

Adaptability of a Business and Superior Performance: Triad Model of Dynamic Capabilities

Adaptabilidad organizacional y desempeño superior: Modelo Tríada de Capacidades Dinámicas

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Recepción: 10 Abril 2024

Aprobación: 30 Abril 2024



Acceso abierto diamante

Abstract

This study examines the relationship between business adaptability and superior performance. The researchers used Exploratory Factor Analysis and Kruskal-Wallis statistics to analyze data from a survey of 227 companies associated with a University Center. The study found that the Triad Model of Dynamic Capabilities, which includes Sense, Seize, and Transform components, explained 78.38% of the variance in business adaptability. The findings confirm the importance of Sense, Seize, and Transform capabilities in sustaining competitive advantage, as demonstrated by the observed superior performance of the organizations. The paper's originality lies in identifying higher-order capabilities associated with business adaptability in organizations across different sectors.

JEL code: M14.

Keywords: Business adaptability, superior performance, dynamic capabilities, competitiveness.

Resumen

Este estudio examina la relación entre la adaptabilidad empresarial y el rendimiento superior. Los investigadores utilizaron Análisis Factorial Exploratorio y estadísticas de Kruskal-Wallis para analizar datos de una encuesta de 227 empresas asociadas a un Centro Universitario. El estudio encontró que el modelo tríada de capacidades dinámicas, que incluye componentes Detección, Aprovechamiento y Transformación, explica el 78,38% de la variación en la adaptabilidad empresarial. Los hallazgos del estudio confirman la importancia de las capacidades de detección, aprovechamiento y transformación para mantener la ventaja competitiva, como lo demuestra el desempeño superior observado de las organizaciones. La originalidad del estudio radica en identificar capacidades de orden superior asociadas con la adaptabilidad empresarial en organizaciones de diferentes sectores.

Código JEL: M14.

Palabras clave: Adaptabilidad empresarial, rendimiento superior, capacidades dinámicas, competitividad.

INTRODUCTION

Technological changes, evolving consumer needs, and market dynamics are external factors that significantly influence organizational performance (Bayighomog et al., 2020). The literature on strategic management and resources has explained the factors contributing to attaining superior results in sustainable competitive advantage (Andersén, 2021). Furthermore, the Dynamic Capabilities (DC) perspective delves deeper into the analysis, elucidating how competitive advantage and superior performance are achieved (Kaur, 2019). Therefore, dynamic capabilities have recently earned considerable attention as organizations endeavor to adapt to unpredictable business environments.

Numerous contributions to the DC perspectives have emerged since its introduction, particularly in literature reviews and theoretical stances, compared to the empirical evidence generated (Reimann et al., 2021). Considering the heterogeneity of the research subjects, the abstraction of the conceptual framework of the research perspective, and the nomological network, the possibility of contributing to the development of the perspective remains valid (Leemann & Kanbach, 2022; Schriber & Löwstedt, 2020; Schilke et al., 2018).

Therefore, the study aims to analyze the business adaptability of firms and superior performance, utilizing the Triad Model of DC (Pitelis et al., 2023), a set of distinctive capabilities that allow the organization to adapt and innovate. The variables sense, seize, and transform have been scrutinized based on the available state-of-the-art literature and collected a priori to ensure consistency with systematic progress (Pitelis et al., 2023). These variables are selected because there are active studies in which the company is involved, through Sense or detect activities, can interpret the information to develop changes to adapt to customers, suppliers, market, or competitors (Khan et al., 2020) and, at the same time, develop capabilities that help to adapt to these changes. By seizing or integrating knowledge into the different changes (Correia et al., 2021), and with the above, the company will be able to transform and reallocate resources without compromising the company's performance (Prester, 2023).

A non-experimental, exploratory, and cross-sectional study was designed for this research. Key informants included middle and senior managers of companies that hosted students from the Internship Program of the University Center between November 2021 and April 2022. The company's age was a control variable when calculating a stratified sample. Two hundred twenty-seven companies met the inclusion criteria, with a margin of error of 5% and a confidence level of 95%. A self-administered electronic survey was constructed using perceptual measures and distributed through emails from the University Center (CUCEA, 2021; 2022). Descriptive statistics and exploratory factor analysis were utilized to analyze business adaptability and superior performance, and the nonparametric test Kuskal-Wallis was chosen to test hypotheses.

DYNAMIC CAPABILITIES TAXONOMY

The literature review unveils extensive research on Dynamic Capabilities (DC) frameworks. Schilke et al. (2018), Arend and Bromiley (2009), and Teece (2007) highlighted criticisms of its construct in the decades after the perspective's introduction. The primary controversy concerns whether DC should be perceived as a process or capability enabling firms to uphold their competitive advantage (Wilhelm et al., 2022). The contributions of Eisenhardt & Martín (2000) and Teece and Pisano (1994) have influenced numerous researchers and essays, presenting divergent narratives that hindered the perspective's consolidation (Kurtmollaiev, 2020; Waleczek et al., 2019; Pavlou & El Sawi, 2011; Helfat, 2007). The discussion also addresses the implications of dynamic capabilities for organizational strategy and the challenges linked to their development and effective utilization.

The hierarchical treatment has been vital to reconciling positions and reducing the concepts' abstraction level (Chen, 2005). To date, sufficient evidence has emerged affirming that employing concept hierarchization

makes it possible to structure the perspective taxonomy, concluding that the schools of Teece and Eisenhardt are complementary and convergent. Their integration provides valuable elements for advancing the perspective toward consolidation (Wenzel et al., 2021).

There is consensus that the taxonomy includes first- and second-level capabilities (Teece, 2018, p. 363). The first level of the taxonomy, also called high-order capabilities, pertains to observable behaviors across organizations' cultures that represent competitive advantage (Santoro et al., 2019; Bogers et al., 2019). It is inferred that companies with these capabilities are flexible, collaborative, and prone to adaptation to sustain superior performance (Kahn et al., 2020). These capabilities are observed in the study to elucidate how companies attain organizational adaptability through the implementation of the triad model, which integrates the capabilities of Sense, seize, and transform (Leemann & Kanbach, 2022; Leemann et al., 2021; Furnival et al., 2019).

First-level capabilities, (1) sense, are capabilities through which organizations identify emerging opportunities and environmental threats. (2) Seize and (3) Transform are capabilities by which the organization captures and reconfigures its resources to capitalize on the insights (Popadiuk et al., 2018; Zahra et al., 2006).

While operational processes are considered second-order or micro-foundational capabilities, they are now learning is generated and used to develop improvements, thereby accumulating knowledge, improving processes, and ultimately aligning with first-order capabilities (Gaviria-Marin et al., 2021; Wenzal et al., 2021; Helfat, 2007). Processes allow the organization to cultivate first-order DC, thus elucidating how business adaptability is achieved. Firms respond to the dynamism of the environment by employing different configurations of resources and capabilities that are influenced by the firm's characteristics and its context (Bayighomog et al., 2020; Chen et al., 2021; Fainshmidt et al., 2016; Foss & Lindenberg, 2013; Peteraf et al., 2013; Foss, 2011). Therefore, studying firm heterogeneity reveals different ways of sensing, seizing, and transforming firms and contributes to the strategic management of firms (Foss, 2011, p. 1414).

Popadiuk et al. (2018) and Leemann and Kanbach (2022) observed the alignment between second-order processes and the three critical high-order capabilities or competencies in the dynamic capabilities' taxonomy: Sense, Seize and Transform (Yoshikun, described initially by Teece and Pisano (1994) and supplemented by Furnival et al. (2019) and Leemann et al. (2021).

With the organization of the taxonomy, the contributions of dynamic capabilities (DC) are strengthened. This perspective provides a theory of the mechanisms used by organizations to maintain a position of competitive advantage over time, complementing the theory of resources and strategic management, which is particularly relevant in constantly changing environments (Teece et al., 1997; Eisenhardt et al., 2000; Doz, 2020).

Therefore, to measure business adaptability, the study adheres to the hierarchical treatment of the taxonomy and focuses its observations on the high-level capabilities presented by Teece and Pisano (1994). Three key capabilities, Sense, Seize, and Transform, permeate the organization (Kurtmollalev, 2020; Schilke et al., 2018).

Incorporating empirical evidence to validate the Triad Model of DC remains ongoing; therefore, adding empirical support is crucial. Araújo et al. (2018), Kump et al. (2018), Pavlou and El Sawy (2011), and Thanh Nhon et al. (2020) have made contributions toward achieving this objective. The study is designed to contribute using the perspective's first-level taxonomy. It addresses the tautological relationships between the concepts, the triad model, and the superior performance measures (Arndt et al., 2022). Therefore, we propose the following research hypothesis:

H: There is a statistically significant difference between business adaptability and superior performance.

Triad model of Dynamic capability

The Triad Model conceptually connects with studies on ambidexterity, entrepreneurial attitude, willingness to learn, high collaboration rates, and effective communication mechanisms (Frogeri et al., 2022; Vu, 2020).

The framework integrates and extends the concepts of strategic management and policy issued within organizations and their correlation with superior performance (Min & Kim, 2022; Hernández-Linares et al., 2020; Arndt & Pierce, 2018). The study embraced the dynamic capabilities concepts outlined below to examine how companies adapt to challenging environments.

Sense/Detect entails behaviors or activities focused on exploring and interpreting information, reflecting the company's inclination to monitor the environment for identifying changes in customers' or suppliers' needs, latent demands, or the emergence of new markets or competitors (Khan et al., 2020). It aligns with second-level studies (Microfoundation) that encompass collaboration mechanisms, knowledge transfer, and adoption of new technologies (Alshanty & Emeagwali, 2019), as well as the examination of customers, suppliers, and reengineering of the business model (Arndt et al., 2022; Ngo et al., 2019; Teece, 2018); These efforts will enable companies to develop organizational capabilities necessary to address technological challenges (Pattanasing et al., 2019). Therefore, the following sub-hypothesis is proposed as H1.a:

H1.a: There is a statistically significant difference between the Sense and the distribution of the superior performance indicators.

Seize/Integrate denotes the organization's capacity to orchestrate or integrate knowledge manifested in the organizational culture and levels of collaboration (Peng et al., 2022; Bogers et al., 2019), guiding the company in assessing market changes, which entails understanding consumer needs, competitors' actions, and market trends (Correia et al., 2021). Micro-foundations research examines intra-organizational collaboration mechanisms, such as information-sharing systems and internal collaboration strategies for making informed and collective decisions, and their correlation with organizational competitiveness (Ortiz, 2023; Gregory et al., 2017; Friedman et al., 2016). Therefore, the following sub-hypothesis is proposed as H1.b:

H1.b: There is a statistically significant difference between the seize and the distribution of the superior performance indicators.

Transform involves the organization's capability to reallocate organizational resources to uphold the strategies envisioned in the preceding stages without compromising organizational performance. Therefore, at a higher level, it is scrutinized as an expression of a flexible and ambidextrous organizational culture (Gelhard et al., 2016). Essentially, this stage ensures the continuous renewal of the organization's competitive advantages, augmenting its resources and capabilities through the absorption, transformation, and exploration of new knowledge (Prester, 2023; Matysiak et al., 2018; Linden & Teece, 2018). Therefore, the following sub-hypothesis is proposed as H1.c:

H1.c: A statistically significant difference exists between the transform and distribution of the superior performance indicators.

In summary, the study was designed by operationalizing the Triad Model of DC, eliminating tautological relationships between the three variables, which explained business adaptability and their relationship to the variable of superior performance.

Dynamic capability and superior performance

Theoretically, given the evolutionary logic of changing the resource base to maintain or gain competitive advantage, a natural outcome is a relationship between the triad model of DC and superior performance. Therefore, it is necessary to define how superior performance is measured. The literature review focuses on the critical importance of studying the various dimensions of performance, enabling the identification of areas for improvement within the organization (Cristofaro & Lovallo, 2022; Rengkung, 2022; Ringov, 2017). We divide superior performance indicators into qualitative and quantitative categories for practical purposes, defining them below.

First, the quantitative measures commonly used in academic studies are related to financial performance. The concept pertains to the economic health of companies over a specified period. Some metrics are associated with return on assets, equity, and earnings per share (Gjoni et al., 2022; Sánchez-Gutiérrez et al., 2019). Other studies analyze Key Performance Indicators (KPIs), such as absenteeism, employee turnover, churn cost,

health cost, outputs, performance, profitability, and time worked. These also represent quantitative measures (Bortoluzzi et al., 2021).

Second, qualitative measures are essential for understanding aspects that quantitative data alone cannot capture. These measures often include customer satisfaction assessments, leadership effectiveness, and organizational culture (Bortoluzzi et al., 2021). Although qualitative indicators are more subjective and difficult to quantify, they provide a comprehensive view of a company's performance. Frameworks such as SERVQUAL demonstrate the potential of qualitative measures (Sarathy, 2006). In this line of thinking, perceptual measures can be valid and accurate if they capture the experiences and attitudes of those most closely associated with the organization, as demonstrated by the study of Ross and Grace (2012).

According to VU (2020), researchers employ qualitative and quantitative superior performance measures. Therefore, this study implemented five indicators for the variable superior performance using a comprehensive measure adapted from Thanh Nhon et al. (2020) work. The adaptation of the measures addresses tautological associations between the variables.

Gaviria-Marin et al. (2021) used the company's age as a control variable, which is essential because it is often associated with accumulating knowledge and experiences. Therefore, older firms typically possess established routines, deeper customer relationships, and more robust brand recognition. Thus, the company's ability to address rapidly changing environments can be observed through its longevity. The interplay between the age of the organization and dynamic capability influences the ability to strategize for sustainable success, ultimately correlating with superior performance (Chen et al., 2021). Some studies supporting the aforementioned include Lin et al. (2020), Mikalef et al. (2020), Zahra et al. (2006), and Eisenhardt and Martin (2000). The study's reflective model has three independent variables measuring business adaptability: Sense, seize, and transform; five items for superior performance as the dependent variable; and finally, the control variable, age firm (Figure 1).

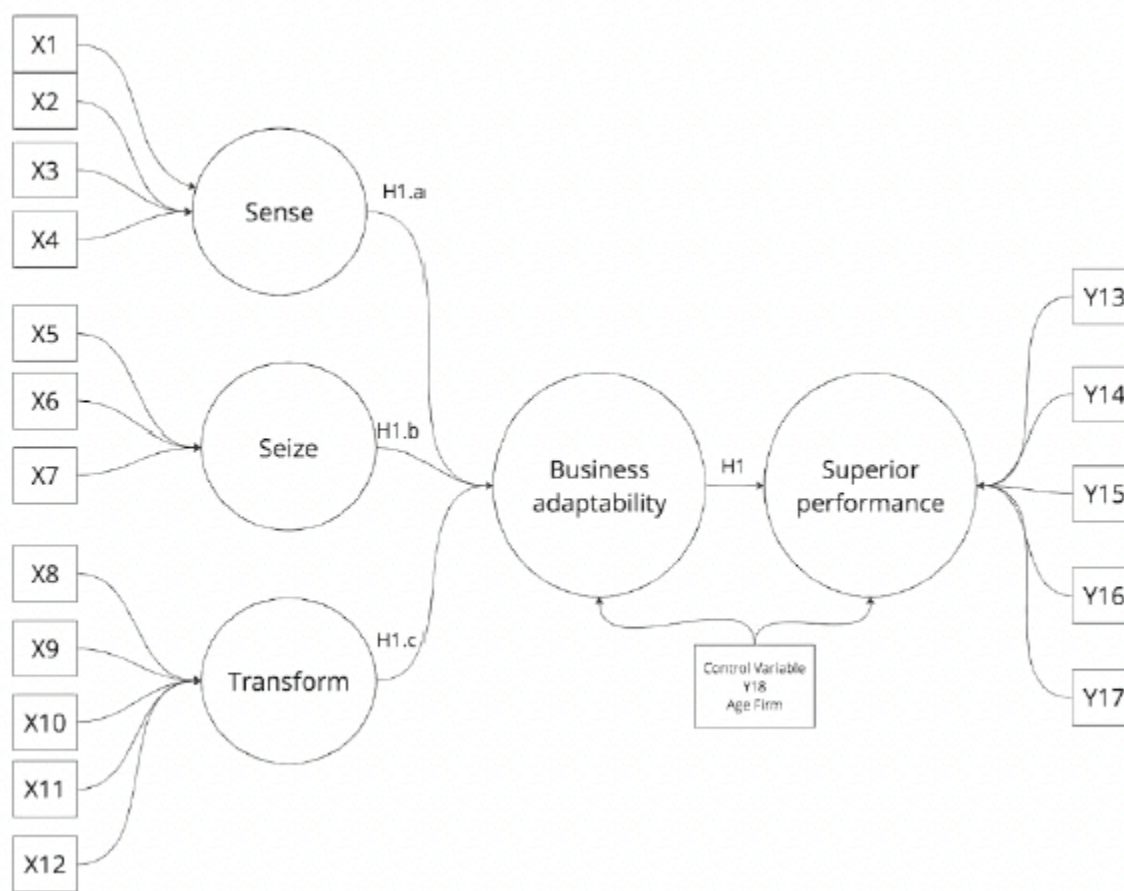


Figure 1.

Research model. Business adaptability and Superior performance Source: Own elaboration.

Source: Own elaboration

METHODS

The research is non-experimental, exploratory, and cross-sectional. It was designed to explain business adaptability and its correlation with superior performance. The study involved middle and senior managers who supervised students during internships between November 2021 and April 2022. A self-administered electronic survey distributed through emails from the University Center (CUCEA, 2021; 2022) served as the data collection tool. The information collection lasted six months, from November 2021 to April 2022. The Centro Universitario de Ciencias Económico Administrativo (CUCEA) facilitated the survey through its Professional Internship Program in 2021 and 2022. The survey was constructed using perceptual measures (Leví-Magnin and Varela-Malloy, 2003). A lower score indicated more robust disagreement with the statement, while a higher score represented significant agreement. The survey included 12 items to measure business adaptability, with five dedicated to assessing superior performance. Lastly, the age of the firm was used as a control variable.

Normality was assessed using the histogram technique in the Statistical Package for Social Sciences ver. 21.1 (SPSS). The data exhibited asymmetry, with a mean of 2.43 and a standard deviation of 0.75 ($n = 227$). Companies with eight or more years in the market were proportionally the most represented stratum (59%). Content validity was estimated using the Lawshe method, yielding a content validity index of 94%. The instrument's reliability was assessed with Cronbach's alpha coefficient using SPSS, yielding a value of 94.3%.

The study used descriptive statistics, where the standard error of the mean, mean standard deviation, and lower and upper limits. An exploratory factor analysis (EFA) used the principal component method to elucidate the data behavior and interdependence among the Triad Model of DC components. The EFA techniques employed were (1) correlation test, (2) commonalities, (3) component matrix, (4) KMO and Bartlett, and (5) proportion of variance explained. No underlying factors were identified. Consequently, we grouped the measures according to the operational concept of the Triad model of DC and conducted a second exploratory factor analysis. Rotation tests and sedimentation plots were deemed unnecessary for this analysis (Fornell & Larcker, 1981).

The data's nature and research objectives justify using the Kruskal-Wallis test for hypothesis testing. First, the data asymmetry violates the normality assumption required for parametric techniques such as ANOVA. According to Gibbons and Chakraborti (2011), the Kruskal-Wallis test is a natural extension of the two-sample Wilcoxon test (p.357), making it suitable for non-normally distributed data. Given the asymmetry of the data, alternatives such as the median test extension and Kruskal-Wallis, Terry, and Van der Waerden tests are all appropriate. However, the researchers chose the nonparametric Kruskal-Wallis test because of its simplicity, power, availability of exact distribution tables, and reasonably accurate chi-squared approximation (Gibbons et al., 2011, p. 378). Researchers have found the technique to be 95% effective compared to other parametric methods.

In addition to considering the nature of the data and the test's effectiveness, have also been considered software compatibility. The Statistical Package for Social Sciences (SPSS) version 21.1. was used for the analysis, and the Kruskal-Wallis test was quickly implemented and widely used within this software package. Therefore, the test emerged as the preferred choice for hypothesis testing, providing a robust and accessible method for examining differences in medians across multiple groups.

Finally, 555 (N) companies met the criteria for inclusion in the sample by substituting the literals of the formula for calculating the sample in a finite population; a sample of 227 (nh) was obtained, stratified by the control variable of the firm's age. The maximum allowable error was 5%, and the confidence level was 95%. (Table 1)

Table 1
Population and sample stratified according to the age of the company

Age of the firm	Population (N)	Proportion	Sample (nh)
Equal to or less than three years	89	16%	36
Between four and seven years old	139	25%	57
Equal to or greater than eight years	327	59%	134
Total	555	100%	227

Source: Own elaboration, CUCEA (2021; 2022)

RESULTS AND DISCUSSION

Descriptive statistics results

The results of the descriptive statistics indicate a standard error of the mean (SEM) ranging from 0.6 to 0.8. In the specific context of a stratified sample of 227, a confidence level of 95%, and an estimated error of 5%,

this provides a relatively accurate estimate of the population mean. The results demonstrate a comprehensive understanding of the distribution of the indicators of interest across the population (Berndt, 2020). The median (Me) corresponds to the sample's 6 and 7 categorical data; the standard deviation (s) ranges between 0.86 and not greater than 1.26. The minimum and maximum limits of the scale values can be observed in Table 2.

Table 2
Descriptive statistics Business adaptability and Superior performance

Item	Standard error of the mean (SEM)	Me	s	Minimum	Maximum
Business adaptability					
X1. Identify opportunities systematically	0.06	7	0.97	2	7
X2. Plan in accordance with the company's identified opportunities	0.07	6	1.05	3	7
X3. Identify threats systematically	0.07	6	1.10	2	7
X4. Respond to detected threats	0.07	6	1.07	2	7
X5. Congruence between the capacity and the assigned task	0.07	7	1.01	3	7
X6. Knowledge sharing	0.06	7	0.86	1	7
X7. Internal organizational alignment	0.07	6	1.01	2	7
X8. Clear HR reallocation process.	0.07	6	1.19	1	7
X9. Operational needs are constantly communicated	0.07	6	1.02	3	7
X10. Guarantees operational efficiency	0.07	6	1.04	2	7
X11. Ambidextrous company	0.07	7	1	2	7
X12. Contingency adaptation	0.06	6	0.92	2	7
Superior performance					
Y13. Compared to the competition, higher quality products and services	0.07	6	1.07	2	7
Y14. Higher levels of customer satisfaction compared to the competition	0.08	6	1.18	1	7
Y15. Higher profitability in comparison to the competition	0.08	6	1.23	1	7

Y16. More innovative products and services than competitors	0.08	6	1.18	2	7
Y17. Higher revenue growth compared to the competition	0.08	6	1.26	1	7

Source: Own elaboration.

Exploratory Factor Analysis results

The exploratory factor analysis (EFA) results using the principal component method are presented in Tables 3 and 5. The Pearson correlation (r) ranges from weak to moderate for the company's business adaptability component and is crucial for superior performance items. The test of communality (h) reveals some indicators with values greater than 0.50, which are considered significant as they explain 25% of the variance, except for three items (X6, X7, and X9), which obtained values of 0.47, 0.45 and 0.46, respectively, the results of (λ), which represents the root of the eigenvalues, range between 0.67 and 0.84. It indicates that a significant amount of variance in the data is explained. Considering the value between weak and moderate correlation, the theoretical emphasis that seemingly insignificant factors can play a critical role in organizational adaptation and change in the effectiveness of dynamic capabilities (Belitski & Mariani, 2023; Apascarietei & Elvira, 2022; Camisón-Zornoza et al., 2020).

In this line of thought, the DC perspective underscores the significance of the specific context of each firm (Furnival et al., 2019). It implies that items may be relevant even if their correlations are modest (Furnival et al., 2019). It is consistent with the understanding of business complexity described by Teece (2007) and articulated by Andersén (2021), where the diversity of strategies employed to exploit resources and capabilities within companies must be considered.

Table 3
Result in EFA for variable business adaptability

Indicator	r	h	λ
X1. Identify opportunities systematically	1	.54	.73
X2. Plan in accordance with the company's identified opportunities	0.69	.55	.74
X3. Identify threats systematically	0.51	0.64	0.80
X4. Respond to detected threats	0.52	0.66	0.81
X5. Congruence between the capacity and the assigned task	0.50	0.52	0.72
X6. Knowledge sharing	0.54	0.47	0.68
X7-I. Internal organizational alignment	0.47	0.45	0.67
X8. Clear HR reallocation process.	0.45	0.52	0.72
X9. Operational needs are constantly communicated	0.36	0.46	0.68
X10. Guarantees operational efficiency	0.57	0.71	0.84
X11. Ambidextrous company	0.47	0.63	0.79
X12. Contingency adaptation	0.60	0.70	0.84

Source: Own elaboration.

In order to ensure that all critical aspects are captured and not to reduce the quality of the model, the researchers grouped the indicators based on their operational definition rather than eliminating measures with factor loads below a certain threshold. This approach was informed by research conducted by Leemann & Kanbach (2022), Leemann et al. (2021), Furnival et al. (2019), Lloret-Segura et al. (2014), and Teece (2007). Table 4 presents the results of an exploratory factor analysis (EFA) for the Triad Model of dynamic capabilities, with the indicators grouped to observe business adaptability.

The results of EFA for business adaptability have captured a significant portion of the variability in the data, with an AVE of 78% for the variables of the Triad model of DC. It indicates that the analyzed variables can explain much of the variation. Additionally, the commonality of the factor loadings is within an adequate range, with values between 0.69 and 0.83. These values signify the strength of the relationship between the factors in the Triad Model, with the transform variable being the most representative with an h value of 0.83, $r = 0.78$, and $\lambda = 0.91$. The correlations between the model's variables are robust, with coefficients ranging from 0.61 to 0.78, indicating significant relationships.

Furthermore, the significance value is less than 0.05, and the Kaiser-Meyer-Olkin measure of 0.70 indicates that the data sample is suitable for factor analysis. It supports the validity of the results (Mavrou, 2015). No underlying factors have been identified.

Table 4
Result from EFA for Variable Business Adaptability

Independent variable indicators						
Indicators	r	h	λ	AVE	p	KMO
1a. Detect	0.61	0.81	0.90	78.38	< 0.05	0.70
1.b. Integrate	0.63	0.69	0.83			
1.c. Transform	0.78	0.83	0.91			

Source: Own elaboration.

The results of the exploratory factor analysis for the dependent variable indicators are shown in Table 5. The Pearson correlation (r) is between 0.60 and 0.75, suggesting a substantial and coherent relationship between indicators. The h values between 0.69 and 0.85 indicate that the observed variables are well represented, which suggests adequate interpretability of the structure (Mavrou, 2015). The AVE was calculated while keeping the indicators consistent with the survey data. The AVE result for the dependent variable (Superior performance) was 76%, indicating that the variables can explain a significant amount of the total variability in the data. The Kaiser-Meyer-Olkin (KMO) result was 0.88, and the significance value (p) was less than 0.05. These results indicate that the EFA has identified a significant and reliable factor structure in the data, providing valuable insight into the relationship between the observed variables (Veliscer & Jackson, 1990).

Table 5
Result in EFA for Variable Superior performance

Dependent variable indicators						
Indicators	r	h	λ	AVE	p	KMO
Y13. Compared to the competition, higher quality products and services	1	0.69	0.83	76.79	< 0.05	0.88
Y14. Higher levels of customer satisfaction compared to the competition	0.75	0.82	0.91			
Y15. Higher profitability in comparison to the competition	0.71	0.85	0.92			
Y16. More innovative products and services than competitors	0.60	0.74	0.86			
Y17. Higher revenue growth compared to the competition	0.60	0.71	0.84			

Source: Own elaboration.

Hypothesis testing: Sense variable

Given the data's lack of normality, the researchers chose the nonparametric Kruskal-Wallis test, also known as the H test, to test the research hypotheses. The test statistic H is computed based on these ranks. Its distribution is approximated by the chi-square distribution with $k - 1$ degrees of freedom, where k is the number of groups that use the ranges of the sampled data to determine whether they come from populations with equal medians. This approach identifies significant differences between the variables (groups). The procedure involves formulating the null hypothesis, which is established regarding equality. Then, the H statistic is calculated from the ranks of each group. If the H value is high, it is more likely that there are significant differences. The degrees of freedom (gl) are calculated with $k - 1$. Finally, it is determined whether there is an asymptotic relationship based on the chi-square distribution.

Hypothesis 1.a. There is a statistically significant difference between the Sense and the distribution of the superior performance indicators.

Zhang et al. (2021) observed that collaboration between firms can promote the acquisition and use of existing and new knowledge of the firm, improving the ability of the firm to adapt to the market. Considering the findings of Chen (2021), whose empirical evidence shows that the ability to learn shapes the ability of the firm capacity for significant innovation. It aligns with Santoro et al. (2019), whose findings indicate that the orientation of an organization towards the management of knowledge has a positive relationship with its performance.

The results of Kruskal-Wallis statistics (Table 6) show that Sense and the distribution of superior performance indicators are statistically significant; an asymptotic relation between the groups is observed through the differences of the medians, the value of H is between 44.37 and 61.89. Hypotheses 1.a has been accepted, with statistically significant differences observed at a significance level $< 5\%$.

Table 6

Hypothesis test results for Sense and indicators of Superior Performance

Hypothesis	Sig.	Decision	nh	H	g
There is a statistically significant difference between Y13 higher quality products and services and 1.a Sense	0.00	Accepted	227	51.55	4
There is a statistically significant difference between Y14 Higher levels of customer satisfaction and 1.a Sense	0.00	Accepted	227	53.61	4
There is a statistically significant difference between Y15 Higher profitability and 1.a Sense	0.00	Accepted	227	60.82	4
There is a statistically significant difference between Y16 innovative products and services and 1.a Sense	0.00	Accepted	227	44.37	4
There is a statistically significant difference between Y17 Higher revenue growth and 1.a Sense	0.00	Accepted	227	61.89	4

Source: Own elaboration.

Hypothesis testing: Seize variable

Analyzing the seize variable with the Kruskal-Wallis test exemplifies the challenge of operating and observing internal collaboration to gain a competitive advantage. Findings suggest that a more significant presence of the seize variable corresponds to a greater presence of superior performance indicators. It supports the affirmation made by Pavlou and El Sawy (2011) regarding the importance of synchronized work, sharing individual knowledge within the group, and the company's ability to implement changes (Kump et al., 2018). Hypotheses 1.b were accepted, with statistically significant differences observed at a significance level $< 5\%$. Values suggest that higher quality products and customer satisfaction are both indicators of superior performance and are more representative; these indicators have the highest value of H. However, compared to the values of H from variable Sense and transform, seize has the lower values of H statistics. (Table 7)

Hypothesis 1.b. There is a statistically significant difference between the Seize and the distribution of the superior performance indicators.

Decision: Accepted

Hypothesis test results for Seize and indicators of Superior Performance

Table 7

Hypothesis test results for Seize and indicators of Superior Performance

Hypothesis	Sig.	Decision	nh	H	g
There is a statistically significant difference between Y13 higher quality products and services and 1.b Seize	0.00	Accepted	227	32.05	4
There is a statistically significant difference between Y14 Higher levels of customer satisfaction and 1.b Seize	0.00	Accepted	227	30.38	4
There is a statistically significant difference between Y15 Higher profitability and 1.b Seize	0.00	Accepted	227	30.94	4
There is a statistically significant difference between Y16 innovative products and services and 1.b Seize	0.00	Accepted	227	19.12	4
There is a statistically significant difference between Y17 Higher revenue growth and 1.b Seize	0.00	Accepted	227	27.11	4

Source: Own elaboration.

Hypothesis testing: Transform variable

We analyzed the transform variable using a base of five indicators. Some of the abilities observed communicated operational needs, predecessors of similar measures contained in Friedman et al. (2016). Additionally, we observed strategic adjustments to operational and organizational practices (Gelhard et al., 2016). Another indicator was the reconfiguration process as a mechanism of ambidexterity (Peng et al., 2022). In summary, transform is the ability to orchestrate and deploy tasks, resources, and activities to expand the operational capabilities (Pavlou & El Sawy, 2011, p. 247), as well as the ability to be flexible and to adapt to the situation at hand (Kump et al., 2018).

Hypothesis 1.c. A statistically significant difference exists between the transform and the distribution of the superior performance indicators.

Decision: Accepted

Hypothesis 1.c have been accepted (Table 8), with statistically significant differences observed at a significance level $< 5\%$. The results indicate a significant difference and an asymptotic relationship with the transform variable across all measures of superior performance, with an H-value greater than 50, four degrees of freedom, and a significance level inferior to 0.05. The superior performance indicators with the highest H value exhibit higher levels of customer satisfaction than the competition ($H = 65.92$) and Higher profitability ($H = 64.77$). It aligns with implementing renewal activities to achieve greater success than competitors in diversifying services, products, and processes to maintain superior performance (Kump et al., 2018). Transformation is a mechanism to ensure the company's permanence in the market despite having limited resources compared to the competition (Peng et al., 2022).

Among the three variables of the Triad Model for DC, the value of the H statistic for the Transform variable was the most stable and highest compared to the Sense and the Seize variables. Following this line of thought, companies with the most significant capacity to transform are those with high capacities to detect and integrate. Thus, Matysiak et al. (2018, p. 230) emphasize the value of the interdependence between the measures: "To create and sustain competitive advantages, companies disaggregate dynamic capabilities into continuous but sequential sensing, seizing, and transforming" statement based on Teece et al. (1997).

Table 8

Hypothesis test results for transform and indicators of Superior Performance

Hypothesis	Sig.	Decision	nh	H	g
There is a statistically significant difference between Y13 higher quality products and services and 1.c Transform	0.00	Accepted	227	54.63	4
There is a statistically significant difference between Y14 Higher levels of customer satisfaction and 1.c Transform	0.00	Accepted	227	65.92	4
There is a statistically significant difference between Y15 Higher profitability and 1.c Transform	0.00	Accepted	227	64.77	4
There is a statistically significant difference between Y16 innovative products and services and 1.c Transform	0.00	Accepted	227	59.83	4
There is a statistically significant difference between Y17 Higher revenue growth and 1.c Transform	0.00	Accepted	227	61.45	4

Source: Own elaboration.

Given the evolutionary fitness effect of DC, Lin et al. (2020) conclude that firms must re-evaluate their strategies and strengthen their ability to sense, seize, and transform in order to face competition and changing environments. Therefore, the ambidexterity concept will prevail in which exploitation-driven and exploration-oriented organizations are an evolutionary fit (Frogeri et al., 2022). Additionally, Popadiuk et al. (2018) observe that ambidexterity and DC literature utilize exploration and exploitation of knowledge to observe business adaptability capacity.

For the reasons mentioned above, when there is evidence of superior performance, it is expected that business adaptability will be present (Cristofaro & Lovallo, 2022). The result of the central hypothesis is

presented in Table 9. The Kuskal-Wallis statistics reveal a significant difference and an asymptotic relationship between dependent and independent variables. It is observed that the highest range of capabilities corresponds to the highest range of superior performance. The H statistic is 68.19, with four degrees of freedom and a statistical significance level $< 5\%$.

Hypothesis 1. There is a statistically significant difference between business adaptability and superior performance.

Decision: Accepted

Table 9
Hypothesis test results for Business adaptability and Superior Performance

Hypothesis	Sig.	Decision	nh	H	g
(1). There is a statistically significant difference between <i>business adaptability</i> and <i>superior performance</i>	0.00	Accepted	227	68.19	4

Source: Own elaboration.

CONCLUSION AND LIMITATIONS

The dynamic capabilities perspective arises from resource-based theory and strategic management. The Triad Model of DC examines these capabilities through intra-organizational behaviors that constitute business adaptability and, consequently, a competitive advantage (Cristofaro & Lovallo, 2022; Markovich et al., 2022; Doz, 2020; Zhang et al., 2018). While maintaining taxonomy and avoiding tautological relationships, the use of perceptual measures is a valuable technique for observing the presence of DC (Min & Kim, 2022; Thanh Nhon et al., 2020; Ross & Grace, 2012). According to the literature, these characteristics represent competitive advantages and define a flexible, ambidextrous, and adaptable organization that produces results perceived as superior to competitors. (Al-Matari et al., 2022; Almaraz, 2022; Gaviria-Marin et al., 2021).

The literature review revealed evidence of the integration of the contributions of Teece and Pisano (1994), Eisenhardt and Martin (2000), and the Ambidexterity theory (Frogeri et al., 2022). These frameworks complement each other and, when integrated, enhance the taxonomy of perspective capabilities, delineating first and second-level capabilities (Leemann & Kanbach, 2022). It addresses the observation that the taxonomy of the dynamic capability's perspective lacks order (Kurtmollaiev, 2020; Schilke et al., 2018). The Sense, seize, and transform triad model of DC reinforces and advances the dynamic capabilities perspective on consolidation (Leemann & Kanbach, 2022; Leemann et al., 2021; Thanh Nhon et al., 2020; Kump et al., 2018; Teece, 2007).

The descriptive statistics results, considering a stratified sample of 227, a confidence level of 95%, and an estimated error of 5%, indicate an SEM of 0.6 to 0.8, suggesting a relatively accurate estimate of the population mean in the specific context of a stratified sample. Therefore, the distribution of the indicators of interest across the population is understood (Berndt, 2020). Conversely, the Exploratory Factor Analysis (EFA) results for the variable Business Adaptability have captured a significant part of the variability present in the data, with an AVE of 78% for the variables of the first-order triad model of DC. It indicates that the extracted factors can explain much of the variation observed in the variables analyzed. The commonalities of the factor loadings are within an adequate range, with values between 0.69 and 0.83, indicating the strength of the relationship between the factors in the model, with transformation being the most representative (h value of 0.83, $r = .78$, and $\lambda = .91$). The correlations between the variables of the model are robust, with coefficients ranging from 0.61 to 0.78, indicating significant relationships between them. Similarly, the values of the

matrix components are consistently high, oscillating between 0.81 and 0.91, indicating a strong association between the observed variables. Furthermore, the significance value is less than 0.05, and the Kaiser-Meyer-Olkin measure of 0.70 indicates that the data sample is suitable for factor analysis, supporting the validity of the results (Mavrou, 2015).

The literature review indicates that Sense represents the firm's ability to systematically search for information outside the firm to identify opportunities and threats to formulate action plans (Kump et al., 2019; Pavlou & El Sawi, 2011). According to Mostafiz, companies with a high ability to sense are "Able to identify opportunities arising from changes in customers, technology, and their competitors, increasing their ability to adapt" (2020, p.18). The results of the Exploratory Factor Analysis (EFA) suggest that companies associated with Centro Universitario de Ciencias Económico Administrativas (CUCEA) through the internship program commonly engage in increasing knowledge and integrating it into decision-making processes (Al-Matari et al., 2022; Barros-Contreras et al., 2021).

The H statistic for the grouped variable Sense and the indicator of superior performance has a lower bound of 44.37 and an upper bound of 61.89, corresponding to product and service innovation and more significant revenue growth, respectively. The more incredible revenue growth indicates superior performance, exhibiting the highest disparity within the sense variable. The data's behavior is asymptotic, and the significance level is <0.5 . The second most important factor is higher profitability and greater customer satisfaction. These results are consistent with firms' interest in gathering, sharing, analyzing, and utilizing market intelligence (Bayighomog et al., 2020) and decision-making through big data analytics (Akter et al., 2020). The mediating role of the sense variable on the variables is to seize and transform (Markovich et al., 2022).

The seize variable examines whether firms utilize internal collaboration mechanisms to gain competitive advantage. The H statistics results indicate that a more substantial presence of the integrated indicators corresponds to a more significant presence of superior performance, which aligns with the importance of synchronized work sharing and sharing individual knowledge to the group (Pavlou & El Sawy, 2011), and the consistency of the company in the implementation of planned changes (Kump et al., 2018). The H statistics ranged between ranks 19.12 and 32.05. Compared with

innovation in product and service, the seized variable had the lowest H value, and the highest quality product or service had the most representative H value.

The data's behavior is asymptotic, and the significance level is <0.5 . This observation is consistent with Peng et al. (2022) assertion regarding the importance of alignment, organizational structure design, and organizational processes in adapting firms to environmental and technological change. The results indicate that the companies associated with the University Center possess this ability, although to a lesser extent than the Sense and transform variables. Future efforts should complement the scale with items aligned to the triad DC model. However, considering that seize has the highest level of abstraction, it is inferred that this tends to make it less noticeable to be observed (Le & Lei, 2019; Gregory et al., 2017; Friedman et al., 2016). Researchers suggest conducting studies at the second level or micro-foundations to specify the mechanisms by which top management creates or incentivizes collaboration and knowledge absorption among the different levels of the organizational structure.

We utilized five indicators to analyze the Transform variable, including the ability to communicate operational needs, among other measures. This indicator emerged as the most representative, exhibiting the highest factor loadings and correlation values. Decision-makers ensure that flexibility does not compromise operational efficiency and that improvements in production, administration, maintenance processes, or the integration of new technologies are effectively implemented. They must also ensure that the organization's learning curve is short, the level of uncertainty is low, and the organization has clarity about the expected results (Hernández-Linares et al., 2020; Lin et al., 2020).

Transforming exhibits the highest correlation value, commonality, and factor loadings. Hypothesis testing was bound between 54.68, the lowest value for H, and 64.77, the highest, representing higher product and

service quality and profitability, respectively. The data's behavior was asymptotic, and the significance level was <0.5 . The result suggests that the greater the ability to transform, the more comprehensive the range of superior performance consistently. This finding aligns with Schepers et al. (2022), who referenced the study of Jong and Den-Hartong, highlighting the critical role of capturing innovativeness signals. Employees' intentional effort to positively influence work outcomes by introducing change and innovation to processes, products, services, and customer solutions is crucial (Schepers et al., 2022, p.3).

The EFA results for the dependent variable (superior performance) indicate correlations ranging from 0.60 to 0.75, suggesting a substantial and coherent relationship between them. Additionally, the commonality values ranging from 0.69 to 0.85 indicate they are well represented. The values on the component matrix are high, between 0.83 and 0.92. The AVE is 76%, meaning that the extracted factors can explain a significant amount of the total variability of the data. A KMO of 0.88 indicates that the data is suitable for factor analysis (Mavrou, 2015). The superior performance measures are in line with the study of Min and Kim (2022), Peng et al. (2022), and Mostafiz (2020). The results show that when it comes to customer satisfaction and profitability, followed by products and services of higher quality or the introduction of innovations, the companies associated with the University Center have better results than their competitors.

Finally, hypothesis testing showed significant differences between business adaptability and superior performance. The relationship demonstrates an asymptotic pattern. The high H-statistics suggest a statistically significant difference. Therefore, hypotheses 1, H1a, H1b, and H1c of the study have been accepted. The operationalization of the concepts addressed the tautological relationships between the variables. Thus, empirical evidence was generated under conditions of systematic advancement, following the recommendations of Arndt and Pierce (2018). These findings emphasize the critical role of dynamic capabilities in driving superior performance. The ability to adapt through sensing, seizing, and transforming becomes a determinant of success. Therefore, investing in nurturing their dynamic capabilities in organizations is advisable.

According to the *Demografía de los negocios* (INEGI, 2022), observers consider them companies capable of "consciously creating, expanding, and modifying their organizational operations for adaptive purposes" (Gaviria-Marin et al., 2021, p. 417). The items measuring customer satisfaction and profitability (compared to the competition) were the most representative. Because of the COVID-19 global health emergency, the years 2021 and 2022 were financially complicated for the Mexican economy.

In Jalisco, approximately 90 days of inactivity were implemented to control the spread of the disease, and government regulations and readjustments in the global commercial chain were external factors that affected the organizations. Adaptability favored the companies associated with the University Center in maintaining their performance even during economic, political, and social pressure periods. Thus, due to the cross-sectional nature of the phenomenon, more data is needed to prove that firm business adaptability changes over time. A longitudinal study is recommended.

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núm. 52, p. 77 - 108, 2024

Universidad de Guadalajara, México

revistamercadosynegocios@cucea.udg.mx

ISSN: 1665-7039 / **ISSN-E:** 2594-0163

DOI: <https://doi.org/10.32870/myn.vi52.7731>



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