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Investigating IT adoption through the TOE model in Albanian retail: an empirical analysis

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Abstract

This research investigates the determinants affecting Information Technology Adoption (ITA) within micro and small enterprises (MSEs) operating in the Albanian retail sector, employing the Technology-Organization-Environment (TOE) framework. The empirical assessment, conducted through multiple linear regression analysis, indicates that the technological context, particularly technology readiness, and compatibility, constitutes the predominant catalyst for IT adoption. The findings demonstrate that neither organizational nor environmental contexts exert a significant influence on IT adoption, thereby illuminating a distinctive dynamic in which technological readiness supersedes alternative factors. Furthermore, a negative correlation was identified between firm size and years in operation with IT adoption, implying that smaller and relatively younger firms exhibit greater agility in embracing novel technologies. From a managerial perspective, it is recommended that MSE managers should prioritize technology readiness by investing in accessible and easy-to-implement technologies. They should leverage their firm's agility to adopt new technologies swiftly, especially in competitive sectors. Additionally, external support from technology vendors can help streamline adoption. Future research should expand beyond Tirana and use longitudinal studies to observe how IT adoption evolves.

Keywords: Information Technology Adoption, Retail Industry, TOE Framework, Technology context

Introduction

The retail industry plays a crucial role in the economy by influencing job generation, contributing to the Gross Domestic Product (GDP), and stimulating business operations (National Retail Federation, 2021). The retail trade turnover index encapsulates the aggregate amounts invoiced by the organization within the specified timeframe, representing the revenue generated from the sale of products without undergoing additional modifications (INSTAT, 2024). This index in Albania was approximately 100.2 for the initial quarter of 2024, indicating a rise of 4.9% compared to the first quarter of 2023. Food products in specialized and non-specialized stores played a significant role in the yearly growth rate of 4.9% in retail trade. These products accounted for 2.9 percentage points of this growth, with beverages and tobacco products also playing a role by contributing 1.6 percentage points. This data suggests a favorable trajectory for the retail sector (INSTAT, 2024). The fieldwork states that the incorporation of information technology plays a

crucial role in the prosperity of retail organizations through the improvement of customer experience and operational effectiveness (Pantano & Gandini, 2017; Piotrowicz & Cuthbertson, 2014; Shankar et al., 2021). The research argues that this is achieved by leveraging data analytics to enhance decision-making processes and offer personalized services, as well as by optimizing the transparency and efficiency of the supply chain (Piotrowicz & Cuthbertson, 2014). Moreover, it leads to a competitive edge in the market, albeit necessitating the resolution of obstacles related to implementation to capitalize fully on its advantages (Piotrowicz & Cuthbertson, 2014; Brynjolfsson & Hitt, 2000). Research has addressed technology adoption in the context of hardware and software technologies such as computers, e-commerce platforms, inventory management systems, etc. (Ghobakhloo et al., 2012; Zhu et al., 2006).

Innovation and technology adoption have attracted considerable attention in Information Systems (IS) research, characterized by a proliferation in theoretical frameworks (Awa et al., 2015; Benbasat & Barki, 2007). These frameworks, span from rational choice models to socioeconomic theories, and demonstrate varied perspectives on adoption factors (Kim & Ammeter, 2014). Within these theories, the Technology-Organization-Environment (TOE) framework is notable for its focus on organizational-level influences and socioeconomic dynamics (Gangwar et al., 2014; Oliveira & Martins, 2011). Nevertheless, criticisms propose that TOE might neglect crucial factors like individual adopter traits and task intricacies and that combining TOE with individual and task characteristics enhances the predictive power of technology adoption in real-world applications (Goodhue & Thompson, 1995; Venkatesh et al., 2003).

The fieldwork revealed that according to Malik et al. (2021) the level of competition, governmental backing, and readiness of trading partners exert a notable influence on the uptake of blockchain technology within enterprises. The study showed that increased competition and backing from the government demonstrate a favorable relationship to adoption, while uncertainty regarding standards and perceived risks negatively impact the adoption process. Moreover, other findings discovered that organizational and environmental characteristics, as opposed to technological features, played a crucial role in influencing the adoption of IS (Henriksen, 2006). Based on these findings, it is noticeable that studies on technology adoption have yielded conflicting results, particularly regarding the factors that influence both the acceptance and rejection of innovation. For instance, while some researchers argue that perceived usefulness and organizational readiness are key drivers of adoption, others have found that these same factors may act as barriers in contexts, leading to rejection (Blut & Wang, 2020). However, another study found the technology readiness (compared to organizational and environmental context) as the strongest factor that predicts ITA in developing countries, suggesting that the technology infrastructure is highly important for ITA (Zhu et al., 2006). This inconsistency in findings highlights a crucial research gap, especially in the Albanian context, where studies on technology adoption in the retail industry remain limited.

Given this gap, it becomes essential to explore how these factors operate within Albania's unique socioeconomic and cultural landscape. Therefore, this study raises the following research inquiry:

RQ: What are the key determinants influencing the intention to adopt information technologies among retail enterprises in Albania?

To answer the research question, a quantitative research approach is developed based on the TOE framework. This manuscript is structured into six sections. Section 2 offers a concise analysis of the existing literature elucidating various theoretical perspectives employed in the study of ITA, subsequently followed by the delineation of the theoretical framework and formulation of hypotheses. Section 4 delineates the methodology and data utilized in assessing the hypotheses. Subsequently, the fifth section elucidates the findings, while the final section concludes with practical implications.

Literature review

Adoption of Information Technology

Retailers are progressively utilizing information technology solutions to address customer needs and enhance visibility in the supply chain, ultimately fostering a comprehensive strategy toward omnichannel retailing (Piotrowicz & Cuthbertson, 2014). Technological progressions such as micro-cloud computing, robotics, 5G, virtual reality (VR), augmented reality (AR), mixed reality (MR), Internet of Things (IoT), and drones are swiftly reshaping the retail industry, particularly amidst the backdrop of the COVID-19 pandemic, facilitating retailers to adjust to unexpected situations and steer towards novel avenues of investigation (Shankar et al., 2021).

Information technology (IT) adoption is characterized by the acknowledgment and initial utilization of a newly introduced technology or product (Khasawneh, 2008). IT plays a pivotal role in the enhancement of national economic competitiveness and firm productivity, with adoption determinants best comprehended through models like the diffusion of innovation (DOI) and the technology, organization, and environment (TOE) framework, which scrutinize individual, organizational, and environmental factors influencing IT adoption (Oliveira & Martins, 2011). Hence, the following subsection describes a group of the key theoretical lenses utilized to investigate IT adoption.

Examining Technology Adoption through Key Theoretical Lenses

This section conducted a thorough examination of four pivotal theoretical frameworks that have been employed to elucidate the phenomenon of technology adoption: the Technology Acceptance Model (TAM), the Diffusion of Innovations (DOI) theory, the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology-Organization-Environment (TOE) framework. Each framework provides distinct insights regarding the determinants that influence technology adoption, and collectively, they offer a holistic comprehension of the mechanisms through which adoption transpires across diverse contexts. Through a meticulous analysis of each framework, we endeavor to underscore at the end of this section their pertinence to the Albanian retail sector, ultimately concluding that the TOE framework is the most suitable for this study.

The Diffusion of Innovations (DOI) theory

The Diffusion of Innovations (DOI) theory posited by Rogers (2003) underscores the mechanisms through which innovations disseminate within social structures, accentuating elements such as relative advantage and compatibility (García-Avilés, 2020). The DOI model, as suggested by Rogers (2003), stands out as a highly utilized framework for examining the dissemination of innovations among a system's constituents, particularly emphasizing the elucidation of post-adoption factors influencing innovation. Rogers identified several determinants of innovations, such as relative advantage, compatibility, complexity, trialability, and observability, that impact the rate of adoption (Minishi-Majanja & Kiplang'at, 2013). Within the realm of Information Technology systems, Rogers' Diffusion of Innovations model proves to be efficacious in analyzing the process of adoption and elucidating the various factors that impact an individual's choice to either embrace or decline an innovative technology (Koukis & Jimoyiannis, 2019).

The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), formulated by Davis (1989), concentrates on perceived usefulness and usability as pivotal factors influencing technology adoption (Marangunić & Granić, 2015). According to this research, TAM is derived from the psychology-based Theory of Reasoned Action and the Theory of Planned Behavior, and the two key variables (perceived ease of use and perceived usefulness) mediate the relationship between system characteristics (external variables) and potential system usage. Throughout the years, the Technology Acceptance Model (TAM) has been widely modified to investigate the acceptance of different technological innovations, such as mobile services (Lule, 2012). According to this study, the model focuses on the attitude-based explanations of users' intentions to use information technologies.

The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), introduced by Venkatesh et al. (2003), amalgamates components from various models to elucidate user intentions and behavioral patterns (Williams et al., 2015). The Unified Theory of Acceptance and Use of Technology (UTAUT) is a holistic framework extensively applied in research on the adoption and diffusion of technology to comprehend user intentions and behaviors. UTAUT has been formulated through the amalgamation of eight prominent theories and frameworks: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Combined Theory of Planned Behavior/Technology Acceptance Model (C-TPB-TAM), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT) (Venkatesh et al., 2003). The model emphasizes the importance of individual characteristics such as attitude, computer self-efficacy, and personal innovativeness in explaining technology acceptance and usage behaviors, suggesting that the facilitation of conditions can predict behavioral intention even in the presence of effort expectancy, challenging prior theories of technology acceptance (Dwivedi et al., 2019).

The Technology-Organization-Environment (TOE) framework

Ultimately, the Technology-Organization-Environment (TOE) framework articulated by Tornatzky and Fleischer (1990) investigates the confluence of technological, organizational, and environmental variables in shaping adoption choices (Tornatzky & Fleischer, 1990; Venkatesh et al., 2003; Rogers, 2003). The TOE framework is a theoretical construct at the organizational level that elucidates how three distinct components within a company's environment impact the decisions regarding adoption (Baker, 2012). The three components encompass the technological context, the organizational context, and the environmental context. Factors influencing the adoption process encompass innovation, organizational technology, and external surroundings (Chau & Tam, 1997). There are significant relationships between the adoption of Information Systems (IS) and the technological as well as organizational characteristics (Thong, 1999). The TOE framework, formulated by Tornatzky and Fleischer (1990), offers a comprehensive perspective for comprehending how technological, organizational, and environmental factors collectively influence the integration of novel technologies. Despite its widespread utilization, the Theoretical Framework has experienced limited theoretical advancement or analysis, persisting predominantly unaltered since its establishment (Baker, 2012). Nevertheless, the TOE framework is well-regarded within academic circles for its robust scholarly recognition across different contexts (Awa et al., 2017; Chau & Tam, 1997; Thong, 1999).

Furthermore, the literature demonstrates the importance of considering demographic factors related to the firm's size and age in the TOE model, as they provide essential insights into a firm's organizational

capabilities and readiness for technology adoption, particularly in resource-constrained environments such as SMEs (Awa et al., 2017; Nguyen et al., 2022; Ramdani & Kawalek, 2007; Zhu et al., 2003). Research indicates a negative significant impact of firm size on ITA in developing countries (Zhu et al., 2006). Small enterprises are flexible and capable of adopting new technologies, and might possess a comparative advantage due to their "necessitating diminished communication, reduced coordination, and lesser influence to obtain support" (Prause, 2019; Zhu et al., 2006). Additionally, research found firm age as an essential factor that impacts ITA, corroborating the assertions made by Nguyen et al., (2022). Younger enterprises of SMEs generally exhibit greater agility and a higher propensity to embrace emerging technologies due to their proactive approach to innovation, which is crucial in competitive markets (Meyer, 2011; Msomi et al., 2019; Zamani, 2022). In addition, the type of industry plays a crucial role in technology adoption rates. Certain industries, particularly those that are rapidly evolving or highly competitive, may see a greater propensity for newer firms to adopt technologies to remain relevant and competitive (Drew, 2003; Ng Tye & Chau, 1995; Premkumar & Roberts, 1999; Zhu et al., 2006). SMEs often view the adoption of IT as a means to enhance their competitive position, especially in industries characterized by high levels of competition and innovation (Ghobakhloo et al., 2012). The need to keep up with rivals can motivate these firms to implement new technologies that improve their supply chain management and overall business processes (Lin & Raman, 2009).

Each of the theoretical frameworks examined offers significant perspectives on various dimensions of technology adoption. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) elucidate the processes of individual decision-making in the realm of technology adoption, which holds substantial relevance in the context of Albanian micro and small enterprises where decision-makers play a pivotal role. The Diffusion of Innovations (DOI) theory illuminates the dissemination of innovations within a wider societal framework, which is essential for comprehending the reasons behind the disparities in technology adoption rates between Albania and more advanced economies. Nevertheless, the Technology-Organization-Environment (TOE) framework is the most pertinent for this investigation as it thoroughly encompasses the technological, organizational, and environmental variables that uniquely influence the Albanian retail sector. Consequently, while the other frameworks contribute supplementary insights, this research will predominantly employ the TOE framework to scrutinize technology adoption, allowing us to account for the diverse factors that impact ITA in the Albanian retail sector.

Theoretical framework and hypothesis development

TOE Framework

The study examines the factors that impact the acceptance of technology in retail businesses in Albania, employing the Technology-Organization-Environment (TOE) framework as a foundational theoretical model. Through the observance of this well-established framework, our objective is to expand upon a substantial body of current studies and present insights tailored to the retail industry in Albania.

Reasoning behind the selection of the TOE model

The selection of the Technology-Organization-Environment (TOE) framework for research on technology adoption is justified by its thorough analysis of the complex aspects involved in technology adoption, with a specific emphasis on organizational factors as opposed to individual ones, a characteristic distinguishing it from theories like the technology acceptance model (TAM) (Al Hadwer et al., 2021; Gangwar et al., 2014; Hossain & Quaddus, 2011; Oliveira & Martins, 2011). Furthermore, most of the existing theories on IT adoption at the organizational level are adaptations of the TOE framework, which either segment or

broaden its components; for instance, Institutional Theory examines how the environmental context impacts technology adoption—a concept already embedded in the TOE framework—while DoI theory encompasses both technological and organizational elements inherent in the TOE framework (Malik et al., 2021). The TEO framework has gained robust empirical and theoretical validation in the IS field, making it a widely accepted and reliable model for studying technology adoption (Henriksen, 2006; Yoon & George, 2013). Because of these advantages, numerous studies have employed similar models to investigate technology adoption in various contexts, providing a robust foundation for the research (Kuan & Chau, 2001; Premkumar & Roberts, 1999; Li et al., 2010; Malik et al., 2021; Premkumar & Roberts, 1999). The theoretical model utilized for this study, as suggested by the TOE framework, is depicted in the figure below. The framework classifies the determinants that impact an organization's embrace of novelty into three distinct groupings: technology, organization, and environment (Al Hadwer et al., 2021). The realm of technology incorporates components such as the security and intricacy of systems. On the other hand, organizational aspects encompass factors such as the size of the organization and the endorsement from top-level management. Furthermore, the environmental context comprises market ambiguity and external influences.

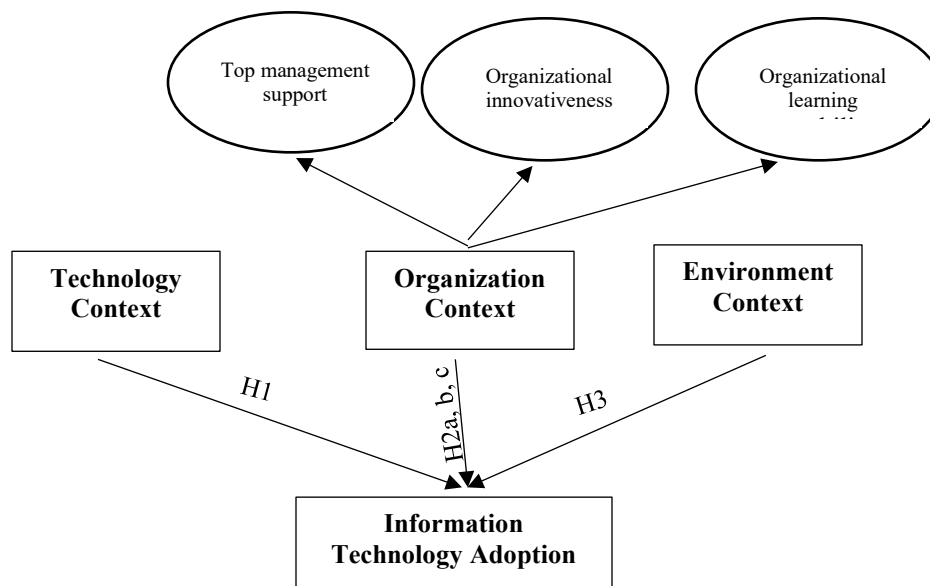


Figure 1: TOE theoretical research framework
Source: Adopted from Tornatzky and Fleischer (1990).

Technology context

The technologies within an organization play a crucial role in integrating new technology and establishing the boundaries for the extent and speed of technological advancement in which the organization can effectively participate (Baker, 2012). The technologies currently in place within an organization are important in incorporating new technology, as they delineate the parameters for the scope and pace of technological progress that the organization can actively engage in (Collins et al., 2024; Kuan & Chau, 2001). Key elements within this particular context encompass perceived simplicity, compatibility, and performance expectancy, all of which exert an impact on the probability of adopting technology (Dedrick & West, 2003; Hossain & Quaddus, 2011). Simplification of technology diminishes uncertainties and risks, rendering it a pivotal determinant in adoption (Rao et al., 2011). While numerous studies have yielded inconsistent findings regarding the primary characteristics of innovations, this research specifically targets

the perceived attributes of innovations (Moore & Benbasat, 1991). Ultimately, the following hypothesis is proposed:

H1: The perceived characteristics of using an Innovation are positively associated with IT adoption.

Organizational context

The organizational context includes the company's attributes and assets, such as the structure of employee connections, internal communication procedures, the size of the organization, and the resources that can be mobilized (Baker, 2012; Zhu et al., 2003). Larger organizations are frequently cited as being more inclined to embrace a greater number of innovations primarily as a result of their enhanced adaptability and capacity to manage higher levels of risk (Hwang et al., 2004; Zhu & Kraemer, 2005). Top management support, innovativeness, and organizational learning capability were significant factors in the organizational context of the adoption of technologies (Malik et al., 2021).

Top management support

The significance of top management support (TMS) in implementing novel technologies holds great importance, especially in organizational settings where technology integration is obligatory, reliant on numerous adopters, or necessitates thorough training (Gallivan, 2000). Research shows that senior executives have a crucial impact on cultivating a supportive atmosphere, proficiently communicating and reinforcing corporate values through a well-established mission, thus becoming a significant driver in shaping the adoption of innovative technologies (Jeyaraj et al., 2006; Sargent et al., 2012). This assistance provides motivation as well as the allocation of adequate resources and the resolution of managerial obstacles linked to the incorporation of novel technologies into current business operations, supporting the following hypothesis (Young & Jordan, 2008).

H2a: Retail companies with strong top management support are more likely to adopt new technologies than those without such support.

Organizational Innovativeness (OI)

According to research, Organizational innovation (OI) pertains to the readiness and capacity of a company to welcome novel concepts, procedures, or goods, thereby cultivating a setting favorable to the advancement and integration of technology (Ruvio et al., 2014). The relationship between Organizational Innovativeness (OI) and the adoption of technology has been a central focus in various research studies, indicating that elevated levels of innovativeness within a firm result in an increased inclination to embrace novel technologies (Malik et al., 2021; Ruvio et al., 2014). Therefore, the following hypothesis is proposed:

H2b: Organizational innovativeness is positively related to technology adoption.

Organizational Learning Capability

This concept, derived from the organizational learning theory, underscores the significance of constantly acquiring and utilizing new insights regarding technological developments to uphold competitiveness in a volatile business landscape (Argyris & Schön, 1997). Research has demonstrated that organizations possessing the ability to acquire new knowledge, retain it, and effectively utilize it are characterized as being receptive to novel concepts and willing to undertake risks, consequently enhancing their propensity to embrace technological advancements (Malik et al., 2021). As a result, it is recommended that

organizations establish a learning mechanism to stay informed about global developments that may have significance for their operations. Therefore, the following hypothesis is proposed:

H2c: Retail companies with a high organizational learning capability are more likely to adopt new technologies than those with a low organizational learning capability.

Environmental context

The adoption of innovation does not solely stem from a rational evaluation of the business consequences of the new technology but is also influenced by the need to address external pressures (Pan & Jang, 2008). The environmental context includes the structure of the industry, the availability of technology service providers, and the regulatory environment, all of which play a crucial role in shaping the adoption of innovation (Kamath & Liker, 1994; Mansfield et al., 1977). The research affirms that the environmental context, characterized by existing competition, regulatory authorities, and various external pressures, exerts a significant influence on the adoption of technology (Kumar et al., 2022). Therefore, the following hypothesis is proposed:

H3: There is a significant positive relationship between environmental context (EC) and the intention to adopt technology in retail outlets.

Methodology

Main variables and measurement

The research studies the impact of TOE factors on the information technology adoption in retail in Albania. To achieve this goal, a cross-sectional survey-based method is utilized and a quantitative questionnaire is employed as the primary instrument for data collection. The constructs of the variable in this research are assessed using multiple items that are derived from the literature of previous scholars. Specifically, the information technology adoption (ITA) is sourced from Chen & Tsou (2007), the technological context from Moore & Benbasat (1991) & Kumar et al. (2022), the organizational context from Malik et al. (2021), and the environmental context from Li et al. (2010) & Kumar et al. (2022). Each of the items of the constructs is measured through the ordinal scale of a 7-point Likert scale. The measurement items are attached in the appendix.

The original questionnaire is translated into the local language (Albanian) and then piloted among a selection of retail service providers to confirm the comprehension of the survey by the participants located in the capital city of Albania, Tirana. The survey instrument was administered to retail establishments through Google Forms in July 2024.

Although the Albanian retail context is under-researched, existing studies from other regions provide a foundation for developing certain hypotheses related to factors such as technological readiness. These hypotheses are tested alongside the exploratory research question that addresses the unique characteristics of the Albanian market.

Sample characteristics

The study's population encompasses all retail establishments located within the capital city of Tirana, Albania, due to the concentration of a large number of retail outlets with expertise in overseeing the

technical aspects of their operations. For this study, we analyzed retail businesses, surveying individuals in various roles from managers to client representatives within these organizations.

The minimum sample size required at a 5% significance level would be 96 observations (Harrell, 2012). In this study, there were 101 respondents, which exceeds this requirement, thus ensuring that the sample size is sufficient for reliable and valid analysis. The sampling technique utilized in this study is convenience sampling, which is highly effective in similar research on technology adoption (Kumar et al., 2022). The study's initial sample comprised 101 participants. However, to maintain the focus of this study on micro and small enterprises, 5 responses from companies with more than 50 employees are removed from the dataset. As the research aims to explore technology adoption challenges specific to micro and small businesses, excluding middle-sized companies ensured that the sample better represented the target population.

The sample is predominately female (86%), with an average age of 27 years. The age distribution was as follows: 49% aged between 18-24 years, 37% between 25-34 years, and smaller proportions in older age groups. Regarding educational attainment, 54% possessed a bachelor's degree, 33% held a master's degree, and 13% had completed high school. Concerning job roles, 40% served as managers, and 20% as assistant managers, while the remaining positions included inventory managers, owners, and other staff members. On average, participants had worked for 4 years, with the majority (49%) having 1-3 years of experience. The majority of the enterprises had fewer than 10 staff members. The enterprises had been operational for an average of 12 years, primarily in the apparel (39%), supermarket (14%), and health and care (12%) sectors. Other sectors represented were furniture & household goods, jewelry & accessories, electronics, and grocery.

Table 1: Sample Characteristics

	Variable	N	Frequency (%)
Profile of the Respondent	Gender	96	Female: 86%, Male: 14%
	Age	96	(18-24): 49%, (25-34): 37%, (35-44): 13%, (45-54): 1%, (55-64): 0%, (65 or over): 0%
	Education Level	96	Master's degree: 33%. Bachelor's degree: 54%, High school degree: 13%
	Position	96	Manager: 40%, Assistant Manager: 20%, Inventory Manager: 3%, Owner: 3%, Other staff: 34%
	Seniority (years)	96	Less than 1 year: 26%, (1-3 years):49%, (4-10 years): 16%, (11-20 years): 8%, More than 20 years: 2%
Profile of the Company	Number of Employees	96	Less than 10: 74%, (10-49): 26%
	Years in Business	96	Less than 5 years: 25%, (5-10 years): 41%, (11-20 years): 23%, (21-50 years): 11%
	Industry Type	96	Apparel: 39%, Supermarkets: 14%, Health and care: 12%, Furniture & household goods: 11%, Jewelry and accessories: 11%, Electronics: 9%, Grocery: 4%.

Source: Author's work

Empirical model

The methodology utilized in this investigation involves a multiple regression model. The assumptions of linearity, homoscedasticity, and independence of errors were checked and met. The following equation represents the relationship between the independent variables (Technology, Organization, and Environment context) and the dependent variable (Technology Adoption).

$$ITA_i = \beta_0 + \beta_1 TC_i + \beta_2 OC_i + \beta_3 EC_i + \varepsilon_i \quad (1)$$

Where:

- **ITA**: Information Technology Adoption (dependent variable)
- **TC**: Technology context (independent variable)
- **OC**: Organization context (independent variable)
- **EC**: Environment context (independent variable)
- β_0 : Intercept
- $\beta_1; \beta_2; \beta_3$: Coefficients for each independent variable
- ϵ : Error term

Results

In the field of data analysis, the utilization of multiple linear regression analysis is common, especially in cases where there exist numerous independent variables alongside a singular dependent variable (Kutner et al., 2004). The current research employs this particular technique to explore the associations between the predictor variables and the outcome variable.

Before performing the relevant checks for hypothesis testing, it is necessary to ensure that all the relevant assumptions are met. Shapiro-Wilk test revealed a value of .288 ($p > .05$) showing that data are normally distributed in the dependent variable. As regards the multicollinearity, the tolerance (greater than 0.2) and VIF values (lower than 10) presented in the appendix (Table A2) fall within acceptable thresholds, indicating the absence of a significant multicollinearity concern in the model. The variables in the regression analysis seem to exhibit a satisfactory level of independence from each other, thereby contributing to the stability of the model in terms of multicollinearity. To assess linearity, a visualization was created where residuals were juxtaposed with predicted values. The resulting scatter plot revealed residuals exhibiting a random distribution around zero, leading to the determination of a normal distribution within the dataset.

To add, reliability and validity test is employed through Cronbach's Alpha and KMO tests (see Table 2 & A3). When Cronbach's Alpha and the KMO coefficient exceed 0.7, constructs demonstrate high levels of reliability and validity.

Table 2. Reliability and statistics of constructs

Construct	Item Statistics			Reliability Statistics		
	Mean	SD	N	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
Technology adoption	3.60	1.20	96	.795	.793	4
Technology context	3.56	.87	96	.727	.730	6
Organization context	3.46	.76	96	.754	.765	10
Environment context	3.56	1.03	96	.698	.700	5

Source: Author's work (2024)

Detailed Statistical Analysis of the ITA Regression Model

According to the model summary (see Table 3), 28.5% of the variance in Information Technology Adoption can be explained by Technology Context, Organization Context, and Environment Context. The adjusted R Square of 0.236 suggests that, after adjusting for the number of predictors, about 23.6% of the variance in Information Technology Adoption is explained by the model. The overall model demonstrates statistical significance ($p = 0.000$), indicating a significant association between the predictors and the outcome.

Table 3. Model summary

Model	R	R Square	Adjusted R Square	Sig.
1	.534 ^a	.285	.236	.000

a. Predictors: (Constant), Industry, EnvironmContext, No_employee, Year_busines, OrganizContext, Tech_context

Source: Author's work (2024)

The p-value derived from the ANOVA analysis (Table 4) serves as a test for the null hypothesis that all regression coefficients hold an equivalence to zero, indicating no effect. A p-value of 0.000 implies the statistical significance of the model at the 0.05 threshold, thus denoting less than a 0.1% probability of the observed relationship transpiring due to random chance.

Table 4. ANOVA analysis of the model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.030	6	6.505	5.850	.000 ^b
	Residual	97.854	88	1.112		
	Total	136.884	94			

a. Dependent Variable: Tech_adopt

b. Predictors: (Constant), Industry, EnvironmContext, No_employee, Year_busines, OrganizContext, Tech_context

Source: Author's work (2024)

As regards the coefficients of the multiple regression, the following table provides the findings for the proposed model. According to this analysis, the technological context, number of employees, years of doing business, and industry were the variables that had a significant effect ($p < 0.05$) on Information Technology Adoption. Specifically, the technological context has a positive effect on ITA, with a coefficient of 0.387, indicating an increase of 0.387 units in ITA for each increase in the environmental context score, holding all other variables constant. The number of employees has a negative significant impact on ITA, with a coefficient of -0.334 and p value of 0.009. Meanwhile, years of doing business have a negative significant impact on ITA, with a coefficient of -0.314 and industry indicates a positive significant effect with a coefficient of 0.052. However, variables that measure the organizational context (top management support, organizational innovativeness, and organizational learning capability) and environmental context did not show a statistically significant effect on ITA ($p > 0.05$).

Table 5. Coefficients of the multiple regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.863	.697		4.104	.000
	Tech context	.387	.161	.280	2.412	.018
	OrganizContext	-.004	.170	-.003	-.024	.981
	EnvironmContext	.144	.133	.118	1.086	.281
	No employee	-.334	.125	-.245	-2.663	.009
	Year busines	-.314	.104	-.285	-3.018	.003
	Industry	.052	.023	.213	2.317	.023

a. Dependent Variable: Tech_adopt

Source: Author's work (2024)

Discussion

This study investigated Information Technology Adoption (ITA) in micro and small enterprises (MSEs) within the Albanian retail sector using the Technology-Organization-Environment (TOE) framework. The results underscore the pivotal influence of the technological environment ($\beta = 0.387$, $p = 0.018$) in facilitating the adoption of information technology, particularly underscoring the importance of technology readiness – thereby corroborating the initial hypothesis, while the remaining hypotheses lack empirical support. This supports previous studies, such as those by Zhu et al. (2006), which emphasize the critical role of technology infrastructure in driving ITA, particularly in developing countries.

However, contrary to expectations, neither the organizational context (e.g. top management support, organizational innovativeness) nor the environmental context (e.g. external pressures, competition) had a statistically significant impact on IT adoption. This finding diverges from much of the existing literature, which typically highlights the importance of these factors. The results suggest that in the Albanian retail sector, technological readiness plays a more pivotal role, potentially overshadowing organizational and environmental influences.

Additionally, the study revealed a negative correlation between firm size and years in operation with IT adoption, indicating that smaller and younger firms are more agile and responsive to adopting new technologies. This aligns with studies (Nguyen et al., 2022) that show smaller firms often face fewer internal barriers and are more flexible in adopting innovations.

Managerial Implications

For micro and small enterprises, the prioritization of technological readiness is of paramount importance. Managers ought to concentrate on ascertaining that the technology they implement is conducive to seamless integration, compatible with pre-existing systems, and provides unequivocal operational advantages (Zhu et al. 2006). MSEs should designate resources toward technologies that possess the potential to augment efficiency and optimize operations without introducing additional complexity.

Smaller and nascent MSEs benefit from enhanced agility, which enables them to swiftly adapt to technological innovations (Zamani, 2022). Managers should capitalize on this flexibility by cultivating an environment conducive to innovation that promotes the prompt adoption of emergent technologies. Such an approach will empower MSEs to maintain competitiveness and address the shifting demands of the marketplace.

Given that industry-specific dynamics profoundly impact IT adoption, MSE managers operating in competitive retail sectors should adopt a proactive stance in monitoring technological trends (Drew, 2003; Zhu et al., 2006). Retailers situated in rapidly evolving industries need to prioritize the acquisition of innovative technologies to sustain a competitive advantage and enhance customer service.

While external factors such as regulatory pressures were determined to be insignificant, MSE managers should nonetheless pursue assistance from technology vendors and partners to facilitate the adoption process (Kumar et al., 2022). Harnessing external training and technical support can mitigate the learning curve and ensure a more seamless transition to new technologies.

Limitations and Suggestions for Future Research

This study contributes to the limited research on IT adoption in developing markets, particularly on micro and small enterprises in the Albanian retail sector. However, the generalizability of these findings is limited due to the small sample size and the specific regional focus. To bolster the strength of forthcoming research, it is advisable to increase the sample size and utilize longitudinal studies to monitor technology adoption over time. Moreover, integrating multiple theoretical frameworks, such as the Technology Acceptance Model or Diffusion of Innovations, may provide a more comprehensive understanding of the adoption process. The exploration of different contexts and the inclusion of qualitative approaches could also enhance the analysis and provide deeper insights into the dynamics of technology adoption.

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Appendix

Table A1. Measurement items

Variable		No of Items	Measurement	Source
Dependent Variable				
Information Technology Adoption (ITA)	For the past few years, our retail: ITA1. has allocated a generous budget for purchasing information technology hardware. ITA2. has allocated a generous budget for purchasing information technology software. ITA3. has emphasized information technology staffing and training. ITA4. has embraced sophisticated Internet applications.	4	Ordinal scale, 7-point scale (1= Strongly Disagree, 7=Strongly Agree)	(Chen & Tsou, 2007)
Independent Variables				
Technological context (TC)	As a retail outlet service provider do you feel technology: TC1: brings more business opportunities TC2: improves efficiency TC3: helps in cost saving	6	Ordinal scale, 7-point scale (1= Strongly Disagree, 7=Strongly Agree)	(Kumar et al., 2022; Moore & Benbasat, 1991)

	TC4: it improves customer relationship TC5: improves management (coordination, sharing) TC6: meets regulatory requirements imposed by the government			
Organizational Context (OC)	<u>Top management support (TMS):</u> TMS1: Their top management provides the necessary resources for ITI. TMS2: Their top management considers ITI as strategically important. TMS3: Their top management is actively involved in IT-related decisions. <u>Organizational innovativeness (OI):</u> In my opinion, retailers adopt IT when: OI1: They actively seek new ideas OI2: They like to do things in new ways OI3: They are open to taking risks <u>Organizational learning capability (OLC):</u> In my opinion, retailers adopt IT when: OLC1: They have a mechanism to store new knowledge. OLC2: They encourage their employees to acquire new knowledge and skills. OLC3: Their employees share their work experiences, ideas, or learning with each other. OLC4: They have practices to utilize new knowledge in their IT-related decisions.	10	Ordinal scale, 7-point scale (1= Strongly Disagree, 7=Strongly Agree)	(Malik et al., 2021)
Environmental Context (EC)	As a retail outlet service provider do you feel: EC1: Retailers will lose customers to competitors if they do not adopt technology. EC2: Technology vendors promote technology by offering free training sessions.	5	Ordinal scale, 7-point scale (1= Strongly Disagree, 7=Strongly Agree)	(Kumar et al., 2022; Li et al., 2010)

	EC3: It is a strategic necessity to use IT to compete in the marketplace. EC4: Perceived consumer readiness for technology is positively influencing technology adoption in retail. EC5: Technologies provide support for various services, such as payment, logistics, and credit reporting.			
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Source: Processed by the author

Table A2. Collinearity Diagnosis

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	OrganizContext	.688	1.453
	EnvironmContext	.772	1.296
	Tech_context	.638	1.567

a. Dependent Variable: TechAdopt

Source: Author's work

Table A3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.785
Bartlett's Test of Sphericity	Approx. Chi-Square	902.369
	df	300
	Sig.	.000

Source: Author's work