Data and Metadata. 2025; 4:746
doi: 10.56294/dm2025746

ORIGINAL

The impact of information systems on SME economic performance

El impacto de los sistemas de información sobre el desempeño económico de las Pymes

Juan Manuel Andrade Navia[1], William Alejandro Orjuela Garzón[2], Carlos Eduardo Aguirre Rivera[1]

[1]Universidad Surcolombiana, Faculty of Economics and Administration. Pitalito, Colombia.
[2]Universidad del Tolima, Faculty of Agronomic Engineering. Ibagué, Colombia.

Cite as: Andrade-Navia JM, Orjuela-Garzón WA, Aguirre Rivera CE. The impact of information systems on SME economic performance. Data and Metadata. 2025; 4:746. https://doi.org/10.56294/dm2025746

Submitted: 30-04-2024 **Revised:** 27-08-2024 **Accepted:** 05-05-2025 **Published:** 06-05-2025

Editor: Dr. Adrián Alejandro Vitón Castillo

Correspondign author: Juan Manuel Andrade Navia

ABSTRACT

The objective of the article was to evaluate the relationship between information systems and the economic performance of SMEs in the Surcolombian region. For the above, the theoretical constructs of the variables were approached from a review of related literature. The study was of a quantitative nature, was approached from the deductive method and was a correlational type of research. The study population corresponded to managers, area chiefs, process directors and, in general, collaborators who occupy positions that involve decision making, while a non-probabilistic convenience sampling was used. A total of 160 surveys were applied. For the information systems and economic performance variables, instruments were elaborated by the researchers in a literature review. The reliability of the research was evaluated with Cronbach's alpha and composite reliability, while the validity was determined with the Mean Explained Variance and Confirmatory Factor Analysis, in all cases was satisfactory. The results obtained showed high levels of the information systems and economic performance variables, evidencing the relevance of these aspects in management. Likewise, the positive and significant relationship between information systems and economic performance in SMEs was verified. It is concluded that the relationship between the variables is strong in the processes that allow operational efficiency and the management of customers and marketing.

Keywords: Information Systems; ICT; Economic Performance; Smes; Operating Efficiency.

RESUMEN

El objetivo del artículo fue evaluar la relación entre los sistemas de información y el desempeño económico de las Pymes en la región Surcolombiana. Para la anterior, se abordaron los constructos teóricos de las variables a partir de una revisión de literatura relacionada. El estudio fue de carácter cuantitativo, se abordó desde el método deductivo y fue una investigación de tipo correlacional. La población de estudio correspondió a los gerentes, jefes de área, directores de procesos y, en general, los colaboradores que ocupen cargos que impliquen la toma de decisiones, mientras se utilizó un muestreo no probabilístico de tipo por conveniencia. En total se aplicaron 160 encuestas. Para las variables de sistemas de información y desempeño económico se elaboraron instrumentos por parte de los investigadores en una revisión de literatura. La confiabilidad de la investigación fue evaluada con el alfa de Cronbach y la confiabilidad compuesta, mientras la validez fue determinada con la Varianza Media Explicada y Análisis Factorial Confirmatorio, en todos los casos fue satisfactoria. Los resultados obtenidos demostraron altos niveles de las variables de sistemas de información y desempeño económico, evidenciando la relevancia de estos aspectos en la gestión. Asimismo, se comprobó la relación positiva y significativa entre los sistemas de información y el desempeño económico en las Pymes. Se concluye que la relación entre las variables se hace fuerte en los procesos que permiten la eficiencia

operativa y la gestión de los clientes y el mercadeo.

Palabras clave: Sistemas de Información; TIC; Desempeño Económico; Pymes; Eficiencia Operativa.

INTRODUCTION

In recent years, SMEs have been an interesting phenomenon in many economies of the world due to their contribution to societies as alternatives to formal entrepreneurship through the production of wealth, consumption of raw materials, and production of products, showing a high capacity for resilience in the face of obstacles and eventualities that the market presents daily.[1] In addition, these types of companies provide many jobs for local populations, promote diversification, and create a dynamic economic activity.

The national economy is boosted in its different sectors by micro, small, and medium-sized enterprises, such as SMEs. By 2023, the country reported the existence of 1,74 million companies, of which 95 % were micro companies, 3,5 % small companies, 0,8 % medium companies, and 0,3 % large companies.[2] The national economy has been consolidating with a business park that adapts and learns dynamically to the changes represented by globalizing processes, especially when physical, tax, and logistic barriers do not constitute obstacles for large economies to feel their presence at the local level.

Notwithstanding their obvious relevance, especially in emerging economies, SMEs face several adverse situations that they must manage. According to the International Labor Organization (ILO),[3] management efficiency is of great importance for the continuity and survival of small enterprises when organizational problems associated with access to different markets, technological obsolescence of enterprises, and strategic management of information and knowledge, among others, are noticed.

Considering the importance of promoting the growth of SMEs and strategic and support programs for the business sector, the emphasis on information systems should be considered. According to Vargas-Encalada et al.[4], systems are key for all companies, as they allow the different business units to have an active role and fluid communication. This translates into an organizational capacity to overcome environmental phenomena, monitor market performance, and contribute added value to stakeholders, satisfying their needs, ensuring competitiveness, and supporting the sustainable growth of regions.

From this perspective, Mintzberg[5] suggests that sometimes companies should pay enough attention and generate mechanisms for monitoring the environment to identify, track, capture, and store valuable information for business management, avoiding a series of traumas such as reprocesses, waste, misinformation, and technical failures, among others. This requires harmonizing the efforts of the organizations' areas to develop the proposed objectives at the strategic and operational levels through an adequate and efficient management of information.

Consequently, SMEs must design mechanisms that facilitate the effective use of helpful information to articulate it with the different demands of internal and external processes. Therefore, the quality of information systems becomes imperative to satisfy the market in a timely and innovative manner, i.e., when companies have reliable information systems, the constant supply of information will allow them to meet requirements and anticipate relevant situations.[6] In short, many situations companies face do not require exceptional details; however, the available information, processed and analyzed effectively, is sufficiently valuable to deal with eventualities.[7]

Salleh et al.[8] consider that, during the last decades, the usefulness of information systems has grown exponentially, going from mechanisms for receiving and processing information to becoming supports for decision-making. This phenomenon is strongly experienced in small and medium-sized companies that previously did not contemplate these systems in their management.

In this regard, Abrego-Almazán et al.[9] extensively reviewed the scientific literature. They found empirical evidence of the positive impacts of information systems on the economic performance of different types of companies. Indeed, several studies suggest this link,[10,11] so it becomes relevant to address this relationship, especially when the use of information and communication technologies and information systems is recent, so the potential consequences and effects are yet to be established.

In Spain, García et al.[12] conducted research on the impact of implementing information systems on the performance of SMEs, finding an excellent cost-benefit ratio. Likewise, at the national level, Vargas et al.[13] did the same in a study on using information systems in customer loyalty processes, substantially improving the relationship between customers and the organization.

Regarding the definition of information systems (IS), these can be defined as the compendium of resources (human, material, and institutional) that a company possesses to manage information. Management is understood as a cycle that goes from the capture, storage, analysis, output, and use of information within the framework of business dynamics.[14] Another definition defines it as the tangible and intangible assets that the company has

and uses to improve its performance. It includes brands, proprietary knowledge, human talent skills, strategic alliances, efficient procedures, and capital. In this regard, Gómez et al.[15] point out that currently, information systems securely store data and convert them into information in such a way that they are easily accessible and simultaneously improve the possibilities of their retrieval.

For Nilapun & Jensuttiwetchakul,[16] the construct of information systems contains several dimensions, i.e., it is multidimensional and is composed of three factors: 1) system quality, 2) information quality, and 3) service quality. Thus, information systems quality (SysQ) evaluates the specifications of an information system, such as the user interface system, and is directly related to its performance;[17] information quality (InfQ) addresses issues related to the content of the information system such as timeliness, as well as being a highly subjective concept in that it is linked to user satisfaction.[18] Service quality (SerQ) evaluates all the assistance provided by the information service provider.[19] It indicates that aspects such as technical knowledge, service readiness, and compliance with agreed commitments, among others, should be considered.[20]

Economic performance has been studied with multiple interests in the literature; however, the size of the companies is one of the criteria to be taken into account since, depending on their size, they will focus on improving one or other indicators.[21] Consequently, Jarvis et al.[22] state that, due to the reality of small companies, they choose to favor aspects that ensure their daily survival, such as cash flow, since this indicator allows them to carry out their work and meet their daily obligations.

On the other hand, Thomas & Logan[23] link economic performance to aspects such as efficiency due to the importance of using the resources available to the company to continue developing, while Bartlett et al.[24] allude to the sales generated by the companies since they consider that these dynamics allow them to remain in time.

Likewise, Lopes de Oliveira & Moneva[25] state that, in addition to efficiency, indicators of quality, differentiation, and image (goodwill) should be considered in the successful performance of business organizations since these drive aspects such as sales, market share, and strategic alliances, among others.

In turn, Hernández Vargas et al.[26] evaluated the economic and financial performance of family businesses in Mexico using financial indicators such as income, expenses, profitability, assets, financial expenses, and leverage.

In the current era, information and communication technologies (ICT) play a preponderant role in company management, especially because they support the capture, systematization, processing, and analysis of information, constituting the basis for making decisions that compromise the future of organizations in the market.[27]

Consequently, the quality of the information and the results from its analysis determine the company's actions and influence indicators such as its productivity and competitiveness.[28]

Zhang et al.[29] consider that information systems substantially reduce the economic efforts required to operate organizations in neuralgic areas such as production and commercial, favoring results and positive economic indicators in the organizations.

On the other hand, there is evidence that the use of information systems makes it possible to increase the individual performance of people within companies,[30] which in turn has repercussions on the increase of organizational performance through the quality and effectiveness of individual results.

METHOD

The present research was quantitative since it sought to measure the variables and establish the relationship between them. Likewise, the deductive method was used because a theoretical perspective was determined from which the constructs of information systems and the economic performance of SMEs[31] were approached.

On the other hand, the study is of the correlational type since it seeks to understand the phenomenon by corroborating the relationship between the variables of information systems and the economic performance of SMEs.[32] The selected sample was derived from a non-probabilistic sample of convenience type, in which the researcher determines the number of individuals according to their availability; however, it was defined as a criterion that at least 150 individuals should be surveyed. The sample selected were managers, area heads, process directors, and, in general, collaborators who occupy positions that lead to decision-making within the companies. A total of 169 surveys were applied.

The corresponding scales were adapted to measure the variables. For the information systems variable (independent variable), a scale was adapted from the proposals of different authors.[19,30,33,34] The SMEs' economic performance variable (dependent variable) was evaluated with a scale of its own developed from contributions found in the literature.[9,35]

The information was collected through perception surveys using a Likert-type scale ranging from one to five, in which one (1) means "totally disagree" and up to five (5) means "totally agree." Likewise, the analysis of the information and the testing of the hypothesis was carried out with the Structural Equation Modeling (SEM).[36]

The scale used in the research is presented below (see table 1).

Table 1. Operationalization of the study variables

Variable	Ask	Code
Information systems	The company has user-friendly information systems.	SI1
	The information systems allow easy access to information.	SI2
	The company has information systems that are fast.	SI3
	IS provide complete information.	SI4
	IS provide timely information.	SI5
	IS provide relevant information.	SI6
	IS have timely technical support.	SI7
	IS have fast technical support.	SI8
	IS have reliable technical support.	SI9
Economic performance	IS facilitate the company's sales processes.	DE1
	IS allow to expand the company's marketing quotas.	DE2
	IS decrease the company's expenses and costs.	DE3
	IS provide speed in the company's decision making process.	DE4

Finally, the information collected was analyzed in terms of its reliability and validity. To determine reliability levels, Cronbach's alpha was initially used and then the composite reliability (CR) was tested, while validity was analyzed with the mean variance extracted.[37]

RESULTS AND DISCUSSION

Regarding the reliability and validity of the instruments applied, table 2 shows that Cronbach's alpha yielded excellent results for the information systems variable (a = 0,925) and was suitable for the economic performance variable (a = 0,868).[38] Likewise, the composite reliability of the information systems variable (p = 0,932) and financial performance (p = 0,913) showed satisfactory results.[39]

On the other hand, construct validity was evaluated through the Mean-Variance Extracted, obtaining satisfactory values for the information systems variable (0,606) and economic performance (0,727) since they reached levels above 0,50.[40]

Table 2. Reliability and validity

Variable	Ask	Factorial loading (ß)	Cronbach's alpha if removed *(a)*	Composite reliability (CR)	Average variance extracted (AVE)
Information systems (a = 0,925)	SI1	0,725	0,817	0,932	0,606
	SI2	0,821	0,883		
	SI3	0,632	0,859		
	SI4	0,779	0,824		
	SI5	0,831	0,886		
	SI6	0,755	0,882		
	SI7	0,824	0,887		
	SI8	0,718	0,896		
	SI9	0,892	0,825		
Economic performance (a = 0,868)	DE1	0,732	0,817	0,913	0,727
	DE2	0,985	0,880		
	DE3	0,879	0,825		
	DE4	0,793	0,817		

The sociodemographic results of the study are shown in table 3. In this regard, 61,25 % of the respondents were male, while the remaining 38,75 % were female. Likewise, the age range with the highest number of people was between 31 and 45 years old with 48,75 %, followed by the group over 45 years old with 31,87 %. In terms of educational level, 45,00 % were high school graduates, while the primary/secondary group accounted for 28,75 %. Finally, with regard to seniority, the group between 1 and 2 years of seniority accounted for 41,88

%, and the group between 3 and 5 years reported 28,12 %. %.

Table 3. Socio-demographic results

Variables	Category	Frequency	Percentage
Sex	Male	98	61,25 %
	Female	62	38,75 %
Age	Between 18 and 30 years old	31	19,38 %
	Between 31 and 45 years old	78	48,75 %
	Over 45 years old	51	31,87 %
Level of training	Primary/secondary school (incomplete)	46	28,75 %
	Baccalaureate	72	45,00 %
	Technical/technologist	23	14,38 %
	Professional	13	8,13 %
	Graduate degree	6	3,74 %
Seniority in the company	Less than 1 year	36	22,50 %
	Between 1 and 2 years	67	41,88 %
	Between 3 and 5 years	45	28,12 %
	More than 5 years	12	7,50 %

Subsequently, table 4 evaluates the relationship between information systems and economic performance. However, their goodness-of-fit indices were previously determined, achieving outstanding results. Chi-Square Minimum - CMIN = 1945,351; Degrees of freedom = 894, p < 0,000; CMIN/gl = 1,943 < 3,00; Comparative Fit Index - CFI = 0,894; Tucker-Lewis Index - TLI = 0,905; Incremental Normative Index - IFI = 0,830; Relative Fit Index - RFI = 0,930; Root Mean Square Error of Approximation - RMSEA = 0,097.

Table 4. Assessment of the relationship between information systems and economic performance

Variable	M	DE	1	2
1. Information systems (IS)	4,29	0,797	(0,863)	
2. Economic performance (DE)	4,06	0,661	0,821***	(0,827)

Note: ***p < 0,00. SI= Information systems; DE= Economic performance.

Table 4 shows a positive and significant relationship (0,821; p < 0,00) between the information systems variable and the economic performance of the SMEs in the Surcolombiana region, i.e., the greater the implementation and use of information systems in the daily management of the SMEs, the greater the economic performance achieved by the companies. Likewise, the averages of the variables are high; in other words, the use of information systems in the companies is considerable in their different processes, and the associated economic performance is considered valuable in management.

Investments in information technologies and telecommunications are a strong trend within organizations since they allow for improving processes regarding time savings and increased quality.[27] However, there is sufficient evidence that mere investment in technology implementation does not guarantee the improvements above.[41] In this regard, the issue is particularly sensitive in SMEs since they have strong capital constraints, which implies that an investment in technology can determine the success or failure of the organization itself.

A literature review conducted in late 2008 found that much of the research linking information systems to favorable economic performance was conducted at the individual rather than organizational level.[34] However, later studies focused on the consequences of information systems on business management performance.[10,42]

In the present study, the economic performance of SMEs was focused on sales and market shares, obtaining results in line with the empirical evidence in the literature that addressed aspects such as operating performance and market performance.[10,42]

Indeed, it was evident that information systems directly impact SMEs' processes and core competencies, allowing them to increase their process speed and decrease the margin of error in waste or reprocessing, thus reducing operating costs. In other words, information systems contribute significantly to operational efficiency, i.e., the proper use of company resources.

On the other hand, the impact of information systems has been oriented toward customer management and

marketing.[43] In the present study on SMEs, information systems were primarily oriented to these two processes because most are service providers in different sectors. These technologies are used to process information related to product orders, customer information, and coordination with suppliers, among other things.

Although no strong contributions to process innovation are perceived as an effect of implementing information systems in SMEs, as seen in other studies in the literature,[44] it can be inferred that improving certain processes, especially those linked to customer management, can lead to some levels of incremental innovation.

CONCLUSIONS

The research objective was to evaluate the relationship between information systems and the economic performance of SMEs in the Surcolombiana region. Based on the results, it was possible to demonstrate a positive and significant relationship between the implementation and use of information systems and this type of business organization's economic performance.

Indeed, the study established outstanding levels in the variables of information systems and economic performance, which shows that these aspects help manage SMEs in a peripheral region in the south of the country. Few studies at the national level allow contrasting results in the segment of small organizations, so this study will serve as a reference for future research.

BIBLIOGRAPHIC REFERENCES

1. Montoya A, Montoya I, Castellanos O. Situación de la competitividad de las Pymes en Colombia: elementos actuales y retos. Agronomía Colombiana, 2010, 28, pp. 107-117. https://www.redalyc.org/articulo.oa?id=180315651012

2. Confecámaras, Dinámica de creación de empresas en Colombia – 2023. 2024. https://confecamaras.org.co/images/Informe-Dinamica-de-creacion-de-empresas-2023.pdf

3. Organización Internacional del Trabajo. Panorama Laboral Temático. Pequeñas empresas, grandes brechas. Empleo y condiciones de trabajo en las MYPE de América Latina y el Caribe (1° Edición). Lima: Oficina Regional para América Latina y el Caribe, 2015.

4. Vargas-Encalada EE, Rengifo-Lozano RA, Guizado-Oscco F, Sánchez-Aguirre FM. Sistemas de información como herramienta para reorganizar procesos de manufactura. Revista Venezolana de Gerencia, 2019, 24. https://www.redalyc.org/articulo.oa?id=29058864015

5. Mintzberg H. The structuring of organizations. Englewood Cliffs NJ: Prentice Hall, 1979.

6. Cohen D. Sistemas de Información para la Toma de Decisiones. 2000. México D.F.: McGraw Hill.

7. Dapena JP, Dapena JL. Sistemas de información en PYMES y acceso al crédito en contextos de asimetría de información. Documentos de Trabajo, 2003, 7, pp. 1-20. https://core.ac.uk/download/pdf/6652465.pdf

8. Salleh M, Rohde F, Green P. Information systems enacting capabilities and their effects on SME s information systems adoption behavior. Journal of Small Business Management, 2017, 55, pp. 332-364. https://doi.org/10.1111/jsbm.12226

9. Abrego-Almazán D, Medina-Quintero JM, Sánchez-Limón ML. Los Sistemas de Información en el Desempeño Organizacional: Un Marco de Factores Relevantes. Investigación Administrativa, 2015, 44, pp. 7-23. https://www.redalyc.org/articulo.oa?id=456044958001

10. Gorla N, Somers T, Wong B. Organizational impact of system quality, information quality, and service quality. Journal of Strategic Information Systems, 2010, 19, pp. 207-228. https://doi.org/10.1016/j.jsis.2010.05.001

11. Murphy T. Achieving business value from technology: A practical guide for todays. New Jersey: John Wiley & Sons, 2002.

12. García JL, Arias AM, Machado A. Metodología para el diseño e implantación de un sistema de información de gestión para PYMES. Revista Española de Financiación y Contabilidad, 1999, 28, pp. 1101-1144. https://aeca.es/old/refc_1972-2013/1999/102-6.pdf

13. Vargas G, Quintero LF, Sánchez N, Olaya A. Diseño e implementación de un sistema de información para la validación de la gestión de proyectos de fidelización en CACTO S.A. Revista de Tecnología, 2008, 7, pp. 51-59.

14. Wernerfelt B. A resource-based view of the firm. Strategic Management Journal, 1984, 5, pp. 171-180, 1984. https://doi.org/10.1002/smj.4250050207

15. Gómez O, Bauta R, Estrada B. Modelo para la compartimentación de la información en las organizaciones. Ciencias de la Información, 2014, 45, pp. 1-17. https://www.redalyc.org/pdf/1814/181431233001.pdf

16. Nilapun M, Jensuttiwetchakul T. The Effect of System Quality, Information Quality, and Service Quality on the Continued Usage of Mobile Payment Application in Thailand. ICSIM '23: Proceedings of the 2023, 2023, pp. 101–108. https://doi.org/10.1145/3584871.3584886

17. Abrego-Almazán D, Sánchez-Tovar Y, Medina-Quintero JM. Influencia de los sistemas de información en los resultados organizacionales. Contaduría y Administración, 2017, 62, pp. 303-320. https://doi.org/10.1016/j.cya.2016.07.005

18. Medina J, Chaparro J. The impact of the human element in the information system quality for decision making and user satisfaction. Journal of Computer Information Systems, 2007, 48, pp. 44–52. https://doi.org/10.1016/j.cya.2016.07.005

19. Delone W, McLean E. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 2003, 19, pp. 9–30. https://doi.org/10.1080/07421222.2003.11045748.

20. Bailey JE, Pearson SW. Development of a Tool for Measuring and Analyzing Computer User Satisfaction. Management Science, 1983, 29, pp. 530-545. https://doi.org/10.1287/mnsc.29.5.530

21. Melgarejo Z, Arcelus F, Simon K. Desempeño económico: diferencias de pequeñas empresas clasificadas según la estructura de la propiedad del capital. Revesco, 2007, 93, pp. 7-38. https://www.redalyc.org/pdf/367/36709301.pdf

22. Jarvis R, Curran J, Kitchin J, Lightfoot G. The use of quantitative and qualitative criteria in the measurement of performance in small firms. Journal of Small Business and Enterprise Development, 2000, 7, pp. 123-133. http://dx.doi.org/10.1108/EUM0000000006834

23. Thomas H, Logan C. Mondragon: An Economic Analysis. London: Allen and Unwin, 1982.

24. Bartlett W, Cable J, Estrin S, Jones DC, Smith SC. Labor-managed cooperatives and private firms in North Central Italy: an empirical comparison. Industrial and Labor Relations Review, 1992, 46, pp. 103-118. http://dx.doi.org/10.2307/2524741

25. Lopes de Oliveira M, Moneva JM. El desempeño económico financiero y responsabilidad social corporativa Petrobrás versus Repsol. Contaduría y Administración, 2013, 58, pp. 131-167. https://www.redalyc.org/articulo.oa?id=39525580007

26. Hernández Vargas CJ, Gurrola Ríos C, Belausteguigoitia I. Desempeño financiero entre empresas familiares y empresas no familiares mexicanas". Trascender, Contabilidad y Gestión, 2022, 7, pp. 46-68. https://doi.org/10.36791/tcg.v7i21sept-dic.181

27. Ferreira R, Cherobim A. Impacto dos investimentos em TI no desempenho organizacional de empresas de panificação de minas gerais: estudo multicaso. Revista de Administração e Contabilidade da Unisinos, 2012, 9, pp. 147-161. https://doi.org/10.4013/base.2012.92.04

28. Ynzunza C, Izar J. Efecto de las estrategias competitivas y los recursos y capacidades orientados al mercado sobre el crecimiento de las organizaciones. Contaduría y Administración, 2011, 58, pp. 169-197. http://dx.doi.org/10.1016/S0186-1042(13)71202-6

29. Zhang P, Zhao K, Kumar R. Impact of It Governance and It Capability on Firm. Information Systems

Management, 2016, 33, pp. 357-373. http://dx.doi.org/10.1080/10580530.2016.1220218

30. Delone WH, Mclean ER. Information Systems Success: The Quest for the Dependent Variable. Information Systems Research, 1992, 3, pp. 60-95. http://dx.doi.org/10.1287/isre.3.1.60

31. Hernández SR, Fernández CC, Baptista LP. Metodología de la Investigación (Sexta Edición). México: McGraw Hill/Interamericana Editores, 2014.

32. Creswell JW, Poth CN. Qualitative Inquiry and Research Design Choosing among Five Approaches (4th Edition). Thousand Oaks: SAGE Publications, 2018.

33. Nelson R, Todd P, Wixom B. Antecedents of information and system quality: An empirical examination within the context of data warehousing. Journal of Management Information Systems, 2005, 21, pp. 199-235. https://doi.org/10.1080/07421222.2005.11045823

34. Petter S, DeLone W, McLean E. Measuring information systems success: models, dimensions, measures, and interrelationships. European Journal of Information Systems, 2008, 17, pp. 236-263. https://doi.org/10.1057/ejis.2008.15

35. Gable GG, Sedera D, Chan T. Re-conceptualizing Information System Success: The IS-Impact Measurement Model. Journal of the Association for Information Systems, 2008, 9, pp. 377-408. https://doi.org/10.17705/1jais.00164

36. Anderson J, Gerbing D. Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. Psychological Bulletin, 1988, 103, pp. 411-423. http://dx.doi.org/10.1037/0033-2909.103.3.411

37. Hair JF, Hult GTM, Ringle CM, Sarstedt M, Danks NP, Ray S. Evaluation of Reflective Measurement Models. In Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R. Classroom Companion: Business (pp. 75-90), 2021. https://doi.org/10.1007/978-3-030-80519-7_4

38. George D, Mallery P. SPSS for Windows step by step: A simple guide and reference 11.0 update. Boston: Allyn & Bacon, 2003.

39. Green SB. Yang Y. Evaluation of dimensionality in the assessment of internal consistency reliability: coefficient Alpha and Omega coefficients. Educational Measurement: Issues and Practices, 2015, 34, pp. 14-20. https://doi.org/10.1111/emip.12100

40. Hair, JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis: A global perspective (7a ed.). Upper Saddle River, NJ: Prentice Hall, 2010.

41. Pérez J, Machado A. Relationship between management information systems and corporate performances. Accounting Review, 2014, 18, pp. 32-43. https://doi.org/10.1016/j.rcsar.2014.02.001

42. Ravichandran T, Lertwongsatien, C. Effect of information systems resources and capabilities on firm performance. A resourcebased perspective. Journal of Management Information Systems, 2005, 21(4), pp. 237-276. https://doi.org/10.1080/07421222.2005.11045820

43. Rai A, Patnayakuni R, Seth N. Firm performance impacts of digitally enabled supply chain integration capabilities. MIS Quarterly, 2006, 30, pp. 225-246. https://doi.org/10.2307/25148729

44. Albertin A, De Moura R. Benefícios do uso de tecnologia de informação para o desempenho empresarial. Revista de Administração Pública, 2008, 42, pp. 275-302. https://www.redalyc.org/pdf/2410/241021977007.pdf

FINANCING

The authors did not receive funding for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ACKNOWLEDGMENTS

The authors express their gratitude to the Universidad Surcolombiana for supporting the development of the research and its publication.

AUTHORSHIP CONTRIBUTION

Conceptualization: Juan Manuel Andrade Navia.

Data curation: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón.

Formal analysis: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón, Carlos Eduardo Aguirre Rivera.

Research: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón, Carlos Eduardo Aguirre Rivera.

Methodology: Juan Manuel Andrade Navia.

Software: Juan Manuel Andrade Navia.

Validation: Juan Manuel Andrade Navia.

Visualization: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón, Carlos Eduardo Aguirre Rivera.

Writing - original draft: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón, Carlos Eduardo Aguirre Rivera.

Writing - revision and editing: Juan Manuel Andrade Navia, William Alejandro Orjuela Garzón, Carlos Eduardo Aguirre Rivera.