



ASSESSMENT OF THE IMPACT OF TECHNOLOGICAL INNOVATIONS ON MANAGERIAL PRODUCTIVITY IN DEVELOPING COUNTRIES: EVIDENCE FROM KOSOVO

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Abstract

Research background: Microfinance institutions (MFIs) play a critical role in providing financial services to underserved populations in developing countries. However, their sustainability and efficiency are increasingly reliant on managerial productivity, which is influenced by technological innovation. Despite growing interest in this area, limited empirical research exists on the specific impact of technological advancements on management efficiency in MFIs, particularly in developing contexts such as Kosovo. This study addresses this gap by exploring the relationship between technological innovation and managerial productivity in MFIs.

Purpose: The study aims to investigate the extent to which technological innovation influences the productivity of managers in MFIs, focusing on developing countries, with Kosovo serving as a case study.

Research methodology: A quantitative research methodology was adopted, utilizing correlation and regression analyses to examine the relationship between technological innovation and managerial productivity. Data were collected from 105 participants across 15 MFIs in Kosovo, focusing on variables such as product innovation, customer service, operational flexibility, and employee productivity.

Results: The findings reveal a significant positive correlation between technological innovation and managerial productivity in MFIs. Factors such as product innovation, customer service, and operational flexibility emerged as key drivers of productivity growth, while operational processes and risk management exhibited a negative influence.

Novelty: This research contributes to the literature by providing empirical evidence on the impact of technological innovation on managerial productivity within MFIs in developing countries. The study offers actionable insights for stakeholders, emphasizing the critical role of innovation in enhancing operational efficiency and achieving sustainable growth in the microfinance sector.

Keywords: technological innovation, managerial productivity, microfinance institutions, developing countries, innovation impact

JEL classification: G21, O33, M12

Introduction

In the world of business and management, one of the biggest challenges is improving the productivity of organizations, an element that is closely related to the strategic goals of developing countries, namely Kosovo to promote the use of technological innovation to hasten progress and economic prosperity (Gashi, 2021). According to the literature review, there are insufficient studies on the impact of technological innovations on financial institutions in developing countries. Therefore, great efforts are needed to learn what technological innovation means and to develop managers' productivity.

In a highly competitive global market, manager productivity is a critical component of a company's performance and long-term viability. According to Obeng et al. (2018), managerial productivity in financial institutions is characterized by the efficiency of using human resources and innovative technologies to provide effective services and meet customer demands (Obeng et al., 2018). In this context, academic studies are crucial to better understand the relationship between factors such as technological innovation and managerial productivity. Numerous studies looking at the complex relationships and influences of various elements on organizational effectiveness and productivity have focused on this area. Studies such as that by Ghosh, Huang, and Sun (2020) found that managerial skills have a significant impact on employee productivity, with managers with higher skills being significantly associated with improved employee efficiency. Meanwhile, studies such as that of Fu, Mohnen and Zanello (2018) show that technological innovation and productivity are closely related. According to the results of their research, technological innovations increase production. According to Obeng et al. (2018) the productivity of financial institutions is highly influenced by technological innovations. In addition, innovation, especially in processes, increases productivity and

contributes to the overall productivity of financial institutions and satisfaction with innovation. These concentrations in information technology provide a strong foundation for microfinance institutions to improve their productivity through technological innovation.

According to OECD (2020), technological innovation in the financial sector has improved management efficiency and productivity. The application of technological information in online financial services has increased the speed and security of transactions and reduced time and financial costs. This has enabled financial companies to provide services in a simpler and more efficient way to their customers, increasing performance and competition in the market. In addition, technological innovation helps managers focus on more creative tasks and let technology handle routine and administrative tasks. Thus, they not only increase the efficiency of operations, but also contribute to improving the performance of financial organizations (OECD, 2020). On the other hand, according to the Ministry of Innovation and Entrepreneurship in Kosovo (2019), technological innovations have a significant influence on productivity and economic development, as they are seen as the main driving force behind economic progress, from advances in technology and research to the development of new business models. Like other businesses, microfinance institutions are essential for the advancement of technological innovation by creating value and opening new areas of higher productivity, despite the challenges and risks associated with this process. In this way, microfinance institutions through technological innovation can serve as catalysts for increasing productivity and competition in the market (MIE, 2019).

1. Literature review

1.1. Study context – MFIs in developing countries

When Professor Muhammad Yunus visited a village in Bangladesh in 1974, he saw how difficult it was for women to raise money for their small businesses, which included growing bamboo (Yunus, 2004). This was the beginning of the history of microcredit in this country. Since 1976, microfinance institutions (MFIs) have developed microcredit programs in developing countries. These MFIs offer modest loans, especially to low-income women, to help them start their own businesses and get employed. Industrialized countries initially supported this project mainly as sponsors, but soon began to finance microfinance, a sign of their financial difficulties (Lorenzo, Soler, 2017).

The controversy over various methods of lending to the poor has gained importance in modern times. One method emphasizes the use of credit at subsidized interest rates to help

people out of poverty, while the other method assumes the cost of credit (Lorenzo, Soler, 2017). Focusing on poor women and forgoing collateral, Grameen Bank, a model widely used in developing countries such as Bangladesh and India, claims that microcredit is a basic human right to alleviate poverty (Grameen Bank, 2016).

This paper will use the example of Kosovo to assess the effect of technological innovation on the managerial productivity of MFIs in developing countries. After a theoretical introduction to the topic, the focus is on a statistical study with data from Kosovo to assess this impact.

The microfinance sector in Kosovo is competitive and relatively stable in the market context. Obeng et al. (2018) state that productivity in this sector must be increased through efficient operations and resource management and emphasize the importance of management productivity for the success of microfinance institutions (Obeng et al., 2018). Microfinance institutions (MFIs) in Kosovo appeared after the conflict (1999) as an initiative to provide financial support and microcredit to small businesses in order to promote the economic development of the region. They raised money by taking business loans provided by foreign financial organizations at interest rates ranging from 6.5 and 9%. These organizations, which promote economic sectors that improve the lives of marginalized groups in society, are development financial institutions and socially conscious investors (AMIK, 2024). The Association of Microfinance Institutions of Kosovo asserts that MFIs in Kosovo are known for promoting financial inclusion and their role in economic empowerment. These MFIs, which are licensed by the Central Bank of Kosovo (BQK, 2024) and have the status of non-profit organizations, include lenders and other entities involved in microfinance and development financing. They submit annual reports and audited financial statements to the CBK. MFIs provide financial services to the poorest members of society and are accessible to the CBK on a monthly and quarterly basis. In addition, they contribute significantly to the empowerment of women and the financial education of their clients through small loans. In Kosovo, MFIs have 109 locations and provide services to over 70,000 active clients. By providing loans to people and small businesses, they support the nation's economic expansion. The average amount of the loan they give is 1,900 euros. Their participation is necessary to improve access to financial services for the poor. Even if the interest rates seem high, they are competitive and cover costs compared to the region. In Kosovo, MFIs have improved community engagement in the formal economy (AMIK, 2024). The number of microfinance institutions (MFI) registered/licensed by the Central Bank of the Republic of Kosovo CBK is 9, while 22 of them are non-banking financial institutions (IFJB) for lending, leasing, payments, remittances, exchange and issuance of electronic money (BQK, 2024). These MFIs are required to submit

their audited financial reports on a monthly and quarterly basis. Regulations governing the financial operations of MFIs include laws that apply to banks, microfinance organizations and non-banks, as well as guidelines issued by the Central Bank of Kosovo. Due to the non-profit nature of most MFIs in Kosovo, they are subject to the Law on Freedom of Association in Non-Governmental Organizations. This means that MFIs must report to the Office for Non-Governmental Organizations in the Ministry of Public Administration in accordance with the law (AMIK, 2018; Law no. 04/L-093, 2012). To meet the needs of their customers, they use technology and innovation to improve their service and operational efficiency. This highlights the importance of adapting management strategies to the demands of technology and innovation to achieve strategic goals (Obeng et al., 2018).

1.2. The role of technological innovation in managerial productivity

In his seminal work, Yunus (2004) emphasized the importance of microcredit in alleviating the social and economic isolation of individuals excluded from traditional banking services, including the provision of small loans without traditional collateral requirements. Innovation is characterized as an endeavor that produces novel concepts, goods, services, and procedures that advance technical solutions and contribute to the improvement of living conditions and productivity (Timur et al., 2017). According to Solidoro and Viscusi (2020), the benefits of technological innovation impact productivity growth by enabling the transformation of business models and paving the way for more efficient use of resources and processes (Solidoro, Viscusi, 2020). Innovation is seen only as a result of a highly skilled workforce, commercial activities and a tremendous intensity of research and development associated with major centers of excellence in the scientific world (Akinwale et al., 2017; Chan et al., 2018). Although the term innovation is broader, it also refers to improved processes and products that originate from high-tech industries and can have an impact on the economy and society. According to the study of Ni (2018), the incorporation of technology innovation in company management has the potential to revitalize firms, making it a significant contemporary trend (Ni, 2018). The study conducted by Diriker, Landoni and Benaglio (2017) identified several trends and characteristics of the European microfinance industry, including the increased use of technological innovation in the provision of financial services. This includes the development of online platforms and mobile applications to facilitate access and services for customers, as well as the use of technological innovation in lending processes to improve risk assessment and productivity (Diriker et al., 2017). However, the progress of the microfinance sector is impossible without the help of technological innovation. Dichter (2007) and Hermes and Lensink (2007)

mention some of the fundamental challenges facing the sector, including high administrative costs and unstable revenue streams. In this context, the work of Kono and Takahashi (2010) and Rosenberg, Gonzalez and Narain (2009) emphasize the importance of developing new models and innovations to overcome these challenges and improve operational efficiency and management productivity in microfinance institutions (Kono, Takahashi, 2010; Rosenberg et al., 2009). According to Gashi (2024), technological innovation has an effect on increasing productivity in the financial advisory industry, through security, transparency and performance in automated advisory services (Gashi, 2024). According to the study of Diriker et al. (2017), the use of technology is a crucial aspect of MFIs' development, as technology can be a tool to break down barriers and facilitate clients' access to these institutions. Furthermore, this study identified the technology sector as a tool to improve services and management productivity in the microfinance industry (Diriker et al., 2017). However, Dichter (2007) and Hermes and Lensink (2007) also emphasize the importance of technological innovations in overcoming administrative and financial challenges in these institutions. In addition, Kono and Takahashi (2010) and Rosenberg et al. (2009) emphasize the significance of technology use to improve management efficiency and productivity in the microfinance sector (Kono, Takahashi, 2010; Rosenberg et al., 2009).

1.3. Theoretical Framework and Research Hypotheses Concerning the Impact of Technological Innovations on Managerial Productivity

Increasing global awareness of the need to maintain or improve competitiveness is the result of efforts to encourage creative behavior by companies by introducing new techniques, especially in the field of technological innovation (Goi, 2017). Technological innovation is known as the development of new concepts, works, plans and methods to advance technology-based solutions, raise living standards and increase productivity. This is attributed to workforce skills, commercial activity and high research and development intensity in important centers of scientific excellence (Akinwale et al., 2017; Chan et al., 2018). Managerial productivity in MFIs is also a key topic in the specialized literature. According to Diriker et al. (2017), the progress of MFIs is closely related to their ability to use technological innovation to increase efficiency and provide better services to their clients. They also cite increased technological innovation as a means of improving managerial productivity in these institutions. Dichter (2007) and Hermes and Lensink (2007) also state that the use of technological innovation is necessary to improve managerial productivity in the microfinance sector. In addition, Kono and Takahashi (2010) and Rosenberg et al. (2009) emphasize the importance of technology

investments to increase the efficiency and productivity of microfinance institutions. According to Obeng et al. (2018), technological innovation in financial institutions has an impact on seven key dimensions of operations in financial institutions, including product quality, process efficiency, customer service time, flexibility in operations, risk management, employee productivity and experience of customer service. Therefore, we propose a hypothesis and the following 6 sub-hypotheses:

- Hypothesis: H1: Technological innovation significantly influences managerial productivity.
- Sub-Hypothesis H1_a: The level of product innovation has an impact on managerial productivity.
- Sub-Hypothesis H1_b: The level of innovation in operational processes has an impact on managerial productivity.
- Sub-Hypothesis H1_c: Service delivery time has an impact on managerial productivity.
- Sub-Hypothesis H1_d: Operational flexibility has an impact on managerial productivity.
- Sub-Hypothesis H1_e: Risk management has an impact on managerial productivity.
- Sub-Hypothesis H1_f: Employee productivity has an impact on managerial productivity.
- Sub-Hypothesis H1_g: Customer service has an impact on managerial productivity.

According to a study by Huang et al. (2016) on the relationship between innovation and technological development and company performance, diversification in the financial sector has a major impact on the productivity of managers. By applying a benchmarking analysis, they found that an organization benefits from different levels of diversification by improving the ability to solve complex problems and steer an organization in different directions (Huang et al., 2016). According to the study of Ortega-Argilés and McCann (2021), there are many paradoxical characteristics in the links between innovation and productivity. According to them, innovation contributes to productivity growth, but productivity growth is not always observed in the same context as the origin of innovation. Thus, the relationships between innovation and productivity are complex and not necessarily linear and are influenced by various constraints, facilitators and barriers related to the innovation process (Ortega-Argilés, McCann, 2021).

According to the study of Calza et al. (2019), who examined the drivers of productivity, found that one of the main factors in increasing productivity is certification according to international management standards. In particular, they found that the benefits of certification according to international management standards for increasing productivity are higher for companies that have invested in technological innovation (Calza et al., 2019). According

to Fayomi et al. (2019), technological innovation has improved productivity in various sectors by developing new ideas, goods, services and practices that improve technological solutions. The results of the study show that the use of technology brings an increase in efficiency and an overall improvement in productivity through the latest technological innovation (Fayomi et al., 2019). The degree of innovation satisfaction, the feasibility of innovative services and the creation of new or improved goods or processes – all of these are influenced by innovations in financial institutions. Also, these dimensions of innovation mean progress in the quality and experience of banking services and affect the level of customer satisfaction and the adaptability of services to the latest innovations. In the meantime, research in the field of production and process innovation is focusing on the development of new or improved goods and processes in the financial industry (Obeng et al., 2018). Therefore, based on these findings, a correlation between these two concepts is hypothesized:

H2: The level of innovation satisfaction has an impact on managerial productivity.

This study examines the relationship between technological innovation and managerial productivity and the specific factors that influence managerial productivity in MFIs using a simpler model adapted from Obeng et al. (2018). In order to compare the findings concerning the relationships between technological innovation dimensions and managerial productivity, the present study relies on a correlation analysis and multiple linear regression since the variables of the dependent variable are continuous, and the analysis is conducted in the empirical part. Multiple linear regression was used to approximate the relationship of a continuously measured dependent variable and a number of independent variables to evaluate the magnitude and direction of the effects of the independent variables.

Three dependent variables and fifteen independent variables were used to predict managers' productivity, according to the model modified by Obeng et al. (2018). The study identified three primary characteristics (dependent variables) for the data analysis: manager productivity (with two indicators), innovation impact (with seven indicators), innovation satisfaction (with three indicators). The data analysis process is outlined in Figure 1. Figure 1 illustrates the conceptual and methodological framework guiding this study, adapted from Obeng et al. (2018). The figure clarifies the hypothesized relationships between innovation impact (II), innovation satisfaction (IS), and managerial productivity (MP), as well as the specific innovation dimensions operationalized in the empirical analysis. This framework informed the selection of dependent and independent variables, the formulation of hypotheses (H1–H2), and the specification of the multiple linear regression models. By visually mapping the causal structure among constructs,

Figure 1 supports the methodological coherence between the theoretical framework and the empirical strategy applied in the study.

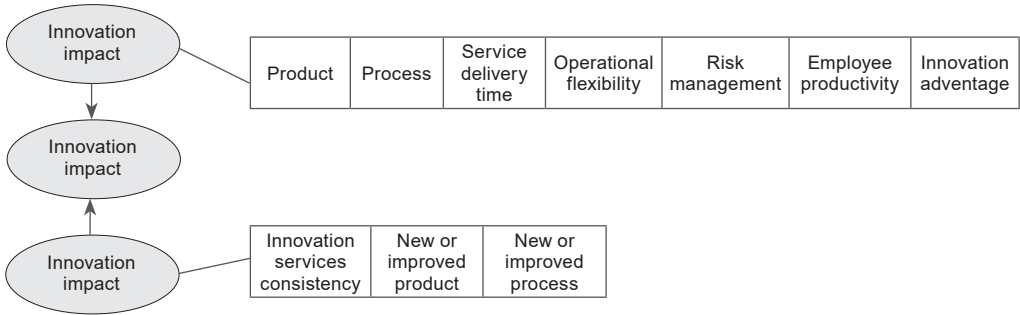


Figure 1. research design

Source: adapted from Obeng et al. (2018).

Figure 1 presents the research design adapted from Obeng et al. (2018). In this framework, II denotes Innovation Impact, MP refers to Managerial Productivity, and IS represents Innovation Satisfaction. Based on the preliminary data, a correlation matrix was created to identify important elements that can improve the functionality of the regression models. The important contributions of the correlations between the dependent variables are shown in Table 4: II and MP (0.003), II and IS (0.007), and MP and IS (0.013).

2. Research methodology

The research design embraced in this study is quantitative and correlational research design in order to explore the correlation that exists between technological innovation and managerial productivity in MFIs. Since managerial productivity is a continuous variable, the multivariate estimation is the most suitable technique of the estimation chosen, multiple linear regression. The data were discussed in order to answer the research questions based on the descriptive statistics and multiple linear regression analysis (Creswell, 2013; Thompson et al., 2005). The method allows to measure the strength and direction with which the relationships between the variables of the study are measured (Sun, 2011).

2.1. Population and sample

The study population included executives and managers from 31 microfinance institutions in Kosovo (BQK, 2024). A sample of 15 institutions with 105 respondents was selected using stratified random sampling. Respondents varied in roles, experience (2 to 10+ years), and expertise across sectors like trade and agribusiness. The stratified random sampling was used to make sure that the managers represented of the microfinance institutions are in proportionality, eliminating the sampling bias and increasing the sample representativeness (Creswell, 2013). Demographic data, including age, gender, education, and professional roles, provided a comprehensive profile of the study group.

2.2. Measures

Data collection involved distributing questionnaires to MFI managers, who recorded numerical responses. The data were analyzed using SPSS version 25.0 (2017). Redundant values were removed, and missing values corrected. Descriptive statistics such as means, frequencies, and standard deviations were calculated. The Pearson correlation and multiple regression analysis were applied to address research questions. The study used a reliable instrument adopted from Obeng et al. (2018) with eight Likert-scale questions covering managerial productivity, innovation impact, and innovation satisfaction. One of the Likert-scale questions in the questionnaire is: “Technological innovations implemented in my institution improve my managerial productivity,” with a response scale of 1 = Strongly disagree to 5 = Strongly agree. The survey instrument and variables were designed in relation to the published research, organizational reports, and previous research in line with Blumberg et al. (2008).

2.3. Assessing the instrument’s validity and reliability

Pilot testing and the correlation analysis were used to measure the validity of the survey instrument, which found that the items were sufficient to measure the intended constructs and the overall validity was found to be 0.74. The reliability was assessed with the help of Cronbach’s alpha that resulted in 0.89 and revealed that the measurement scale had high internal consistency (Creswell, 2013; Taherdoost, 2016). These results confirm the suitability of these instruments in the research of the role of technology’s contribution in the improvement of productivity in MFIs. Before estimating the regression models, the standard diagnostic measures were performed in order to check the main assumptions of multiple linear regression. The P-P graphs and the histograms were used to determine the normality of the residuals, and

it appeared to be a normal distribution. Variance Inflation Factors (VIF) were used to test Multicollinearity and all the VIFs were lower than the generally accepted value implying that there were no severe cases of Multicollinearity. Heteroscedasticity was assessed by examining residual scatterplots and this showed that error terms were homoscedastic. Such diagnostic tests prove the suitability of the multiple linear regression application in this research (Hair et al., 2019; Field, 2018).

3. Analysis and presentation of the results

This section examines respondents' views on the impact of technological innovation on the productivity of managers in MFIs. Inferential statistics, including multiple regression and the Pearson correlation, were used in this part to analyze the data for each study hypothesis, presenting the results and data analysis (SPSS, version 25.0, 2017).

Table 1 provides an overview of respondents' characteristics, including gender, age group, and educational level. Thus, the sample consisted of 105 respondents from 15 microfinance institutions, to whom 105 questionnaires were distributed to MFI managers during the empirical implementation phase.

Table 1. Characteristics of respondents by gender, age group and level of education (n = 105)

Gender	Frequency and percentage							
	n	%	Age group	n	%	Education	n	%
Male	60	57.1	25–35	32	53.33	University	40	66.67
			35–45	20	33.33	High school	15	25.00
			45–55	8	13.33	Other	5	8.33
Female	45	42.9	25–35	19	42.22	University	30	66.67
			35–45	17	37.78	High school	10	22.22
			45–55	9	20.00	Other	5	11.11

Source: authors' calculations based on survey data.

Among 105 respondents, 57.1% are male and 42.9% female, indicating a balanced gender representation. Most of the respondents are aged 25–35, with 51 participants, followed by 37 in the 35–45 group. Education data show that the majority hold university degrees, while smaller groups completed high school or other levels. Table 2 and Figure 2 present descriptive statistics for the study's key variables, highlighting their mean and standard deviation to assess variability and consistency.

Table 2. Descriptive analysis for key study variables

Variables	Mean	Standard Deviation	Median
Innovation impact	4.15	0.67	4.35
Satisfaction with innovation	3.95	0.70	4.10
Product	4.20	0.63	4.30
Process	3.90	0.69	4.10
Service delivery time	4.30	0.60	4.35
Operational flexibility	4.15	0.56	4.20
Risk management	3.90	0.68	3.85
Employee productivity	4.10	0.65	4.15
Customer service	4.25	0.59	4.25
Innovation service sustainability	4.10	0.66	4.20
New or improved product	4.20	0.63	4.25
New or improved process	3.95	0.72	3.95

Source: authors' calculations based on survey data.

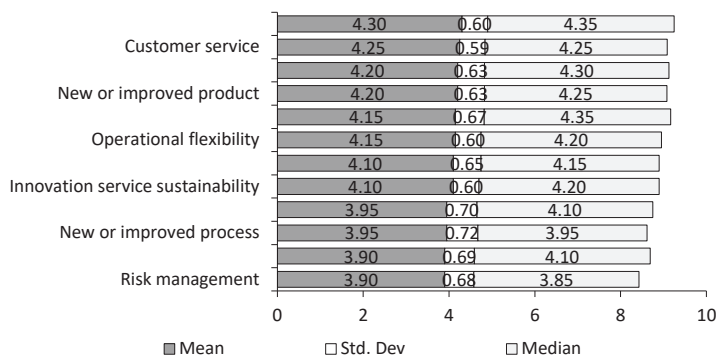


Figure 2. Descriptive analysis of the key variables of the study

Source: authors' calculations using Microsoft Excel (2016).

Innovation Impact has a mean of 4.15, reflecting high importance for productivity, while Innovation Satisfaction has a mean of 3.95, indicating moderate ratings. Product and Delivery Time show strong significance, with means of 4.20 and 4.30, respectively, while Process has a lower mean of 3.90, showing broader variability. Operational Flexibility (4.15) and Customer Service (4.25) are critical factors. Risk Management (3.90) and New or Improved Process (3.95) show moderate ratings. Overall, the findings emphasize the importance of these factors for managerial productivity. The standard deviations are somewhat small and this shows that

there is not much dispersion around mean values whereas the closeness of mean and median values shows that there are even distributions of responses among variables. Table 3 defines the variables used to examine the impact of technological innovation on MFI managers' productivity.

Table 3. Variable definitions for analyzing the impact of technological innovations on the productivity of managers in the MFI

Key Factors	Predictors	Definition
Managerial productivity	Innovation impact	The impact of innovations on microfinance institutions (MFIs)
	Innovation satisfaction	Level of satisfaction with innovation among MFI managers
Innovation impact	Product	The effect of innovation on products offered by MFIs
	Process	The effect of innovation on MFI operational processes
	Service delivery time	The effect of innovation on the time required to provide a service or product
	Operational flexibility	The effect of innovation on the level of MFI flexibility of operational processes
	Risk management	The effect of innovation on the MFI's ability to manage and reduce operational and financial risks
	Employee productivity	The effect of innovation on the MFI productivity of employees
	Customer service	The effect of innovation on meeting customer expectations from MFI services
Innovation satisfaction	Innovation service sustainability	Stability and continuity of services provided by MFI innovations
	New or improved product	Identification of new or improved products offered by the MFI
	New or improved process	Identification of new or improved operational processes implemented by the MFI

Source: definition of variables, adapted from Obeng et al. (2018).

Management productivity reflects how innovation in processes, technologies, or methods influences productivity. Satisfaction with innovation indicates managers' contentment with introduced innovations, which likely enhances productivity. The impact of innovation covers product and process changes, such as developing new products or improving operations. Sustainability highlights the long-term viability of innovations, aligning with the framework by Obeng et al. (2018). These variables collectively capture innovation's influence on managerial effectiveness. Table 4 shows the Pearson correlation between managerial productivity, innovation impact, and innovation satisfaction, revealing statistically significant positive relationships.

Table 4. Correlation values for managerial productivity, innovation impact and innovation satisfaction

		Innovation impact (II)	Managerial productivity (MP)	Innovation satisfaction (IS)
Innovation impact (II)	Pearson correlation	1		
	Sig. (two-tailed)			
	n	105		
Managerial productivity (MP)	Pearson correlation	0.614**	1	
	Sig. (two-tailed)	0.003		
	n	105	105	
Innovation satisfaction (IS)	Pearson correlation	0.721**	0.812*	1
	Sig. (two-tailed)	0.007	0.013	
	n	105	105	105

The Pearson correlation was used to test the correlation. Statistical significance was assessed at the 0.05 (* $p < 0.05$) and 0.01 (** $p < 0.01$) levels.

Source: authors' calculations based on survey data.

The correlation between innovation impact and managerial productivity is 0.614, confirming that innovation enhances productivity. Innovation impact and satisfaction are strongly correlated at 0.721, indicating that satisfaction contributes to improved productivity. The strongest correlation, 0.812, is between managerial productivity and innovation satisfaction, emphasizing innovation's vital role in boosting both satisfaction and productivity, reinforcing its importance for organizational success in microfinance institutions. Table 5 presents the regression results for the impact of innovation on managerial productivity, highlighting the effects of various predictors.

Table 5. Test results of individual predictors from the regression for the innovation impact on managerial productivity

Specification	Coefficient	Std. Error	z-Statistic	Sig.
Product	0.232	0.066	3.617	0.000**
Process	-0.126	0.051	-2.352	0.015*
Delivery time	0.174	0.065	2.518	0.013*
Operational flexibility	0.313	0.084	3.438	0.001**
Risk management	-0.084	0.043	-2.228	0.028*
Employee productivity	0.254	0.079	3.264	0.001**
Customer service	0.187	0.063	3.186	0.003**

* All predictors show statistical significance at the 0.05 level (two-tailed test).

** All predictors show statistical significance at the 0.01 level (two-tailed test).

Source: authors' calculations based on survey data.

The analysis confirms that product innovation positively influences managerial productivity. The coefficient of 0.232 shows that increased product innovation leads to higher productivity, with results statistically significant at the 0.01 level. This validates the hypothesis that product innovation impacts productivity.

1. Operational process innovation shows a negative effect. The coefficient of -0.126 indicates that negative changes in operational processes reduce productivity, with results also significant at the 0.01 level. This supports the hypothesis that operational processes impact productivity.
2. Service delivery speed positively affects productivity. The coefficient of 0.174 demonstrates that faster service delivery enhances productivity, with robust statistical significance.
3. Operational flexibility has the highest positive impact, with a coefficient of 0.313, confirming that increased flexibility significantly boosts productivity.
4. Risk management shows a negative effect. The coefficient of -0.084 indicates that poor risk management reduces productivity, with results being statistically significant.
5. Employee productivity positively influences managerial productivity. The coefficient of 0.254 validates this relationship with a high degree of confidence.
6. Improved customer service also enhances productivity. The coefficient of 0.187 highlights this positive impact, confirming the hypothesis that customer service contributes to managerial productivity.
7. Product innovation has a positive impact on the productivity of the managers. The value of the coefficient 0.232 suggests increasing the product innovation leads to an increase in productivity and the outputs are found to be statistically significant with the coefficient value at 0.01. Table 6 evaluates the linear regression model and its fit.

Table 6. Summary of model estimation and goodness-of-fit statistics for the linear regression of manager productivity

Specification	Coefficient	Std. Error	p-value
1	2	3	4
Constant	0.551	0.041	<0.001
Product	0.269	0.031	<0.001
Process	-0.184	0.028	<0.001
Delivery time	0.196	0.036	<0.001
Operational flexibility	0.312	0.041	<0.001

1	2	3	4
Risk management	-0.109	0.025	<0.001
Employee productivity	0.248	0.034	<0.001
Customer service	0.187	0.029	<0.001

$R^2 = 0.776$, $F(7, 86) = 35.132$, $p < 0.001$.

Source: authors' calculations based on survey data.

Product innovation, delivery time, and operational flexibility positively affect managerial productivity, with operational flexibility showing the strongest impact (0.312). Process innovation and risk management have negative effects. The model explains 77.6% of productivity variability, confirmed by significant F-test results. These findings highlight the importance of innovation and flexibility while addressing negative influences from processes and risk management, emphasizing the diverse impacts of predictors on productivity in microfinance institutions.

4. Discussion

This study is of great importance as it focuses on how technology and innovation affect the productivity of managers in microfinance institutions (MFIs) in developing countries. The use of correlation and regression results has made it possible to investigate this impact on 15 MFIs in Kosovo. Nevertheless, it is important to point out that the results of this study may not be universal as they represent the perspective of MFI managers in Kosovo regarding the impact of technological innovations on their productivity. According to Ndesaulwa and Kikula (2016), technological innovation is a major catalyst for economic progress and has a remarkable impact on the operational effectiveness of financial institutions in developing countries (Ndesaulwa, Kikula, 2016). An initial analysis of respondents shows that both genders are equally represented: 57.1% male and 42.9% female. The most represented age group is 25–35 years old, followed by 35–45 years old and 45–55 years old. Most of the respondents have a university degree. This indicates a combination of perspectives and experience in shaping management actions and strategies. Interest in the development of technological innovation is high in the 25–35 age group. At the educational level, the presence of many respondents with a college degree indicates the potential for effective use of technology in management work. These findings suggest that technological innovation has the potential to increase managerial productivity, especially in organizations with gender diversity and an educated workforce.

These conclusions can be instructive for leaders as they develop their strategies to improve productivity through technological innovation. As emphasized by Redondo-Rodríguez et al. (2023), technological innovation proves to be a central element in digital companies, even if it must be combined with additional factors such as knowledge and digital skills for optimal effectiveness (Redondo-Rodríguez et al., 2023).

The examination of key variables in the study regarding the influence of technological innovation on managerial productivity has drawn some important conclusions. It is emphasized that the impact of innovation is high, while risk management is at a relatively low level. However, aspects such as product, customer service, operational flexibility and sustainability of innovation performance were rated as important factors for manager productivity. According to Akinwale et al. (2017), technological innovation affects the performance of organizations, bringing about an increase in performance when it is accompanied by investing in research and development and through initiatives that focus on product and process innovation. This suggests that companies that invest in technological innovation tend to have better results in productivity and performance (Akinwale et al., 2017). These results highlight the need for continuous investment in technological innovation as a means to increase the efficiency and performance of companies in a competitive environment. According to Ndesaulwa and Kikula (2016), one of the most striking features of innovation in the developed economies of the OECD area is the high degree of uncertainty in the search for new technologies (Ndesaulwa, Kikula, 2016).

Based on the correlation results for manager productivity, innovation impact and innovation satisfaction, the results show that changes in the innovation impact in MFIs are associated with positive changes in managers' productivity. Furthermore, high manager satisfaction with innovation is associated with high manager productivity, demonstrating the positive impact of innovation satisfaction on MFI managers' productivity. Testing the hypothesis suggests that innovation has a positive effect on the productivity of MFI managers and that the degree of managers' satisfaction with innovation can serve as an indicator of their performance in this institution. The results of the regression tests for the individual predictors show that a high level of product innovation, service speed, operational flexibility, risk management, employee productivity and customer service have a positive and statistically significant influence on the productivity of MFI managers. These results confirm the importance of such factors in improving the performance of MFIs and can serve as a basis for developing future strategies to increase productivity in these institutions. In addition to operational efficiency, improvement in the productivity of managers in microfinance institutions brings about quantifiable social and

macroeconomic impacts in developing countries. On the client level, the increased productivity of managers will allow the MFIs to increase the outreach of services, lower the transaction costs and enhance service quality which will build the financial inclusion and welfare of clients. It is also associated with more efficient management that leads to quicker disbursement of loans and cheaper financial products much more than poverty reduction and long-term institutional sustainability (Yunus, 2004; Hermes, Lensink, 2007). On the macroeconomic level, productivity gains enable MFIs to shift financial resources to micro and small enterprises more efficiently in assisting the development of SMEs, creation of employment, and generation of income. Productive MFIs help to improve the national economic growth and deepen the financial system through increased access to finance and sustainability of the services (Ndesaulwa, Kikula, 2016; Obeng et al., 2018). According to Fayomi et al. (2019) technological innovation has positively affected the style and standard of living in the manufacturing sector by creating new ways of thinking, products, services and processes that contribute to the improvement of technological solutions (Fayomi et al., 2019).

Several important conclusions emerge from the analysis of the linear regression model for managerial productivity. The coefficient for the constant indicates that this constant is statistically significant, while the coefficient values for the predictor variables indicate the changes in managerial productivity for a one-unit change in each. The coefficient analysis confirms that product innovation, operational flexibility, employee productivity and customer service have a positive and statistically significant influence on management productivity, while operational processes and risk management have a significant negative impact. The “*goodness of fit*” statistics show the statistical significance of the model with an R-squared of 0.776, which explains a considerable part of the variance in manager productivity. When comparing the coefficients, it becomes clear that product innovation and customer service have a stronger influence on management productivity than operational processes. These results underline the importance of innovation, flexibility, risk management and customer service for increasing the efficiency of MFIs. The analysis of the regression model confirms that changes in product innovation have a greater positive effect on management productivity than changes in operational processes. In addition, the duration of service provision has a stronger influence on management productivity than risk management. Furthermore, the influence of customer service on management productivity generally exceeds that of operational processes. The adverse consequences that come with process innovation and risk management can be explained by the fact that the short-term adjustment costs and implementation difficulties may be the factors that can be cited instead of the inefficiencies in the long run. The implementation

of new processes and tightening the control over risk also tend to increase the administrative complexity and compliance activities in microfinance institutions that may temporarily lower the managerial productivity at least in the developing-country setting. This is in line with the innovation-productivity paradox that concludes that innovation may not necessarily bring prompt productivity in resource-limited settings (Ortega-Argilés, McCann, 2021). According to Akinwale et al. (2017) and Calza et al. (2019), technological innovation and compliance with international certification standards are key factors in increasing the productivity and performance of companies and thus contribute to the improvement of microfinance institutions in developing countries (Akinwale et al., 2017; Calza et al., 2019).

4.1. Theoretical contributions

The paper builds on the current body of research on microfinance and innovation by shifting the paradigm further than the commonly accepted perspective of technological innovation as something that leads to the overall performance of an organization or economy (Broughel, Thierer, 2019). Although earlier studies have paid much attention to productivity or financial performance of the firm in terms of technological innovation (Broughel, Thierer, 2019; Obeng et al., 2018), the current research offers new details as its empirical basis of managerial productivity in microfinance institutions in developing countries. With the disaggregation of technological innovation to particular dimensions of product innovation, customer service, operational flexibility, and sustainable innovation performance, the findings indicate the heterogeneous impacts that have not been highlighted in previous research. This subtlety improves the current innovation-productivity models and emphasizes the context-dependent processes, by which the technological innovation affects the productivity of managers in resource-bound microfinance settings (Ortega-Argilés, McCann, 2021).

4.2. Managerial implications

The research has prioritized and focused on practical implications to key stakeholders based on the empirical findings. The most immediate implications on the productivity of management in MFI are those relating to the product innovation, customer service technologies, and operational flexibility, which MFI managers should emphasize in the short term. Medium-long-term investments into employee digital skills, capacity building, and gradual implementation of risk management systems are suggested to make the process of the productivity increase sustainable. Regulators are encouraged to facilitate regulatory regimes that are supportive of innovation and flexible and, yet financial, stable, and technology

providers are required to make available scalable and practical digital solutions tailored to the MFI business ecosystems in developing nations (Ndesaulwa, Kikula, 2016).

4.3. Limitations and directions for future studies

This paper presents empirical results based on the situation in Kosovo acting as a typical developing-country setting, but institutional capacity, regulatory practices, and organizational culture can vary across developing economies, which can partially influence the generalizability of the results. According to previous studies, the impact of financial regulation, governance framework, and reporting regime on the implementation and management of technological innovations in financial systems is dependent on different factors (Usaj, Gashi, 2025; Ndesaulwa, Kikula, 2016). Therefore, the practices of supervisors, technological preparedness, and managerial norms across different countries may affect them. The comparative designs should be used in future research involving developing economies and directly consider institutional and regulatory heterogeneity to increase the external validity (Ortega-Argiles and McCann, 2021).

Conclusions

Microfinance institutions recognize technological innovation as essential for enhancing managerial productivity. This behavior drives efforts to provide quality services, increase employee satisfaction, and achieve sustainability. As AMIK (2024) emphasizes, the legal framework supports MFIs in adopting innovative strategies, fostering improved productivity and sustainability in the sector. This study confirms the positive, statistically significant impact of innovation on managerial performance in developing countries. Managers can leverage this evidence to develop strategies that promote innovation for improved organizational outcomes. Additionally, the research aligns with findings by Akinwale, Adepaju, and Olomu (2017), highlighting how technological innovation contributes to profitability and efficiency in organizational contexts. In conclusion, this study enriches the innovation management and finance literature by illustrating how technological advancements enhance productivity in financial organizations within developing regions.

References

- AMIK (2024, February). Legal Framework of Microfinance Institutions (MFIs). Association of Microfinance Institutions of Kosovo. Retrieved from <https://www.amik.org/f/17/Ligjet-dhe-Rregulloret-per-IMF-te> (4.04.2024).
- Akinwale, Y.O., Adepoju, A.O., Olomu, M.O. (2017). The impact of technological innovation on SME's profitability in Nigeria. *International Journal of Research, Innovation and Commercialization*, 1(1), 74–92. DOI: 10.1504/IJRIC.2017.082299.
- Blumberg, B., Cooper, D.R. and Schindler, P.S. (2008) *Business Research Methods*. Maidenhead: McGraw-Hill Education.
- BQK (2024, February 12). Licensed Financial Institutions. Central Bank of the Republic of Kosovo. Retrieved from <https://bqk-kos.org/mbikeqyrja-financiare-2/licencimi-i-institucioneve-financiare/institucionet-financiare-te-licencuara-2>.
- Broughel, J., Thierer, A. (2019). Technological Innovation and Economic Growth: A Brief Report on the Evidence. *Mercatus Center at George Mason University, Arlington, VA*. Retrieved from <https://www.mercatus.org/publications/entrepreneurship/technological-innovation-and-economic-growth>.
- Calza, E., Goedhuys, M., Trifković, N. (2019). Drivers of productivity in Vietnamese SMEs: the role of management standards and innovation. *Economics of Innovation and New Technology*, 28(1), 23–44. DOI: 10.1080/10438599.2018.1423765.
- Chan, S.W., Ahmad, M.F., Zaman, I., Ko, W.S. (2018). Employers' perception on important employability skills in the manufacturing industry. *International Journal of Engineering & Technology*, 7(2.29), 170–175. DOI: 10.14419/ijet.v7i2.29.13311.
- Creswell, J.W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications, Inc.
- Dichter, T. (2007). A Second Look at Microfinance: The Sequence of Growth and Credit in Economic History. *Development Policy Briefing Paper*, 202, 1–13. Center for Global Liberty & Prosperity, Cato Institute. Washington D.C.: 1000 Massachusetts Avenue, N.W. Retrieved from www.cato.org.
- Diriker, D., Landoni, P., Benaglio, N. (2017). *Microfinance in Europe: Survey Report 2016–2017*. Social Innovation Teams (SIT) & Politecnico di Torino. Financed with the financial support of the European Union. Retrieved from <https://www.european-microfinance.org/publication/microfinance-europe-survey-report-2016-2017>.
- Fayomi, O.S.I., Adelakun, J.O., Babaremu, K.O. (2019). The Impact of Technological Innovation on Production. *International Conference on Engineering for Sustainable World. Journal of Physics: Conference Series*, 1378, 022014. DOI: 10.1088/1742-6596/1378/2/022014.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

- Fu, X., Mohnen, P., Zanello, G. (2018). Innovation and productivity in formal and informal firms in Ghana. *Technological Forecasting and Social Change*, 131, 315–325. DOI: 10.1016/j.techfore.2017.08.009.
- Gashi, K. (2024). The Future of Robo-Advisors in Management. In: S. Gupta, S. Taneja, V. Kumar, E. Ozen, L. Vardari (eds.), *Robo-Advisors in Management* (pp. 35–56). IGI Global. DOI: 10.4018/979-8-3693-2849-1.ch003.
- Gashi, K. (2021). The Relationship between SME's Organizational Culture and Training and Development as a Human Resource Management Practice. *Journal of Global Policy and Governance*, 10(2), 139–161. DOI: 10.14666/2194-7759-10-2-008.
- Ghosh, D., Huang, X., Sun, L. (2020). Managerial Ability and Employee Productivity. *Advances in Management Accounting*, 32, 151–180. DOI: 10.1108/S1474-787120200000032006.
- Goi, C.L. (2017). The impact of technological innovation on building a sustainable city. *International Journal of Quality Innovation*, 3(6), 1–9. DOI: 10.1186/s40887-017-0014-9.
- Grameen Bank (2016). *What is Microcredit?* Grameen Bank. Retrieved from <http://www.grameen.com/what-is-microcredit> (22.04.2024).
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Hermes, N., Lensink, R. (2007). The Empirics of Microfinance: What do We Know? *The Economic Journal*, 117(February), F1–F10. DOI: 10.1111/j.1468-0297.2007.02013.x.
- Huang, K.-E., Wu, J.-H., Lu, S.-Y., Lin, Y.-C. (2016). Innovation and technology creation effects on organizational performance. *Journal of Business Research*, 69(6), 2187–2192. DOI: 10.1016/j.jbusres.2015.12.028.
- Kogabayev, T., Maziliauskas, A. (2017). The definition and classification of innovation. *Holistica – Journal of Business and Public Administration*, 8(1), 59–72. DOI: 10.1515/hjbpa-2017-0005.
- Kono, H., Takahashi, K. (2010). Microfinance Revolution: Its Effects, Innovations, and Challenges. *The Developing Economies*, 48(1), 15–73. DOI: 10.1111/j.1746-1049.2010.00098.x.
- Law No. 04/L-093 (2012). Law on Banks, Microfinance Institutions, and Non-Banking Financial Institutions of the Republic of Kosovo, entered into force on April 12, 2012.
- Lorenzo, R., Soler, J. (2017). Microcredit in developed countries: The case of Barcelona. *International Business Economics*. Final Year Project Code: EW105. Universitat Pompeu Fabra Barcelona. European Commission on Integration. Retrieved from <https://migrant-integration.ec.europa.eu>.
- Microsoft Excel 2016 [Microsoft Excel spreadsheet]. Microsoft Corporation. Retrieved from <https://www.microsoft.com/en-us/microsoft-365/excel>.

- MIE (2019). *National Strategy for Innovation and Entrepreneurship (2019–2023)*. Ministry of Innovation and Entrepreneurship, Republic of Kosovo. Retrieved from <https://konsultimet.rks-gov.net/viewConsult.php?ConsultationID=40551>.
- Ndesaulwa, A.P., Kikula, J. (2016). The Impact of Technology and Innovation (Technovation) in Developing Countries: A Review of Empirical Evidence. *Journal of Business and Management Sciences*, 4(1), 7–11. DOI: 10.12691/jbms-4-1-2.
- Ni, H. (2018). Study on the Role of Technological Innovation in Business Administration. *Modern Economy*, 9, 1619–1624. DOI: 10.4236/me.2018.910100.
- Obeng, A., Boachie, E., Liu, S. (2018). The impact of IT-technological innovation on the productivity of a bank's employee. *Cogent Business & Management*, 5(1). DOI: 10.1080/23311975.2018.1470449.
- OECD (2020). *Advancing the Digital Financial Inclusion of Youth: Report prepared for the G20 Global Partnership for Financial Inclusion by the OECD*. Retrieved from www.oecd.org/daf/fin/financial-education/advancing-the-digital-financial-inclusionof-youth.htm.
- Ortega-Argilés, R., McCann, P. (2021). The innovation productivity paradox. Paper presented at the OECD-EC high-level expert workshop series Productivity Policy for Places, workshop on “Innovation-Productivity Paradox,” held on 3 and 5 March 2021.
- Redondo-Rodríguez, L., Yábar, D.C.P.B., Díaz-Garrido, E. (2023). Impact of technological innovation on digital entrepreneurship and the effects on the economy. *International Entrepreneurship and Management Journal*, 19, 1501–1526. DOI: 10.1007/s11365-023-00873-2.
- Rosenberg, R., Gonzalez, A., Narain, S. (2009). The new moneylenders: Are the poor being exploited by high microcredit interest rates? In: T.A. Watkins K. Hicks (eds.), *Moving Beyond Storytelling: Emerging Research in Microfinance* (Contemporary Studies in Economic and Financial Analysis, Vol. 92, pp. 145–181). Emerald Group Publishing Limited. DOI: 10.1108/S1569-3759(2009)0000092008.
- Solidoro, A., Viscusi, G. (2020). Digital Transformation and Business Model Innovation in the Film Industry: The Case of Movieday.it. In: J. Strandgaard Pedersen, B. Slavich, M. Khaire (eds.), *Technology and Creativity* (pp. 10). Palgrave Macmillan. DOI: 10.1007/978-3-030-17566-5_10.
- SPSS. Version 25.0 (2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.
- Sun, T. (2011). *Understanding the nature of relationship between self-constructs and leadership behaviors as a function of generation* (Doctoral dissertation). Harold Abel School of Social and Behavioral Sciences, Capella University. UMI Number: 3487770.
- Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management (IJARM)*, 5(3), 28–36. Helvetic Editions LTD, Switzerland.

- Thompson, B., Diamond, K.E., McWilliam, R., Snyder, P., Snyder, S.W. (2005). Evaluating the Quality of Evidence from Correlational Research for Evidence-Based Practice. *Exceptional Children*, 71(2), 181–194. DOI: 10.1177/001440290507100204.
- Usaj, V., Gashi, K. (2025). Digital currency and its implications for traditional banking systems: A qualitative inquiry. *The Economics and Finance Letters*, 12(4), 798–813. DOI: 10.18488/29.v12i4.4621.
- Yunus, M. (2004). Grameen Bank, Microcredit and Millennium Development Goals. *Economic and Political Weekly*, 39(36), 4077–4080. Retrieved from <http://www.jstor.org/stable/4415509>.

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- Gashi, K., Usaj, V. (2026). Assessment of the Impact of Technological Innovations on Managerial Productivity in Developing Countries: Evidence from Kosovo. *Folia Oeconomica Stetinensia*, 26(1), 46–69. DOI: 10.2478/fofi-2026-0003.