Adoption and Use of ICTs Among SMEs in Mexico
Adopción y Uso de las TIC en las PYMES de México

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Resumen. La adopción y el uso de las tecnologías de la información y la comunicación (TICs) pueden haber llevado a las pequeñas y medianas empresas (PYMES) a ser más competitivas y tecnológicamente compatibles a lo largo de los años, pocos estudios han abordado las estrategias organizacionales que impactan positivamente el uso de las TIC en pymes. El propósito de este trabajo es identificar estas estrategias. Se revisaron bases de datos de literatura académica para proporcionar material confiable para usar en un cuestionario administrado a 42 administradores de PYMES. Se aplicó una escala de Likert de cinco puntos y se utilizó el valor alfa de Cronbach para garantizar la consistencia. Con base en una ecuación de regresión múltiple, se determinó que la planificación estratégica empresarial (β=0,294), la informalidad empresarial (β=0,391) y la estructura organizacional (β=0,327), fueron las variables estratégicas con mayor impacto en el uso de las TICs entre las pymes, siendo la informalidad empresarial la que tiene el mayor efecto sobre el cambio de unidad. Además, el 79% de los resultados del estudio piloto mostraron que se podía obtener una distribución similar de la población, como lo muestra el valor R2 (0,79). Se concluyó que las estrategias organizacionales de planificación empresarial, informalidad empresarial y estructura organizacional impactan positivamente en el uso de las TIC en las PYMES. Debido a que esta investigación fue un estudio piloto, se recomienda que futuros estudios aumenten el tamaño de la muestra y apliquen el cuestionario a otros sectores económicos para verificar la consistencia de los resultados.

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Palabras clave: estrategia; informalidad; organización; pequeña y mediana empresa; tecnología de la información y la comunicación.

Abstract. Although the adoption and use of information communication technologies (ICTs) may have led small and medium enterprises (SMEs) to become more competitive and technologically compliant over the years, few studies have addressed organizational strategies that positively impact the use of ICTs in SMEs. The purpose of this paper is to identify these strategies. Scholarly literature databases were reviewed to provide reliable material for use in a questionnaire administered to 42 SME administrators. A five-point Likert scale was applied, and Cronbach's alpha value was used to ensure consistency. Based on multiple regression, it was determined that strategic business planning (β=0.294), business informality (β=0.391), and organizational structure (β=0.327), were the strategic variables with the greatest impact on the use of ICTs among SMEs, with business informality having the highest effect on unit change. Additionally, 79% of pilot study results showed that similar distribution could be obtained from the population, as shown by the R2 value (0.79). It was concluded that the organizational strategies of business planning, business informality, and organizational structure positively impact the use of ICTs in SMEs. Because this investigation was a pilot study; it is recommended that future studies increase the sample size and apply the questionnaire to other economic sectors to check the consistency of the results.

Keywords: business informality; information and communication technology; organization; small and medium enterprise; strategy.

Introduction

SMEs are major constituents of the world's economies, and it is not surprising that the increased adoption and use of ICTs would provide them with many benefits, including less-expensive production methods, increased access to market knowledge, and advanced administrative capabilities (Mwila et al., 2019). ICTs are generally adopted and used to gather and distribute information, as well as to manage tasks in many SMEs, which contributes to their efficiency (Chung et al., 2008).

The arrival of the 21st century has been accompanied by many changes related to the adoption and use of information and communication technologies (ICTs), as many small and medium enterprises (SMEs) have become more competitive and technologically compliant (Ibarra Cisneros et al., 2013; Makena, 2015; Sanabria Torres, 2015). This phenomenon was well explained by related theories (Katsamudanga *et al.,* 2021), but only a few studies have attempted to relate organizational strategies (e.g., strategic business planning, business informality, and organizational structure) as variables that positively

impact the use of ICTs in SMEs, such as veterinary clinics and hospitals. It is expected that an in-depth investigation into these strategies will help explain the organizational characteristics that influence the adoption and use of ICTs.

Over the past years a great number of investigations have been related to research on the use of ICTs among large companies but recently there has been a little increase in the number of investigations on adoption and use of ICTs among SMEs. The main reason being a need for increasing efficiency and effectiveness as Information and Communications Technology (ICT), integrates SMEs into the global supply chain and the service industry. Al Busaidi et al., (2019) on the other hand goes on to mention that it is a fundamental source of facilitating innovation and enchaining performance and growth. Therefore, ICTs are considered the drivers of levels of competitiveness. Knowing the organizational strategies that increase the adoption, and use would help harness many SMEs (Nandan, 2009).

Recently Selamat et al., (2011) in a study showed that there is limited knowledge on the adoption and use of ICTs among SMEs and succinctly defined ICTs as all forms of technologies and products that include a wide range of software, hardware, telecommunications and information management techniques, applications and devices, and are used to create, produce, analyze, process, package, distribute, retrieve, store and transmit or receive information electronically in a digital form such as computers, email, internet, websites, social networking and other wireless communications devices, networks, broadband, and as well as the various specialized devices and applications associated with them, such as satellite systems and video conferencing.

Although many theories may have given the reasons for why SMEs may adopt and use ICTs, it should be noted that this process is dynamic and beyond the explanation they may have given to researchers and owners of the businesses. The theory of dynamic capability shows that organizations can adopt and use ICTs as a way of changing the way they offer products and services to increase their competitive advantage. Generally, not only do external factors affect this process but internal factors like organizational strategies like business planning, business informality and structure of organizations (Eze et al., 2018). Duran et al., (2021) mentioned that this is a progressive line of research for a better understanding of the future. Arguably Afolayan, (2015) complemented this by stating that SMEs are likely to adopt

and use ICTs when compared to larger ones. The main reason being the existence of their flexibility.

Davis et al., (1989) further showed that the theory of reasoned action (TRA), which was adapted to the technology acceptance model (TAM), is specifically meant to explain computer usage behavior. TAM uses TRA as a theoretical basis for specifying the causal linkages between two key beliefs: perceived usefulness and perceived ease of use, and users' attitudes, intentions, and actual computer adoption behavior. Perceived usefulness strongly influenced peoples' intentions while perceived ease of use had a small but significant effect on intentions as well, although this effect subsided over time. Attitudes only partially mediated the effects of these beliefs on intentions. Subjective norms had no effect on intentions. Whilst on the other hand Selamat et al., (2011) determined that TAM was too parsimonious, which implied it should be supplemented and extended with other constructs.

Eze et al., (2018) then proposed a model which showed how ICTs could be integrated in SMEs. It is mainly composed of factors such as integration (problem assessment, concept generation and evaluation), learning (role delegation, misalignment, and alignment of interest) and reconfiguration (product modification, adaptation, problem redefinition, product trial, concept specification). A similar study, with the participation of 219 SMEs from Turkey showed that adoption, organizational innovativeness, and ICT awareness had a positive impact on adoption of ICTs. This was shown after a regression equation was applied based on an exploratory and confirmatory factor analysis. Related beta values that came out were organizational innovativeness, 0.125-0.634 while ICT awareness had 0.197-0.377 (Öz ̧sahin, 2022).

After applying a structural model Chairoel et al., (2018) showed that initial technological levels, organizational, management characteristics and environmental levels had an influence on levels of adoption and use of ICTs among SMEs. Tan et al., (2006) went on to state that, SMEs in England with less than 10 employees were less likely to adopt and use ICTs for gaining a competitive advantage whilst those that were considered as small, and mediums SMEs by the Mexican government had higher chances. Based on information from 291 SMEs from Sweden it was concluded that small enterprises had a higher use of ICTs for internal communication than micro enterprises and less likely to use it for marketing, as their strategy is focused on specific niches (Parida *et al.,* 2009). Thus, having noted the information presented, the present investigation contributes to the knowledge that there is

existence of internal and external causes that cause SMEs to adopt and use ICTs. Thus, at the same time it gives an update on what has been done so far in the field of ICTs.

Then strategic business planning involves a series of steps to reach specific corporate objectives, and many people have argued that the process is both an art and a science of formulating, implementing, and analyzing decisions (Velásquez Campozano, 2016). Datasoft, (2019) asserted that strategic business planning for the use of ICTs requires the fusion of service-oriented, application-specific, and infrastructure-based considerations (Mariño Osorio, 2016). Lu et al. (2019), in a study with $p \leq 0.000$, determined that strategic business planning was the driving force behind the appropriate use of ICTs in SMEs. Strategically if SMEs have a global orientation, they tend to adopt ICTs at a faster rate than those without (Chairoel et al., 2015). It was determined in Zambia that 46.7% of the firms had in place strategic measures to implement ICTs in their business with 53.3% having no plans to do so. One of the reasons that stood out most was the lack of funds to sustain the implementation stage (Mwila et al., 2019).

A study in Somalia showed that SMEs, whose strategic business plan emphasized an orientation towards performance improvement, increased profitability and increased market share would most likely adopt and use ICTs (Ibrahim, 2014). Whilst in Santiago de Cali, Colombia, it was shown that SMEs with strategic business plans that included the implementation of ICTs successfully achieved their goals (Aguilera Castro et al., 2017). Buenrostro Mercado et al., (2019) showed that the lack of an ICT strategic plan led to limitations in communication, process standardization, administration, and production pathways. While Velásquez Campozano (2016) added that when an SME seeks to improve its informatics department with the goal of harnessing administrative processes, strategic business plans can positively affect the use of ICTs.

Clarke et al., (2009) pointed out that SMEs in the construction industry do not consider ICTs to be a strategic tool for reaching a competitive edge. It should be noted that an alignment of the goals of an enterprise with adoption and use would help efficient functioning of the entity. On the other hand, after realizing a study of 265 SMEs from Nigeria with an orientation of use of ICTs for internationalization, yielded results which showed that that lack of ICT competence and strategic focus of ICT applications are internal problems facing Nigerian SMEs (Gbadegeshin et al., 2019)

Generally, the structure of a business organization includes the set of all work processes and their coordination (Volpentesta, 2016). Brodar et al. (2009) showed that organizations are affected by external and internal structures. Wang et al. (2016) found that structures that are based on a company's size, resources, and competitive culture have positive effects on the use of ICTs, especially in SMEs. Taylor (2019) recognized that leaders in an organizational structure have a positive impact on adoption and use of ICTs among SMEs in developing countries. He further went on to state that the leader's innovativeness, attitude to ICTs, ICT knowledge and risk aversion were the main determinants of this relationship. After a participation of 250 workers who belonged to SMEs in Kigali, Rwanda it was determined that knowledge of ICTs had a positive impact on adoption and use of ICTs (Mukamanzi et al., 2018).

Thus, as part of his research, he later went on to propose a model that shows that there is existence of organizational strategies that can affect levels of adoption of ICTs among SMEs. (Chairoel et al., 2015). Mpofu et al., (2013) went on to emphasize that SMEs need to be prepared to adopt and use ICTs, thus having business strategic plans that promote a reach of these goals. A study from Accra Ghana emphasized the presence of internal factors like lack of technical expertise as a hindrance for adoption and use of ICTs (Agboh, 2015). Thus, confirming a need for workers and administrators with knowledge and a human capital strategy among its structures to adopt and use ICTs (Mbuyisa et al., 2016).

In his studies of Asian SMEs Al Busaidi et al., (2019) confirmed that a structure of an organization with special mention on size, human capital, culture and workers participation were considered as key factors in determining if an SME could adopt and use ICTs. He further went on to state that resistance to change was the main factor in non-adoption and use of ICTs. As well, structural organizations with high compatibility, positive perceived usefulness, less external pressure, perceived ease of use, and organizational readiness have been found to be statistically significant as determinants of adoptions and use of ICTs. This would be complemented by the firm's culture, values, and preferred work practices as well as consistency with the existing technology infrastructure turned out to be the most influential ones (Nandan, 2009).

Like in many other continents, the European Union is composed mainly of informal SMEs, 99 %, who play a major role in the countries that fall in this region. In a recent investigation it was determined that the adoption and use of ICTs among informal SMEs is often temporary, whilst the reason being a non-

recognition of the competitive advantages of use of ICTs and due to lack of time to examine and learn what will benefit the organization in a long run (Eze et al., 2018).

In Africa, Deen-Swarray et al., (2013) showed that mobile phones remained as the most used ICT among informal businesses, while the use of other ICTs, such as fixed-line telephones, computers and the internet remained negligible. The lack of use of the different kinds of ICTs was attributed to issues around need, affordability, availability, and access. On the other hand, Duran et al., (2021) determined that informal SMEs usually suffer from having low levels of technology, a phenomenon that has contributed to their poor development which results in low productivity and little progress in productive and organizational terms.

Most informal SMEs are not registered with their local governments and do not contribute to the appropriation of funds for social programs, which is necessary for the development of many countries. They are also characterized by poor working conditions, low wages, job insecurity, and low educational standards (Onyima *et al.,* 2017). Nevertheless, García Murillo et al. (2017) found that an increase in the use of ICTs among informal SMEs can reduce transaction costs while increasing access to information and resources. Ultimately, ICT adoption should lead to SMEs becoming formalized. However, as a comparison, formal SMEs have better ICT opportunities than informal ones.

Notably, SME formalization via the increase of ICT use does not necessarily lead to poverty reduction; however, it does lead to the simplification of business processes and improved service management (OECD/ILO, 2019). In countries like Nigeria, informal SMEs that have strategically planned the adoption of ICTs have enjoyed increased opportunities in terms of realizing efficient and timely transactions. Furthermore, many have managed to enter different economic sectors due to their improved access to information (Gatune, 2022).

The research question of this study is, "What are the organizational strategies that impact the adoption and use of ICTs among SMEs in the veterinary sector?" Consequently, the objective is to find the answer. This leads to the following hypothesis: Strategic business planning, business informality, and organizational structure positively impact the adoption and use of ICTs

among SMEs in the veterinary sector. The proposed theoretical business model for the present investigation is depicted in Fig. 1.

Figure 1: Theoretical business model about the organizational strategies that determine the use of ICTs in SMEs of the veterinary sector.
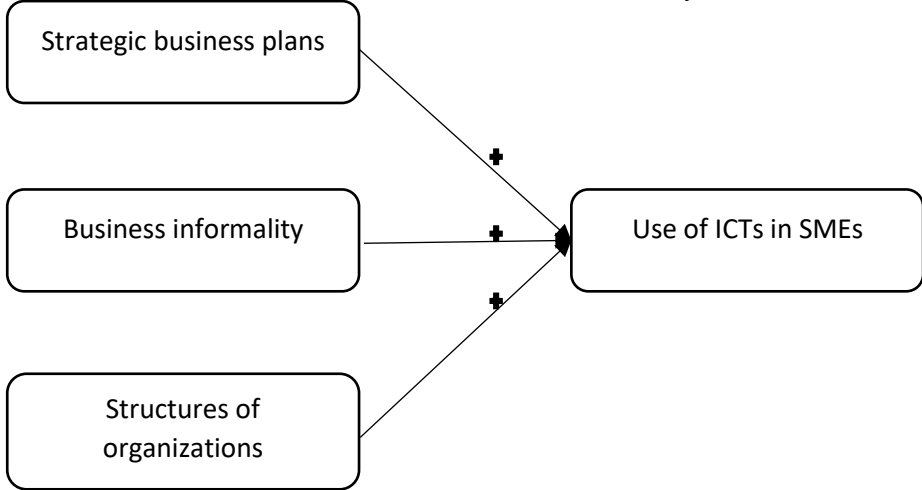
Source: Authors

Materials and Methods

Scholarly literature was retrieved for this investigation from the EBSCO, SCOPUS, JCR, and Google Scholar databases, and most were less than five years old as of this writing. Exceptions were made for highly esteemed articles that provided grounded theory. This literature review led to the creation of a questionnaire that was provided to participants.

This investigation took place between January and May 2022, engaging veterinary hospital administrators from the municipality of Monterrey, Nuevo Leon. The questionnaire contained three information-gathering sections: administrator information, hospital data, and a five-point Likert scale set of questions, where "1" indicates total disagreement, and "5" indicates total agreement. Cronbach's alpha tests were completed, showing that the questionnaire was internally consistent.

Based on guidance provided by the National Institute of Statistics and Geography (INEGI) as of September 1st, 2021, the theoretical sample size of

this study was determined to be 129 from a population of 192, based on the Yamane formula:

$$n = \frac{N}{1+N(e)^2},\qquad\qquad(1)$$

where n indicates the sample size, N is the population size, and e is the error value (5%).

Control questions in the first two sections of the questionnaire were used to obtain demographic and hospital information. The answers collected from section three were subjected to multiple linear regression using IBM's SPSS statistical software. Exploratory factor analysis, R^2, analysis of variance (ANOVA), and multicollinearity were used to show dependencies. A stepwise method together with the weighted average method was used to obtain the above-mentioned constants.

Although the F-test finds the significance levels of all independent variables contributing to the regression equation, some researchers have noted that it also shows whether an equation is meaningful. The R^2 level reflects the regression results adjusted to the expected values of the population. It is also seen as the level of variance in a dependent variable that can be explained by the variance of the independent variables (Chicco, 2021). However, Filho (2011) argued that the R^2 value does not. In the social sciences, acceptable values are between 40 and 60%; however, higher values are often acceptable (Bartels, 2015).

Results and Discussion

Many studies on SME modernization have examined the effects of improving human capital, financial management, production efficiency, transaction security, market-size control, and services to clients and providers based on the use of ICTs; none have deduced the relationships among the organizational characteristics that influence their use (Ibarra Cisneros et al., 2013; Saavedra García et al., 2013). Buenrostro Mercado et al. (2019) showed that there are internal organizational factors that clearly influence SMEs' use of ICTs.

A total of 42 veterinary hospital administrators in the municipality of Monterrey, Nuevo Leon, Mexico, responded to the questionnaire with valid results, upon which Cronbach's alpha value was calculated (see Table 1).

Table 1: *Reliability test of the questionnaire*

Variable	Items	Cronbach Alpha
Use of ICTs	7	0.871
Strategic business planning	6	0.801
Business informality	7	0.867
Structure of organization	10	0.911

Source: SPSS

Based on the rubric of Taber (2018), the results of this questionnaire fell into the category of "acceptable," and Cronbach's alpha value indicated that the measures used were correct for the variables measured. Because Cronbach's alpha value is multidimensional by nature, reliability values were calculated for each variable. Based on the assured reliability of the questionnaire, exploratory factor analysis, the R^2 value, model significance level, multiple regression coefficients, and multicollinearity levels were calculated, as listed in Tables 2–8.

The present investigation included only veterinary hospitals in the municipality of Monterrey, Nuevo Leon, whose range of patients focused on household pets (94.5% of respondents). One third of the responding hospitals had between two and four years of operation, and 71.4% had between zero and five staff members, confirming that the participating veterinary hospitals were of the SME class. It was determined that 52.3% of the respondents were women, and 59.5% had between two and four years of experience.

An exploratory factor analysis showed that the KMO value was above 0.5 along with a sphericity test which was considered as significant and acceptable and a total of 7 components were formed with an accumulated variance of 77 %, whose rotation showed that the items in the questionnaire were related according to the people who answered the questions. Also, the extraction of the items by the principal components' method showed the values were above 0.5. As explained by Izquierdo *et al.,* (2014) the values can be considered as acceptable but upon interpreting them they need to be put into context. The author even went on to suggest elimination of items to extract one component. Extraction of more than one component only shows the existence of other variables not explicitly contemplated in the investigation according to the people who answered the questionnaire but are being in another way.

A linear regression equation was used to relate the dependent variable to the independent variables (Ferrari and Cribari Neto, 2004). The size of the

regression coefficient correlates to the level of contribution provided by the predictor variable to the variance in the dependent variable values after the effects of all other predictors are statistically removed. This is reflected as the β value in the regression equation. Regression coefficients reflect the importance of each variable and allow researchers to compare its relative importance (Petchko, 2018). As the unit change in the use of ICTs, 0.327 was found for organizational structure, 0.391 for business informality, and 0.294 for strategic planning. The following information relates to similar studies that have been done. The related multiple regression equation is as follows:

$$IT = −0.096 + 0.327EO + 0.391IE + 0.294PE + ERROR.$$
(2)

EO: Structure of organizations, **IE**: Business Informality, **PE**: Strategic Business Planning

The following tables 2 to 8 show the results of the statistical analysis related to the investigation.

Table 2: *KMO and Bartlett Test*

Kaiser-Meyer-Olkin value		.687
Bartlett sphericity	Chi-squared test	1087.829
	degrees of freedom	435
	Sig.	.000

Source:SPSS

Table 3a: *Extraction by principal components.*

	Initial	Extraction
IT2	1.000	.721
IT4	1.000	.692
IT6	1.000	.629
IT9	1.000	.725
IT10	1.000	.776
IT13	1.000	.699
IT14	1.000	.707
PE1	1.000	.780
PE2	1.000	.775
PE4	1.000	.809
PE5	1.000	.814
PE6	1.000	.743
PE7	1.000	.820

Source: SPSS

Table 3b: *Extraction by principal components.*

	Initial	Extraction
IE2	1.000	.774
IE3	1.000	.762
IE4	1.000	.788
IE5	1.000	.644
IE6	1.000	.895
IE7	1.000	.821
IE8	1.000	.888
EO1	1.000	.800
EO2	1.000	.770
EO3	1.000	.872
EO4	1.000	.759
EO5	1.000	.821
EO6	1.000	.785
EO7	1.000	.828
EO8	1.000	.817
EO10	1.000	.774
EO11	1.000	.710

Source: SPSS

Table 4: *Accumulated variance*

Component	Initial autovalues		
	Total	% de la variance	% acumulated
1	13.923	46.410	46.410
2	2.055	6.851	53.261
3	1.833	6.111	59.372
4	1.644	5.480	64.852
5	1.352	4.506	69.358
6	1.280	4.266	73.624
7	1.108	3.692	77.316

Source: SPSS

Table 5: *Summary of the model by stepwise method*

	R	R squared	Corrected R squared	Error	Durbin- Watson
Model	0.889	0.790	0.774	0.43108	1.644

Source: SPSS. Dependent variable: IT (Use of ICTs). Independent variables: PE (Business strategic planning), IE (Business informality), EO (Structure of organization).

Table 6: *Calculation of the significance levels of the model with ANOVA by stepwise method*

	Sum of squares	Degrees of freedom	Root mean square	F	Sig
Regression	26.577	3	8.859	47.673	0.000
Residual	7.061	38	0.186		
Total	33.638	41			

Source: SPSS. Dependent variable: IT (Use of ICTs). Independent variables: PE (Business strategic planning), IE (Business informality), EO (Structure of organization).

Table 7: *Multiple regression equation coefficients by stepwise method*

	B	Error	Beta	t	Sig	FIV
Constant	-0.096	0.367				
EO	.413	.149	.327	2.766	.009	2.526
IE	.315	.089	.391	3.556	.001	2.183
PE	.316	.108	.294	2.918	.006	1.838

Source: SPSS

Table 8: *Determination of multicollinearity levels by stepwise method*

	Condition index	Proportions of variance			
		Constant	EO	IE	PE
1	1.000	0	0	0	0
2	10.490	0.43	0	0.46	0
3	14.104	0.34	0	0.19	0.84
4	19.198	0.22	1	0.34	0.16

Source: SPSS

Adoption and use of ICTs

Although considered as little, the adoption and use of ICTs among SMEs, Duran *et al.,* (2021) demonstrated that the number of internet subscribers increased from 3.3 million in 2010 to 16.9 million in 2017 whilst the internet penetration rate increased from 7.3 - 32.5% in the same period. The national internet subscriber penetration rate was 32.8% in Colombia while demographic characteristics of the owner or manager (gender and age), characteristics of the company (age, size, and computer equipment), legal practices of the company (formality), social capital (associativity and cooperative affiliation), and the diffusion or epidemic effect of ICT, influenced adoption and use of ICTs among SMEs. Fambeu, (2021) on the other hand reported that in 2016 the internet penetration rate was 87% in developed countries whilst it was 40% in developing ones and only 25% in Africa.

Relation between strategic business plan and adoption and use of ICTs

Nandan, (2009) in another study mentioned that the adoption and use of ICTs is related to the vision, value, technical ability, and control that can be developed. Therefore, a good business plan which encompasses the aforementioned factors would increase the use of ICTs. Positive results have since been obtained from Tanzania where adoption percentage rose from almost non-existent in 2004 to 80.1% computer, 68.9% internet, 56.6% website,

and 72.2% email in 2014. Whilst the use of ICTs was between 47 and 53 %. This rate has continued to ascend to the present. This was alluded to the good business planning procedures that had been adopted by SMEs in that country (Msuya et al., 2018).

In Namibia it was shown that a lack of awareness of digital services, electricity, skills to navigate smart devices, high cost of both devices and mobile internet and cybercrime were the main determinants of adoption and use of ICTs. Therefore, it was determined that if SMEs would adopt a business plan along with the help of the government it would help to avert the effects of such factors (Kamutuezu et al., 2021). In South Africa it was successfully shown that SMEs with a strategic business plan of modernizing and moving from traditional business operations would be more likely to adopt and use ICTs (Bvuma et al., 2020). On the other hand, the absence of business strategies may be a result of the governments, like those in the European region, not promoting policies that increase adoption and use of ICTs (Harindranath et al., 2008b).

As has been shown by other authors from the European region, the adoption and use of ICTs is mainly related to the benefits that can be obtained operationally. Therefore, barriers like being unaware of existing policy instruments at the regional, national, and European levels can be averted (Harindranath *et al.,* 2008). The same sentiments were mentioned by a committee on digitalization reported that a lack of adoption and use of ICTs may be a lack of digitization policies of the governments of the Mediterranean region (European Union, 2020).

Okundaye *et al.,* (2019) stated that the only way SMEs can plan, execute, and analyze post application of strategic business plans efficiently is by use of ICTs. Thus, in a way they can be profitable and compete globally. This can be complemented by SMEs with an orientation on intensifying marketing and sales of its products and services, as well, would be more likely to adopt and use ICTs (Mwai, 2016). In rural Malaysia, after 167 questionnaires were analyzed, it was shown that SMEs with a strategic business plan that points towards extension of communication, business involvement, dissemination of information as well as knowledge sharing among their business network had more probabilities of adopting and using ICTs. Also, a significant relationship was obtained between owner's attitude and ICT adoption (Jaganathan et I., 2018). CGR (2014) noted that strategic business plans influence ICTs when the organization incorporates and develops their use in alignment with the given SME strategies. Similarly, Suarez Lozano et al.

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e-ISSN: 3061-743X   InnOvaciOnes de NegOciOs   Vol. 22 Núm. 43 ene-jun 2025

https://revistainnovaciones.uanl.mx

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(2022) showed that the difficulties faced when incorporating ICTs are related to successfully identifying business needs and the disposition of the equipment.

Relation between structure of organizations and adoption and use of ICTs

Reza (2021) showed that SMEs with increasing organizational structures tend to implement ICTs as a means of facilitating the complex nature of their operations. Thus, their organizational structures will positively affect their ICT use. Although ICTs have been shown to revolutionize organizations, it must be emphasized that the initial incorporation of an SME often leads to the increased use of ICTs to maintain their hierarchy, business process divisions, and communication methods (Volpentesta, 2016).

A study from Nigeria with the participation of 158 SMEs showed that organizational structures which promote higher financial, market and shareholder return organizational performance tend to adopt ICTs as a vehicle to reach high levels (Lamido et al., 2022). Naushad, (2020) y Weerd et al., (2016) further went on to explain that organizational factors like support from the top management, organizational readiness, communication, and communications medium-channels & quality, information and management support systems, networking & networking structures, organizational structures, and quality orientation prompt organizations to adopt the information systems (IS) and technologies were very important for adoption and use of ICTs.

Adoption and use of ICTs is as well hindered by the knowledge of the workers of the SMEs. After investigating with the participation of 180 SMEs from Nigeria, it was determined that 40 % lacked technical skills, which is a result of a country that is still in the process of development. Results may be different when compared with developed countries like the USA or China (Apulu, et al., 2011). Similar research from Kenya, with the participation of 1700 SMEs, used a stratified sampling method and a questionnaire on which factors affected the adoption of ICTs. Results showed that the adjusted r squared was 0.801 and two of the factors which were highly significant were management support and employee ICT skills (Kanyaru et al., 2017).

Relation between business informality and adoption and use of ICTs

Generally, in many parts of the world most family SMEs are informal. Rozmi et al., (2020) noted that family SMEs tend to be less likely to adopt and use ICTs if the founders had a less culture of what this investigation is advocating. The

same concerns were echoed by Hendrawaty et al., (2020) who showed that SMEs with low adoption and use of ICTs had a less chance of moving from being informal to formal. Since most of the informal SMEs are not structured and as managers are the mainstays of the SMEs Akomea-Bonsu et al., (2012) mentioned that a lack in knowledge among them normally creates a barrier in use and adoption of ICTs among SMEs. Further the authors went on to recognize the need for more training facilities in ICT for SMEs.

Given that at least 50% of the active labor force in Latin American regions is part of informal SMEs, the regional governments have pushed ICT adoption to help them transition to formal statuses (Martez de Miranda et al., 2012). If SMEs in this situation desire to become formal, the inclusion of ICTs in their day-to-day functioning has been found to accelerate this transition (Onyima et al., 2017). It has been noted that informal SMEs play important roles in various economies and that their inclusion in a region's strategic business policy making should include the use of ICTs (Jediel, 2016).

There is a dual view of business informality in this case. Some scholars view informal SMEs as determinants of economic growth that lack authoritative controls; hence, they do not directly contribute taxes, whereas others view them as both a by-product and a precursor to poverty, as they occupy more than half of the work-capable population. It has also been claimed that informal SMEs rarely make a formal transition owing to corruption and the desire to avoid government control; hence, most close within a few years of their establishment (La Porta et al., 2014). Bhattacharya (2019) showed that SMEs in the Americas were 49.6% informal. Hence, it is expected that there would be a higher probability of them adopting ICTs to increase their profits, as was found in India.

On the contrary to what would be expected, a study among 14 African countries showed that informal businesses have a higher profitability in terms of fixed assets employed than semi formal ones, which in turn have a higher profitability than formal businesses. Therefore, with this goal of having higher profitability informal SMEs tend to adopt and use ICTs at a faster rate than formal ones (Esselaar, 2006). On the other hand, Mramba et al., (2017) mentioned that there was a low level of ICT uptake by informal workers in Sub Saharan African, scarce use of user-centered design principles, lack of design science research approaches, and uneven distribution of ICT solutions among informal workers.

Multicollinearity

Other factors indirectly may affect the interpretation of the results obtained. One of them is multicollinearity. Some authors consider multicollinearity as the 'ghost' of regression equations because, in most cases, its effects are not directly evident. Multicollinearities are nonlinear relationships that cause variations in regression results. Examples include the over-definition of models and sample outliers from different populations (NCSS, 2022). The FIV results were less than three, whereas the levels of the condition index were within acceptable levels. This shows that the independent variables were sufficiently different, suggesting that the model reliably predicted the dependent variables, as shown in Eq. (2).

Conclusion

The purpose of this investigation was to determine the organizational strategies that impact the use of ICTs among SMEs in the veterinary sector, and the hypothesis stated that strategic business plans, business informality, and organizational structures have a positive impact on these organizations adopting ICTs. The literature review showed that there is sufficient evidence supporting the existence of a relationship between organizational strategies and the use of ICTs in veterinary SMEs.

The multiple linear regression showed that strategic business plans, business informality, and organizational structure have a positive impact on the use of ICTs among these SMEs in the study area. It was also determined that business informality had the highest effect on unit change with respect to the use of ICTs. Therefore, the independent variables applied in the present investigation should be considered when implementing ICTs among SMEs in various economic sectors. It can be mentioned that the present investigation was done in the veterinary sector and as shown by the results it contributed to filling the void of knowledge as was shown by the previous investigations and theoretical information. Therefore, in such a sector the independent and dependent variables should be considered when analyzing them. It should also be noted that these results are from a pilot study; therefore, a more formalized study with a larger and more diverse sample size should be accomplished to ensure the generalizability of the results. Similar studies in other economic sectors should also be considered.

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