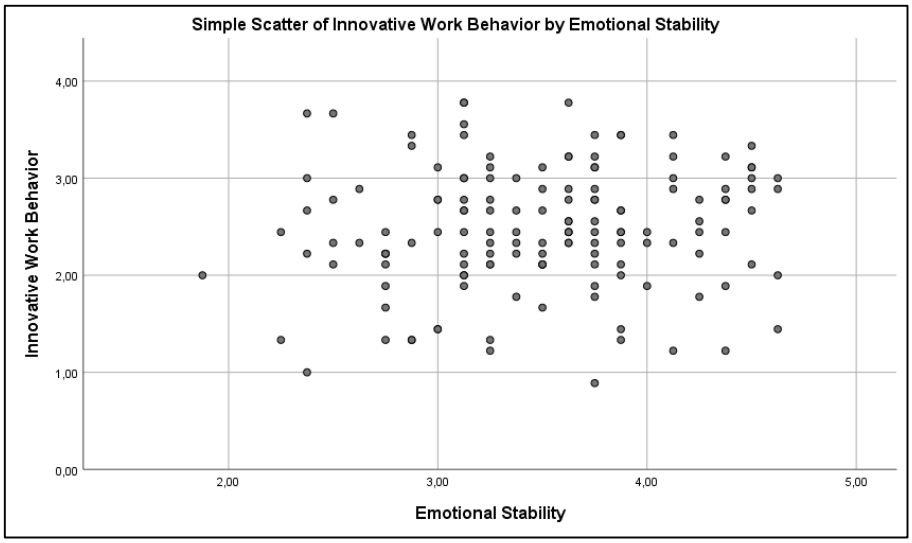
Assessment of Linearity.



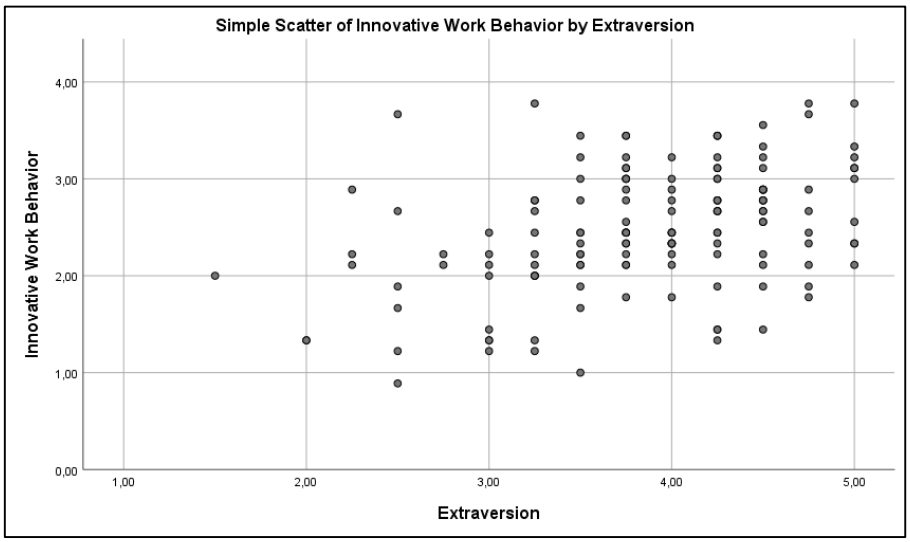
Source: based on statistical analyses conducted by the author



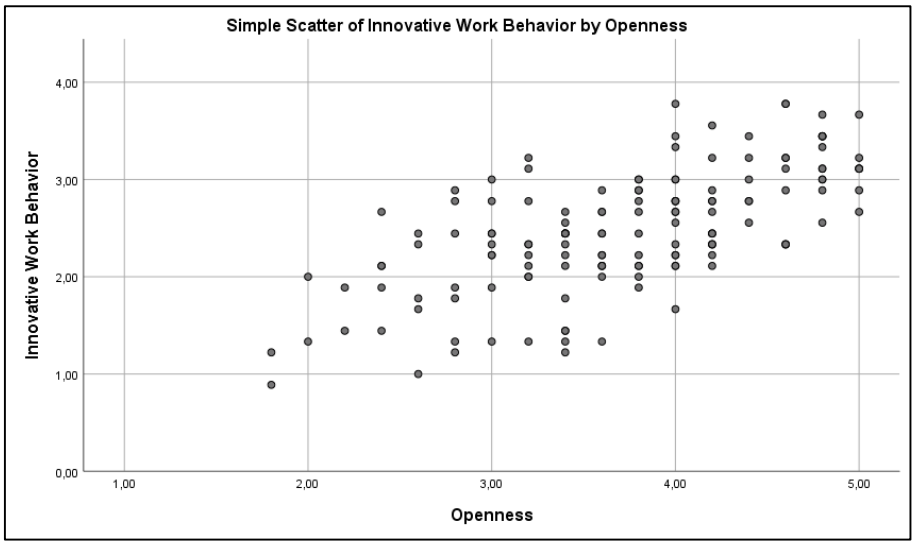
Source: based on statistical analyses conducted by the author



Source: based on statistical analyses conducted by the author



Source: based on statistical analyses conducted by the author



Source: based on statistical analyses conducted by the author

Foreign-language resume

Innovatsioon on ettevõtete jaoks äärmiselt konkurentsivõimelises keskkonnas ellujäämise põhielement. Innovatsiooni juhtimiseks peavad ettevõtted soodustama tööalast innovaatilist käitumist (IWB), mille määravaks teguriks on töötajate isikuomadused. Seetõttu on oluline mõista, milised isikuomadused on tööalase innovaatilise käitumisega seotud, et aidata kaasa töölevõtmise protsessile ja toetada ettevõtete tegevust. Käesolev uuring keskendus tööalase innovaatilise käitumise ja Suure Viisiku (Big Five) mudeli esindatud töötajate iseloomujoonte vahelise seose identifitseerimisega, et teada saada, milliseid jooni võib IWB-ga seostada. Selle eesmärgi saavutamiseks olid käesoleva uuringu ülesanded tutvustada Suure Viisiku mudelit ja tööalast innovaatilist käitumist ning nende suhet kui praeguse uuringu põhimõisteid, vaadata üle varasemad empiirilised uurimused ja välja tuua hüpoteesid uuritud suhte teoreetilisele taustale tuginedes. Samuti esitas autor metoodika kirjelduse, kogus valimi kolmelt Ukraina tootmisettevõttelt 146 vastajaga, viis läbi analüüse ja tutvustas järeldusi. Jongi ja Hartogi (2010) ning John ja Srivastava (1999) kavandatud skaalasid kasutati tööalase innovaatilise käitumise ja töötajate Suure Viisiku iseloomujoonte mõõtmiseks. Korrelatsiooni analüüsid (kasutades Pearsoni korrelatsioonikordajat) viidi läbi SPSS empiiriliste analüüside tarkvaras. Suhete teoreetilises ülevaates avastati, et igal Suure Viisiku iseloomujoonel on potentsiaal olla seotud IWB-ga. Avatus võib olla positiivselt seotud tööalase innovaatilise käitumisega, kuna see peegeldab uudishimulikke ja loovaid töötajaid. Teadlikkus hõlmab selliseid iseloomujooni nagu tulemustele suunatlus ja sihikindlus, mis toetab ka tööalast innovaatilist käitumist. Nõustuvus identifitseerib koostöövalmeid ja tolerantseid töötajaid, kes hindavad rahumeelset meeskonnatööd, mis võib olla seotud IWB-ga. Ekstraversioon on omane seltskondlikele ja enesekindlatele töötajatele, kellel on märkimisväärne suhtlemisoskus, mis võib positiivselt olla seotud innovatsiooniga. Emotsionaalne stabiilsus (vastupidiselt neuroosile) tuvastab stressikindlaid ja stabiilseid töötajaid, kes suudavad oma emotsioone kontrollida ja seeläbi IWB-d demonstreerida. Samuti demonstreeriti, et tööalasel innovaatilisel käitumisel on oluline roll innovatsiooniprotsessi kõigis etappides ja aitab kaasa selle edukusele. Samuti tehti kindlaks tööalast innovaatilist käitumist mõjutavad tegurid, mille hulgas oli alati olemas isikuomadused, ning neid rühmitati individuaaltasandi tegurite alla, kus kõige sagedamini mainiti sotsiaalsust (ekstraversioon) ja loovust (avatus). Pealegi avastati kahte tüüpi tööalase innovatsiooni käitumise mõõtmise kavandit, nimelt ühemõõtmeline ja mitmemõõtmeline. Empiirilise analüüsi tulemused viitasid

sellele, et avatus, teadlikkus ja ekstraversioon võivad olla seotud IWB-ga, samas kui nõustuvus ja emotsionaalne stabiilsus ei olnud seotud töötajate innovaatilise käitumisega. Neid järeldusi võib personaliosakond rakendada valimisprotsessis ja innovatsiooni juhtimisel, kui nad palkavad töötajaid innovatsiooniga seotud projektidesse. Sellest hoolimata tuleks tulemuste viitamisel arvestada praeguse uuringute piirangutega, milleks on mittetõenäosusega valim ja ühe allika andmed, mis ei võimalda teha terviklikku üldistust.

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13/05/2021