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Thesis Summary

The Effect of Transformational and Transactional Leadership Behaviors on Innovation and Work Engagement in the Hungarian Fintech Sector

Doctor of Philosophy

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Abstract

Leadership behaviors play a vital role in driving organizational performance. As catalysts for transformation, effective leaders can inspire teams, foster innovation, and ensure an organization's viability in an increasingly competitive marketplace. However, in the context of the dynamic Fintech sector, particularly in regions such as Hungary and wider Eastern Europe, there remains an insufficient depth of exploration. Despite the sector's significant expansion and impact, comprehensive studies examining the influence of these leadership styles on innovation and employee engagement within these digital-centric environments are rather sparse. This suggests an exigent need for more focused and dedicated research in this field. This research aims to examine the impact of transformational and transactional leadership styles on innovation and the degree of work engagement in Budapest's Fintech sector. The study further explores the contrasting perceptions of employees about Transformational and Transactional leadership behaviors. The research design is quantitative, employing a questionnaire to collect primary data, which was processed using the Statistical Package for Social Sciences (SPSS v26). The target population sample for this investigation comprises 300 employees from 146 Fintech firms. The study employed a cross-sectional research structure to gather data from both employees and middle managers within the Fintech sector in Budapest, Hungary. An online survey tool was used, encompassing the Multifactor Leadership Questionnaire (MLQ-5X), Innovation Index (II), and Utrecht Work Engagement Scale (UWES-9). Regression and moderation analyses were deployed to interpret the data.

The findings showed significant positive impact by transformational and transactional leadership on innovation and work engagement. Further, the study found significant coefficients associated with each of these relationships, indicating that an increase in the perception of either leadership style would result in a corresponding increase in organizational innovation and work engagement. In addition, the moderation analysis revealed that transformational leadership plays a moderating role in the relationship between innovation and work engagement within the professional setting. These findings offer significant insights for the Fintech industry in Hungary, providing evidence that transformational and transactional leadership can foster innovation and increase work engagement among employees.

Keywords: Leadership, Innovation, Work Engagement, Fintech sector, Hungary.

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1.1 Introduction

The study of leadership has a long and varied history, with roots dating back to ancient civilizations (Bell et al., 2022). Early philosophers and leaders, such as Plato and Aristotle, recognized the importance of effective leadership in shaping the success and prosperity of societies (Burns, 1978). In the modern era, the study of leadership has evolved to encompass a wide range of theories and approaches (Amabile, 1996). Early theories focused on the traits and characteristics of effective leaders, such as charisma and intelligence (Bass & Riggio, 2006), while more recent research has shifted towards examining the behaviors and practices of successful leaders (Hartog et al., 1997). In the 1950s and 60s, the emergence of transformational leadership theory marked a significant shift in how leadership was conceptualized, focusing on inspiring and motivating followers to achieve their full potential (Bass & Riggio, 2006). In the following decades, various other leadership theories have been proposed, including contingency theory, which posits that the most effective leadership style depends on the specific situation (Gibb & Fiedler, 1969), and servant leadership, which emphasizes the importance of prioritizing the needs of followers (Greenleaf, 1977).

Today, leadership continues to be a subject of ongoing study and discussion, with researchers and practitioners alike seeking to understand and develop effective leadership practices in a variety of contexts (Bryman and Bell, 2015). Recent research has focused on the impact of leadership style on organizational outcomes such as innovation (Clark & Guy, 1998), employee engagement (Schaufeli et al., 2002), and performance (Bakker et al., 2008). Understanding the role of leadership in organizational success is critical for businesses and leaders seeking to foster a positive and productive work environment (Tushman & O'Reilly, 1996).

Businesses and corporations face various challenges globally, including technological advances, administrative and fiscal issues, and educational concerns. In the context of globalization, companies and organizations seek competitive advantages by developing innovative ideas for processes and products to strengthen their foundation and increase profits in a highly competitive environment (Khalili, 2016). In today's rapidly evolving global market, innovation has become a key factor for businesses, particularly those in the Fintech industry, to stay competitive and adapt to market transformations (Arner et al., 2015). According to

current literature, successful innovation in firms and businesses depends on the interaction between various human and organizational factors (Stanescu et al., 2020). A company's leadership style can significantly impact its ability to foster innovation (Bass & Riggio, 2006). Researchers and practitioners have long been interested in the concept of leadership, and there is a wealth of literature on the various leadership styles and behaviors that can affect organizational outcomes (Avolio et al., 2004). Leadership plays a vital role in the success of organizations, as it can shape employee behavior, motivation, and the overall culture and performance of the organization (Bell et al., 2022). Two commonly studied leadership styles are transformational and transactional (Burns, 1978; Bass & Riggio, 2006). Transformational leadership inspires and motivates employees to achieve their full potential and contribute to the organization's success (Bass & Riggio, 2006), while transactional leadership focuses on exchanging rewards and punishments to influence employee behavior (Burns, 1978). Transitioning into a knowledge-based economy, we are now in an economic system where knowledge, predominantly represented in the forms of information technology and skilled labor, is the principal driver of productivity and economic growth (Powell & Snellman, 2004). Furthermore, the evolving landscape of the modern world highlights that it's not solely universities and research institutions propelling scientific and technological innovation, but Fintech companies have also emerged as significant contributors. These companies play a significant role in a country's ability to innovate, and as such, they are receiving increasing attention from scholars and managers. One key factor in a company's success is work engagement, which has been described as a mental state characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). Work engagement has been shown to be a valuable organizational variable that can predict work performance and innovation (Mone & London, 2018; Park et al., 2014).

Engaged employees, who are characterized by a positive and fulfilling work-related state of mind, including vigor, dedication, and absorption (Schaufeli et al., 2002), tend to have better job performance and can lead to improved organizational outcomes (Bakker et al., 2008). Therefore, high-tech enterprises must focus on human resource development and improving employee work engagement to maintain a competitive edge. However, it is not uncommon for some employees to lack enthusiasm or for excellent employees to leave the organization. To understand these phenomena, it is important to consider psychological factors and leader

behaviors.

Moreover, in the present business landscape, characterized by rapid technological development, organizations and businesses, particularly those that are technology-driven, must constantly innovate in order to survive, compete, grow, and maintain a position of leadership (Jung et al., 2003; Tierney et al., 1999). Innovation, as defined by a widely accepted definition, is the successful implementation of new ideas within an organization (Amabile & Pratt, 2016). Also, innovation, defined as the introduction of new ideas or methods (Amabile, 1996), is a critical outcome for organizations, as it can enhance competitiveness and adaptability in rapidly changing environments (Tushman & O'Reilly, 1996). However, a number of factors have been identified as influencing organizational innovation, including leadership style (Cummings & O'Connell, 1978), as leaders can impact organizational characteristics such as culture, strategy, structure, and resources (Woodman et al., 1993), and directly affect the creativity and motivation of their employees (Oldham & Cummings, 1996). Transformational leadership (TL), in particular, has positively influenced innovation in international research (Hussain et al., 2014; Gumusluoglu & Ilsev, 2009).

1.2 The Prosperity of the Fintech Sector in Hungarian Capital

The burgeoning fintech domain within Budapest has witnessed a remarkable expansion in recent years, thereby solidifying its status as a preeminent European fintech centre. Owing to the city's prime geographical positioning and access to a cornucopia of adept professionals, in conjunction with a propitious regulatory framework, Budapest has successfully lured an array of both nascent and established fintech enterprises, rendering it a crucible of ingenuity and commercial undertakings. Fintech establishments in Budapest are devising avant-garde technologies, commodities, and services, spanning digital payments, peer-to-peer lending, blockchain resolutions, and robo-advisory platforms. These ground-breaking developments are revolutionizing the financial sphere, expediting more efficient, convenient, cost-effective fiscal transactions, and propelling financial inclusivity (Varga, 2017; MNB, 2022).

The fintech realm's escalation in Budapest is attributable to numerous factors, including the city's tactical location in the heart of Europe, rendering cross-border business operations facile. Budapest's cost of living is much lower than other major cities in Western Europe and the United States. This makes maintaining a good quality of life possible while bootstrapping a

firm and paying less compensation.

Further, Budapest is home to several of the country's most prestigious colleges and has recently experienced an increase in professional training programs, notably for developers (Szabo, 2013). For example, GreenFox and CodeCool are aggressively expanding the technical talent pool, and the increasing number of local businesses is educating a new generation of growth hackers and business developers (Szabo, 2013; Varga, 2017). Additionally, Budapest boasts numerous academic and research institutions, supplying an abundant pool of talent for fintech firms. Furthermore, the Hungarian government's endorsement of the fintech sector has cultivated a conducive regulatory milieu and spurred investment in initiatives bolstering fintech innovation (Fáykiss et al., 2018). Budapest's flourishing technological landscape, replete with promising startups, offers a robust ecosystem for fintech entities. The city's thriving fintech industry has positively affected the local economy by generating employment opportunities, enticing foreign capital, and stimulating economic expansion. Moreover, the fintech sector enhances Budapest's appeal to businesses and residents (Varga, 2017; MNB, 2022).

Notwithstanding the optimistic prospects, the fintech sector in Budapest grapples with several obstacles, such as the necessity to entice additional talent to accommodate the sector's growing demands. Additionally, refining the regulatory environment is imperative to foster innovation, as the sector is in its incipient stages. Enhancing collaboration between public and private sectors is crucial to address the existing fragmentation and bolster innovation and growth. Despite these challenges, the fintech sector in Budapest is poised for a promising future, replete with potential for further advancement. The city possesses all the requisite components for success, and the government remains dedicated to nurturing the sector (MNB, 2022).

The city's access to top talent, combined with a favorable regulatory environment, has enabled it to attract a significant number of fintech startups and established companies, making it a hotbed of innovation and entrepreneurship. Fintech companies in Budapest are developing cutting-edge technologies, products, and services, ranging from digital payments, peer-to-peer lending, and blockchain solutions to robo-advisory platforms. These innovations are transforming the financial industry, enabling faster, more convenient, and cost-effective financial transactions and driving financial inclusion (Varga, 2017; Fáykiss & Ónozó, 2020).

Innovation is a critical driver of growth and competitiveness in the Fintech sector, and effective leadership practices can foster a culture of innovation and creativity, leading to the development of new and improved products and services. Further, innovation in the Fintech sector in Budapest has developed dramatically in recent years, and the city frequently appears on lists of cities with the most rapidly expanding businesses (Fáykiss et al., 2018). Successful businesses such as Prezi, UStream, and LogMeIn have developed in the city, and their founders and early staff are active members of the community who assist new firms. Regarding financial support, Budapest has a variety of governmental and private funding opportunities for entrepreneurs, including the Hungarian Business Angel Network, incubators and accelerators, and seed-stage venture capital companies (Alinda, 2013; Mulloth et al., 2016). Numerous of these financial sources have links to other markets, creating expansion prospects. Similarly, work engagement is a critical factor in the success of any organization, including Fintech companies. Engaged employees are more productive, committed, and satisfied, leading to better performance and outcomes. Therefore, understanding the impact of transformational and transactional leadership behaviors on work engagement and innovation in Fintech companies in Budapest is crucial for identifying effective leadership practices that can enhance the performance and competitiveness of these companies (Devi & Mahajans, 2019). This knowledge can also have broader implications for other industries and sectors, as effective leadership practices can enhance employee engagement and foster a culture of innovation and creativity, leading to better outcomes and growth.

1.3 Research Goals and Objectives

The primary aim of this research is to investigate the influence of transformational and transactional leadership behaviors on work engagement and innovation within the Fintech sector in Budapest, Hungary. This study seeks to understand how these leadership styles affect employee innovation and engagement levels, with the goal of enhancing performance and competitiveness in Fintech companies. The outcomes of this research are anticipated to offer insights that could be beneficial to other industries and sectors, as they relate to improving leadership practices, fostering a culture of innovation, and supporting organizational growth. Based on the goals of the research, the subsequent research objectives were established:

1. Determine the prevalence and characteristics of transformational and transactional

leadership in Budapest's Fintech companies.

2. Explore the degree of innovation among employees in these companies and investigate how transformational and transactional leadership influence employee innovation and work engagement. Additionally, conduct an in-depth analysis of the unique characteristics of Budapest's Fintech sector, considering factors such as technological advancement, regulatory environment, and market trends to ensure the findings are contextually relevant and applicable to the sector.
3. Discover any moderating or mediating factors that might affect the relationship between leadership behaviors and outcomes in innovation and engagement.
4. Propose recommendations and formulate practical implications for fintech organizations and policymakers, based on the research findings, for optimizing leadership practices to support innovation and employee engagement. This objective will also include ensuring that the research outcomes have actionable policy implications and strategic recommendations tailored to the Fintech sector, potentially involving collaboration with industry experts and policymakers for a more comprehensive impact.

1.4 Research Questions:

In order to accomplish the objectives outlined above, the following research questions are addressed:

1. What are the prevalence, characteristics, and perceived impacts of transformational and transactional leadership behaviors among employees in Budapest's Fintech companies?
2. How do employees in these companies perceive their level of innovation, and what is the influence of transformational and transactional leadership behaviors on this perception?
3. How do these leadership behaviors affect employee work engagement in Budapest's Fintech sector?
4. Are there any significant moderating or mediating factors that influence the relationship between transformational and transactional leadership behaviors and the levels of work engagement and innovation in these companies?
5. What recommendations can be made for enhancing leadership practices to foster better work engagement and innovation?

1.5 Research Model

The research model for this study is designed to examine the impact of leadership behaviors on innovation and work engagement within the fintech sector in Budapest. This model is predicated on the belief that leadership behaviors, both transformational and transactional, significantly influence these two outcomes. The relationship between transformational and transactional leadership and innovation work engagement is an important area of study for practitioners and researchers interested in promoting innovation in organizations. The majority of studies have found a positive relationship between transformational leadership and innovation, supporting the hypothesis that transformational leadership has a significant positive impact on innovation.

The research model for this study is designed to examine the impact of leadership behaviors on innovation and work engagement within the fintech sector in Budapest. This model is premised on the idea that leadership behaviors, notably transformational and transactional, significantly influence these two outcomes. Transformational leadership, where leaders inspire and motivate employees towards innovative and transformative changes (Bass, 1985), and transactional leadership, focusing on rewards and punishments to promote compliance and maintain the status quo, are integral in this context (Hater & Bass, 1988). The relationship between these leadership styles and innovation is an essential field of study for both practitioners and researchers interested in fostering innovation in organizations. Nonetheless, there remains a necessity for further exploration in the fintech sector to better comprehend the specific conditions and environments under which leadership style might yield positive or potentially negative impacts on innovation. Such insights would deepen our understanding of these intricate dynamics and foster more tailored leadership strategies within this rapidly evolving industry.

Therefore, studying the impact of transformational and transactional leadership on innovation in the fintech sector in Budapest is particularly important given the rapid pace of technological change and the increasing importance of innovation in the financial industry. Fintech firms in Budapest are facing increasing competition and pressure to innovate in order to stay relevant and meet the changing needs of their customers (MNB, 2019). Understanding how transformational leadership can foster innovation in this context can help fintech firms in

Budapest to develop more effective leadership strategies and drive innovation in their organizations. The fintech sector in Budapest notably contributes to both the local economy and the broader European Union (EU) economy (MNB, 2019). Stimulating innovation within this sector could potentially drive regional economic growth and enhance competitiveness. Given this, the impact of leadership behaviors on innovation in this context is crucial, with significant practical implications for policymakers and business leaders.

In conclusion, current evidence indicates that transformational and transactional leadership could cultivate innovation within specified contexts, including the fintech sector in Budapest. However, more detailed research is needed to understand the specific conditions under which transformational leadership may positively impact innovation. Engaging in this line of research could significantly promote innovation and economic growth within the Hungarian fintech sector (MNB, 2019).

1.6 Conceptual Framework

The proposed hypotheses are represented in the conceptual framework showcased in Figure 1 below.

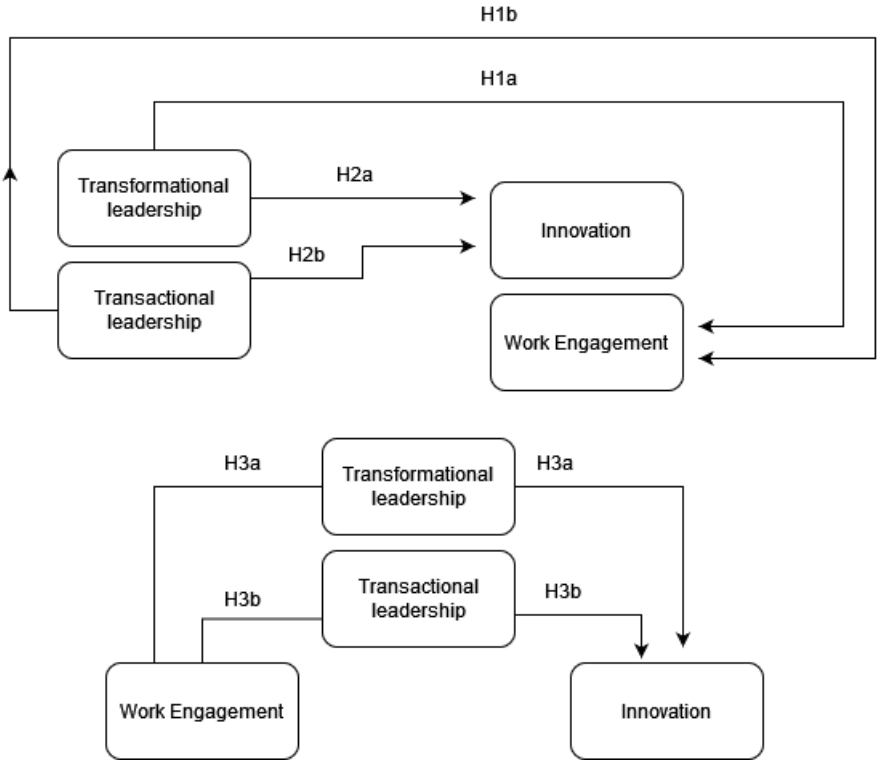

Figure 1: Conceptual framework.

Research Hypotheses:

Drawing upon the research problem, objectives, and inquiries, as well as theoretical frameworks encompassing transformational and transactional leadership, innovation, and work engagement, the literature review's exploration of experimental evidence sets the groundwork for the formulation of the subsequent research hypotheses:

Hypothesis 1: Transformational and Transactional leadership have a significant positive impact has an impact on Innovation.

Hypothesis 2: Transformational and Transactional leadership have a significant positive impact has an impact on Work Engagement.

Hypothesis 2-a: *Transformational leadership has a significant positive impact on Work Engagement.*

Hypothesis 2-b: *Transactional leadership has a significant positive impact on Work Engagement.*

Hypothesis 3: Work Engagement has a positive and significant impact on Innovation under the influence of both Transformational and Transactional leadership.

Hypothesis 3-a*: Transformational leadership positively influences the relationship between Work Engagement and Innovation.*

Hypothesis 3-b*: Transactional leadership has a significant positive impact on Work Engagement.*

1.7 Methodology

This research employed both quantitative and descriptive methodologies to establish the statistical attributes of the model and the underlying hypothesis. The hypotheses are probed utilizing quantitative techniques encompassing descriptive statistics like mean, median, mode, Skewness, and kurtosis. The research incorporates both simple linear regression and moderation regression analysis, aiming to discover if any moderating effects are present within the data. Both simple and moderation regression analyses and correlation analyses are used to evaluate the hypotheses, examining the effect of leadership behavior on innovation and work engagement. The application of Confirmatory Factor Analysis (CFA) is used to validate the hypothesized factors pertaining to leadership behaviors (transformational and transactional

leadership) as well as employees' work engagement and innovation.

Chapter 2: Methodology and Research Design

2.1 Research Methods

The research methodology efficiently synthesizes a wide range of diverse concepts to elucidate the formation of the phenomenon (Joyner et al., 2018). The study adopted an analytical approach, which focuses on methods that deduce the presence of findings within a statistical population through the use of representative samples, thereby generating quantitative data. This strategy aims to establish a database from which attributes or relationships can be concluded. It encompasses the sample, and its characteristics are presumed to resemble the original population's (Schindler, 2019). This investigation examines the impact of transformational and transactional leadership on innovation and work engagement among Fintech sector employees in Budapest, Hungary. The research design for this study is quantitative and employs statistical analysis to summarize the gathered data. To gather the necessary data for this research, three models have been used - the Multifactor Leadership Questionnaire (MLQ-Form 5X) (Bass & Avolio, 1995), the Innovation Performance Index (Jimenez et al., 2008), and the Utrecht Work Engagement Scale (UWES-9) (Schaufeli et al., 2006; Carmona et al., 2019). These models were chosen to provide a comprehensive understanding of the impact of transformational and transactional leadership styles on innovation and work engagement among Fintech employees.

Therefore, implementing an analytical research methodology in this study has facilitated a comprehensive understanding of the phenomenon under investigation. By utilizing representative samples and generating quantitative data, the findings derived from this approach provide valuable insights into the original population's characteristics and relationships. This rigorous methodology serves as a robust foundation for the present study, enhancing the validity and reliability of the research findings and their implications for the field.

Furthermore, this investigation adopted an exploratory methodology, which proves advantageous in delineating and scrutinizing the problem's essence by elucidating its

conditions, elements, and dimensions. This method encompasses the description of interactions, data analysis, measurement, comprehension, and precise depiction of the phenomena or issue in a holistic manner. Consequently, it aids in generalizing the information or knowledge acquired and offers insights and recommendations for addressing the concern (Sekaran, 2016; Bell et al., 2022). In addition, the study employed a descriptive approach, which entails gathering data from a sample, organizing it, and subsequently presenting it quantitatively through iterative tables. As per the methodological blueprint of the Summated Scales, an assortment of questionnaire items was formulated. The inherent purpose of this assessing measure, often denoted as the Likert scale, is to probe and quantify a respondent's extent of concurrence or discordance concerning a particular subject.

Comprising a collection of statements describing either an affirmative or contradictory stance towards a topic, the scale encourages the respondent to express their standpoint accordingly. Each resulting response is assigned a numerical rating that signifies a subjective preference. The collation of these ratings enables the measurement of the participant's attitude towards the given issue. The design of the scale is rooted in a five-point structure. Comprising a collection of statements describing either an affirmative or contradictory stance towards a topic, the scale encourages the respondent to express their standpoint accordingly. Each resulting response is assigned a numerical rating that signifies a subjective preference. The collation of these ratings enables the measurement of the participant's attitude towards the given issue. The design of the scale is rooted in a five-point structure. The polarity of the scale exhibits strong agreement and vehement disagreement, respectively, while intermediate points traverse the spectrum in between. Each position on the scale corresponds to a specific degree of agreement or disagreement. As such, a value of 1 is attributed to the least agreeable response, whereas the peak of agreement is denoted by a 5. This numeric allocation extends to each quintet of possible responses (Kothari, 2019).

2.2 Population and Sample

The study population consisted of 146 fintech companies in Budapest; the list was obtained from the National Hungarian Bank report (MNB) and the Hungarian Fintech Association (MFS, 2022; MNB, 2022). The researcher employed Krejcie and Morgan Table to determine the optimal sample size; this resulted in a sample of approximately 250 employees out of a

population of 8,000 individuals in the fintech sector, ensuring a high level of precision and statistical power. The methodology for this research involved the construction of an electronic questionnaire (Online Survey), which was subsequently distributed using Google Forms using the random sampling method. The questionnaire was active for a period stretching from October 2022 to December 2022. Within this timeframe, a total of 334 responses were collected, of which 300 met the criteria for inclusion in the analysis. Participants in the study were employees, middle and higher management personnel from the fintech firms, all chosen due to their readiness and agreement to contribute to the research. The use of a representative sample and a valid sample size ensured that the study's findings could be generalized to the broader population of fintech employees in Budapest, Hungary. Lastly, the study employed statistical methods such as regression analysis to examine the significance of the relationship between the variables.

2.3 Questionnaires and Reliability Tests

The questionnaire was chosen with great care, focusing on two main factors: first, its alignment with the theoretical intent of the research, and second, its previous demonstration of reliable and consistent outcomes. Apart from relying on earlier reliability evaluations from past studies, the questionnaire's reliability was also analyzed during the present study, hence the decision to use it. At the start, the respondents were posed with various socio-demographic questions. Consequently, the Multifactor Leadership Questionnaire (MLQ 5X) was implemented to capture both transactional and transformational leadership styles, the Innovation Index (II) was used to assess innovation, and the Utrecht Work Engagement Scale (UWES-9) was deployed to measure the level of employee work engagement.

2.4 Current Reliability Test

Table 1: Current reliability test for the questionnaire

FACTOR	CRONBACH'S ALPHA	STANDARD DEVIATION	MEAN
Transformational leadership dimensions			
Individual consideration	.755	.99	3.36
Idealized Influence	.665	.92	3.36
Intellectual stimulation	.815	1.06	3.53

Individualized influence	.746	.96	3.41
Inspirational motivation	.817	1.00	3.50
Transactional leadership dimensions			
Contingent Reward	.759	.96	3.49
Management-by-Exception (Active)	.758	.94	2.78
Innovation dimensions			
Process Innovation	.598	.90	2.98
Product Innovation	.658	.92	3.04
Administrative Innovation	.610	.98	3.12
Work Engagement Dimensions			
Vigor	.645	.97	3.24
Dedication	.616	.84	3.33
Absorption	.615	.91	3.44

Source: Own construction 2023

Table 1 provides information on the Cronbach's alpha, mean, and standard deviation for different sub-factors of transformational leadership, transactional leadership, innovation, and work engagement. Cronbach's alpha measures the internal consistency of the items in a scale, with higher values indicating greater reliability. For transformational leadership, the sub-factor of individual consideration has a Cronbach's alpha of .755, indicating good internal consistency. The mean score for this sub-factor is 3.36, indicating that, on average, respondents tend to agree that their leaders are attentive to their individual needs. The standard deviation of .99 suggests some variability in responses.

Chapter 3: Results and Analysis

3.1 Introduction

In this day and age, the analysis of data is a crucial component of research since it reveals insightful new perspectives on difficult issues. In the data analysis chapter, we will use IBM SPSS 26.0, a well-known software used for data analysis in various study sectors, including the social sciences, business, and others. Also, the research will use the Moderation Process for SPSS Version 4.0, designed by Andrew F. Hayes, PhD, which is a strong tool frequently used for conducting moderation analysis in regression (Hayes, 2022). The chapter will start with a descriptive and frequency analysis to help summarize the data and get some first insights. In the following step, we will confirm that the data is trustworthy and valid by conducting reliability and validity tests through exploratory factor analysis (EFA). The final stage will examine the study's hypotheses using simple linear regression and moderation regression analysis. This will help determine the presence of any moderating effects in the data. Following these processes puts the study in a position to make informed judgments and offer recommendations based on the data analysis findings.

3.2 Descriptive Statistics

Table 2: Descriptive statistics (Gender)

Sex		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Male**	169	56.3	56.3	56.3
	Female	131	43.7	43.7	100.0
	Total	300	100.0	100.0	

Source: Own Research 2023

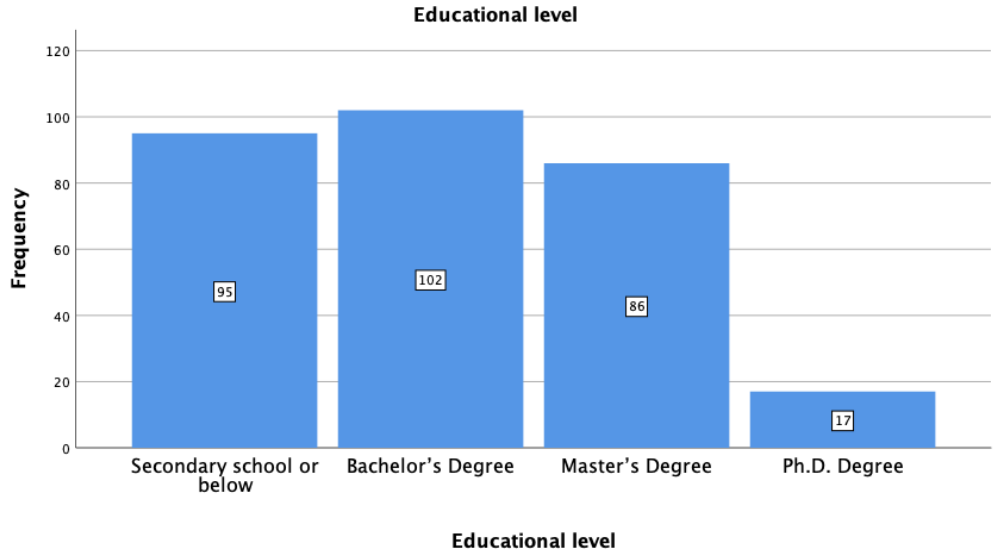

Figure 2: Bar chart of educational level

Source: Own construction

The results indicate that a significant proportion 31.7%(n=95) of fintech employees in Budapest do not hold advanced degrees. This may be due to factors such as industry-specific skills that can be gained through training and experience, or the possibility that some employees may have entered the industry through non-traditional paths. Overall, the findings suggest that the fintech industry in Budapest, Hungary, has a diverse and highly educated workforce, which could contribute to the industry's growth and innovation.

3.3 Hypotheses test and analysis

The vectors for the models to prove the hypotheses were obtained as follows:

Transformational leadership: The mean of each of the constructs was obtained; then, the total value of leadership was obtained by calculating the grand mean.

Transactional leadership: The total value of transactional leadership was obtained by calculating the average mean of the constructs to obtain the grand mean.

Employee Innovation: To measure this variable, the average mean of each of the constructs was obtained; subsequently, the grand mean was obtained.

Work Engagement: The mean of each of the constructs was obtained; then, the total value of

leadership was obtained by calculating the grand mean.

To test hypotheses H1, H2 and H3 Pearson's correlation coefficient was observed; Subsequently, linear regressions were used to underscore the direction and size effect of every relationship.

All variables were written as follows:

Table 3: Variable abbreviation

Variable	Abbreviation
Transformational Leadership	TFL
Transactional Leadership	TSL
Innovation	EIN
Work Engagement	WEM

Source: Own construction 2023

3.4 Reliability and Validity of the Measurements

The use of a reliable and valid tool for data collection is crucial for conducting accurate and meaningful research. In this study, 300 fully completed questionnaires were collected, and the data were coded and analyzed using IBM-SPSS version 26.0. An Exploratory Factor Analysis (EFA) was conducted to determine the appropriateness of the variable definitions and the measurement model's fit before testing the research questions and hypotheses. Reliability analyses were also conducted to ensure the psychometric properties of the study's components and items, using Cronbach's alpha analysis for both scales and items.

The reliability of a survey is a critical aspect that assesses its applicability, compatibility, and durability, particularly in components such as transformational and transactional leadership, employee creativity, and work engagement. EFA is a common method used to examine validity issues and measurement models. The findings of this study suggest that the reliability statistics and EFA factor loading results were satisfactory, allowing for the testing of hypotheses. All EFA factor loadings were above 30%, indicating that the loadings were in the lower, moderate, or strong point range. Additionally, all reliability statistics were above 70%, indicating that they were in the strong point range.

A bivariate correlation matrix was used to assess the validity of the relationship between a

factor's average and its questions. All correlation coefficients with the factor's average exceeded 30%, indicating a weak, moderate, or strong association with the factor. These results indicate that the study's components and items were reliable and valid, providing a strong foundation for subsequent hypothesis testing.

Table 4: All instruments reliability tests

Questionnaire	Alpha Coefficient	Mean	Standard Deviation	Number Items
TFL	0.930	3.4381	0.84609	20
TSL	0.672	3.1404	0.69022	08
EIN	0.803	3.0481	0.77455	09
WEM	0.808	3.3378	0.758	09

Source: Own construction 2023

The statistical results describe the characteristics of four variables: transformational leadership, transactional leadership, innovation, and work engagement. The mean, standard deviation, skewness, kurtosis, and reliability are reported for each variable. Transformational leadership has a mean score of 3.43, which suggests that, on average, the participants in the study perceive their leaders as transformational. The standard deviation of 0.84 indicates that there is some variability in the participants' perceptions. The negative skewness of -0.57 suggests that the distribution of responses is slightly skewed to the left, indicating that more participants may have given higher scores for transformational leadership. The positive kurtosis of 0.98 indicates that the distribution of scores is slightly peaked and has heavier tails than a normal distribution. This means that there are more scores at the extreme ends of the scale than would be expected in a normal distribution. The strong reliability of 0.930 (N = 12) indicates that the results are consistent and reliable. In contrast, the mean and standard deviation for transactional leadership are M = 3.1404 and SD = 0.69, respectively. This suggests that participants perceived their leaders as less transactional than transformational. The skewness of -0.52 indicates a slightly left-skewed distribution, while the kurtosis of 0.68 suggests a distribution that is less peaked and has lighter tails than a normal distribution. The medium reliability of 0.672 (N = 8) suggests that the results are somewhat less reliable than those for transformational leadership. The mean and standard deviation for innovation are M =

3.04 and SD = 0.77, respectively. This indicates that, on average, the participants in the study perceived innovation to be moderately important in their work environment. The negative skewness of -0.36 suggests a slightly left-skewed distribution, while the positive kurtosis of 0.094 suggests a relatively flat distribution with light tails. The strong reliability of 0.803 (N = 9) indicates that the results are reliable. Finally, the mean and standard deviation for work engagement are M = 3.33 and SD = 0.75, respectively. This indicates that, on average, participants reported moderate levels of work engagement. The skewness of -0.839 suggests a left-skewed distribution, indicating that more participants may have given higher scores for work engagement. The kurtosis of 1.825 indicates a distribution that is highly peaked with heavy tails, suggesting that there are more scores at the extreme ends of the scale than would be expected in a normal distribution. The strong reliability of 0.808 (N = 9) indicates that the results are reliable. Overall, the statistical results suggest that the participants in the study perceived their leaders as transformational and less transactional, and perceived innovation and work engagement to be moderately important. The reliability of the results is strong for all variables, indicating that the findings are consistent and trustworthy. These findings may have implications for organizations seeking to enhance leadership, innovation, and work engagement in the workplace.

3.5 Hypothesis testing and analysis

Hypothesis 1-a: Transformational leadership has a significant positive impact on Innovation.

Hypothesis 1-b: Transactional leadership has a significant positive impact on Innovation.

Hypothesis 2-a: Transformational leadership has a significant positive impact on Work Engagement.

Hypothesis 2-b: Transactional leadership has a significant positive impact on Work Engagement.

Hypothesis 3-a: Transformational leadership influences the relationship between Work engagement and Innovation.

Hypothesis 3-b: Transactional leadership influences the relationship between Work engagement and Innovation.

3.5.1 Pearson's correlations

Table 5: Pearson's correlations

PEARSON'S CORRELATION COEFFICIENT				
VARIABLE	**1**	**2**	**3**	**4**
1. TFL	-	-	-	-
2. TSL	.592**	-	-	-
3. EIN	.536**	.465**	-	-
4. WEM	.584**	.352*	.334**	-

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in the table above, the results of Pearson correlations indicate that hypotheses 1-a, 1-b, 2-a, 2-b, 3-a and 3-b have statistically significant positive relationships between the dependent and independent variables.

Additionally, according to the scale for the strength of correlations by (Evans, 1996), a medium relationship was observed for the relationship between transformational leadership and transactional leadership $r=.592$, $p<0.01$; transactional leadership and work engagement $r=.465$, $p<0.05$, transactional leadership and employee work engagement $r=.352$, $p<0.01$ and work engagement and employee innovation $r=.334$, $p<0.01$. On the other hand, a moderate relationship was observed transformational leadership and employee innovation $r=.536$, $p<0.01$, and between transformational leadership and work engagement $r=.584$, $p<0.01$.

3.5.2 Linear Regressions

Hypothesis 1-a. Transformational leadership has a significant positive impact on Innovation.

Table 6: Model Summary H 1-a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.536[a]	.287	.284	.65518

a. Predictors: (Constant), TRANSFORMATIONAL

Table 7: Coefficients H 1-a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.362	.159		8.593	.000
	TFL	.490	.045	.536	10.949	.000

a. Dependent Variable: EMPLOYEE INNOVATION

It was observed that the model summary shows a very weak effect of the coefficient of determination (r^2=.287), what implies that just 28.7% is the proportion of variance of employee innovation that can be explained by transformational leadership variable. (See table 6: model summary). Similarly, it can be concluded that both the constant coefficient (b=1.362, t=8.593) and the transformational leadership coefficient (b=.490, t=10.949) are significant at p<.001. Additionally, the coefficient of the independent variable (b_1=.490, t=10.949) shows that there is a positive impact between employee innovation and transformational leadership. Hence, businesses should think about adopting transformational leadership approaches in order to encourage staff to think outside the box, boost productivity, and improve morale.

As a result, the H 1-a is supported.

Hypothesis 1-b. Transactional leadership has a significant positive impact on Innovation.

Table 8: Model Summary H 1-b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.465[a]	.216	.213	.68693

a. Predictors: (Constant), TRANSACTIONAL

Table 9: Coefficients H 1-b

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.410	.185		7.619	.000
	TSL	.522	.058	.465	9.063	.000

a. Dependent Variable: EMPLOYEE INNOVATION

It was observed that the model summary shows a very weak effect of the coefficient of determination (r^2=.216), what implies that just 21.6% is the proportion of variance of employee innovation that can be explained by transactional leadership variable (See table 8: model summary). Similarly, it can be concluded that both the constant coefficient (b=1.410, t=7.619). Additionally, the coefficient of the independent variable (b_1=.522, t=9.063) shows that there is a positive impact between employee innovation and transactional leadership; it is concluded that the level of employee innovation is expected to increase 0.522 units, when the transactional leadership perception increases by one. This implies that while transactional leadership may not be the most influential factor in determining employee innovation, organizations can still benefit from adopting these practices to enhance innovation.

As a result, the H 1-b is supported.

Hypothesis 2-a. Transformational leadership has a significant positive impact on work engagement.

Table 10: Model Summary H 2-a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.584[a]	.341	.339	.61635

a. Predictors: (Constant), TRANSFORMATIONAL

Table 11: Coefficients H 2-a

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	**t**	**Sig.**
1	(Constant)	1.539	.149		10.318	.000
	TFL	.523	.042	.584	12.419	.000

a. Dependent Variable: WORK ENGAGEMENT

It was observed that the model summary shows a weak effect of the coefficient of determination (r^2=.341), what implies that just 34.1% is the proportion of variance of work engagement that can be explained by transformational leadership variable. (See table 10: model summary). Similarly, it can be concluded that both the constant coefficient (b=1.539, t=10.318) and the transformational leadership coefficient (b=.523, t=12.419) are significant at p<.001. Additionally, the coefficient of the independent variable (b_1=.523, t=12.419) shows

that there is a positive impact between work engagement and transformational leadership; it is concluded that the level of work engagement is expected to increase 0.523 units, when the transformational leadership perception increases by one. Overall, these results highlight the importance of transformational leadership in promoting work engagement and suggest that leaders who adopt transformational leadership practices can create a positive work environment that fosters employee engagement, leading to higher levels of productivity, job satisfaction, and overall organizational success.

As a result, the H 2-a is supported.

Hypothesis 2-b. Transactional leadership has a significant positive impact on work engagement.

Table 12: Model Summary H 2-b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.352[a]	.124	.121	.71068

a. Predictors: (Constant), TRANSACTIONAL

Table 13: Coefficients H 2-b

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	**t**	**Sig.**
1	(Constant)	2.124	.191		11.093	.000
	TSL	.387	.061	.352	6.492	.000

a. Dependent Variable: WORK ENGAGEMENT

It was observed that the model summary shows a very weak effect of the coefficient of determination (r^2=.124), what implies that just 12.4% is the proportion of variance of work engagement that can be explained by transactional leadership variable. (See table 12: model summary). Similarly, it can be concluded that both the constant coefficient (b=2.124, t=11.093) and the transactional leadership coefficient (b=.387, t=6.492) are significant at p<.05.

As a result, the H 2-b is supported.

3.6 Moderated Simple Liner Regression Model.

H 3-a: Transformational leadership influences the relationship between Work engagement and Innovation.

The model summary showed a significant moderate coefficient of determination (r^2=.3225, F=46.9655; p<.001 Similarly, the relationship between the interaction term and the dependent variable (EIN) was significant (b=-.1501, t=-3.9067, 95% CI [-.2257, -.0745], p<.001). Also, when the moderator term was added, the change in r^2 was significant (r^2=.034, p< 0.001). It indicates that the relationship between Employee Innovation and Work engagement was moderated by the Transformational Leadership. So, its moderated the relationship negatively. Because the interaction term is negative, (b=-.1501, t=-3.9067, 95% CI [.-.2257, -.0745], p<.001). As a result, the hypothesis 3-a *Transformational leadership influences the relationship between work engagement and employees' innovation* was accepted.

H 3-b: Transactional leadership influences the relationship between Work engagement and Innovation.

The model summary showed a significant moderate coefficient of determination (r^2=.2544, F=33.6714; p<.001, But, the relationship between the interaction term and the dependent variable (EIN) was insignificant (b=-.0766, t=-1.4408, 95% CI [-.1812, .0280], p>.05). Also, when the moderator term was added, the change in r^2 was insignificant (r^2=.00527, p> 0.05). It indicates that the relationship between employee innovation and work engagement was not moderated by the transactional leadership. And, its moderated the relationship negatively. Because the interaction term is negative, (b=-.0766, t=-1.4408, 95% CI [-.1812, .0280], p>.05).As a result, the hypothesis 3-b *Transactional leadership influences the relationship between work engagement and employees' innovation* was rejected.

Chapter 4: Discussion, Conclusion, and Implications

Discussion

4.1 Overall hypothesis results and discussion

The results of the study's findings are briefly summarized in Table 13. The table provides a detailed overview of the hypotheses tested and their respective outcomes, alongside their corresponding conclusions, serving as a comprehensive reference for understanding the study's outcomes.

Table 13: Hypothesis results

No	Hypothesis	Results
Hypothesis 1-a	Transformational leadership has a significant positive impact on Innovation.	*Accepted*
Hypothesis 1-b	Transactional leadership has a significant positive impact on Innovation.	*Accepted*
Hypothesis 2-a	Transformational leadership has a significant positive impact on Work Engagement.	*Accepted*
Hypothesis 2-b	Transactional leadership has a significant positive impact on Work Engagement.	*Accepted*
Hypothesis 3-a	Transformational leadership influences the relationship between Work engagement and Innovation.	*Accepted*
Hypothesis 3-b	Transactional leadership influences the relationship between Work engagement and Innovation.	*Rejected*

Source: Own elaboration 2023

The research findings confirmed that both transformational and transactional leadership styles have a significant positive impact on innovation (Hypotheses 1-a and 1-b) and work engagement (Hypotheses 2-a and 2-b). These results align with previous studies that have demonstrated the positive effects of transformational leadership on innovation (e.g., Bass, 1985; Jung et al., 2003; Martini et al., 2023) and work engagement (e.g., Tims et al., 2011; Yasin et al., 2013; Carasco-Saul et al., 2014; Hawkes et al., 2017; Gemeda & Lee, 2020). Similarly, the positive impact of transactional leadership on innovation and work engagement found in this study is consistent with findings from (Li et al., 2018; Breevaart et al., 2013; Udin et al., 2022; Gemeda & Lee, 2020; Martini et al., 2023). These results support the notion that a combination of visionary, empowering transformational leadership and structured, goal-oriented transactional leadership can effectively promote

innovation and employee engagement in the fintech sector. This is particularly relevant in a rapidly evolving industry like fintech, where adaptability, creativity, and collaboration are crucial for success.

Furthermore, the findings could be attributed to cultural aspects, the Hungarian culture, with its historical influences, high power distance, collectivist orientation, moderate uncertainty avoidance, and pragmatic outlook, can contribute to the adoption and integration of both transformational and transactional leadership styles among managers in the fintech sector. This blended approach can enable fintech organizations to adapt and thrive in a dynamic and competitive global market. The following factors can help explain the role of Hungarian culture in this context:

1. Regulatory environment: As Hungary transitioned to a market economy, the country had to establish new regulatory frameworks to govern various sectors, including the financial and technology industries (Fáykiss et al., 2018). The bureaucracy that Hungary inherited from the Soviet era may have influenced the development of these regulations, making them more complex and stringent. In this context, transactional leadership can be effective in ensuring compliance with regulatory requirements by setting clear expectations and monitoring performance.

2. Cultural factors: Hungary's historical and cultural context may also play a role in shaping employees' preferences and expectations regarding leadership styles. It is essential to understand that cultural dimensions can change over time due to various influences, such as globalization, technological advances, and shifts in political and economic landscapes. While it is possible that historically Hungary may have had collectivist tendencies, these tendencies might change or evolve. In the present day, Hungarian employees may be more receptive to transactional leadership due to their familiarity with hierarchical structures and the importance placed on rules and regulations (Klára, 2014). Moreover, the Hungarian culture may play a significant role in shaping how fintech managers adopt and integrate transformational and transactional leadership styles. The following factors can help explain the role of Hungarian culture in this context:

    a) Historical influences: Hungary has a rich history marked by periods of occupation, transition, and adaptation, which may have fostered resilience and adaptability in the Hungarian people (Kóger, 2022; Fehérváry, 2022).

These traits could translate into a willingness among fintech managers to adopt different leadership styles to adapt to changing circumstances and drive innovation.

b) High power distance: Hungarian culture tends to have a high-power distance, which refers to the acceptance of hierarchical structures and authority (Hofstede, 2023). This cultural aspect might contribute to accepting transactional leadership, where clear expectations, rewards, and penalties are more easily embraced. At the same time, transformational leadership can help bridge the power distance by fostering trust and strong relationships between leaders and employees.

c) Transition from collectivism to individualism: Historically, Hungarian culture leaned towards collectivism, emphasizing group harmony, loyalty, and interdependence (Kóger, 2022; Hofstede, 2023). However, with globalization and socio-economic changes, there has been a shift towards more individualistic tendencies in Hungarian society. This shift might influence how transformational leadership is perceived and adopted, as individualistic cultures often value autonomy and personal achievement, which can be facilitated through transformational leadership styles.

d) Uncertainty avoidance: Hungarian culture has a high uncertainty avoidance, indicating a preference for avoiding uncertainty and a tendency to adhere strictly to established codes of beliefs and behaviors (Hofstede, 2023). There is often a low tolerance for unconventional ideas or actions, and an emotional attachment to rules, even if they are not always effective. In Hungarian culture, people are internally driven to be industrious, and values such as precision and punctuality are upheld. While innovation might sometimes face resistance, security is a vital aspect of individual motivation. Nonetheless, fintech managers may still find opportunities to strike a balance by employing transactional leadership to provide structure and predictability, while using transformational leadership to encourage controlled innovation and adaptation.

e) Pragmatism and adaptability: The Hungarian culture has a history of pragmatism and adaptability, reflecting the country's experiences with

various political systems and economic transformations (Kovács & Trencsenyi, 2019; Tarrósy & Vörös, 2020). This pragmatism might contribute to fintech managers' inclination to adopt a blended approach to leadership, combining transformational and transactional elements to navigate the rapidly evolving fintech landscape.

4.2 Recommendations

1. **Promotion of Both Leadership Styles**: Given the significant positive associations between both transformational and transactional leadership styles and employee innovation and work engagement, organizations should consider training programs that encourage leaders to develop and utilize both styles.
2. **Emphasis on Transformational Leadership**: As transformational leadership accounts for a larger proportion of the variance in employee innovation and engagement than transactional leadership, it might be beneficial for organizations to focus more on developing transformational leadership skills among their leaders. These skills include inspiring and motivating employees, stimulating intellectual growth, and considering individual employee's needs and talents.
3. **Context-Specific Leadership Approaches**: As the moderating role of transformational leadership varies with levels of work engagement, leaders should be trained to assess and understand the context of their workplace environment. In particular, in environments with low levels of employee engagement, greater emphasis should be placed on transformational leadership to enhance employee creativity.
4. **Personalized Leadership Development**: Due to the variations in impact of leadership styles on employee innovation and engagement, personalized leadership development programs could be beneficial. These programs should consider individual leaders' specific needs, strengths, and weaknesses and help them develop a balanced, effective leadership approach.
5. **Monitor Leadership Perception**: Since the perception of leadership style appears to have a direct effect on employee innovation and engagement, organizations should consider ways to effectively monitor and manage how leaders are perceived by their team members. This could be done through regular feedback surveys or more informal feedback mechanisms.

6. **Promote Positive Dynamics**: Given that transformational leadership can negatively impact the positive dynamics between work engagement and innovation in highly engaged environments, it's crucial to promote an organizational culture that values both engagement and innovation without placing excessive stress or demands on employees. This can be achieved through balanced task assignments, promoting a positive work-life balance, and ensuring that leaders are trained to respond appropriately to high levels of employee engagement.
7. **Further Research**: Given that the leadership styles examined in this study only account for a portion of the variance in employee innovativeness and work engagement, additional research is needed to explore other factors that may influence these outcomes. This could include organizational culture, job design, or other leadership styles.

4.3 Research Implications

Theoretical Implications

1. **Innovation-conducive Environment:**
- Governments and businesses should collaborate on funding, tax incentives, and regulatory frameworks to support innovation.
- Businesses should invest in research and development and engage with government on policy-making for a robust innovation ecosystem.
2. **Education and Skills Development:**
- Joint government-business initiatives to enhance fintech education and training, ensuring a skilled workforce through scholarships and updated curricula.
3. **Collaboration and Networking:**
- Industry associations, supported by government policies, should promote collaboration through events and resources like forums and shared workspaces for fintech professionals.
4. **Attracting and Retaining Talent:**
- Fintech companies should focus on competitive compensation and a supportive work environment with growth opportunities to attract and keep top talent.
5. **Industry Trends and Advancements:**
- Companies must stay updated on fintech trends through conferences, publications, and networking to make informed decisions and maintain competitiveness.

Practical Implications:

1. **Blended Leadership Approach:** Fintech managers should consider integrating both transformational and transactional leadership styles to leverage their respective strengths and mitigate weaknesses. This approach, combining inspiration and support with clear expectations and performance management, can foster innovation and work engagement.
2. **Leadership Adaptability:** Managers must adapt their leadership styles to various situations and employee needs, understanding when to apply transformational or transactional leadership to address the dynamic fintech environment in Budapest.
3. **Employee Involvement:** Actively involving employees in decision-making processes can enhance work engagement and spur innovation by tapping into creative ideas and fostering commitment.
4. **Supportive Culture:** Creating a supportive organizational culture prioritizing well-being, communication, and collaboration can enhance the effectiveness of leadership styles, leading to higher innovation and work engagement levels.
5. **Monitoring Leadership Effectiveness:** Establishing mechanisms to monitor and evaluate leadership practices can help fintech organizations identify areas for improvement and adjust their approaches accordingly.
6. **Regulatory Support:** Policymakers should foster a regulatory environment conducive to fintech innovation by reducing barriers, providing incentives for research, and promoting collaboration among stakeholders.

4.4 Research Limitations:

1. The study's geographic focus on Budapest's fintech sector limits the generalizability of findings to other regions and industries.
2. Reliance on subjective perceptions may not fully represent objective reality, suggesting the need for more objective measures in future research.
3. Sole reliance on self-reported survey data introduces biases, indicating the potential benefits of complementing surveys with other data sources.
4. Lack of qualitative data limits the study's depth, highlighting the importance of incorporating qualitative methods in future research.

References

All the mentioned references here are available in the full version of the thesis.

List of Publications

A. Journal Publications

1- Balawi, A., & Ayoub, A. (2023). A Review of The Main Differences Between Behavioral and Traditional Economics: A Focus on The Impact of Nudge Theory on Public Policies and Its Applications. Modern Management Review, 28(4), 17–31. https://doi.org/10.7862/rz.2023.mmr.22

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2- Balawi, A. (2021). The influence of exports and imports on economic growth in Palestine. In Proceedings of FIKUSZ Symposium for Young Researchers (pp. 12-20). Óbuda University Keleti Károly Faculty of Economics.

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4- Balawi, A. (2020). The Impact of Social Media Platforms on Consumer Decision making Process. In *Proceedings of the 9th Interdisciplinary Doctoral Conference (IDK20)* (pp. 18-25). Pecs University. **ISBN: 978-963-429-583-9.**