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The Spanish company in the face of COVID-19: adaptation factors to the new scenario

La empresa española ante la COVID-19: factores de adaptación al nuevo escenario

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Abstract

The COVID-19 pandemic has radically and unpredictably changed the competitive environment for companies, with Spain being one of the western countries most affected. In this new context, to face extremely dynamic, complex, and hardly predictable competitive environments, companies must adapt by having or developing a series of specific resources and capacities. This article aims to show that the development of Information and Communication Technology, labor flexibility and the capacity to innovate are factors that favor organizations having the ability to adapt to the new and changing competitive environments caused by the health emergency of COVID-19, reflecting the organization's ability to adapt through its ability to give continuity to both the management and monitoring of its operations and the relationship with its customers throughout all levels of the sales process. To analyze this relationship, company managers were interviewed during the months after the declaration of the state of alarm in Spain. Through the application of the multivariate analysis technique Partial Least Squares Structural Equation Modeling (PLS-SEM), it has been estimated that high levels of ICT development, labor flexibility or capacity to innovate are positively related to a better adaptation of companies to both the new needs of their customers as well as the operating limitations imposed in their respective markets.

Resumen

La pandemia de la COVID-19 ha cambiado de forma radical e impredecible el entorno competitivo de las empresas, siendo España uno de los países de su entorno que se ha visto más afectado. En este nuevo contexto, para hacer frente a unas condiciones del entorno extremadamente dinámicas, complejas y difícilmente predecibles, las empresas para poder adaptarse necesitan estar en posesión o desarrollar una serie de capacidades específicas. Este artículo pretende mostrar que el desarrollo de las TIC, la flexibilidad laboral y la capacidad de innovar son tres factores que favorecen la capacidad de las organizaciones para adaptarse a los nuevos y cambiantes entornos competitivos provocados por la emergencia sanitaria de la COVID-19. La capacidad de adaptarse se refleja a través de su habilidad para dar continuidad tanto a la gestión y monitorización de sus operaciones como a la relación con sus clientes a lo largo de todos los niveles del proceso de venta. Para analizar esta relación, se entrevistó a directivos de empresas durante los meses posteriores a la declaración del estado de alarma en España. Mediante la aplicación de la técnica de análisis multivariante PLS-SEM, se ha estimado que un mayor nivel de los tres aspectos indicados se relaciona positivamente con una mejor adaptación de las empresas tanto a las nuevas necesidades como a las limitaciones de operación en sus respectivos mercados.

Keywords | palabras clave

Management, ICT, flexibility, innovation, COVID-19, PLS-SEM, adaptability, competitive environment.
Gestión, TIC, flexibilidad, innovación, COVID-19, PLS-SEM, capacidad de adaptación, entorno competitivo.

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1. Introduction

The COVID-19 pandemic, since its declaration at the end of 2019, has imposed a radical transformation in the behavior of the different economic agents at a global level. Specifically, the impact it has had on Spanish economic activity has been devastating, making the country one of the most affected in its context. If at the end of the third quarter of 2020 the drop in GDP in the eurozone, compared to pre-crisis levels, was 4.5%, in Spain it was 9.1%. The Organization for Economic Cooperation and Development (OECD) forecasts for the year 2020, as a whole, are for a fall of 11.6%, the highest among all the organization's countries (OECD, 2021). And these forecasts establish the recovery of pre-crisis levels for the second half of 2022. The succession of waves of contagion and the consequent restrictions on economic activity or mobility do not suggest a more optimistic scenario.

Since the declaration of the state of alarm in Spain in March 2020, thousands of companies and workers have seen their activity stopped or suspended. Specifically, according to the report presented by the Bank of Spain in December 2020 (Blanco et al., 2020), it is estimated that up to 9.9% of Spanish companies could disappear due to solvency problems caused by the crisis generated by the COVID-19. This represents a 150% increase compared to the 2019 data. An indicator of this situation offered by the report is that 40.6% of companies have high financial pressure, compared to 13.9% the previous year. These data are explained taking into account that during the first nine months of the year, 36% of Spanish companies have had losses in their income statement. And all this despite the fact that the situation of Spanish companies before the pandemic was, on average, financial strength.

Not all economic sectors have been affected equally. Confinement and restrictions on mobility and assembly have affected supply and demand conditions in a very heterogeneous way in the different markets, as well as the relationships between the different value chains and systems. It is estimated that, in the hotel, restaurant, and leisure sectors, 72.4% of companies will have viability problems due to inability to pay their debts. In motor vehicles, this problem is estimated to be suffered by 64.6% of companies, 42.2% of those in the commercial sector, and 41.6% of those dedicated to transport and storage (Blanco et al., 2020).

The behavior of organizations in high volatility environments caused by exogenous shocks has been widely studied in the literature, under different names: unexpected events, rare events, crises, or catastrophes (Duchek et al., 2020). However, the origin of this social and economic situation, the COVID-19 pandemic, constitutes an event that fits with all the characteristics of a "black swan" event (Taleb, 2008): an unpredictable surprise event, of great socioeconomic impact and that can be rationalized by hindsight (later predictable appearance). In this way, the implications and consequences of an event of these characteristics imply a greater impact than those of predictable events, longer-lasting effects, and with a strong transversal component.

In this factual context, the analyzes on the adaptation factors to volatile, dynamic, and complex environments, but to a greater or lesser extent predictable, are no longer valid, given that the conditions imposed by the health emergency have radically changed, and literally overnight, the operating conditions of companies. And they continue to do so. The succession of waves of contagion has meant restrictions on economic activity and freedom of movement, therefore companies have had to continue adapting their activities to radical changes in their competitive environment. From all this, the conclusion can be drawn that the companies that were in possession of the resources and capacities necessary for a rapid reactive adaptation to the successive

and changing competitive environments have been able to face these new conditions imposed in a situation of competitive advantage compared to those that were not in possession of those resources and capacities (Barney, 2001).

The objective of this research is to explore, in the Spanish case, possible answers to the question of what factors determine that companies are endowed with the necessary adaptation capacity to the new and changing conditions of the competitive environment caused by the pandemic, without entering to analyze the particularities of companies and the Spanish economy that have made the intensity of the crisis resulting from the pandemic greater than in the rest of the surrounding countries.

Three factors have been considered to analyze this relationship: the innovation capacity of organizations, their labor flexibility, and their level of development and implementation of Information and Communication Technologies. These following three variables, as will be explained later, are widely considered as drivers or as dimensions of the attributes related to an active adaptation capacity and organizational resilience in times of crisis: speed, agility, learning capacity, reinvention capacity (Alday et al., 2020; Duchek, 2020; Freije & Aláez, 2020; Garamendi, 2020; Weick & Sutcliffe, 2001).

The work has been organized as follows. In the first place, the theoretical bases and the hypotheses to be tested are presented. The methodology used in the research is described below, including the collection of sample data and the used multivariate analysis methodology. Afterward, the results obtained in the estimated model are presented and analyzed alongside the applied validation criteria. Finally, there is a discussion of the results and a presentation of the conclusions, as well as the establishment of the next steps to be carried out in line with the research.

1.1. Theoretical framework and hypotheses

1.1.1. The ability to adapt during the crisis

The COVID-19 pandemic has required companies to adapt, as quickly and efficiently as possible, their structures, activities, products, or processes to new competitive conditions. Different studies (Duchek, 2020; Hermann, 1963; Pearson & Clair, 1998; Smart & Vertinsky, 1984; Lengnick-Hall et al., 2011) analyze the adaptability of organizations to unexpected crisis situations with a high potential of consequences. Common factors considered in them are the proactive attitude, the continuous observation of the environment, or the ability to rebuild and reinvent themselves. However, the already described characteristics of the exogenous shock produced by COVID-19 make the determinants of adaptation capacity vary in the face of more predictable situations or with less dynamic or traumatic evolution. In this context, the analyzes on how to successfully face the crisis focus on concepts that are difficult to quantify such as business resilience (Garamendi, 2020), sustainability (Schaltegger, 2020), or the exploitation of strategic options such as coopetition (Crick & Crick, 2020).

This research aims to determine some of the factors that favor successfully circumventing the current competitive environment. Thus, the "adaptability" of organizations has been defined as an endogenous variable, considered as the ability to be in sync with successive competitive environments, the speed in doing so, and the efficiency of the process (Grant, 2014; Hax & Majluf, 2015; Thompson & Strickland, 2004). Said adjustment of the company to the new external conditions implies that the company must align aspects related to:

- Resource needs.

- Offer of products/services, both mix and quantity demanded.
- Operating leverage.
- Operating procedures.
- Relationship with external stakeholders, especially clients.

1.1.2. The relationship between ICT development and adaptive capacity

Information and Communication Technologies (ICT) constitute a heterogeneous field and of which there are many definitions and classifications. They group together a set of resources and innovations of hardware, software, telecommunications, or electronic devices linked to each other, with the capacity to generate between all of them a universal network or tools that allow the accumulation of data to synthesize and generate information. Therefore, they constitute a set of means, tools, and devices that use both telecommunications and computing technologies to generate and transmit information (Cobo-Romaní, 2009).

Regarding the organizational and business dimension of ICT, it is identified with the set of resources that provides the ability to manipulate information and that support the development and economic growth of any organization (Thompson & Strickland, 2004). In any case, ICTs provide organizations with enormous possibilities and different approaches to manage their knowledge, increase their flexibility, enhance interactivity with their stakeholders, favor their financial robustness, increase their speed of development, favor their independence, etc.

Despite the consensus among academics that ICTs are a factor that significantly favors the growth and survival chances of companies, the specific mechanisms that underlie these consequences have been the subject of wide debate (Bharadwaj, 2000), although there is a certain consensus on one of its most valued effects: that of enhancer and support of the basic competences of the organization (Ravichandran & Lertwongsatien, 2005).

Thus, directly or indirectly, the level of ICT development or digitization of organizations has a key impact and a permanent effect on organizational processes, behavior, performance, or culture (Bloom et al., 2014; Draca et al., 2007).

Therefore, based on this, we formulate the following hypothesis:

H1: There is a positive and significant relationship between a company's ICT development and its ability to adapt to the external shock produced by COVID-19.

1.1.3. The relationship between innovation effort and adaptability

Innovation has become in recent decades a fundamental element for the survival of companies when previously it had been considered as a differentiating element. And in the turbulent environment marked by COVID-19, the innovation factor of companies is being perceived as a catalyst for the efficient management of organizations and as a generator of opportunities at multiple levels of their value chain (Guderian et al., 2020; Lee & Trimi, 2020; Sharma et al., 2020).

Innovation has different determinants, the fundamental one being the capacity for innovation (Prajogo & Ahmed, 2006), considered as the capacity of the company to generate new knowledge that will later be applied in a practical way, either through the offer of new products or services or through the development of new processes. In turn, the capacity for innovation can be broken down into effort and experience in innovating (López-Mielgo et al., 2012). In our research, the first component has been considered, since it significantly determines the second, and it is also not biased or moderated by the age of the organization.

Thus, the organization's effort in innovation is identified with the search for the generation of new knowledge, for its subsequent application in new products or services to be offered in the market or in new internal processes, organizational structures, etc., Its measurement is carried out through the implemented R+D+i activities (Adler & Shenbar, 1990; Guan & Ma, 2003).

Based on all this, we formulate the following hypothesis:

H2: There is a positive and significant relationship between a company's innovation effort and its ability to adapt to the external shock produced by COVID-19.

1.1.4. The relationship between flexibility and adaptability

Organizational flexibility represents the ability to adapt quickly and efficiently to an uncertain environment —in terms of demand and market conditions— applying a combination of resources and capabilities (Bueno, 2007; Volberda, 1996).

The flexibility of the organization can be divided into three dimensions (Sánchez et al., 2011):

- Productive flexibility: ability to achieve adequate versatility in volume and type of offered products or services.
- Flexibility of the organizational structure: the ability to adapt at the level of hierarchical structure, decentralization, size, internationalization, or vertical integration.
- Labor flexibility: capacity of human resources to adapt to the internal and external conditions of the organization.

This research focused on labor flexibility, considered as a facilitator of organizational and productive flexibilities (Wright & Snell, 1998). Atkinson (1981) establishes the following typology of labor flexibility: numerical, financial, and functional. The first two have been excluded from the study since the first refers to the ability to adapt the size of the workforce to demand — a situation that companies have carried out through the legal figures of ERE and ERTE— and the second to the remuneration conditions - also determined by different laws and regulations. The third refers to the versatility or autonomy of employees as a factor for adapting the workforce to market demands. In this context, it is important to highlight the relationship established between organizational resilience and human resources management, in which it is identified that the former is favored by the level of competencies in the possession of employees (Lengnick-Hall et al., 2011).

In this way, we formulate the following hypothesis:

H3: There is a positive and significant relationship between the labor flexibility of an organization and its ability to adapt to the external shock produced by COVID-19.

1.1.5. The mediating role of the innovation effort

The positive influence that flexibility exerts on the ability to adapt can also be analyzed through the influence that flexibility exerts on the effort in innovation. This influence, at the level of functional labor flexibility, has been analyzed through various channels that favor the capacity for innovation (Sánchez et al., 2011):

- Versatility improves individual skills.
- Versatility favors teamwork and interdepartmental collaboration.

- Versatility broadens the dissemination of knowledge.
- Versatility improves motivation by eliminating repetitive work
- On-the-job training develops employees from the competitive core of the organization.

In addition, the innovation capacity of companies influences and transversally enhances the capacities of the organization and its relationship with the different stakeholders (López-Mielgo et al., 2012).

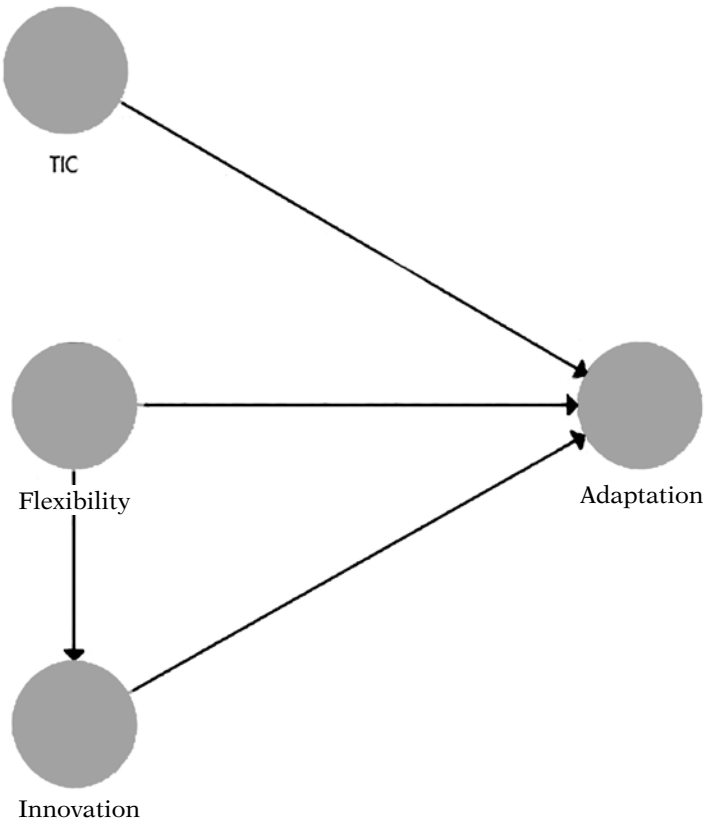
All of the above leads us to formulate the following hypothesis:

H4: There is a positive and significant relationship between the flexibility of an organization and its ability to adapt to COVID-19, through the channel of effort in innovation.

1.1.6. Theoretical model

With the presentation of the resources, foundations, and reasoning, we propose the following theoretical model.

Figure 1. Theoretical model



Source: the authors

2. Materials and methods

The exploratory analysis of our theoretical model has been carried out by Modeling Structural Equations with Partial Least Squares (PLS-SEM), through the SmartPLS 3.3.2 software application. The reasons for this choice were its adaptation to the exploratory nature of the research, its flexibility for the simultaneous use of for-

mative and reflective indicators and different measurement scales, as well as its ability to use non-parametric variables.

Data collection was carried out through a survey of 76 company managers between the months of May and August 2020. The average size of the companies included in the sample was 527 workers, with a median of 60, which approaches the representation of the Spanish economic fabric if individual companies are ignored. Companies from the sectors most affected by the pandemic and the resulting restrictions, such as hotels and restaurants, tourism, transport, leisure, automotive or certain retail businesses were not included in the sample (Blanco et al., 2020).

The survey was constructed with open questions about different activities, practices, or resources related to the variables of our theoretical model and with the difficulties that arose after the state of alarm. For the observation and measurement through the survey of the four latent variables of the model, a set of indicators or manifest variables were defined.

Latent variable "ICT": construct with a training indicator, *Digi*, quantified by a Likert scale from 1 to 3, based on the classifications by subject areas and levels of ICT development established by the Ministry of Industry, Commerce and Tourism of the Government of Spain (National Observatory of Telecommunications and the Information Society, 2011, 2020):

- Level 1 (Likert 1): basic technological infrastructure (computer, servers, etc.); basic communications infrastructure (telephony, internet).
- Level 2 (Likert 2): general solutions (office automation, ERP, etc.). Profiles in RRSS. Website development or e-commerce.
- Level 3 (Likert 3): industry 4.0, advanced ICT services (specific tools for business processes, electronic administration, real-time information, targeted advertising, Big Data, etc.).

Latent variable "Innovation": composed of a training indicator, IDi. R+D+i activities are considered the first step and promoters of innovation (Cohen & Levinthal, 1990; Janowski, 1998; López-Mielgo et al., 2012), which is why resources dedicated to R+D+i were taken as a proxy for this construct. The quantification of the observations made through the indicator survey was carried out using a Likert scale from 1 to 3, based on the adjustment of the responses obtained regarding the resources dedicated to R + D + I activities with the following pattern:

- They are not done or are done as an extraordinary effort.
- Activities are carried out on a regular basis. No committed budget/formal structure for their realization.
- The R+D +I effort is part of the normal operation of the company, with a set percentage of the annual budget and people/department/division responsible.

Latent variable "Flexibility": composed of two formative constructs, *Aut* and *Multi*. Considering functional labor flexibility (Atkinson, 1981), the two dimensions observed were the redistribution of workers based on their versatility (Multi indicator) and the autonomy of the employee in carrying out the work (*Aut*). The quantification of each indicator was by Likert scale from 1 to 5, applying the criteria set out by Bloom and Van Reenen (2007):

Quantification of the *Aut* indicator: "the pace of work and tasks performed by workers on a day-to-day basis is decided":

1: Businessperson/manager all.
2: Businessperson/manager most.
3: Consensus / balance.
4: Worker most.
5: Worker all.

Quantification of the *Multi* indicator: "in the organization exists":

1: High specialization of workers to achieve maximum efficiency. There is no mobility between positions.
2: Some ad hoc mobility when production needs demand it.
3: Formal movements between positions due to production needs. There is no specific program for the development of worker versatility.
4: Formal movements between positions due to production needs. There is a specific program for the development of the versatility of the worker.
5: Promotion and development of the versatility of workers. Turnover is part of the normal operating operation of the company.

Latent variable "Adaptation": measured by five reflective indicators, *Costs*, *P/S*, *Pers*, *Org*, *RelCl*. Each one corresponds to the effects that cause a greater or lesser capacity to adapt to the environment in organizations. The observation of each one was carried out through the following questions and the quantification of the observations based on the corresponding answers:

- *Costs*: "Has the situation caused by COVID-19 forced your company to reduce overhead costs (excluding personnel costs) to reduce the operating leverage of the company?" Likert quantification from 1 (a lot) to 3 (little/not at all).
- *Pers*: "Has the situation caused by COVID-19 forced your company to continuously vary the number of workers on the payroll?" Likert from 1 (a lot) to 3 (little/not at all).
- *P/S*: "Has the situation caused by COVID-19 forced your company, due to operational problems, to vary the mix of products/services offered?" Likert from 1 (a lot) to 3 (little/not at all).
- *Org*: "Has the situation caused by COVID-19 made it difficult to organize or monitor work at the operational level in the company?" Likert 1 to 5:
  1: The organization and monitoring of work have been greatly affected.
  3: Some of these activities have been affected in a medium or temporary manner.
  5: The organization and monitoring of work, in general, have not been affected.
- *Rel.Cl*: "Has the situation caused by COVID-19 hindered the relationship and management of customers at the pre-sale, sale, or post-sale level?" Likert 1 to 5:
  1: The relationship with customers has been greatly affected/hampered at all levels.
  3: The relationship with customers has been significantly affected at some of these levels.
  5: The relationship with customers has not/hardly been affected.

With all this, our theoretical model has four latent variables and nine manifest variables:

Table 1. Latent variables and indicators of the theoretical model

Latent variable	Description	Index	Description
ICT	ICT development.	Dig	Level of development reached in Information and Communication Technologies.
Flexibility	Functional labor flexibility.	Aut	Level of autonomy of workers.
		Multi	Versatility of employees.
Innovation	Effort in innovation.	IDi	Resources dedicated to R + D + i
Adaptation	Adaptability.	Costs	Variation of operating leverage.
		Pers	Worker's variation.
		P/S	Product/service mix variation.
		Rel.Cl.	Impact on the relationship with customers
		Org	Incidence in organization and monitoring of work.

3. Results

3.1. Sample

For the definition of the sample size, the criterion of the power tables of Cohen (1988) was used. For our research, with a maximum number of predictors of three, power of 0.8 and √ of 0.05, the required sample for medium effects is 76 observations and 35 for large effects, therefore the sample obtained is considered sufficient for our model.

Table 2 describes the statistical parameters of the manifest variables of the sample.

Table 2. Descriptive statistics

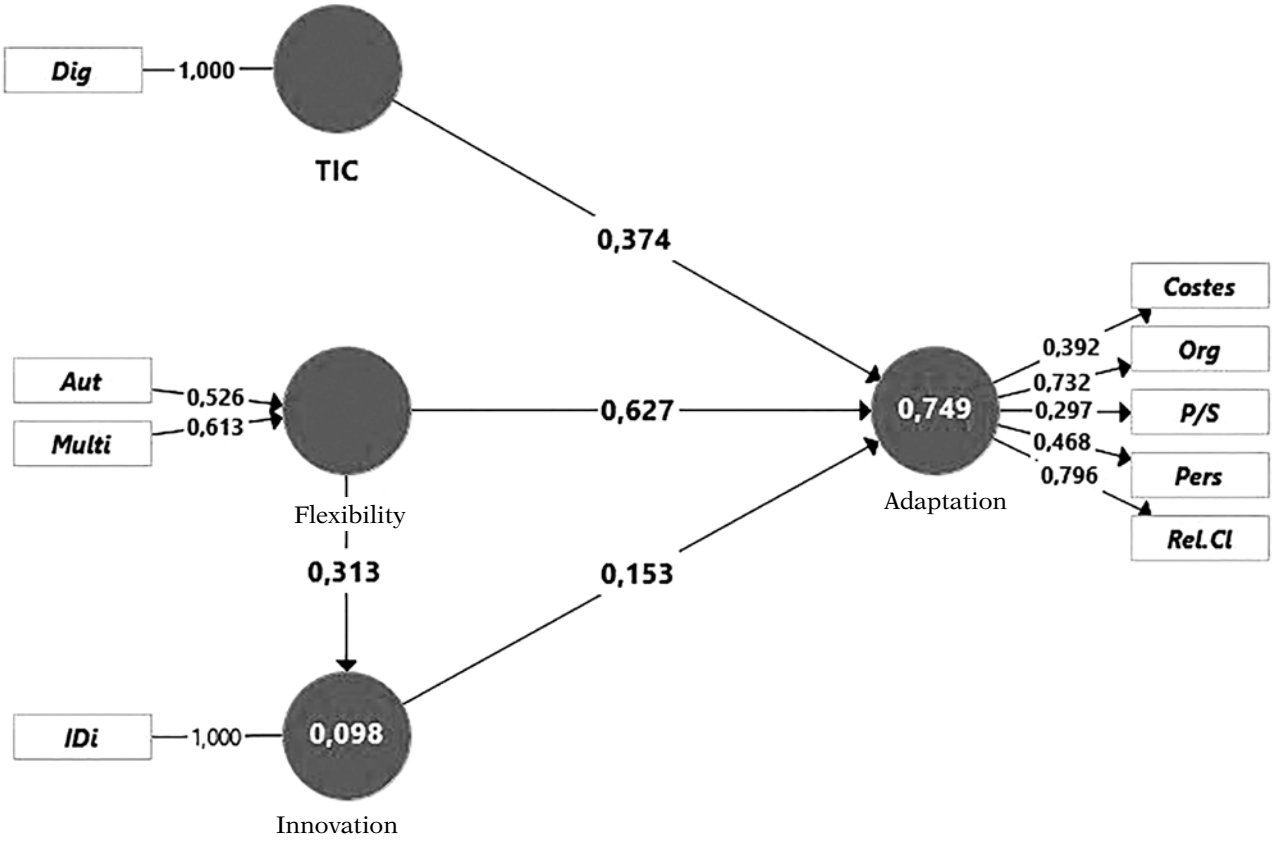
	Mean	Median	Desv. Est.	Kurtosis	Nº Observ.
Dig	2,158	2,158	0,779	-1,31	76
Aut	2,105	2,105	0,981	-0,175	76
Multi	2,605	2,605	1,052	-0,383	76
IDi	2,816	2,816	1,243	-0,936	76
Costs	2,092	2,092	0,652	-0,634	76
Pers	2,039	2,039	0,637	-0,499	76
P/S	2,592	2,592	0,566	0,119	76
Rel.Cl	3,289	3,289	1,049	-0,576	76
Org	3,066	3,066	1,017	-0,626	76

3.2. Estimated model

The analysis procedure carried out has been the one proposed by Hair et al. (2019). The evaluation of the model was carried out in two stages: evaluation of the structural model and evaluation of the measurement model. Additionally, a valuation adjustment of the global model has also been carried out.

The estimated results were as follows:

Figure 2. Estimated model (R^2, path coefficients, and external weights/loads)



Source: the authors

3.2.1. Evaluation of the measurement model

The measurement model shows the relationships between constructs and indicators. Through its analysis, the reliability and validity of the indicators of each construct were evaluated (Hair et al., 2019). Given the different nature of the measurement models with reflective and formative indicators, the validation of each type was carried out separately. The following validation criteria were considered:

Formative (Hair et al., 2019; Chin, 2010):

- Construct level evaluation: external or convergent validity.
- Evaluation at the indicator level: assessment of the existence of multicollinearity; assessment of the magnitude of the weights and their significance.

Reflective (Hair et al., 2019):

- Reliability of the indicator.
- Internal consistency.
- Convergent validity.
- Discriminant validity.

Training measurement models ("Innovation", "ICT" and "Flexibility").

Analysis of the existence of multicollinearity: using the Variance Inflation Factor (VIF), where the validation criterion is that for VIF values greater than 3.3 there is high multicollinearity (Diamantopoulos & Siguaw, 2006).

Table 3. Variance Inflation Factor (VIF)

	VIF
IDi	1
Dig	1
Aut	1,406
Multi	1,406

Valoración de la relevancia de los indicadores: los pesos de los distintos indicadores formativos muestran que todos ellos son relevantes en el modelo.

Table 4. External weights

	Innovation	ICT development	Flexibility
IDi	1		
Dig		1	
Aut			0,526
Multi			0,613

Assessment of the significance of the indicators: using the bootstrapping resampling procedure. The results show that the indicators are significant.

Table 5. Bootstrapping result for external weights

	Original sample	Average sample	Standard deviation	Statistics t	P-Values
Aut -> Flexibility	0,526	0,504	0,162	3,25	**0,001**
Multi -> Flexibility	0,613	0,625	0,149	4,106	**0,000**

Reflective measurement models ("Adaptation").

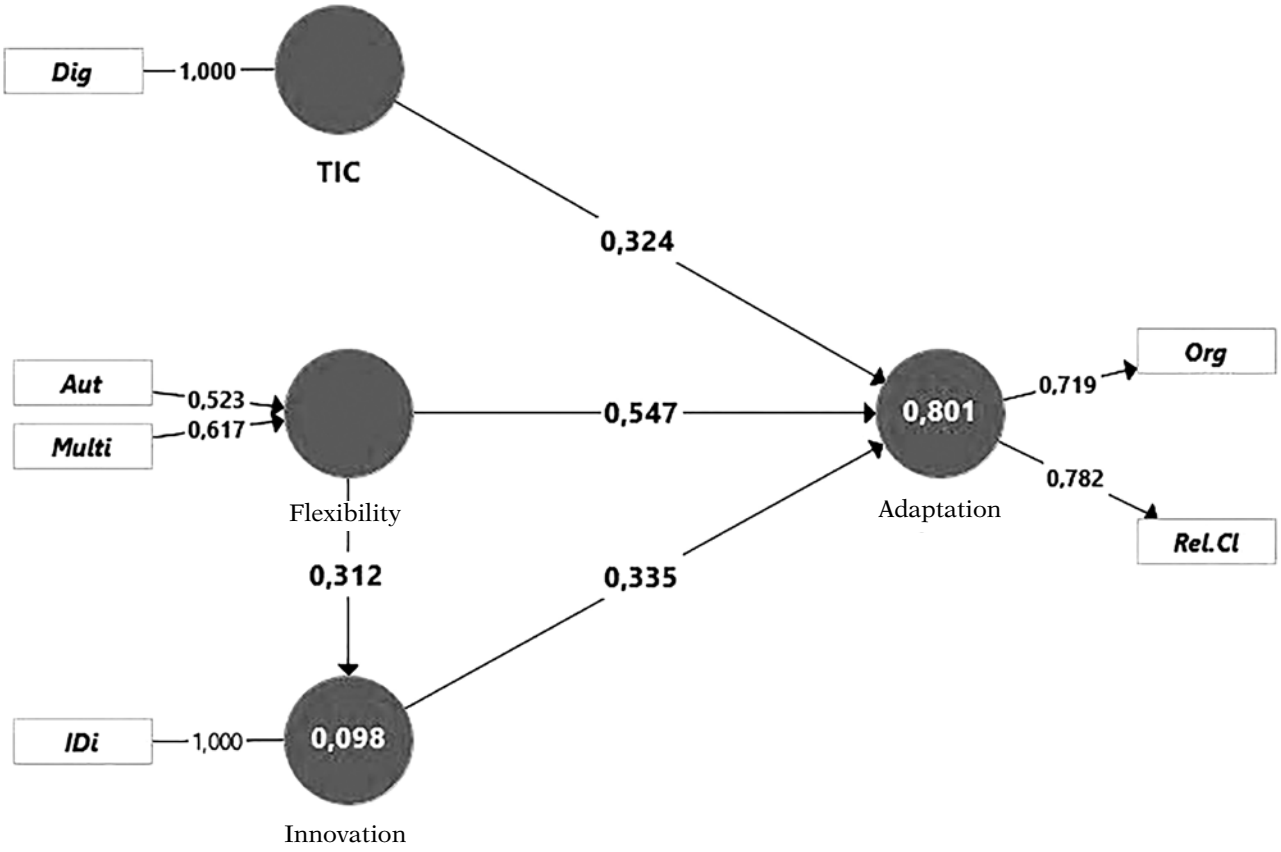
Individual reliability of the indicator (correlation with its construct): the factorial load (l) must be greater than 0.707. The following results have been obtained:

Table 6. Factor loads

	l
Costes	0,392
Pers	0,468
P/S	0,297
Rel.Cl.	**0,796**
Org	**0,732**

Only the Rel.Cl and Org indicators are sufficiently reliable, so the other three were removed from the model. The estimation of the theoretical model once these three indicators had been eliminated was as follows:

Figure 3. Estimated refined model



Source: the authors

Reliability and validity of the construct (internal consistency): the following criteria were used (Hair et al., 2019; Werts, et al., 1974; Dijkstra & Henseler, 2015):

Table 7. Results criteria reliability and validity of the construct

	Alpha Cronbach	Composite reliability	Dijkstra and Henseler
Values (reliability if> 0.7)	0,719	0,721	0,723

Convergent validity (convergence of a construct in explaining its indicators): measured by the Average Variance Extracted (AVE). In the construct "Adaptation Capacity" AVE = 0.564> 0.5.

Discriminant validity (degree to which each construct is different from the others in the model): evaluation by two criteria.

- Fornell-Larcker criterion: variance captured by a construct of its indicators must be greater than the variance shared between it and the others in the model (Fornell & Larcker, 1981).

Table 8. Fornell-Larcker criterion

	Adaptation
Adaptation	**0,751**
TIC	0,699
Innovation	0,682
Flexibility	0,587

- Analysis of the cross loads: the factor loads of the indicators must have a higher value with their own variable than with the others.

Table 9. Cross loads

	Adaptation	ICT	Innovation	Flexibility
Org	**0,719**	0,369	0,488	0,535
Rel.Cl	**0,782**	0,508	0,535	0,516
Dig	0,587	**1**	0,547	0,147
IDi	0,682	0,547	**1**	0,312
Aut	0,572	0,116	0,307	**0,854**
Multi	0,649	0,14	0,246	**0,898**

The results validate all the formative and reflective measurement models of the refined theoretical model.

3.2.2. Evaluation of the structural model

The estimated direct and indirect effects between the exogenous and endogenous variables were the following:

Table 10. Direct effects (path coefficients), indirect and total

	Efectos directos	Efectos indirectos	Efectos totales
Flexibility -> Adaptation	0.547	0.104	0.651
Flexibility -> Innovation	0.312		
Innovation -> Adaptation	0.335		
ICT -> Adaptation	0.324		

For the validation of the structural model, the following have been considered (Hair et al., 2019): collinearity problems, values of the path coefficients, coefficient of determination (R^2), size of the effects (f^2) and predictive relevance.

Analysis of the presence of collinearity problems: to ensure that there is no multicollinearity between the preceding variables of each endogenous construct, the Variance Inflation Factor (VIF) must be less than 3.

Table 11. VIF of the structural model

	Adaptation	Innovation
Flexibility	1,109	1
Innovation	1,547	
ICT development	1,427	

Evaluation of the algebraic sign, magnitude, and statistical significance of the path coefficients (hypothesized relationships between the variables), based on the data in Figure 3.

- Sign and magnitude of the coefficients: all coefficients have a positive sign, according to the hypothesized positive relationships. They show medium or moderate effect sizes.
- Valuation of the significance of the effects: using the bootstrapping resampling technique, the level of significance of each coefficient ($p < 0.05$) has been verified.

Table 12. Results bootstrapping effects

	Original sample	Sample mean	Standard deviation	Statistics t	P-Values
Flexibility -> Adaptation	0,547	0,548	0,106	5,175	**0**
Flexibility -> Innovation	0,312	0,324	0,112	2,797	**0,003**
Innovation -> Adaptation	0,335	0,336	0,111	3,014	0,001
ICT -> Adaptation	0,324	0,323	0,097	3,345	**0**
Flexibility -> Innovation -> Adaptation	0,105	0,112	0,059	1,769	**0,039**

The results show that the four hypotheses formulated constitute significant relationships.

Assessment of the determination coefficient (R^2): the values obtained for R^2 and adjusted R^2 for the endogenous variable "Adaptation" have been 0.801 and 0.792 respectively, which indicates a substantial explanatory power (Chin, 1998).

Regarding the explained variance of "Adaptation" for each of its predictor variables:

Table 13. Variance explained by each predictor

	Coef. path	Correlation	Explained variance
Flexibility	0,547	0,699	**0,3823**
Innovation	0,335	0,682	**0,2284**
ICT	0,324	0,587	**0,1901**

Assessment of effect sizes (f2): all observed effects are large in size (Cohen, 1988).

Table 14. Effects size

	f^2
Flexibility	1,352
Innovation	0,363
ICT	0,369

Assessment of predictive relevance: the Q^2 value of the Stone-Geisser test was used as a measure of the predictive power of the model outside the sample used. For its calculation, the blindfolding procedure has been used, reusing the sample omitting each D-th data of the endogenous construct, estimating the different parameters with the remaining data, and predicting the omitted values from them (Chin, 1998). The procedure has been carried out with an omission distance D = 7[1]. The value of Q^2 was calculated using the cross-validated redundancy approach (estimates from both the structural model and the measurement for prediction).

Table 15. Results blindfolding-Cross-validated construct redundancy

	Sum of Squared Observations (SSO)	Sum of squared prediction errors (SSE)	Q^2=1-SSE/SSO
Adaptation	152	85,456	0,438
Innovation	76	72,035	0,052

The obtained value, greater than 0, reflects predictive relevance. In the case of "Adaptability", when it is between 0.25 and 0.5, it indicates medium-size relevance and in the case of "Innovation", low (Hair et al., 2019b).

3.2.3. Global fit of the model

By evaluating the degree of discrepancy between the correlation matrix of the estimated model and the empirical correlation matrix. The SRMR, Standardized Root Mean Square residual, was used as a reflection of this divergence. SRMR must be less than 0.08 (Hu & Bentler, 1998), and the lower the SRMR value, the better the fit. In our model, SRMR = 0.026.

4. Conclusions and discussion

This research has explored whether certain cross-cutting factors for organizations can facilitate their adaptation to the competitive environment resulting from the COVID-19 pandemic. Significant relationships have been found between three organizational characteristics and the ability to adapt to the new scenario: labor flexibility, ICT development, and effort in innovation. The latter also plays a mediating role in the relationship between flexibility and adaptability, increasing the total effect of the former on the latter. The results have validated the four hypotheses formulated.

1 The recommended values for D are between 5 and 10 (Hair et al., 2019). Furthermore, the quotient between the sample size and the distance D cannot be a whole number, to avoid that the same set of observations is always eliminated from the data matrix in each round. In this case, 76/7.

Regarding the ability to adapt, it has been found that the most appropriate variables for observation are the level of incidence on the organization and monitoring of work and on relationships with clients. Aspects such as workforce adjustments, changes in the supply mix, or structural cuts have not been shown to be elements whose main common factor is the ability to adapt, having to explore other internal and external factors of the company- such as the generic strategy, the particularities of its supply chain, specific regulatory limitations, seasonality of the sector, etc.

The main contributions of the research are, firstly, the delimitation of determinants that seem to favor the ability of companies to adapt to the competitive environment as a result of COVID-19. Although all hypothesized relationships have been significant, the greatest effect is given by the positive influence exerted by functional labor flexibility, which is in line with previous studies that show that practices such as decentralization or polyvalence favor the competitiveness of organizations. (Bloom et al., 2010; Sánchez et al., 2011). Second, the results can guide the focus of efforts. Many of the effects caused by the crisis will remain in the long term (Gruszczynski, 2020; Ortega-Vivanco, 2020), with COVID-19 becoming a catalyst for trends observed for years. Thus, actions towards digitization- which allow activities such as real-time monitoring, teleworking, or developing online channels with customers and suppliers-, the versatility of workers- which favors continuous adaptation to demand, greater motivation, and work spirit as a team —or efforts to innovate— that have organizational consequences of excellence throughout the entire organization beyond innovative outputs —become a must for companies in the short and medium-term.

The results and conclusions are in line with various previous investigations. Following Milgrom and Roberts (1992), it can be concluded that the development of ICT allows the information and coordination problems of an organization to be managed more efficiently, which directly affects its adaptation to the competitive environment. In the current context, Almeida et al. (2020) highlight the importance of the role that digitization can play in the competitiveness of companies in the post-COVID-19 era. And Fields et al. (2020) find that Industry 4.0 practices have helped sustain business activities during the crisis.

In addition to the moderating and mediating role played by innovation, it has been observed that the effects of the pandemic have exerted a catalytic role on innovation (Heinonen & Strandvik, 2020) and that in the current environment the capacity to innovate significantly influences the business success (Putra et al., 2020).

The next steps to follow in the research are to delve into the relationships explored and analyze their temporal evolution through the use of panel data, also exploring the relationship between the considered variables and various organizational performance indicators, incorporating other variables in the study, such as cooperation between companies as a source of local economic development in times of crisis (Carpio, 2020; Vergara-Romero & Sorhegui-Ortega, 2020). Also increasing the sample size to advance on the path of confirmatory study of the relationships between the variables. Finally, analyze the moderating role that variables such as type of property or size can exert on the relationships analyzed.

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