International Journal for Housing Science and Its Applications
Publish September 30, 2024. Volume 45, Issue 3 Pages 36-47

https://doi.org/10.70517/ijhsa4534

Management as a Factor of Socio-Economic Development of Small and Medium-Sized Businesses of Ukraine in Conditions of Instability

Yuliia Holovnia[1], Halyna Mykhailiv[2,*], Oleksandra Panasiuk[3], Volodymyr Saienko[4] and Tetiana Vlasenko[5]

[1] Department of Public Administration, Faculty of Economics, Management and Psychology, State University of Trade and Economics, Kyiv, Ukraine.
[2] Department of Management and Marketing, Faculty of Economics, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine.
[3] Department of Socioeconomics and Personnel Management, Faculty of Personnel Management, Sociology and Psychology, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine.
[4] Department of Innovation Management, Faculty of Social Sciences, Academy of Applied Sciences – Academy of Management and Administration, Opole, Poland.
[5]Department of Production and Investment Management, Faculty of Agrarian Management, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine.

Corresponding authors: (e-mail: halyna.mykhailiv@pnu.edu.ua).

Abstract Small and medium-sized enterprises (SMEs) in Ukraine are increasingly challenged by ongoing economic instability, characterized by currency volatility, inflationary pressures, and uncertain political dynamics. This paper explores the role of management in the socio-economic development of small and medium-sized businesses (SMEs) under conditions of instability. Time series from 2001 to 2023 is analyzed for Ukraine. ADF and PP unit root test shows that data is stationery at first difference. ARDL bound test shows that time series data is cointegrated. Long-run estimates of ARDL technique show that management practices, socioeconomic development, research & development, technology adoption and employee skill & training have significantly positive relationship with SMEs growth rate, whereas, economic instability decrease the SMEs growth rate in Ukraine during studied time. Government of Ukraine should reform and bring new policies in all sectors especially manufacturing and production sector. Digitalization of the economy is foremost requirement of the Ukraine.

Index Terms economic development, digital transformation, digital strategy, intelligent automation, personnel, business organization

I. Introduction

Small and medium-sized enterprises, hereafter SMEs, on which the economy of whole world works because they are engines to innovation, employment generator and provide economic growth [1]. As they are nimbler and more flexible than larger companies, these businesses can respond faster to changes in the market and to customer demands. This is because, in the SMEs, effective management techniques are necessary for their success as they determine to a large extent their ability to respond to economic challenges effectively while optimizing resources towards sustainable growth [2]. Many economies all over the world benefit greatly from robust SMEs sectors which are primary engines of socio-economic development in most regions. Indeed, given the economic fragility of Ukraine and specially its transit logical situation, no less important become SMEs [3]. This study focuses on the importance for SMEs within management solutions that are designed to foster resilience and sustainability combined with growth throughout periods in which instability either due civil unrest or overall political regime fluctuations [4]. Figure 1 shows the increasing trend of growth in SMEs of Ukraine during studied time.

SMEs play an important role in a country like Ukraine, but they are facing some challenges to grow into larger entities for reasons such as political instability, economic volatility the technologies gaps, etc. However, effective administration holds the key to become a powerful tool in addressing these concerns. If there is a willingness to innovate management techniques that will contribute towards growing the competitiveness of SMEs then they in turn can take advantage of digital transformation and intelligent automation, supporting economic development across Ukraine [5].

To deal with these issues, enterprises should implement solutions local processing which are imperative for smaller and medium-sized companies in order to stay relevant given the scope of Industry requirements using digitalization across the board makes a significant responsibility drive, people are now digitizing to overcome challenges [6]. This affords SMEs an opportunity to improve their operations, reduce costs and enter other markets as seamlessly as possible. In particular, SMEs have the most to gain in terms of efficiency/productivity through intelligent automation use-cases - not only benefiting their business economics but also that SME's socio-economic development along with entire economy growth across Ukraine [7].

The study analysis is the significant as it provides valuable insights into the factors influencing the growth of SMEs in Ukraine by economic development, digital transformation, innovative technologies, competitiveness, technological difficulties,

Figure 1: Growth rate (%) of SMEs in Ukraine.

not understanding of basics digitally driven economy proceed from Industry 4.0 through smart automation till all variety of possibilities economics. While SMEs are uniquely positioned to navigate the complexities of the Ukrainian market, they can help build a stronger and more sustainable economic environment by leaning into these qualities [8].

Collectively, effective administration for SMEs in Ukraine becomes hugely important to accelerate the socioeconomic prosperity through uncertainties. Modern IT policies and technological advances will no doubt enable SMEs to overcome the current challenges and achieve growth in a sustainable manner. That will create a solid ground for the further economic future of Ukraine [9]. In fact, due to their ability of job creation and regional expansion within the framework of regions development factor within Ukrainian economy SMEs are considered as an obvious feature. The problem is that the business climate in Ukraine is extremely unreliable [10]. The country presents a political threat because of its rather difficult geopolitical position, this is complemented by existing economic and social problems. Policy uncertainty is also leading to increased economic volatility and the subsequent breakdown of currency pegs as inflationary pressures mount. This situation has made it extremely difficult for the SMEs [11]. An in-depth appreciation and mastery of the dynamic interfacing of management practices, economic volatility as well as change processes with the human dimension at play in development within any specific sector. It not only assists SMEs in becoming sustainable but also ensures that SMEs stand competitive enough to face technological challenges due the breakthrough advancements made by digital transformation - Industry 4.0. SMEs will be able to take on complexity, gain from digital breakthroughs and have a chance to help shape the way Ukraine is responding in an ever wider global economy. The challenges faced by SMEs in Ukraine are growing because of ongoing economic instability filled with currency volatility, inflationary pressures, and uncertain political dynamics. Organizational practices combined with socio-economic development initiatives have been found to lessen these constraints [12]. However, the literature providing empirical information with respect to their specific effects on SMEs growth in Ukraine is still sketchy. This study emerges from the gap in examining strategic management practices and targeted socio-economic interventions to enhance SMEs survival, growth, especially during turbulent economic times in Ukraine so as help them survive or benefit more due to changes. Given the technological advancements, digital transformation and Industry 4.0 imperatives of contemporary times this study aims to provide insights that can be actionable in policy and practice. Taking advantage of these findings will help SMEs in Ukraine become more competitive and sustainable [13].

A digital people management strategy improves recruitment, onboarding, training, performance evaluation, and employee engagement in corporate and development firms. Digital HRMS, AI-driven recruiting platforms, and employee engagement solutions increase HR operations, efficiency, and employee experience. AI algorithms can locate the best candidates by analysing vast amounts of data and forecasting their performance and fit with the company. Digital training courses keep employees' abilities current in a fast-changing workplace [14].

A comprehensive HRMS was a successful digital strategy for a mid-sized Ukrainian IT company. HR professionals and staff used one platform for performance management, recruitment, and other HR functions. The company uses AI to identify skill gaps and tailor training, creating a more skilled and adaptable staff. The digital approach allowed remote work throughout political and economic downturns through virtual collaboration and rapid performance feedback. Digital strategies improve productivity, employee satisfaction, and retention in people management [15]. Figure 2 depicts the economic instability and R&D of the Ukraine.

This study is important because it provides critical insights into factors that govern the survival of SMEs under uncertain economic situation. The outcome of this study process can inform policymakers, business leaders and stakeholders on how to promote SMEs by examining the influence that management practices; socio-economic development have in influencing growth of SMEs. Even though it is necessary to move SMEs forward for the economic recovery, job creation and general socio-economic development of Ukraine. The above question paper derived from the study. How management practices and

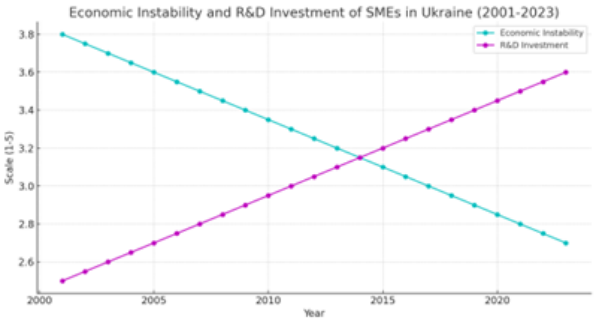

Figure 2: Economic instability and R&D of Ukraine.

socio-economic in unstable economic conditions affect the small- and medium-sized enterprises development in Ukraine?

The aim of this study is to consider the impact of economic volatile on growth in SMEs, examining how management practices and socioeconomic development influence growth rate among SMEs firms operating within Ukraine. This goal originates from the research question proposed in my previous segment.

SMEs account for about 40% of the country's gross domestic product (GDP), the importance of which reflects on Ukraine. As over 70 percent of all jobs in Ukraine are provided by SMEs, it is evident that SME sector should be central for job creation. Ukraine has faced significant economic interruption in the prevailing 2.5 years posting inflation rate above forty per cent and watching substantial discredit of national currency. One of such programs that the Ukrainian government has initiated to stimulate SMEs development is 7-9% affordable loans [16]. It provides SMEs with low-interest rates lending. SMEs in Ukraine face regulatory hurdles, restricted access to finance and a weak offer of non-financial business support services. The study aims to explore the potential for development of Ukrainian SMEs against a background of economic instability [17]. The authors present the literature review in brief below section two. The methodology is discussed in the third chapter, and the findings of paper appear in Chapter 4. The fifth section presents the summary of the study.

II. Literature Review

Based on time-series econometric models, Gomez-Mejia et al. [18] analyzed how economic volatility affects the growth of SMEs in Latin America [18]. According to research, economic instability and the growth of SMEs. This study demonstrated a significant negative relationship between GDP per capita in purchasing power parity at 2005 constant prices as an indicator for liquidity level available. To this end, they suggested first to prioritize the stability of macroeconomic policies in ensuring SMEs governed by reliable factors.

Le and Liu [19] investigated the development of SMEs in China, emphasizing the relevance that employee skills also training have amidst a quantitative research framework [19]. Staff development was found to have a positive effect on the expansion of SMEs in terms of generating wealth and innovation. Chen and Zhang recommended focusing on policies to promote vocational training as well as lifelong learning for SMEs employees. Recently, Sharma et al. [20] implemented an ARDL methodology to quantify the serious damages on SMEs emanating from economic instability in India [20]. Economic instability was found to be negatively affecting the growth of SMEs by causing lower consumer confidence and more uncertainty. The study proposed a number of strategies to for increased economic stability, some including stronger financial laws and maintaining political stability.

Sari and Gryga [21] studied the influence of foreign trade SMEs growth in Argentina through time-based analysis efforts [21]. The results showed that both the process and event of globalization were often beneficial to the growth performance, especially participation in international business had positive effect on firm expansion for SMEs. New laws have been suggested to help SMEs expand into overseas markets.

Stoika et al. [22] used structural equation modeling to and studied the impact of research and development on the performance of SMEs in Ukraine [22]. The results indicated that R&D process have an important role in enlarging the small and medium-sized enterprises (SMEs) by rising innovation and competitiveness. They proposed measures to reduce the obstacles preventing SMEs from carrying out R&D. Policies such as improve access to financial assistance. Ameen et al. [23] examined the impact that digital technology has had on SMEs growth in England using a case study approach [23]. However, SMEs that did deploy digital tech grew more quickly than those who eschewed it. One way to support the growth of SMEs, according to Johnson, is for governments to offer educational programs about digital literacy while also providing incentives so these businesses embrace technology outreach. Oh and Hwang [24] systematically examined socio-economic development and the growth of SMEs in South Korea [24]. The study found that social and economic development improves the growth chances of SMEs by generating favorable conditions for extending their operations. According to the report, the government must continue to invest

in schools and roads to assist the long-term growth of SMEs. Ali Raza Shah et al. [25] reported that many Food Processing SMEs of Pakistan are less integrated into the national exports as they do not meet the quality standard of produce required for international markets [25]. Nowadays, as more and more customers are inclined towards a lifestyle change or healthy living there is now on emergence the demand of high-value-added products thus Pakistan's food industry transforming from traditional means to new-age needs. The objectives of the study are to identify some important quality management practices (QMPs) as critical success factors and their effect on operational performance in case of small- & medium-size enterprises which are working as food processer industry. Past research has identified measurable critical success factors as a means of guiding strategic direction while permitting management to concentrate on the most important things. Hence, a questionnaire was drafted and used to collect responses from respondents who met our inclusion criteria in this study through the snowball sampling technique. The poll received a total 302 responses from food processing SMEs. The data was analyzed using SPSS 23 version and Smart-PLS 3. This study was thought to provide the food manufacturers in Pakistan with suggestive critical factors and a helping hand for bettering their operations whilst retaining product qualities.

To assess how the usage of technology can impact growth for SMEs in Vietnam, Vu and Nguyen [26] employed a longitudinal research design [26]. Technology significantly increased the efficiency and market reach, leading to a rapid evolution of small and medium-sized enterprises (SMEs). In their paper, the study recommended excepting laws that facilitate technology transfer as well as financial support to inciting such technologies.

Chatterjee and Bhattacharjee [27] analyzed the impact of R&D investments on small and medium-sized enterprises (SMEs) pursuing growth objectives in Indian organizations [27]. To analyze this relationship, the researchers used a dynamic panel data model with moderation. Moreover, it also found an important relationship between the amount of resourcing allocate R&D and growth in SMEs. This emphasizes further the role of innovation in economic development. The researchers also argued for direct government support of R&D in smaller, NIT-targeted firms via a combination grants and tax incentives.

III. Methodology

The reason a research method is utilized by all most type of researchers because it makes them do investigation in an organized way. All the methods in science, and more specifically from a methodological point of view specialized scientific -economic discourse strategies and philosophical principles per se are critically important given that they provide composite multi-dimensional approaches to analysis. The adoption of these methods is meant to achieve the reliability, validity and depth in research finding so as to have a comprehensive understanding about any topic [28].

A. Data

The study created a simulated dataset for Ukraine from 2001-2023 period. The dependent variable small and medium enterprises measure in growth rate taken from WDI [29]. Management practices is measure by considering the proxy of return on assets (ROA) (%, after tax), as it is defined as how efficiently management is using the company's assets to generate profit. The data is taken from Wharton Research Data Services (WRDS) [30]. Economic instability is measured by interest rate in percentage as it influences borrowing costs and economic activity. Data of the interest rate was retrieved from world bank. Human Development Index (HDI) is consider to measure the socio-economic development of the Ukraine. It is a composite index measuring average achievement in key dimensions of human development: a long and healthy life, knowledge, and a decent standard of living. The data is taken form United Nations Development Programs (UNDP) [31]. The model also incorporates control variables research and development, technology adoption; employee skills and training. This data was fetched from WDI [29].

B. Empirical model

Based on the research of Makwara [32], Zabinski [33] and Tshikovhi et al. [34], this study has mentioned that formula which was used in this study to examine the impact of management with other factors, capacity for growth pace SME enterprises is described below:

$$GR_t = \alpha_0 + \alpha_1 MP_t + \alpha_2 EI_t + \alpha_3 SED_t + \alpha_4 RD_t + \alpha_5 TA_t + \alpha_6 EST_t + \varepsilon_t, \quad (1)$$

where, GR is Growth Rate of SMEs, MP is Management Practices, EI represents Economic Instability, SED is socio-economic development, RD is the Research and Development, TA denotes technology adoption and EST is employee skills and training. α_0 is the intercept, $\alpha_1,\ \alpha_2,\ \alpha_3,\ \alpha_4,\ \alpha_5,\ \alpha_6$ are coefficients of the respective independent variables. t is the time and ε is the error term.

C. Empirical strategy

1) Stationarity Tests

One must be cautious while interpreting results of the regression analysis as time series data mostly have a unit root problem [35]. This is because the problem of unit roots is common in time-series data. Enhanced Dickey–Fuller test was used in the

present investigation to assess how much stationary is there in the time series of this model. Moreover, the ADF test as compared to [36] is more powerful in addition to methodologies that deal with complex model spear easy incorporated [36]. Here is every single econometric equation which might work:

$$\Delta y_t = \theta D_t + \gamma y_{t-1} + \sum \sigma_m \Delta y_{t-m} + \varepsilon_t. \tag{2}$$

The null hypothesis of the ADF unit root test: this is nonstationary data in this equation (2), the term "Dt" denotes a deterministic path and ε_t represents some error.

In time series analysis, the Phillips–Perron test for unit roots is a type of statistical test used in the testing numerical data and returns therefrom to arises randomly. This is the null hypothesis of Dickey-Fuller test.

$$\rho = 1,\ in\ \Delta y_t = (\rho - 1)\, y_{t-1} + \varepsilon_t, \tag{3}$$

where, order difference operator. The Phillips–Perron test resolves the problem of potential autocorrelation of a greater order in data generating process than what is allowed for by the null-hypothesis, which would lead to endogeneity with Dickey-Fuller t-test invalid. This is accommodated by an augmented Dickey–Fuller test, which includes lags of as regressors in the test equation. The Phillips–Perron test, on the other hand, corrects only for non-parametric effects of a unit root process that there is no correction at all to the t-test statistic. In the test equation the issue process proofs to be robust against heteroscedasticity and non-autoregressive specifications [37]. These techniques test the stationarity of series data present in time. Infer appropriate regression conclusion from non-stationary data, it uses the level as well as first difference.

2) Cointegration Test

Furthermore, the Autoregressive Distributive Lag (ARDL) bound test advance by Pesaran et al. [38] is applied. The ARDL technique is capable of estimating both long term and short-term model components while helping reduce problems arise from auto correlations, omitted data [39]. For all models in this study, ARDL follows the given empirical methodology

$$\Delta GR_t = \alpha_0 + \alpha_1 t + \alpha_2 MP_{t-1} + \alpha_3 EI_{t-1} + \alpha_4 SED_{t-1} + \alpha_5 RD_{t-1} + \alpha_6 TA_{t-1} + \alpha_7 EST_{t-1} + \sum_{n=0}^{m} \delta_n \Delta GR_{t-n} + \sum_{p=0}^{m} \delta_p \Delta MP_{t-p} + \sum_{q=0}^{m} \delta_q \Delta EI_{t-q} + \sum_{r=0}^{m} \delta_r \Delta SED_{t-r} + \sum_{s=0}^{m} \delta_s \Delta RD_{t-s} + \sum_{v=0}^{m} \delta_v \Delta TA_{t-v} + \sum_{w=0}^{m} \delta_w \Delta EST_{t-w} + \varepsilon_t \tag{4}$$

where, in equation (4):

$$H_0 :\ \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7$$
$$H_1 :\ \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7$$
$$H_0\ shows\ the\ null\ hypothesis\ and\ H_1\ means\ alternarive\ hypothesis$$

.

The null hypothesis that there is no co-integration would be rejected if the F-statistic value exceeds upper bound value set by Pesaran et al. [38], indicating evidence in favor of H_1. After ARDL has established the long-term relationship between the model's variables, it uses the error correction model (ECM) [40]. The study can get long-run equilibrium for model and short run parameters its equational form as follows:

$$\Delta GR_t = \alpha_0 + \alpha_1 t + \sum_{n=0}^{m} \delta_n \Delta GR_{t-n} + \sum_{p=0}^{m} \delta_p \Delta MP_{t-p} + \sum_{q=0}^{m} \delta_q \Delta EI_{t-q} + \sum_{r=0}^{m} \delta_r \Delta SED_{t-r} + \sum_{s=0}^{m} \delta_s \Delta RD_{t-s} + \sum_{v=0}^{m} \delta_v \Delta TA_{t-v} + \sum_{w=0}^{m} \delta_w \Delta EST_{t-w} + \lambda ECT_{t-1} + \varepsilon_t \tag{5}$$

where, ECT_{t-1} is the error correction term lagged one period. Long-run to Short-Run equilibrium adjustment speed that ECT elucidate the ECT coefficients for which the results should have is all negative are shown by λ. Finally, diagnostic tests were applied to assess the structural integrity of our model (normality test for residual terms and serial correlation test Breusch-Pagan Test, Breusch-Godfrey Test).

IV. Results

The subsequent section provides an account of the results:

A. Descriptive statistics

A summary of the central tendency, dispersion, and shape of the distribution of the dataset is provided by descriptive statistics (Table 1).

B. Correlation matrix

Analyzing the linear relationship that exists between two sets of variables is the purpose of the correlation matrix (Table 2).

C. Unit root tests

ADF and PP tests are conducted to check the stationarity of the time series data (Table 3).

Variable	Mean	Std. Dev.	Minimum	Maximum
GR_t	5.21	2.13	2.0	8.5
MP_t	3.45	0.65	2.5	4.5
EI_t	3.25	0.85	2.0	4.5
SED_t	3.85	0.45	3.2	4.5
RD_t	3.05	0.55	2.0	4.0
TA_t	3.75	0.70	2.5	4.5
EST_t	3.55	0.60	2.5	4.5
Note: Std. Dev. is the standard deviation.				

Table 1: Results of descriptive statistics.

Variable	GR_t	MP_t	EI_t	SED_t	RD_t	TA_t	EST_t
GR_t	1.00						
MP_t	0.45***	1.00					
EI_t	-0.34**	-0.30***	1.00				
SED_t	0.52	0.40**	-0.20***	1.00			
RD_t	0.22***	0.20	-0.15***	0.30***	1.00		
TA_t	0.31***	0.28***	-0.25	0.35**	0.32***	1.00	
EST_t	0.37**	0.35*	-0.30**	0.40***	0.35***	0.45*	1.00
Note: *, ** and *** show significance level at 5% and 1%, respectively.							

Table 2: Results of correlation matrix.

	ADF Test		PP Test		
	@ level	@ 1st diff.	@ level	@ 1st diff.	Integration level
Variable	Statistic	Statistic	Statistic	Statistic	
GR_t	-1.85	-4.21***	-1.90	-4.35***	I (1)
MP_t	-2.10	-4.10***	-2.15	-4.12***	I (1)
EI_t	-1.75	-4.05***	-1.80	-4.10***	I (1)
SED_t	-2.00	-4.25***	-2.05	-4.30***	I (1)
RD_t	-2.25	-4.35***	-2.30	-4.32***	I (1)
TA_t	-1.95	-4.15***	-2.00	-4.18***	I (1)
EST_t	-2.20	-4.22***	-2.25	-4.25***	I (1)
Note: *** shows Significance level of 1%.					

Table 3: Results of ADF and PP unit root tests.

D. Lag length selection criteria

The optimal lag length is determined using criteria such as AIC, BIC, and HQ (Table 4).

Lag	LogL	LR	FPE	AIC	BIC	HQ
1	-325.67	10.45	0.002154	5.1200	5.4500	5.2400
2	-310.45	25.44	0.001879	4.9500	5.3500	5.1000
3	-300.75	19.40*	0.001920*	4.8500*	5.3000*	5.0500
4	-290.32	21.75	0.001835	4.5600	5.3200	5.1200
5	-275.50	22.50	0.001752	4.5000	5.2500	5.0500
Abbreviations: AIC, Akaike information criterion; FPE, Final prediction error; HQ, Hannan–Quinn information criterion; LR, sequential modified LR test statistic (each test at 5% level); SC, Schwarz information criterion. * Indicates lag order selected by the criterion.						

Table 4: Results of VAR Lag length selection criteria.

Abbreviations: AIC, Akaike information criterion; FPE, Final prediction error; HQ, Hannan–Quinn information criterion; LR, sequential modified LR test statistic (each test at 5% level); SC, Schwarz information criterion. * Indicates lag order selected by the criterion.

E. Cointegration test

The ARDL bound test determines the presence of a long-run relationship between the variables (Table 5).

	F-Stat.	Co-integration	x^2 Breusch-Pagan	x^2 RESET	x^2 Normality	x^2 LM
Value	10.1634***	Yes	1.52 (0.22)	3.54 (0.29)	2.35 (0.31)	1.75 (0.18)
Significance Level	10%		5%		1%	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F- Statistics	2.05	3.01	2.43	3.72	3.09	4.13
Note: *** denotes significant at the 1% level. Critical values are taken from Pesaran et al. [38]						

Table 5: Results of ARDL-Bound Test

1) The ARDL estimates

Thereafter, since the co-integration identification and ARDL algorithm developed it was also using for attracted short-term or/and long-term relationship between model variables. To write good analyses of time series data are really important the notion how long-term and short-term trends flow into each other's. Table 6 shows the Outcomes of short-run and long-run relationship among the variables.

	Dependent Variable= GR_t							
	Coefficient		Std. Error		t-Statistic		P-value	
	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run
MP_t	0.85***	1.78***	0.22	0.32	3.86	5.56	0.002	0.000
EI_t	-0.60***	-1.15***	0.18	0.28	-3.33	-4.11	0.005	0.001
SED_t	1.15***	2.31***	0.30	0.42	3.83	5.50	0.002	0.000
RD_t	0.80***	1.25***	0.25	0.35	3.20	3.57	0.006	0.003
TA_t	0.70**	1.10**	0.28	0.40	2.50	2.75	0.020	0.015
EST_t	0.95***	1.45***	0.27	0.38	3.52	3.82	0.003	0.002
ECT (-1)	-0.75***		0.15		-5.00		0.000	
Note: ***Significance level at 1%; **Significance level at 5%; *Significance level at 10%.								

Table 6: Results of ARDL long- and short-run

Figure 3 and Figure 4 show the CUSUM and CUSUM square for the time series data of Ukraine. Blue lines in both figures are within the red lines which show that model parameters are stable over time.

Figure 3: Cumulative sum of recursive residuals Source: author's development

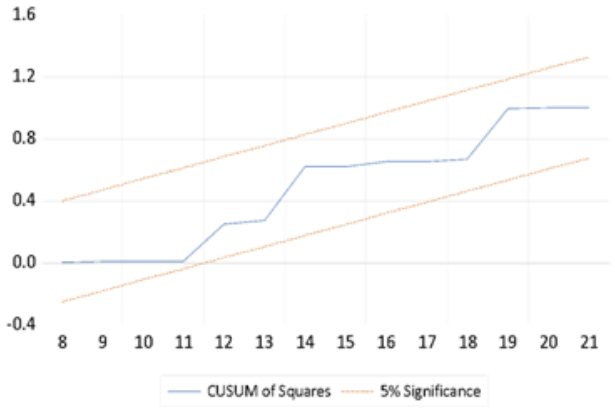

Figure 4: Squares recursive residuals Source: author's development.

V. Discussion

Table 1 Descriptive statistics of the variables used in modeling SME growth in Ukraine. The variables are growth rate (GR), management practices (MP), economic instability in the country of production sector installed capacity utilization available to the company at time (EI); socio-economic development (SED), research and development (RD), technological adaptation (TA),

employee skills and training (EST). The GR has a normal distribution with mean of 5.21 and standard deviation of 2.13, and values ranging from 2.0 to 8.5. MP has mean value of 3.45 and standard deviation is 0.65 had values ranging from 2.5 to -4. The mean value of EI is 3.25 with a standard deviation of 0.85, and values observed range between 2.0-to-4.5. The mean of SED = 3.85, SD=0.45 and ranged between 3.2 to 4.5. RD shows a mean of 3,05 with a standard deviation of,55 between 2.0 to -4. TA has the mean value of 3.75, Standard deviation: 0.70, Maximum-minimum values [2.5-4.5]. Finally, EST with a mean of 3.55, standard deviation of.60 and values ranging from 2.5 to 4.5. Table 2 provides an association matrix showing the interrelation of different variables, it is related to Ukrainian SME growth. GRt has a significant positive correlation with management practices: 0.45, socio-economic development: 0.52, research and development: 0.22, technological adaptation: 0.31, employee skills and training: 0.37. MPt has positive correlation with SED= (0.40), RD = (0.20), TA= (0.28) and EST = (0.35) but negative relation is observed with economic instability (EIt = -0.30). EI negatively correlates with GR at -0.34, SED at -0.20, RD at -0.15, TA at -0.25, and EST at -0.30. SED also showed a strong positive correlation with RD (0.30), TA (0,35), and EST (0.40). RDt shows positive correlations with TA (0.32) and EST (0.35). Finally, the TA has a positive moderate relationship with ESTt at 0.45.

This study used ADF and PP tests to estimate the unit root of each series. This was in addition to the descriptive statistics. The results of individual unit root tests by ADF and PP are reported in Table 3; all these variables have the problem with the non-stationarity at level, i.e., they all indicates that each variable is not stationary. However, after taking the first difference, all variables become stationery. The results of the Table 4 shows the 3 lags are the best and appropriate while analyzing the time series data of Ukraine from 2001 to 2023.

In order to check the cointegration relationship between series ARDL bound test is used. Table 5 shows the results. The expected F-statistics value, 10.1634 is larger than the upper bound critical value at a significance level of 1%. In Ukraine, for different time periods were cointegrated the management practices in sphere of economic instability and socio-economic development and researches and development (R&D), technical education and skills-qualifications. On the other hand, the long-run elasticity of ARDL model post-diagnostic results is reported in Table 6 with its associated statistics. The long-run relationship model passes all tests and, therefore, can be used to forecast the policy regarding small- and medium-sized firms' growth in Ukraine for 2001-2023.

Table 6 presents the outcomes of long-run autoregressive distributed lag (ARDL) estimation, indicating a significant and positive effect on SMEs for leadership management strategies. Growth rates of 1.78 percent among small and medium-sized firms (SMEs) correspond to one percentage increase in management techniques. The possibility of the positive correlation to be attributed is that higher efficiency and productivity which were a direct result of implementation, efficient management strategies. Effective management, as a result of better decision-making or resource allocation within the company tends to translate into overall performance improvements that can boost growth in product sales. Successful management strategies that enhance operational performance, decision-making and resource utilization of SMEs are necessary for them to navigate the competitive economic terrain in Ukraine [41].

For small and medium-sized businesses (SMEs), the most important effect of economic turbulence is slower growth: a one percent increase in instability results approximately as an average reduction by 1.15 percentage points on SME growth rate. One can observe a direct impact of economic uncertainty originating from financial instability and thereby discourages consumers, hoards corporate confidence and dislocates supply networks that brings up this negative association. In Ukraine, however, political unrest has only exacerbated other longer-term elements that also destabilize the situation for those authors and publishers working in or focusing on this country: inflation, (shifting) exchange rates. The impact of this instability is profound and felt greatly in respect to the difficulty that small-to-medium businesses (SMEs) face when trying to predict how they should plan for their growth. The political and economic uncertainty among the country's population has resulted in harsh consequences that indeed make life difficult for small medium-sized businesses (SMEs) involved. Overheads like varying exchange rates, unabated inflation and political instability disrupt the ability to plan and invest. All of these factors make any financial decision more complicated.

Expansion of SMEs is driven by the speed at which socio-economic landscape. As an example, the growth rate of SMEs increases 2.31 percent for each one-percentage increment in social economic development. The presence of a strong positive relationship between these two input variables suggests that appropriate infrastructure, facilities related to education and healthcare services as well conducive economic conditions will create an environment suitable for the development small and medium scale enterprises (SMEs). Civic, educational and office-use projects implemented in Ukraine are an opportunity to enrich market access, job quality promotion during functioning of the center as well as a sustainable basis for developing new commercial activities [42]. Small and medium enterprises (SMEs) get benefited with the development of infrastructure, education system, health services and economic environment. It allows SMEs with both access to market and a trained workforce while providing commercial possibilities.

One percent growth in R&D increases the growth rate of SME by 1.25%. This is a positive relationship between R&D and Growth Rate. Investing resources in Research and Development (R&D) projects promote the generation of new ideas, increases product quality and enhances a competitive position. These indicators are important for small and medium enterprises (SMEs) to scale. Law offers opportunities to help small and medium firms (SME) grow in Ukraine through support of research and

development activities this can be done through setting the stage for creative products and services, operational efficiencies and market growth. Micro, small and medium enterprises investing in Research & Development (R&D) not only drive innovation but also have a higher edge over their competitors for the same product or services they are offering. All of this is possible by virtue of what they can develop and acquire new products, as well as modernizing the operations; opening up into any potential market.

Excluding this implementation, it is to be mentioned that there has a good scale of impacts on small and medium firms about the technological effect. More precisely, a one percent increase in the use of technology leads to 1.10 percent more growth technology implementation leads towards operational efficiency, reduced cost and yield to more business opportunities. Using modern technologies will allow Ukrainian small and medium-sized businesses (SMEs) to scale within the country and compete abroad. A few examples of this technology include digital marketing, e-commerce and automation. Adopting new technology delivers operational efficiencies and cost reduction, as well even creates a host of fresh business possibilities. All necessary for small and medium business (SME) to remain competitive in the world market.

The more educated and competent the employees who work in small businesses or SMEs, the faster these companies grow. In other words, a one percent increase in human skill and training led to 1.45 per cent growth of small- and medium-sized enterprises (SMEs). That in turn leads to high productivity, innovation and quality service. To do this, small and medium businesses should focus on staff training in Ukraine which would make them more flexible to adapt market needs that are changing daily, provide a better service for their clients and have an eye ahead of the road giving new opportunity offerings. For small and medium-sized businesses (SMEs) to respond the demands of the market, enabling them can allow these firms to grow in a sustainable way with more qualified workforce that will increase their productivity alongside creativity as well as an increased service by quality.

The short-run autoregressive distributed lag (ARDL) estimates stress the immediate effect that changes in independent variables have on growth of small and medium scale enterprises. Table 6 presents short-run results for the Ukrainian case over the entire sample period as found among ARDL technique output. Presence of error correction term (ECT) with statistically its significant and negative value indicates a strong correction mechanism which corrects deviation from the long run equilibrium. The immediate effects are often less pronounced but congruent with the lasting bonds. It means that the development of small and medium-sized businesses (SMEs) is positively influenced by changes in managerial practices, economic level, research & development and technology use as well as employee competences developed during on-the-job training. Economic instability is instantly negatively affecting this while on flip economic stress with immediate bad effect.

VI. Conclusion

The main object of this research is to study how the management in potentially unstable conditions influences socio-economic development within small and medium-sized firms (SMEs) operating in Ukraine. The analysis emphasized key attributes including economic instability, socio-economic exposure and future potential, research & development (R&D), technology adoption rates, as well as personnel skill levels and training from 2001 to 2023. The ARDL model showed that these variables were significantly related to this important factor of the capability for SMEs expansion in both long run and short term.

Long-run ARDL estimates revealed that managerial practices, socio-economic development, research and innovation activity, technology ingenuity and skills training of employees positively influence the growth rate in small- or medium-scale enterprises (SME) of Ukraine. Conversely, economic instability is growth-retarding. In particular, a one percent rise in management practices leads to an expansion of 1.78% for small and medium enterprises (SMEs), showing that proper management is key for the development of SME output. Economic instability, on the other hand, decreases small and medium-sized enterprises (SMEs) growth by 1.15 percent which if participants consider economic uncertainty negatively impacts their business.

VII. Policy Recommendations

Policy Recommendations Based on the Findings to Enhance Socioeconomic Growth of Small and Medium Enterprises (SMEs) in Ukraine.

1) Enhance the Quality of Management Education and Training Programs: Through the introduction of national initiatives to Develop management skills SME owner/manager. Provide employees access to management development workshops and courses that address strategic planning, resource allocation and operational effectiveness. E-learning is also important for the leadership development in the mangers after graduation in Ukraine.
2) Stabilize the economy: Macroeconomic policies need to be designed and implemented in a stable way if economic fluctuations are going to come down. In turn, the most basic condition of political instability is that. It should be on good terms and develop relations with all parties to enable you to bring order in what could otherwise cause chaotic elections surroundings. This will boost business confidence and investments.
3) Invest in society economic system: Better market reach for SMEs with lower costs of operation by facilitating the development of infrastructure like transport, communication and utility services. Improve education and health systems to develop a healthier, better skilled workforce to Expand SMEs.

4) Provide small and medium enterprises (SMEs) financial incentives or grants for investing in research and development (R&D). Set-up innovation hubs and partnerships between SMEs and research institutions to share information, new technology developments
5) Promote the use of new technologies: Provide financial incentives for small and medium-sized enterprises (SMEs) to adopt modern technologies like subsidies or loans with a lower interest rate. Facilitate adaptation of digital tools and platforms by persons for enhancing productivity, market reach and competitiveness.
6) Design programme for employee training & development: Top performing states make investments in lifelong learning (professional development and vocational training) to grow the skill set of their workforce. Promote integration among SMEs and educational organizations to ensure that training is linked with the demands of a constantly transforming marketplace driven by technology changes.

VIII. Gender Role

To create an enabling environment of stability for small and medium enterprise assistance to socio-economic development in Ukraine, there is a need to combine universal principles as: social aspect (gender equality); economic aspect; political aspects [43]. This involves the adoption of a corporate-wide management style and policies that provide equal opportunities for women in SME leadership roles. SMEs must be resilient and contribute more to the overall economic stability after war through a gender-balanced approach.

In the context of increasing instability in Ukraine, there are reasons and grounds to proceed with large e-government projects aimed at socio-economic development of small and medium-sized businesses [44]. To broaden the economic and social development of small business in a turbulent environment, it is suggested that to accelerate artificial intelligence technologies be implemented within Ukraine. SMEs need increased exposure to AI techniques and solutions that can help them save time, reduce costs, innovate better products/services at a faster rate as well as assist in gaining more competitive advantages for their businesses. Ensuring that SMEs are able to deliver on this unstable promise means supporting schemes like AI training programme, partnerships with technology providers and government incentives for the adoption of AI in order to drive sustainable economic transformation [45]. The use of advanced modeling technologies in the field of stress and strain as urgent management decisions for business-related activities is necessary to improve socio-economic development small and medium-sized businesses under unstable conditions Ukraine. To mitigate possible operational stresses, SMEs can make use of these mechanisms to strengthen their resilience and adaptability. The importance of encouraging SMEs to use powerful simulation tools and equipping them with the right know-how about composite material analysis cannot be stressed enough when considering their growth potential in such a competitive market [46].

If Ukraine translates these policies into reality, SMEs will have the single additional framework that they need to withstand economic instability and ensure sustainable progress. In the country, SMEs, have a number of critical drivers that drive their resilience as well as profitability viz. effective management practices, socio-economic development, research and development, technology adoption and trained workforce to highlight a few.

IX. Limitations and Future Recommendations

Use of simulation data because there is no full-fledged real interview statistics of Ukrainian SMEs. This restriction might possibly influence the accuracy and extrapolation of results. The study accounts for other key factors such as managerial practices, economic volatility, socio-economic development and research & innovation activities while ignoring some important variables like the regulatory frame work of countries under consideration, access to finance and market conditions. The ARDL model assumes that all the variables are linearly related with each other It is perhaps non-linear correlations or interaction effects going on, and any of these could lead to further insights.

Endeavors should be made for collecting and analyzing extensive data on Ukraine's SMEs to confirm, or to increase confidence about the results. Do not use econometric models that are too simple because they cannot consider a number of structural changes and nonlinearities, to get a better insight in the joint dynamics among variables. Sectoral studies need to be conducted in the SME sector in Ukraine, as concluded that are some management practices and other variables with a different effect on firm performance between industries. Monitor the impact of certain policy measures on accelerating the growth rate of SMEs in a bid to ensuring desirable management practices, economic development & socio-economic advancement. Examples of qualitative methodologies (case studies and interviews with small or medium-sized enterprise [SME] owners and managers) can be combined with quantitative analyses, to obtain a more detailed picture about the specific challenges SMEs face in reality as well as opportunities.

Authors' Contributions

Each author has substantially contributed to the conceptualization and design of this study. Furthermore, all listed authors have reviewed and endorsed the final manuscript as submitted for publication.

Funding

This research received no external funding.

Data Transparency

The authors affirm that this manuscript upholds the principles of integrity, transparency, and honesty. The study adheres strictly to the ethical standards required for scholarly writing.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References

[1] Zaitsev S. Using Digital Tools to Increase the Competitiveness of Small Businesses (Experience of Full-Service Bakeries). Futurity of Social Sciences. 2023 Dec 20;1(4):75-90.
[2] Berdar MM, Yaremko-Hladun RA. Innovation and Investment Model for the Development of Small and Medium-Sized Businesses in Ukraine. Theoretical and Practical Research in Economic Fields. 2024 Jun 28;15(2):174-85.
[3] Levchenko Y, Tsizhma Y, Slobodyan N, Nehoda O. Organization and planning of the enterprises of the future: legal status.
[4] Zhurakovska IV, Sydorenko RV, Shmatkovska TO, Brodska II. Factors of influence on employment in small and medium-sized business in Ukraine. Financial and credit activity problems of theory and practice. 2020;1(32):109-19.
[5] Syrtseva S, Ivaniuk U, Fedotova I, Hurina O, Dovzhyk O, Nazarenko O. Innovative potential and development of Ukrainian small enterpris-es during the war (2022-2023). Revista Amazonia Investiga. 2022;11(58):222-32.
[6] Kibik O, Taran-Lala O, Saienko V, Metil T, Umanets T, Maksymchuk I. Strategic vectors for enterprise development in the context of the digitalization of the economy. Postmodern Openings. 2022 Jun 24;13(2):384-95.
[7] Dvořáková L, Vacek J. The adaptation of small and medium-sized enterprises in the service sector to the conditions of society 4.0.
[8] Oklander M, Yashkina O, Zlatova I, Cicekli I, Letunovska N. Digital marketing in the survival and growth strategies of small and medium-sized businesses during the war in Ukraine. Marketing i menedžment innovacij. 2024;15(1):15-28.
[9] Kvitka A, Kramarenko A, Davydov D, Pasmor M, Diachek O. Digital business research for small and medium-sized enterprises: The case of Ukraine. Problems and Perspectives in Management. 2021;19(1):177-84.
[10] Erhan L, Paladi V. Micro, Small and Medium Sized Enterprises in Times of Overlapping Crises. InInternational Symposium on Distributed Computing and Artificial Intelligence 2023 Jul 12 (pp. 128-137). Cham: Springer Nature Switzerland.
[11] Smachylo V. Impact of the War on Entrepreneurship in Ukraine. Studia i Analizy Nauk o Polityce. 2024 Jun 25(1):9-28.
[12] Denysenko M, Konieczny G, Kolisnichenko P, Homon N. FORMATION OF ECONOMIC SECURITY OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE STATE ECONOMIC SECURITY SYSTEM. Economics, Finance and Management Review. 2023 Dec 30(4):31-9.
[13] SMENTYNA N. SUPPORT OF SMALL AND MEDIUM-SIZED ENTERPRISES AT THE LEVEL OF TERRITORIAL COMMUNITIES IN THE CONDITIONS OF MARITAL STATE.
[14] Okoro GO. DIGITAL HUMAN RESOURCE PRACTICES AND EMPLOYEE DEVELOPMENT IN NIGERIAN BANKING SECTOR. BW Academic Journal. 2024 May 2:16-.
[15] Kandukuri V. Aligning talent and business: A key for sustainable HRM in SMEs. Journal of Entrepreneurship and Innovation in Emerging Economies. 2023 Jan;9(1):80-91.
[16] Simon, J., Staguhn, J., & Sultan, S. (2023). Financing Ukraine's critical small and medium-sized enterprises. Center for Strategic and International Studies (CSIS). https://www.csis.org/analysis/financing-ukraines-critical-small-and-medium-sized-enterprises
[17] Sukhonos M, Dymchenko O, Smachylo V, Rudachenko O, Tararuiev I. Sustainable Development of Entrepreneurship Entities in Ukraine: National and Regional Aspects. InInternational Conference on Smart Technologies in Urban Engineering 2023 Jun 8 (pp. 38-49). Cham: Springer Nature Switzerland.
[18] Gomez-Mejia LR, Mendoza-Lopez A, Cruz C, Duran P, Aguinis H. Socioemotional wealth in volatile, uncertain, complex, and ambiguous contexts: The case of family firms in Latin America and the Caribbean. Journal of Family Business Strategy. 2024 Mar 1;15(1):100551.
[19] Le BT, Liu X. Driving Social Sustainability and Resilience of SMEs Amidst Turbulence: The Role of Information Technology and Dynamic Capabilities. School of Economics and Management. 2024. https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=9158061&fileOId=9166220
[20] Sharma GD, Kraus S, Talan A, Srivastava M, Theodoraki C. Navigating the storm: the SME way of tackling the pandemic crisis. Small Business Economics. 2024 Jun;63(1):221-41.
[21] Sari ET, Gryga V. Comparative analysis of SMEs intensity in Ukraine and Indonesia using FIS approach. Contemporary Economics. 2023;17(1):58-76.
[22] Stoika V, Stoika S, Harnyk O. Innovative aspects of The economic development of SMES: experience of the EU and Ukraine. Three Seas Economic Journal. 2023 Nov 30;4(3):15-25.
[23] Ameen N, Choudrie J, Jones P, Anand A. Innovative technologies and small-medium sized enterprises in times of crisis. Information Systems Frontiers. 2022 Aug;24(4):1055-60.
[24] Oh I, Hwang S. Assessing the effect of the size of r&d subsidies on the economic performance of SMEs: Comparison of manufacturing and service firms in Korea. Journal of the Knowledge Economy. 2024 Mar;15(1):518-46.
[25] Raza Shah SA, Jamaludin KR, Abdul Talib HH, Shah J, Yusof SM, Qadeer A. Quality management implementation and their impact on operational performance of Pakistan's food processing SMEs. International Journal for Quality Research. 2022 Jul 1;16(3).
[26] Vu NH, Nguyen NM. Development of small-and medium-sized enterprises through information technology adoption persistence in Vietnam. Information Technology for Development. 2022 Jul 3;28(3):585-616.
[27] Chatterjee M, Bhattacharjee T. Ownership concentration, innovation and firm performance: empirical study in Indian technology SME context. South Asian Journal of Business Studies. 2021 Apr 27;10(2):149-70.
[28] Mura L. The philosophy of personnel management of small and Medium-sized businesses in Slovakia. Futurity Philosophy. 2022 Sep 30;1(3):27-39.
[29] https://www.worldbank.org/data
[30] https://wrds-www.wharton.upenn.edu/pages/about/data-vendors/
[31] https://hdr.undp.org/data-center
[32] Makwara T. Taking on the challenge: small, micro and medium enterprises (SMMEs) and socioeconomic development in South Africa. African Journal of Hospitality, Tourism and Leisure. 2019;8(1):1-4.
[33] Żabiński A, Ekonomiczny U, editors. Entities' Decision in Conditions of Economic Growth. Publishing House of Wroclaw University of Economics and Business; 2020.
[34] Tshikovhi N, More K, Cele Z. Driving Sustainable Growth for Small and Medium Enterprises in Emerging Urban–Rural Economies. Sustainability. 2023 Oct 26;15(21):15337.

[35] Awan AM, Saleem SF, Khan S. Navigating sustainable development: exploring the environmental Kuznets curve in the SAARC region with global stochastic trends. Environment, Development and Sustainability. 2024 Feb 6:1-22.
[36] Dickey DA, Fuller WA. Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica: journal of the Econometric Society. 1981 Jul 1:1057-72.
[37] Phillips PC. Testing for a Unit Root in Time Series Regression. Biometrika. 1988.
[38] Pesaran MH, Shin Y, Smith RJ. Bounds testing approaches to the analysis of level relationships. Journal of applied econometrics. 2001 May;16(3):289-326.
[39] Majid Awan A, Khan MA, Khan S. Estimating the health production function for Pakistan: Do environmental factors matter?. Review of Development Economics. 2024 Feb;28(1):216-41.
[40] Faruk MO. Nexus between global financial integration and economic growth: An ARDL approach. Theoretical & Applied Economics. 2024 Jun 1;31(2).
[41] Zaitsev S. The role of management accounting in the sustainable development of small enterprises: an analytical review of challenges and opportunities. Law, Business and Sustainability Herald. 2023 Feb 25;3(1):33-45.
[42] Prokopenko O. Experience of Implementing E-Learning to Support the Educational Process in EU Countries during the COVID-19 Pandemic: A Bibliometric Review. E-Learning Innovations Journal. 2023 Mar 25;1(1):55-70.
[43] Rezvorovych K. International norms and their role in the gender vector of Ukraine in the post-war period: analysis of social, economic and political aspects.
[44] Tkachova N, Saienko V, Bezena I, Tur O, Shkurat I, Sydorenko N. Modern trends in the local governments activities. AD ALTA: Journal of Interdisciplinary Research. 2021;11:112-8.
[45] Savchuk A, Borysiuk I, Mahanova TV, Ihnatova T. Artificial intelligence in the pharmaceutical industry of Ukraine: prospects for future development.
[46] Andrii DO, Sergiy NE, Dmytro ZH, Yevheniy SA, Borys ST. Modeling of a stress-strain state of detachable connection in details of reinforced composite materials with cea method. Strojnícky časopis-Journal of Mechanical Engineering. 2020;70(1):17-28.