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Effects of Technological Advancement on the Functioning of Small and Midsize Enterprises (SMEs) in Khyber Pakhtunkhwa, Pakistan

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### Abstract

Technological transformation aims to investigate small and medium-sized businesses' capacity to implement novel strategies that will boost production while endangering worker efficiency. Managers of SMEs in Khyber Pakhtunkhwa (KP), the province of Pakistan, made up a population sample of 273 respondents, who were compelled to do new research. The main statistical methods that are mandated are methods for linear regression. It is hypothesized that the medium-sized firm in KP's north and south areas is affected by the technological shift. The coefficient's determination ( $R^2 = 0.101$ ) shows that technical change accounts for 10.1% of the success observed in SME performance. When the forced p-value (0.000) matches the significance level of 0.05, it is considered statistically significant. results stated that the performance of SMEs in KP was positively and significantly impacted by technological progress.

**Keywords:** Change Management, SMEs, Innovation, Technological Change, Performance

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### Title

## Effects of Technological Advancement on the Functioning of Small and Midsize Enterprises (SMEs) in Khyber Pakhtunkhwa, Pakistan

### Abstract

*Technological transformation aims to investigate small and medium-sized businesses' capacity to implement novel strategies that will boost production while endangering worker efficiency. Managers of SMEs in Khyber Pakhtunkhwa (KP), the province of Pakistan, made up a population sample of 273 respondents, who were compelled to do new research. The main statistical methods that are mandated are methods for linear regression. It is hypothesized that the medium-sized firm in KP's north and south areas is affected by the technological shift. The coefficient's determination ( $R^2 = 0.101$ ) shows that technical change accounts for 10.1% of the success observed in SME performance. When the forced  $p$ -value (0.000) matches the significance level of 0.05, it is considered statistically significant. results stated that the performance of SMEs in KP was positively and significantly impacted by technological progress.*

**Keywords:** [Change Management](#), [SMEs](#), [Innovation](#), [Technological Change](#), [Performance](#)

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### Introduction

Since technology is such an unpredictable external factor, managers sometimes struggle to make good plans for it, particularly in small and medium-sized businesses (SMEs) where expenditures are focused. Technology is costly and challenging to use. Investing much in cutting-edge technology requires a shift from manual or basic processes to automated complex ones. Most of the time technological change brings

with it new economic potential for the company, but it also comes with higher training costs and capital requirements. A sluggish period in production is not allotted in SMEs involved in manufacturing. Additionally, service providers where information processing is accelerated by ICT. Internet facilities are used to make technological modifications for network clients, customers, and other global stakeholders. For this reason, a lot of businesses are motivated to implement innovative technology.



Anticipating and preparing firms for the technological advancements required in other industries is crucial, as the high standards of technology companies need. When it comes to the requirement to buy technology, there is a basic conflict between the need to employ cutting-edge technologies which are usually accessible to companies outside the environment, and the need for control compromised by dependence on external resources. Businesses that have developed a deep comprehension of technological dynamics are better positioned to acquire the skills required to adjust to changes in the environment and in the marketplace. Therefore, in order to react to or foresee technological change, a comprehensive grasp of the nature of technological growth is necessary.

Profitability and sustained development depend on technological innovation and prudent management. Organizational growth is greatly impacted by innovation in the form of new goods and technologies. "Particularly small and medium-sized businesses (SMEs) significantly contribute to job creation and economic expansion because of their inventive endeavors which are the primary driver of their competitive edge and stellar performance" (Idiko & Obah, 2023). Unable to completely comprehend new technology, managers may find themselves at a disadvantage since they are unable to take advantage of the chances it presents or use it to their benefit (Cong, Yang & Zhang, 2021)

Developments in technology, markets, production processes, goods, and services are greatly impacted by Social values, the global economy, information systems, labor demography, and political settings. "The collapse of these forces has resulted in a dynamic, unpredictable, demanding, and often destructive external environment for which organizations are unprepared or unable to respond" (Shadid, 2017).

### Statement of the Problem

According to Jackson, Burgess, Toms & Cuthbertson (2018), "There are times when difficulties cause many companies to modify or evolve." Change procedures are necessary for development organizations to adapt as part of their expansion or in relation to fresh development possibilities or reorganization activities. Employee performance, both individually and collectively, has an impact on the SMEs' overall success. Because of this, management needs to develop creative methods to keep human talent while also being more receptive to the latest technologies.

Whether automatic or manual, a lot of Pakistani business owners select a technology that best fits

their company's information processing and product offerings in order to generate the necessary investments and profitability. This can be the result of a concern of having the necessary skills to deal with the problems involved with acquiring and maintaining new technology innovations. However, there are shortcomings in the general socioeconomic environment, insufficient government funding for research into the production of essential machinery and equipment, and unfavorable financial policies with reference to local growth. Thus, the goal of this research is to provide small and medium-sized businesses (SMEs) with advice about innovative methods that will improve machine and human performance and make it possible to employ new technologies to increase production. The ability to adopt new methods brought about by technical advancements will decrease the reliance on antiquated (manual) methods of production in favor of automated and simpler methods, which will increase profitability and boost competitiveness globally.

### Conceptual Structure

#### The Change Management Model by Lewin

According to Lewin (1951, referenced by Ghavifekr et al., 2013), there are three processes that successful organizational transformation should take: "Unfreezing change initiatives to surmount the constraints of both personal resistance and collective conformity." Moving an organization from its current condition to a desired end state is called a change process. Refreezing, on the other hand, is the third phase and is defined as "striking a balance between the forces that are pushing and pulling a change intervention." In this particular situation Kezar and Harper (2023) stated that in order to be successful, Management needs to guarantee that pertinent parties possess a chance to engage in cooperative problem-solving and decision-making. If change recipients are better informed about the advantages and requirements of the transformation, they may react to it with little to no resistance. Refreezing, the final step, focuses on the employer enforcing new policies and duties inside the organization. For this stage to be effective, employees must be acknowledged because remuneration is a critical component. Employees who adapt to the technology shift should get commensurate rewards for changing their behavior. In order to change behavior, rewards are essential. Framework Conceptual Change Management.

According to Mazikana (2023), Change management is the ongoing process of modifying The capacity, direction, and structure of an organization

to satisfy the constantly evolving needs of internal and external customers. There is a widespread belief among employees that changes they will be involved in will benefit them when they are disclosed (Kimaku, 2010). The majority of workers, on the whole, anticipate success and think that The administration will take their needs into account. This also holds true for recent and creative ideas, services, products, and tools. According to Chepkosgei, Akuku, and Onyango (2019), trust is therefore essential in assessing the mood of the workforce, thinking and reacting to the recent modification. "Effective management of a business change is defined by Korir et al. (2012) as executive leaders, managers, and frontline employers cooperating to successfully implement necessary organizational, technological, or process changes."

Given its significance, change management is growing increasingly important and calls for suitable managing abilities and methodology. In the highly volatile and ever-evolving modern business environment, a company's capacity to effectively handle change is essential to its survival, growth, and competitiveness. These days, organizations are realizing the need for change management strategies. An organization's degree of system awareness is a critical component of its effectiveness (Rees, 2018). "Organizations had to use different techniques and production models in addition to the ones that were already in place to meet the needs of changing employees and threats from competitors" (Kotter, 1990).

When confronted with the topic of change, employees frequently get fearful and adopt a defensive, resistance-based stance. It's crucial to remember that workers do not see change favorably. Their regular routines are disrupted by change and they are forced to do things differently than they are used to. They are uncertain about their future and feel intimidated. This causes emotional and mental instability which frequently affects how well they function. It is observed that employees experience unpleasant emotions during the change implementation process and find it difficult to adjust to the new circumstances. "Pre-conditioned and routine subjection that the employees were previously exposed to within the work environment is the deep root of the resistance displayed" (Sardana, Terziyovsk & Gupta, 2016).

### The Difficulties of Change

It is imperative for leaders to acknowledge that the successful implementation of change requires a shift in organizational management from a directive and

controlling style to a supportive and inspiring style. In the absence of a unified goal, it falls on each individual to evaluate the surroundings and choose which chances to pursue. Furthermore, those who are requested to change are actually being asked to dedicate their own personal energy to the transformation. Business assets have to be allocated to educating employees about the upcoming change, persuading its benefits, and handling the inevitable opposition that is going to occur.

### Definitions of (SMEs)

"A business with an annual revenue of little more than one million Rupees is defined as a small and medium enterprise," states the State Bank of Pakistan (2024). The Small and Medium Enterprises Development Agency (SMEDA) participated in The 2010 National Collaboration Survey on Micro, Small, and Medium-Sized Enterprises of Pakistan and the National Bureau of Statistics (NBS) worked together to identify SMEs in Pakistan. They achieved this by using a categorization scheme that was based on two factors: assets (other than land and buildings) and employment.

Micro enterprises are defined as those that have less than ten employees and, omitting real estate and structures, less than five million rupees in total assets. Small firms are defined as those with more than ten employees but not more than forty-nine, and total assets above five million rupees but falling short of fifty million rupees (excluding land and buildings).

Businesses classified as medium-sized are those with a total workforce of 50–199 employees and total assets (not including land and buildings) of at least fifty million rupees but not more than five hundred million rupees.

### Dimensions of SMEs

SMEs can expand in certain areas and grow in certain ways as they expand their operations and companies. One can identify the following dimensions:

1. Increase the degree of technological integration – The ability to integrate technological synergies is a prerequisite for managing technologies and fully realizing their potential.
2. Step up cutting-edge technological procedures – Through fresh concepts and adaptations of current technology to fit the current economic climate, this innovative path significantly contributes to the updating of enterprises and the execution of tactics of competition.
3. Increase the number of marketplaces in which the business operates – Globalization and

internationalization are the immediate results of this choice. When items meet both local and worldwide market standards, this may be accomplished.

4. Expand companies' portfolios – Through product integration, a company that operates in one area now can expand its investment into other industries tomorrow.
5. Expand the number of times that technologies are used operationally – Numerous technologies can be used in different kinds of activities. Investing in more advanced technology will boost output while promoting training and the capacity-building of human resources.

### The Impact of Technology on Organizational Effectiveness

Global attention has turned to technological progress and how it affects the workforce. On the other hand, opinions of how employment would be affected by technological advancements differ. According to some analysts, the rate of technological advancement is quickening, and as labor-saving innovations spread more broadly, thousands of employees in factories and offices may be impacted. Others however argue that methods for preserving job security were crucial and that current advancements mark a significant divergence from previous modifications. All segments of a community benefit from technological progress and in the long run technology is thought to generate more employment than it destroys, particularly in small and medium-sized businesses. "Throughout human history, worries about evolving technology have persisted; they typically peak during times of unemployment that is more than normal before easing a little (Mark, 2010).

Global attention has turned to technological progress and how it affects the workforce. Advanced communication technologies, industrial robots, computer-aided design (CAD), computer-assisted manufacturing (CAM), and flexible production systems are some of the developments. According to Riabtseva (2017b), "These contemporary Technological advancements include affordable and potent microelectronic gadgets that can boost output in manufacturing and office settings." Executives must set an example for their subordinates to follow in terms of behavior, issues, clients, workers, and stakeholders before they can successfully implement the intended change. Approaching this methodically and progressively is necessary. By combining human, technical, and conceptual abilities, SMEs may address production-related difficulties and adapt to change in

a dynamic business environment. This can be achieved through technological investment.

### Organizational Performance

From an organizational standpoint, "An essential component of organizational success is organizational commitment from employees, which raises the bar for overall success and growth within the firm" (Mutahar et al, 2015). According to Choi et al. (2014), performance is a key predictor of organizational commitment and retention. Employees who are happy in their jobs are more inclined to go above and beyond what consumers anticipate, which will improve the perception that customers have of their service. Employees who are unhappy at work are probably going to be less productive and experience higher occupational stress (Skinner and Champion, 2008). In order to maintain the loyalty of the organization's current employees, hiring new employees when necessary should not be interpreted as a betrayal of their human dignity or a disdain for their needs when doing new tasks.

Efficient communication improves the performance of employees and the company as a whole, particularly in small and medium-sized firms like the Marbal sector and similar industries where the majority of workers are semi-skilled. In order to prevent rumors and word manipulation that might undermine the grounds for change communication should be distributed through the proper channels. Organizational managers and CEOs need to be aware that people differ in their backgrounds, cultures, values, beliefs, and conventions. Because a specific employee's accepted conduct may seem weird to another and result in deviant workplace behavior from that person, individual employee variances can have a beneficial or negative impact on organizational performance.

### Research Methods

A descriptive survey study design is used in this study. This survey approach was chosen because it did not seek to modify the sample variables; instead, it observed what occurred to them (Asika, 2018). A structured questionnaire was employed to collect pertinent information. The respondents' opinions were coded using the five Likert-type scale assessments of "strongly disagree," "strongly agree," "agree," "indifferent," and "disagree."

With around 2039 registered SMEs, all SMEs in all Local Government areas of KP, make up the study's population. Three hundred copies of the questionnaire were distributed throughout all of KP of which only 273 were received and valid for data

analysis. The study instrument's validity was assessed using content validity, and its reliability was demonstrated by the instrument's internal consistency result (Cronbach alpha = 0.75). Descriptive and inferential statistics were employed in the study to evaluate the hypothesis.

### Findings and Results

After 300 copies of the questionnaires were distributed, 273 were returned and the results were analyzed.

**Table 1**

*The respondents' descriptive statistics (Demographic data)*

Sex	Male	273	100%
	Age group	Frequency	Percentage
Age	20-29	16	5.9
	30-39	101	37
	40-49	138	50.5
	50-59	16	5.9
	60 and above	2	.7
	Total	273	100.0
Marital status:	Single	180	66%
	Married	93	34%
	Total	273	100%
Level of education	Matric	143	52.3%
	Intermediate	77	28.2%
	Bachelor	41	15%
	Masters or above	12	5.5%
	Total	273	100%

Source: Fieldwork by researchers (2024)

### First Hypothesis

Technology advancements have little effect on the

performance of small and medium-sized businesses.

**Table 2**

*Synopsis of the Model*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F
1	.317a	.101	.097	.64018	30.282
Predictors: (Constant), technological change Predictors					

Source: Fieldwork by researchers (2024)

Results show in Table 2 that R = .317, R square = .101, .64018 and F=30.282. adjusted R square = .097, std error of the estimate =

**Table 3**

*ANOVA<sup>a</sup>*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.411	1	12.411	30.282	.000b
	Residual	111.064	271	.410		
	Total	123.475	272			

a. Dependent Variable: SMEs Performance b. Predictors: (Constant), Technology



Source: Fieldwork by researchers (2024)

**Table 4**

*Coefficients<sup>a</sup>*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.396	.352		3.964	.000
	Technology change	.464	.084	.317	5.503	.000

### Fieldwork by researchers (2024)

The model summary demonstrates how much technology advancement improves the performance of SMEs. Technology change accounts for 10.1% of the success observed in the performance of SMEs, according to the coefficient of determination ( $R^2 = 0.101$ ). Because the p-value of the result (0.000) is less than the 0.05 level of significance utilized for the study, this result is statistically significant. This suggests that the performance of SMEs in KP is positively and significantly impacted by technological progress.

Since the F value is equal to the calculated F value, which is 30.282 at the degree of freedom of 151, the ANOVA value F of (3.90) at the degree of freedom of 272 indicates that technological development has a positive and substantial influence on the performance of SMEs in KP.

According to the model, SMEs perform better when technical advancements occur at a pace of 0.464 per unit. This suggests that the expansion and development of SMEs depend heavily on technological advancement. Consequently, the null hypothesis was disproved and the alternative hypothesis was approved.

### Discussion of Results and Findings

Regression analysis was used to test the hypothesis, and the results showed that the performance of SMEs in KP is significantly impacted by technological change. The hardest things to alter are human resources, thus employers of labor need to make sure they support both corporate and worker job happiness (Ghavifekr et al., 2017). This will facilitate smooth collaboration between management and stakeholders and allow staff to execute to the best of their abilities when changes, such as technological ones, occur inside the company.

According to Mazikana (2023), Sustainable development and profitability necessitate technical progress and careful management approaches. The development of SMEs is greatly impacted by

innovation in the form of new goods and technology, particularly in KP.

### Conclusion and Recommendations

Additionally, financial institutions have to offer SMEs credit facilities with lower collateral security requirements and reasonable interest rates. Technical support is a component that is just as crucial to SMEs as financial support but is frequently disregarded, misinterpreted, or misunderstood. In order to enable SMEs to implement the technical changes required for the manufacturing of their goods and services, taxes levied on them had to be decreased. Fear of the unknown and a lack of inventiveness are obstacles for small and medium-sized businesses innovation for technologically driven, globally competitive firms. It is important to create competent human resources that can oversee and contribute to the purchase of new technologies when SMEs need to replace outdated machinery and equipment.

When needed, our team must handle technology, skilled human resources, and the new way of doing things. This will remove any false portrayal of the management's sincere objectives for change activity.

Only via logical and inclusive decision-making by those who will be impacted by organizational change can innovative and emotionally charged methods of thinking particularly in the context of technology be promoted.

Additionally, managers had to embrace a fresh approach to fusing human labor with cutting-edge technology advancements. In order to improve organizational performance, this will lessen antisocial behavior that will purposefully break accepted norms and might have detrimental effects on the company and its members.

The influence of technological development will provide additional opportunities, such as foreign exchange, employment, and capital inflow, so that the economy may take full advantage of the chances presented by globalization brought about by technology in the export of commodities produced

by small and medium-sized businesses. Small and medium-sized businesses should continue to work to upgrade and improve their outdated machinery and other equipment as needed in order to adapt to the dynamics of change. This will help to standardize their operations and bring them into line with what is expected of developed economies. Therefore, it was suggested that:

- Financial institutions should offer loans to SMEs at a reasonable interest rate and with less collateral security;
  - Taxes levied on SMEs should be decreased to enable the subsector to embrace technology and acquisitions. They will be able to purchase the facilities required for their production of products and services as a result.
- Even though SMEs have been the subject of a great deal of research, further study is necessary since the findings indicate that prior research has only looked at ICT and quantitative methods.
  - Only peer-reviewed articles published within the previous 10 years are included in this review, and keywords are restricted to the article's title.
  - By including article keywords and abstracts in the poll, future research can expand upon it. With the aid of Microsoft Excel, the analysis for this study was completed manually. Systematic literature review strategies can be used in future studies to obtain more thorough analytical results.

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