Relational analysis of the impact of technological practices on the human development of youth. A study in Mexican organizations

Análisis relacional del impacto de las prácticas tecnológicas en el desarrollo humano de la juventud. Un estudio en organizaciones mexicanas.

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ABSTRACT

The purpose of this study was to validate a theoretical proposal to analyze the correlation between information and communication technology (ICT) practices in an organizational structure and their impact on achieving human development in youth. In this text, the authors review the theories of culture in organizations and the structural perspective of technology. Moreover, based on these, a theoretical model is proposed to guide the methodology used. This consisted of estimating a structural equation model applied to the database of a survey carried out in 2016 to 204 Mexican government and civil society organizations oriented to support young people's development. The findings showed that the variables institutional capacity, ICT practices for searching information and internal communication achieved a significant impact on their scope and capacity to attend the human development of youth population.

Keywords
Structuration theory of technology; technological appropiation; organizational studies; youth development; structural equation mode

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RESUMEN

El propósito de este estudio fue validar una propuesta teórica para analizar la correlación entre las prácticas de tecnologías de la información y comunicación (TIC) en una estructura organizacional y su impacto para lograr el desarrollo humano en la juventud. En este texto se revisan las teorías de la cultura en organizaciones y, con base en la perspectiva de la estructuración de la tecnología en la vida organizacional, se propone un modelo teórico que guio la metodología utilizada. Esta consistió en estimar un modelo de ecuaciones estructurales aplicado al banco de datos de una encuesta realizada en 2016 a 204 organizaciones de gobierno y de la sociedad civil mexicanas orientadas a apoyar a los jóvenes. Los hallazgos mostraron que las variables capacidad institucional, prácticas de TIC para la búsqueda de información y comunicación interna lograron un impacto significativo en su alcance y en su capacidad para atender el desarrollo humano de la población juvenil.

Palabras clave
Teoría de la estructuración tecnológica; apropiación tecnológica; estudios organizacionales; desarrollo juvenil; modelos de ecuaciones estructurales

INTRODUCTION

The International Scientific Council (ISC) and the United Nations (UN) have opened an invitation to discuss human development, a key concept in the context of the pandemic and the various crises caused during it. The understanding of human development based on promoting freedom and human capabilities seems to have been diluted in a global scenario highly at risk due to environmental deterioration, multiple inequalities, violence and fragmented societies. With this in mind, the role of technology, particularly information and communication technologies (ICTs), is highlighted here, since the meaning of the digital era is essentially based on its capacity to address the serious problems that have been stressed by the health emergency caused by covid-19 (International Science Council, 2020).

ICTs embrace a strategic axis for the achievement of all the sustainable development goals that "comprise a universal call to action to end poverty, protect the planet and improve the lives and prospects of people around the world" (UN, 2020). The link between ICTs and development has been approached in two ways: with emphasis on the development of ICTs themselves, in terms of their innovation and infrastructure, and in relation to their potential to promote human and, therefore, social development, a factor in which the interest of the project lies.

This study was conducted in Mexican civil society organizations (CSOs), non-governmental organizations (NGOs) and governmental organizations (GOs) whose purposes are aimed at serving young people[1].The objective was to analyze the relationship between their practices in the use of ICTs and their performance in promoting human development, in this case among the youth, without the intention of making comparisons between them. It should be clarified that this diagnosis was carried

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[1] Hereinafter they will be referred to as "organizations", since the differences between them were not distinguished for the purposes of this paper.

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out based on the results of the scope of practices of the organizations themselves and not from the perspective of the users.

This project is not limited to describing the current state of technological practices among these organizations or their activities with young people, but sought to contribute to reflection and studies on ICTs through a functional analysis (cause and effect) between the set of ICT practices of the organizations and their impact on the human development of the youth they serve.

The purpose of this work is to generate a theoretical-methodological precedent, since the analysis put theory in dialogue with empirical evidence, providing a model to be replicated in new studies. Likewise, by means of a statistical methodology, empirical evidence is analyzed to generate contributions to the line of technologies for development within the framework of the study of organizations. This analysis contributes with relevant information for the elaboration of public policy with respect to the digital agenda and for the allocation of budgets for the equipment and digital appropriation of organizations of this nature.

Without being thorough, the study on the digital transformation of organizations has focused on the interest in innovation in socio-digital spaces and networks to promote democracy, in the installed infrastructure and organizational capacity to use the Internet (Finquelievich and Kisilevsky, 2005). Special emphasis has been placed on the digital strategies implemented by organizations to achieve efficient management and so that they would reach their social and philanthropic goals (Caralt *et al*., 2017).

In addition, the adoption of socio-digital networks (mainly Facebook) was examined as they are important channels to establish communication with the community, volunteering and donors (Attouni & Mustaffa, 2014; Nonprofit Tech for Good, 2019). Similarly, the possibilities and challenges of providing information through mobile platforms were addressed (Raspopović & Vasić, 2014), as well as the opportunities that ICTs open for NGO transparency practices, the ethical, social and economic challenges linked to privacy and data security of sponsors and benefactors, and the potential risks vis-à-vis other NGOs due to competition for grants and donations (Vaccaro & Madsen, 2009).

Consistently, organizations such as Funraise and Nonprofit Tech for Good conduct biannual surveys to learn how NGOs around the world use ICT in areas such as: web and email communication, fundraising, adoption of social networks, assessment of technological efficiency, productivity and emerging technology (artificial intelligence, augmented reality, blockchain technology, cloud computing, internet of things, machine learning, predictive analytics and virtual reality).

The 2019 Global NGO Technology Report (Nonprofit Tech for Good, 2019) identified that the cause with the greatest presence in these NGOs precisely is that related to children and the youth, as well as that fundraising through their websites is on the rise and that the vast majority of NGOs frequently use socio-digital networks -especially Facebook- to connect with their supporters and donors. For its part, the PwC Foundation points out in its study that NGOs are in a "take-off stage" in their digital transformation

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and that, in this regard, their main challenge lies in formulating a strategic vision that takes into account the current organizational context and culture (Caralt *et al*., 2017).

In the literature review, it was found that the studies show what these organizations are and how they use and practice ICTs, but there is no precedent on the internal relationships between their organizational structure, the uses or practices based on technology or the attention to the development of the population served, which is the purpose of this work.

This lack prompted the question that guided this analysis: what practices or uses of ICTs influence the performance of these organizations in serving the development of young people?

Theoretical and conceptual framework. The study of organizations

There are several theoretical options for the study of organizations; Zalpa (2002), for example, carried out a review of the cultural perspective for the study of organizations based on three aspects: cultural studies, workers' culture in Mexico and organizational culture. From these, he defines culture as the social meaning of reality and argues that this includes a theoretical perspective for the study of organizations with a heuristic value. This author explains that culture has a dual character, between the structures that determine it and the practices that continuously shape it.

> That is to say, from one point of view we can consider the meaning of the world, the constructed realities, as something given, as something external and independent from our will, a social fact, the objectified world of which Berger and Luckmann (1971) speak. And from another point of view, emphasized by scholars of worker culture, we can consider the practices of signification put into play by the agents, tending to recreate, reproduce or change the objectified meaning of the world, the constructed reality (p. 27).

Another important contribution to Zalpa's (2002) review is the distinction of three levels in the study of organizations from the cultural perspective: artifacts, beliefs and values. For this study, interested in technology, artifacts are particularly relevant; the author defines them as "observables" in organizations and are objects, actions, ceremonies, rites, customs and social relations.

Zalpa (2002) warns that artifacts or objects are not culture itself, but that culture is expressed through them. With this in mind, for the project it was assumed that technology and, more precisely, the practices surrounding the use thereof, account for organizational culture and how it influences its contribution to social development.

Thus, the analysis of this article is enclosed within two approaches: the cultural perspective and Orlikowski's (2000) structuration theory. This author argues that technology is a central aspect of organizational life that has a dual nature, an argument he bases on Anthony Giddens' (1984) structuration theory. This duality, by recognizing

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that technology and the practices that derive from its uses are part of the culture of organizations, is consistent with the way in which Zalpa (2002) defines culture. For Orlikowski, technology makes sense through its social practices, it is composed of artifacts or "things", but also of the meanings attributed to it and derived from the relationship with it. Technology is understood as an essential part of the structure of organizations and at the same time it is continuously configured through practices.

Orlikowski (2010) conducted a review of studies on technology from the organizational approach and found out that there were four perspectives prevailing. In some works, technology is absent and the role of materiality, i.e., artifacts and objects used on a daily basis, is ignored. Others conceive of technology as an exogenous force that exerts a homogeneous and determining impact on organizations, without considering the characteristics of the people and organizations in which it is used.

A third body of studies conceives technology as the result of contextually and historically situated interpretations and uses in organizations, without attending to the impact of the materiality of technology. The author explains that there is a fourth alternative for the integral study of technology in organizations, which assumes a relational ontology between the materiality of objects and the role of human agency. In this, technology is understood as being intertwined or intimately linked to the various aspects of organizational life; it does not make sense in itself as an artifact, but through the practices that are carried out with it, in other words, she calls them "technologies in practice" (Orlikowski, 2010).

This author proposes a practice-based approach to the study of the use of technology in organizations. In the first instance, she makes a key analytical distinction: technology is defined on the basis of its material nature.

> Technology is, on the one hand, an identifiable, relatively durable entity and a phenomenon organized physically, economically, politically and socially in time and space. It has material and textual properties and transcends the experience of particular individuals and settings. In this aspect, it is what we call a material artifact (Orlikowski, 2000, p. 263, own translation).

Although materiality itself and its access have a determining influence on use, technology becomes meaningful in terms of the differentiated and situated experience resulting from the practices of those who employ it. The notion of technology in practice is important because, although the technology exists –for example, a given number of computers or access to the Internet– its role is understood when it is analyzed with respect to how and for what purpose it is used. According to Giddens' (1984) structuration theory, social practices are the key analytical issue in understanding the link between structure and human agency.

Orlikowski (1992, 2000) adapts this author's theory to propose the notion of technologies in practice as resources or tools. Technologies in practice are conditioned by the characteristics of the organization and the context in general that surrounds them. Simultaneously, through the practices of use of technologies it is possible to change the
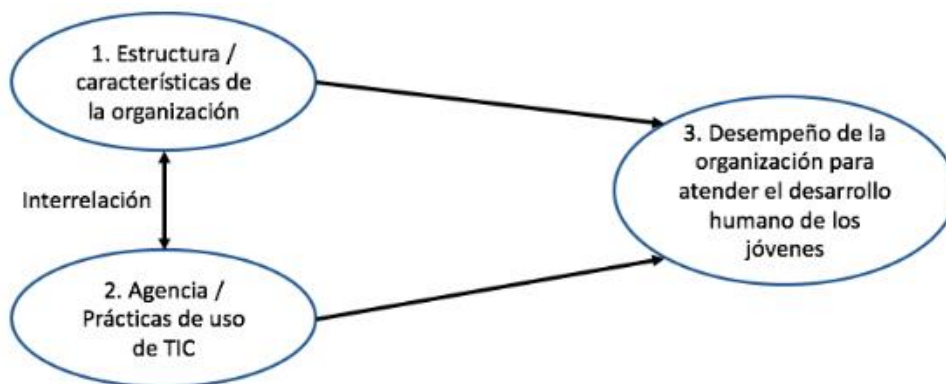
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structure of the organization, even from the practices of an organization, technology can influence a broader social context.

> As the user interacts with a technology he shapes the technological structure that shapes its use. Technological structures are therefore neither external nor independent of human action; they are not "out there" embodied in technologies simply waiting to be appropriated. Rather, they are virtual and emerge from people's repeated and situated interactions with the technologies available to them. The structures that emerge from the technologies in use, which I call technologies in practice, are the set of rules and resources that are constituted in the continuous and situated action of people with specific technologies (Orlikowski, 2000, p. 262, own translation).

Orlikowski's (2000) proposal is broader and more complex; however, for this study we only take his essential approaches to guide the analysis and interpretation of the data. First off, the structure and general characteristics of the organizations are recognized. This body of data includes the size of the organization in terms of its operational capacity, with reference to the number of departments or administrative areas, the number of personnel, the years of operation of the organization and the years since it has had access to the Internet, as well as the budget it has and the number of sources of financing.

Secondly, the possibilities of organizations to make use of ICTs are reviewed, specifically the technologies in practice, what they do, for what purpose and their modes of use, as well as the frequency with which they are used. Finally, data on the performance of the organizations with respect to the fulfillment of their objectives are analyzed, considering the number of young people they serve, the thematic areas and the intervention modalities or strategies through which they do so. Figure 1 shows these aspects in the form of causal relationships.

Figure 1. Relationships between structure, technological practices and performance.

Sourse: theoretical model based on Orlikowski (2000).

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The methodology used to analyze the behavior between the body of data or variables corresponding to Orlikowski's (2000) categories is presented below; these were modified to accommodate the empirical variables of the questionnaire used in this research.

Methodology

This work was based on a database of organizations that mainly (although not exclusively) served Mexican youths in the 32 states of the country. Some of the basic ones were youth institutes at their various levels of government, youth integration centers and various associations whose name and objectives made explicit their work in support of the youth.

The data were collected from July to October 2016[2] through a national online survey conducted on these organizations, with the purpose of generating information for the preparation of a diagnosis at national level on the ways in which governmental and civil organizations use ICTs in addressing problems related to young people from 12 to 29 years of age in vulnerable or marginalized conditions.

The questionnaire considered contact, linkage, dissemination, spaces for participation, feedback, evaluation and follow-up of programs and actions, as well as the identification of new demands and intervention alternatives aimed to improve the development options of this population group. The survey was conducted over the telephone and included four sections: 1) general characteristics of the CSO or GO; 2) objectives, population served and intervention strategies; 3) use of ICTs; and 4) organizational structure, physical infrastructure and financing.

In its initial format, the database included 258 questionnaires answered by the GOs and CSOs and contained 53 discrete and continuous variables. Therefore, the first step was to reparametrize some count variables (continuous or scale) into discrete ones. This involved working with a database of 204 questionnaires and 43 variables. The variables used and their main statistics are presented in Attachment 1. A broader description of the context, methodology and main findings of this survey can be found in Padilla *et al*. (2019).

As mentioned above, the objective of this article is not to report the results of this survey, but to use them for theoretical-methodological analysis. This databank, although not of recent date, maintains its value since there is no reference to a more recent survey on ICT practices in Mexican organizations dedicated to youth development.

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This analysis proposes a set of statistical hypotheses based on the theoretical model derived from Orlikowski's theory (see figure 1), which predict the behavior among the variables grouped in the three main categories of this model:

- H1: The general characteristics of the organizations, in terms of years of operation and internet access, positively influence their objectives, their population served and their intervention strategies.
- H2: The organizational structure (physical infrastructure and organizations financing) positively influences their objectives, population served and intervention strategies.
- H3: The fact that the organizations make use of ICTs positively influences their objectives, their population served and their intervention strategies.

This analysis provides a detailed statistical review of the behavior among its variables, particularly the relationship between the body of data defining the organization's characteristics on the practices and uses of ICTs and the attention they offer to the youth, as described in the theoretical section. The statistical methods employed were exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and covariance structure-based equation modeling (CSEM). These procedures were chosen for the following reasons:

1) There were many observable variables, so it was necessary to use a procedure to reduce them.
2) The variables in the ICT group were Likert scale variables.
3) The variables did not represent the perceptions of the interviewees, but rather indicated activities, characteristics, frequencies of use, etc., which are based on what the organizations themselves reported and not on records (accounting or otherwise).

The AFE –a procedure also known as dimension reduction– allows observable variables to be grouped into unobservable or latent constructs. In this process, observable variables that are not integrated into the model are discarded. To improve efficiency, different restrictions were considered: a) that the eigenvalues were greater than 1 to determine the number of intrinsic variables; b) that the factor loadings were greater than 0.5; c) would not have high cross factor loadings (greater than 0.4); and d) would not have communality values lower than 0.4 (Hair *et al*., 1999). Exceptions to this rule were considered only if the factor loadings were greater than 0.5 and the communality value was greater than 0.4. The AFE results were used to propose the measurement model or AFC. This procedure was carried out with the FACTOR® and SPSS 22 programs.

In the AFC, a hypothetical model, in this case the one derived from the AFE, is used to compare a covariance matrix of the observed variables (S) with the estimated covariance matrix (Σ*). By reparametrizing the study variables into discrete variables, the problem of skewness and kurtosis was considerably reduced, whereupon it was considered to employ the maximum likelihood method in the AFE procedure (Aldas and Jimenez, 2017).

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To test the efficiency of the CFA, various model fit statistics were used, as well as discriminating and convergent validity. Convergent validity, which confirms that the observable variables cluster into the latent constructs, is tested with the statistics average variance extracted (VPE > 0.5), and construct reliability index (IFC > 0.7) (Ahmad *et al*., 2016).

Discriminating validity, which allows differentiating the latent constructs of the model from each other, is tested with two statistics: a) from the square root of the SPV values, which must be greater than the bivariate correlation of the latent variables (Fornell & Larcker, 1981); b) according to the HTMT statistic, proposed by *Henseler et al*. (2015), which must be less than 0.9.

SCMs express the direct, indirect and total effects between a set of latent variables, which are based on the covariances of the observable variables. Therefore, SCMs have two components: the measurement model (or CFA) and the structural model of latent variables (Schreiber *et al*., 2006). These components are estimated simultaneously using various statistical methods. According to Fornell and Larcker (1981) the variances and covariances matrix of the structural component and the measurement component can be expressed as: $\Sigma = E\left[\begin{bmatrix} y \\ x \end{bmatrix}\begin{bmatrix} y \\ x \end{bmatrix}'\right]$, which is compared with the covariance matrix of the population S, through minimization between S and Σ. The minimization method resembles that employed in the AFC, since the maximum likelihood routine is used. It should be noted that both the AFA and the SCM were performed with the AMOS 22 program.

The stability of the structural model is evaluated with different fit statistics, generally based on the chi-squared distribution and information criteria such as Akaike, Bayesian and Browne and Cudek (Hooper *et al*., 2008).

Results and discussion

When applying the exploratory factor analysis procedure, ten intrinsic variables were extracted, grouping 30 observable variables out of a total of 43; thirteen variables were discarded due to a low correlation between them. The initial grouping of "use of information and communication technologies" stood out, with six latent constructs that grouped 20 observable variables. The initial grouping "general characteristics of the organizations" was formed with two of its three observable variables to the latent construct called "years of operation and Internet access of the organization" (see table 1).

The initial grouping of the three observable variables "objectives, population served and intervention strategies" was renamed the latent construct "social impact of the organizations: youth served, thematic areas and means of intervention", as it was considered more appropriate for the observable variables it integrated.

The initial grouping "organizational structure, physical infrastructure and financing" was divided into two latent constructs, which integrated the five original variables. Regarding the efficiency of the model, the 10 latent constructs maintained

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59.2% of the variance. Six of these constructs presented adequate Cronbach's alpha values (above 0.81). The KMO and Bartlett's sphericity values indicated an efficient factorial adjustment (Levy-Manguin and Varela, 2008) (see table 1).

The considerations derived are summarized below. Thanks to the CFA, greater consistency was achieved in the definition of the observable variables included in the model. This meant discarding 24 non-significant observable variables and including only 19 of these variables (which were grouped into six latent variables) in the subsequent estimation of the SCM. Likewise, four latent constructs derived from the AFE were not integrated in the CFA, because they were rejected by the convergent validity statistics.

These latent constructs are "staff with activities in and training on ICT", "other ICT use frequency activities", "years of operation and with internet access of the organization/institution" and "budget and number of funding sources in 2015". Based on the above, we can affirm that the first statistical hypothesis (H1: The general characteristics of the organizations, in terms of years of operation and internet access, positively influence their objectives, their population served and their intervention strategies) of this work does not hold.

Table 1. Exploratory factor analysis

Initial grouping	N3	N4	Latent construct	AC	T*	PV*	PVA*
Use of information technologies	31	5	Frequency of use of ICT for accounting and financial management and financial management	0.890	5.12	16.0	16.0
		5	Frequency of ICT use for project and internal activities management	0.804	3.13	9.8	25.8
		2	Frequency of use of ICTs in internal staff communication	0.868	1.03	3.2	29.0
		4	Frequency of ICT use in the search for information	0.813	2.61	8.2	37.1
		2	Staff with ICT activities and training	0.452	0.71	2.2	39.3
		2	Other ICT usage frequency activities	0.628	0.67	2.1	41.4
Objectives, population served and intervention strategies	4	3	Social impact of organizations: youth served, thematic areas and means of intervention means of intervention	0.807	1.96	6.1	47.5
Characteristics of the organizations	3	2	Years of operation and internet access of the organization/institutio	0.919	1.60	5.0	52.5

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Initial grouping	N3	N4	Latent construct	AC	T*	PV*	PVA*
Organizational structure, physical infrastructure and financing	5	3	Operational capacity: personnel and administrative areas	0.640	1.29	4.0	56.6
		2	Budget and number of funding sources in 2015	0.596	0.83	2.6	59.2

Notes: N1= number of observable variables of the initial grouping. N2= number of observable variables grouped in the latent construct. AC= Cronbach's alpha. */ Rotational sums of squared loads for T= total, PV= percentage variance and PVA= Percentage of accumulated variance. Extraction method: Maximum likelihood. Rotation method: Promax with Kaiser normalization. Rotation converged in 7 iterations. Kaiser-Meyer-Olkin statistic of sampling adequacy. = 0.843 (very good). Bartlett's test for sphericity: $\chi 2$ [496 gl] = 3082.162, with Probability. = 0.000. Determinant = 1.02 E-07.
Source: Prepared by the authors based on data from 204 surveys.

The CFA results are illustrated in table 2, which shows that the estimated unstandardized factor loadings (NSF) of the observable variables grouped in the latent constructs were significant. Likewise, the standardized factor loadings (SFC) are all greater or close to 0.6 (and less than unity). The latter allows us to estimate SPV values greater than 0.5 and IFC values exceeding 0.7. Latent variables that did not reach these values or whose SFC of the observable variables were greater than unity had to be eliminated from the model.

Consequently, it can be stated that the latent variables derived from the CFA present adequate convergent validity (Ahmad *et al*., 2016). Although not all latent variables presented adequate Cronbach's alpha values, this does not invalidate the above statement. Some goodness-of-fit indicators are also presented at the bottom of table 2, indicating that the measurement model and convergent validity are adequate and reliable, according to criteria proposed by Hooper *et. al*. (2008) and Schreiber *et al*. (2006).

Table 2. Confirmatory factor analysis and convergent validity

Latent construct	V. observable	CFNE	EE	CFE	IFC	VE	AC
Frequency of use of ICTs for accounting and financial administration (Adfin)	fr_adtic5	0.806	0.054	0.789	0.895	0.634	0.89
	fr_adtic4	0.941	0.05	0.889			
	fr_adtic3	0.553	0.052	0.639			
	fr_adtic2	1.000		0.917			
	fr_adtic1	0.797	0.064	0.711			
Frequency of ICT use for project and internal activities management (Gproy)	fr_adtic9	0.807	0.102	0.619	0.762	0.519	0.76
	fr_adtic8	1.000		0.759			
	fr_adtic7	1.006	0.108	0.773			
Frequency of ICT use in information search (Fbinf)	frc_inftic4	0.774	0.094	0.578	0.831	0.555	0.81
	frc_inftic3	0.912	0.076	0.799			
	frc_inftic2	1.000		0.835			

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Latent construct	V. observable	CFNE	EE	CFE	IFC	VE	AC
	frc_inftic1	0.681	0.062	0.742			
Frequency of use of ICTs in internal staff communication (Coint)	fr_adtic13	0.897	0.077	0.922	0.879	0.784	0.87
	fr_adtic12	1.000		0.847			
Social impact of organizations: youth served, thematic areas and intervention strategies (Imsoc)	tot_med5	1.000		0.848	0.814	0.596	0.81
	tot_tema5	0.975	0.095	0.804			
	tot_aten5	0.802	0.09	0.65			
Operational capacity: personnel and administrative areas (Cap)	tot_per5	0.428	0.08	0.694	0.725	0.570	0.62
	sum_dptos	1.000		0.811			

Adjustment indexes

1) Absolute adjustment	Prob [$\chi^2$137gl= 189.525]	0.002	
	Root mean square approximation of error (RMSEA)	0.043	Acceptable
	Goodness-of-fit index (GFI)	0.912	Suitable
2) Adjustment incremental	Modified goodness-of-fit index (AGFI)	0.878	Not acceptable
	Comparative fit index (CFI)	0.971	Acceptable
	Tucker-Lewin Index (TLI)	0.964	Acceptable
	Normal adjustment index (NFI)	0.905	Suitable
3) Parsimonious adjustment	$\dfrac{\chi^2}{gl}$	1.383	Acceptable

Notes: CFNE= Unstandardized factor loadings. EE= Standard error. The values of CFNE other than unity had a significance 99.9%. CFE= Standardized factor loadings. IFC= Construct reliability index. VPE= Average variance extracted. AC= Cronbach's alpha.
Source: Prepared by the authors based on data from 204 surveys.

As can be seen in table 3, the values on the main diagonal are all greater than the values below the main diagonal (both by rows and by columns). Similarly, the HTMT ratios above the main diagonal are all less than 0.9. These results indicate that the discriminating validity of the latent variables is adequate. In this sense, it can be affirmed that the measurement model with six latent variables is reliable and significant, with adequate convergent and discriminating validity, so that from this model it is possible to estimate the SCM.

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Table 3. Discriminating validity

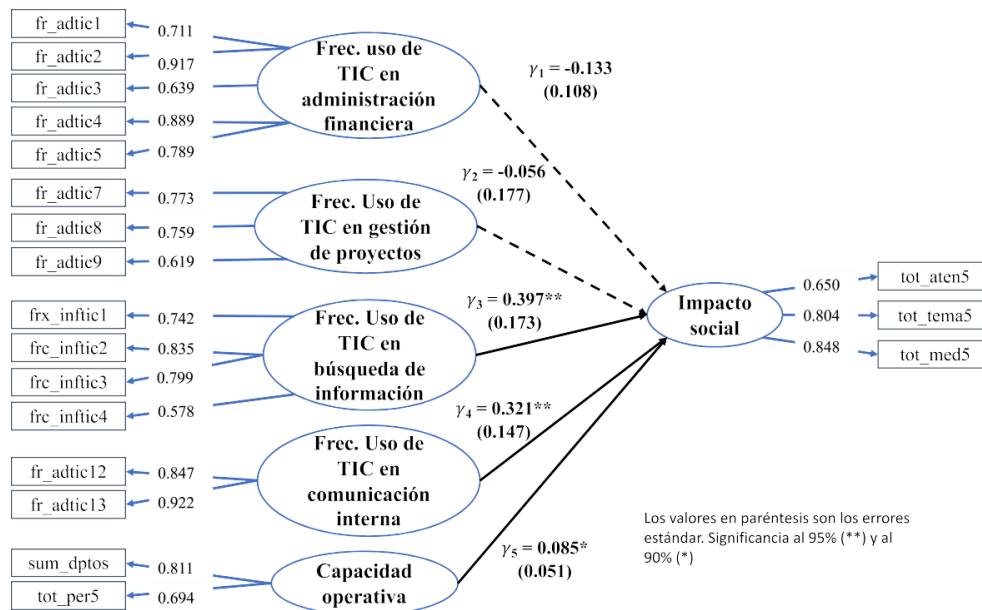| Latent construct	Adfin	Gproy	Fbinf	Coint	Imsoc	Cap
Frequency of use of ICTs for accounting and financial administration (Adfin)	**0.796**	0.664	0.503	0.442	0.209	0.445
Frequency of ICT use for project and internal activities management (Gproy)	0.575	**0.720**	0.613	0.501	0.233	0.233
Frequency of ICT use in information search (Fbinf)	0.427	0.601	**0.745**	0.569	0.382	0.253
Frequency of use of ICTs in internal staff communication (Coint)	0.404	0.53	0.553	**0.885**	0.376	0.308
Social impact of organizations: youth served, thematic areas and intervention strategies (Imsoc)	0.123	0.204	0.35	0.355	**0.772**	0.265
Operational capacity: personnel and administrative areas (Cap)	0.441	0.247	0.238	0.322	0.238	**0.755**

Notes: the root of the SPV is presented in the main diagonal. The values below the main diagonal are the bi-variate correlations of the latent variables. Above the main diagonal are the HTMT ratios of the latent constructs.
Source: Prepared by the authors based on data from 204 surveys.

The structural model presented in Figured 2 shows the SCM estimation, with the standardized path coefficients, their standar error values and their statistical significance; this allowed contrasting the three hypotheses derived from Orlikowski´s (2000) proposal. Figurre 2 also includes the values of the standardized factor loadings associated with the observable and latend varuables.

The SCM estimation was performed considering the covariances of the talent independent variables (following the theoretical proposal of Orlikowski, 2000), although these values are not presented in the figure.

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Figure 2. Estimated SCM

Source: develop by the author

Adjustment index

	$\chi^2 137gl$	189.525	
Absolute or predictive adjustment	χ^2/gl	1.383	Acceptable
	Goodness-of-fit index (GFI)	0.912	Suitable
	Modified goodness-of-fit index (AGFI)	0.878	Almost adequate
	Root mean square residual index (RMR)	0.08	Sufficient
	Root mean square approximation of error (RMSEA)*	0.043	Acceptable
	Akaike information criteria (AIC)	295.5	
	Criterio Browne–Cudeck (BCC)	307.1	These are the comparatively comparatively smaller
	Bayes information criterion (BIC)	471.4	
	AIC Consistent (CAIC)	524.4	
	Expected cross validation rate (ECVI)	1.456	
Comparative adjustment	Comparative fit index (CFI)	0.971	Acceptable
	Normal adjustment index (NFI)	0.905	Suitable
	Incremental adjustment index (IFI)	0.972	Acceptable
	Tucker-Lewin Index (TLI)	0.964	Acceptable
	Comparative fit index (CFI)	0.971	Acceptable

Notes: */ 90% confidence interval = (0.027, 0.058). These fit indices were taken considering Hooper *et al*. (2008) y Schreiber *et al*. (2006).
Source: Prepared by the authors based on data from 204 surveys.

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The structural consistency of the model was based on different goodness-of-fit statistics (see notes in figure 2), which indicate that it is an acceptable model, given that they are in agreement or close to the critical values suggested by Hooper *et al*. (2008) and Schreiber *et al*. (2006). With this in mind, it is possible to affirm that the relationship between the intrinsic variables of this estimated model is reliable and, therefore, can be used for its cause and effect analysis between the resulting latent variables.

H1, which indicates that the general characteristics of the organizations positively influence their objectives, their population served and their intervention strategies, disappears because the CFA statistics made it necessary to suppress the intrinsic variables "years of operation and with access to the Internet of the organization".

On the other hand, H2, which states that the organizational structure, physical infrastructure and financing of the organizations have a positive influence on their objectives, their population served and their intervention strategies, is partially verified. Given this, it was necessary to modify the hypothesis to H2b: operational capacity, i.e., number of staff and administrative areas, positively influence the social impact of the organizations: youth served, thematic areas and means of intervention. This hypothesis holds (γ_5 =0.085, t=1.670).

If the organization is better articulated, that is, if it has an organizational structure with areas with delimited responsibilities (management, marketing, treasury, etc.) and more of its own staff and volunteers, then it will increase the number of people it serves, the electronic and direct means, as well as the topics of attention (educational, psychological, sports, health issues, among others), and the modalities through which it promotes social development and achieves an impact. However, empirical evidence shows that budget management does not influence the social impact of organizations.

H3 was disintegrated into four additional hypotheses, given that the initial grouping "use of information and communication technologies" resulted in four latent constructs. Thus, following the theoretical model proposed by Orlikowski (2000), the additional statistical hypotheses were as follows:

- H3a: The frequency of ICT use for accounting and financial management positively influences the social impact of the organization.
- H3b: The frequency of ICT use for project management and internal activities has a positive influence on the social impact of the organization.
- H3c: The frequency of ICT use for information search has a positive influence on the social impact of organizations.
- H3d: The frequency of ICT use for internal staff communication positively influences the social impact of the organization.

Hypothesis H3a was not statistically significant, so it was rejected, as was H3b, since it did not sustain statistical significance. In contrast, the additional hypothesis H3c was confirmed (γ_3 = 0.397, t = 2.297); as the frequency of searching for information on sites by organizations in databases, statistics, reports, reports,

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bibliography related to the activities it carries out or on its internal planning increased, the social impact of the organization increased.

Likewise, H3d was confirmed by the empirical data (γ_4 =0.321, t=2.190); to the extent that the frequency of ICT use increased, such as e-mails, social networks, video calls, among others, for the internal communication of the personnel of these organizations, their social impact increased. As a result, it is implied that they were able to serve a greater number of young people, with a wider range of topics and intervention strategies.

Conclusions

The importance of this work lies in its representativeness, given that it contains information from organizations that serve the youth population at the national level. Another contribution is that it determines, from its own perspective, which of the many activities carried out by these organizations have an impact on their performance in serving the human development of young people. Although this project did not directly address this segment of the population, it does open lines of communication with studies on their human development (Zermeño *et al*., 2022), which broadens the understanding of the different and complex living conditions of this population.

The empirical information gathered from these organizations is broad, covering various operational and administrative aspects, the uses of ICTs, the objectives and methods of intervention in the target population, etc. However, one possible explanation for the limited predictive capacity of the model is that not all the organizations provided complete information, which, added to the heterogeneity of the scales used to measure the variables of interest, resulted in the loss of information regarding observable variables.

In addition, it is possible that the heterogeneity of the characteristics of the organization was the cause of the low consistency of the responses, i.e., that there was little correlation between the observable variables. This is considered to explain the modifications and exclusion of certain hypotheses of the work.

In response to the question used in this article, what do technologies tell us about the practices of these youth-oriented organizations in Mexico? A question derived from Orlikowski's (2000) approach to the structuring of technology applied to the statistical model, the following conclusions can be drawn. In the first place, it is evident that there are practices of use of these technologies by the organizations studied; however, the results show that using them in administrative, financial, project and internal activities management is not enough to have an impact on their performance with their beneficiaries.

Likewise, the ICT use practices that are related to the social impact of these organizations are linked to the investment of time for information search and internal staff communication, and to the operational capacity of the organizations.

In other words, both those that do have an impact on the performance of the organization to address its social mission, and those that do not, are practices that

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pertain to early stages of ICT adoption that satisfy the level of functionality or operation of the organization but do not advance towards the challenges demanded by the digital transformation we are experiencing —changes in the traditional models of care and service, the capture of resources, the evolution in programs and goals, the improvement of the efficiency of processes to meet these challenges— as suggested by Caralt *et al*. (2017). Therefore, government and civil society organizations that seek to influence the improvement of the conditions of youth in Mexico are in a take-off stage in the adoption of ICTs.

Secondly, we may conclude that the practices of ICT use that were relevant for organizations to achieve their goals, according to their responses, are far from aspects such as fundraising (fundraising for NGOs), encryption technology to protect their data and communication, According to the biannual survey conducted by Nonprofit Tech for Good, these are key for organizations to take advantage of ICTs in a more efficient and creative way in favor of their social goals, especially nonprofit organizations.

Therefore, the level of ICT adoption by these entities reflects that their maturity as organizations is not yet fully developed with respect to the optimization of their technological practices. These results coincide empirically with the results on Latin America of Nonprofit Tech for Good (2019) and theoretically with Orlikowski's perspective, in that the characteristics of organizations influence the way in which employees interact with technology.

In this sense, it is evident that organizations, even when some have been in operation for years and have adopted ICTs, have windows of opportunity that require attention so that they can mature and better respond to their social goals. Some of these opportunities are: to have sufficient and constant sources of funding; to employ dedicated and trained personnel, including specialists in software and digital communication; and to move towards a digital culture that helps them understand that digital technologies can be allies in their social causes, especially when the young population is a preferred user of these technologies.

In view of the limitations of ICT adoption in organizations, there is a need for future comparative studies between the different types of civil, non-governmental and governmental organizations, and their impact on the effective fulfillment of their social mission, which would imply including the perspective of young people. Along the same lines, confirming that the dyad between the statistical model and the perspective of the structuring of technology is valuable for studying practices with technology, since it has helped to see with greater precision future adjustments to the instrument to include other variables that better reveal the social impact of organizations supported by ICTs.

Finally, we find it valuable to ratify the relevance that deepening the understanding of how these social and governmental entities use ICTs can facilitate the identification of opportunities to improve their use in administrative and financial management, but, above all, it can be of support to detect gaps in their mission, expand the approaches to understand and serve their beneficiaries in a better way, as well as to propose digital strategies that have an impact on the achievement of their goals and objectives.

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Annex

Initial grouping	Key	Observable variable	Min.	Max.	Average	Desv. Est.	Asymmetry	Curtosis
General characteristics of OG or OSC	y_oper5	Years of operation of your organization	1	5	2.89	1.46	0.07	-1.36
	y_www5	Years that your organization/institution has internet access	1	5	2.84	1.47	0.10	-1.34
	inver5	Average annual investment in ICT	1	5	2.89	1.51	0.00	-1.44
Objectives, population served and intervention strategies	tot_aten5	Total number of people served per organization	1	5	2.98	1.42	0.01	-1.30
	cob_geo4	Geographic coverage in your organization (1 = municipal, 2 = state, 3 = national, 4 = international)	1	4	1.46	0.68	1.37	1.34
	tot_tema5	Number of thematic areas of support to youth by your organization	1	5	2.95	1.39	0.09	-1.24
	tot_med5	Number of means of intervention that the organization carries out with young people.	1	5	2.94	1.36	0.05	-1.24
Use of information and communication technologies	s_equip5	Total equipment owned by the organization	1	5	2.90	1.41	0.11	-1.28
	frec_internt	Frequency of internet use (1 = less than 1 per month, 2 = monthly, 3 = fortnightly, 4 = weekly, 5 = days a week, 6 = daily)	1	6	5.74	0.80	-4.26	20.22
	s_ptic5	Organizational staff with ICT activities	1	5	2.95	1.44	0.00	-1.38

Initial grouping	Key	Observable variable	Min.	Max.	Average	Desv. Est.	Asymmetry	Curtosis
	dias_cap4	Days per year are dedicated to training staff in the use of ICTs.	1	4	2.35	1.18	0.19	-1.47
	fr_adtic1	Systematized accounting in accounting software	1	4	2.37	1.29	0.20	-1.67
	fr_adtic2	Management of online banking accounts	1	4	2.25	1.26	0.31	-1.58
	fr_adtic3	Internet price research or quotations	1	4	2.70	0.99	-0.13	-1.08
	fr_adtic4	Payment to suppliers by e-bank	1	4	2.04	1.22	0.61	-1.28
	fr_adtic5	Online Payroll	1	4	1.85	1.18	0.92	-0.82
	fr_adtic6	Project management with specialized software	1	4	2.07	1.13	0.56	-1.15
	fr_adtic7	Scheduling of activities with specialized software	1	4	2.85	1.12	-0.48	-1.18
	fr_adtic8	Cloud-based file hosting and management	1	4	2.65	1.14	-0.22	-1.36
	fr_adtic9	Management of databases and internal online platforms	1	4	1.99	1.13	0.70	-0.98
	fr_adtic10	Internal training through the use of ICT	1	4	2.54	1.10	0.03	-1.32
	fr_adtic11	Online accountability (own or other institution's web page)	1	4	2.34	1.08	0.29	-1.18
	fr_adtic12	Staff alerts through the use of ICTs	1	4	3.34	0.97	-1.29	0.41
	fr_adtic13	Internal communication through the use of ICT	1	4	3.55	0.80	-1.73	2.04
	fr_adtic14	Other functions	1	4	1.64	1.12	1.39	0.21
	frc_inftic1	Sites related to your activity	1	4	3.54	0.70	-1.48	1.64

Initial grouping	Key	Observable variable	Min.	Max.	Average	Desv. Est.	Asymmetry	Curtosis
	frc_inftic2	Databases and statistics to support your activity	1	4	3.16	0.92	-0.82	-0.28
	frc_inftic3	Reports, reports, academic texts and specialized literature	1	4	3.16	0.87	-0.67	-0.53
	frc_inftic4	Corporate business travel planning	1	4	2.38	1.03	0.29	-1.04
	frc_inftic5	Other information	1	4	2.01	1.21	0.68	-1.19
	imag_tic	Number of media to disseminate the company's image and activities	0	7	2.62	1.66	0.53	-0.38
	mfr_tic	How often you update your online content (1 = less than once a month, 2 = monthly, 3 = bi-weekly, 4 = weekly, 4 = weekly, 5 = daily)	0	6	4.17	1.91	-0.86	-0.55
	sum_fintic	Sum of types and purposes for the use of ICT (communication campaign, donation, volunteers, distribution and production of publications).	0	6	2.49	1.29	0.42	-0.81
	servs_online	Types of online services provided by the organization (documentation, library, infographics)	0	5	0.54	0.92	1.88	3.39
	numtipo_inf	Types of information provided to young people through the Internet and other ICTs (organization, consultations,	0	8	3.66	1.62	-0.48	-0.20

Initial grouping	Key	Observable variable	Min.	Max.	Average	Desv. Est.	Asymmetry	Curtosis
		advice, complaints and suggestions, video tutorials).						
	sum_mectec	Number of technological mechanisms used by the beneficiary to interact with the organization (surveys, forums, social networks, signatures for causes, social mobilization, evaluation).	0	7	3.03	1.71	0.34	-0.27
	sum_coopint	Number of national or international cooperation activities with the use of ICTs (presentation of projects, financing, training, advice, promotion of public policies and legislation, denunciations, exchange of information, virtual communities).	0	9	4.50	2.48	-0.23	-0.69
	sum_dptos	Number of departments in the organizational structure (management, head office, operational area, marketing, treasury, etc.)	0	10	4.80	2.84	0.28	-0.82
Organizational structure, physical infrastructure and financing	tot_per5	Total number of members of your organization	1	5	2.99	1.42	0.01	-1.32
	infr_prop	The organization has its own facilities (1 = no physical space, 2 = borrowed, 3 = rented,	1	4	2.98	1.01	-0.44	-1.09

Initial grouping	Key	Observable variable	Min.	Max.	Average	Desv. Est.	Asymmetry	Curtosis
		4 = owned), 3 = rented, 4 = owned)						
	mts_sqr	Surface area in square meters of facilities (1 = less than 100, 2 = from 101 to 200, 3 = from 201 to 500, 4 = more than 500)	1	4	2.03	1.18	0.67	-1.11
	pres_2015_6	Budget amount during 2016	1	6	3.46	1.72	0.03	-1.29
	nu_ffinan5	Number of funding source in 2015.	1	5	2.91	1.32	0.24	-1.09

Source: own elaboration with information from the working database of 204 observations.

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