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Digital Transformation of Marketing in Small and Medium Enterprises Through Social Networks: Plitogenic Decision-Making

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Abstract. How companies relate to customers and the global society has changed over time; those who do not use internet marketing and social networks have reduced their recognition. The archaic ways businesses handled their marketing have caused a considerable lag in their online sales and the many benefits they can offer. The revolution in the use of technology is currently fundamental for business; practitioners can find several areas to apply this resource, such as decision-making, teleworking, and sales, among others. This allows adapting business operations and services efficiently. Companies leverage a combination of cutting-edge technologies to modernize legacy business operations and recognize and implement new opportunities from current models. This research aims to analyze aspects related to the implication that social networks have in marketing in small and medium-sized companies in the city of Santo Domingo. Te research was developed based on the analytical-synthetic and inductive-deductive research modality and mathematical modeling for decision-making through neutrosophic logic and plithogenic logic. It was determined that the most relevant economic activity is commerce and that the tertiary sector was one of the most affected by the quarantine. Likewise, it was determined that social communities helped increase sales and that the most used company is Facebook and its complementary networks.

Keywords: Social networks, digital transformation, electronic commerce, internet sales, neutrosophic logic, plithogenic logic.

1 Introduction

Reinventing oneself is the term used by medium, small, and micro-enterprises (MSMEs) to take a step towards the digital transformation of their activities in the face of the situation produced by the quarantine. Due to the COVID-19 pandemic, there was no alternative but to enhance electronic commerce (e-commerce)[1]. Those who already had digital platforms adapted easier and are taking better advantage of the situation. The first option for MSMEs that did not have an e-commerce platform was selling their products through their social media profiles or well-known buying and selling applications in Ecuador: "Mercado libre" and OLX. Below are some essential concepts:

Marketing a product: The commercialization of a product or service focuses on commercializing, which consists of putting a product on sale, giving it the necessary commercial conditions for its sale and providing it with the distribution channels that allow it to reach the final public. It is based on all the techniques and decisions focused on selling a product in the market to achieve the best possible results [2].

Social marketing: It is the use of social networks (Facebook, Instagram, Twitter, YouTube, Pinterest, etc.) to communicate information that is interesting to the thousands and millions of users who use the network. It is not a miracle solution for any business, but it can be very effective to add new potential clients, expand the network of suppliers, generate alliances, among others [3]. Social networks can be a fantastic tool to get these contacts to visit the profile, establish a communication channel with them, position the brand, get new customers, and continue buying and recommending other people. To achieve these objectives, a practitioner must know very well how these networks work, their terms and conditions, analyze how to achieve the sale of products and services and the most important thing is to establish a strategy, follow an action plan and use the correct tools to optimize maximum time and resources [3].

Ecuador - Digital Users: Society has been driven towards accelerated digitization due to confinement, motivating proposals from organizations and institutions that, along with creativity and innovation, have activated various digital services that were previously only found in plans. This has provoked a growth both in the number of users and in time spent on platforms, transactions, use of digital services, relevant content, and unfortunately also, false, incomplete content and news that users should be aware of and alert to, verifying and validating

information before sharing or publishing it [4].

Social media	Users
Facebook	13.1 million
Instagram	4.7 million
Linkedin	2.7 Million
TikTok	2.6 Million
Twitter Ads	1.3 Million
Pinterest	1.1 million

Table 1 Audience on Social Networks. Source: [4]. Facebook Ads, Twitter Ads, SemRush, Linkedin Ads, Snapchat Ads, Statista, InternetWorldStats & CIA Worldfact book. Twitter and Spotify information according to the latest available statistics. Figures Spotify and Pinterest.

Ecuador users who employ the different messaging services to carry out communication processes in different activities.

Instant messaging	Users
Messenger	8,400,000
Telegram	300,000
WhatsApp	9,100,000

Table 2 Use of Instant Messaging in Ecuador. Source: [4]. Facebook Ads July 14, 2020.

Digitization has brought along the adaptation of people to a more agile, convenient, and connected world. It has enabled organizations to obtain real-time information, evaluate data and follow the customer throughout the entire value chain to keep it authentic and secure. At the same time, it facilitates the coordination of decisions for the best operation of a company.

In the business landscape, digital transformation fluctuates between two variables. First, measure the revenue each share brings according to competitors. Furthermore, second, add value to customers through the use of technology. Both make the customer experience accessible and control the entire supply chain [5].

Implementing a digital transformation project can be challenging due to budget constraints, or you may find that users are resistant to changes. If this happens, having a plan is essential to get the project back on track. Forbes Technology Council advises on managing digital transformation and correcting courses if the project deviates. Here are the best strategies for tech teams to follow [6]:
- ✓ Identify the goal
- ✓ Remember the reasons to transform
- ✓ Prioritize for an early and easy impact
- ✓ Reboot with a new goal
- ✓ Incorporate smaller profits
- ✓ Design an overlay solution in the cloud
- ✓ Focus on the customer
- ✓ Set recognizable milestones
- ✓ Take a look at organizational change
- ✓ Build consensus across the organization
- ✓ Train employees to experiment and learn
- ✓ Develop a measurable message about the value of the project
- ✓ Handle expectations with care
- ✓ Do not try to do too much at once
- ✓ Remember why it started

Social networks for SMEs

Networks are used to sell on the internet, but launching without a plan does not guarantee business. Facebook, Twitter, Instagram, LinkedIn, Google Plus, Snapchat, or YouTube cannot increase sales by themselves. Social

platforms are essential in a digital marketing strategy to increase the sales of SMEs. The dissemination of content and "advertising" of social platforms are one of the most powerful tools to generate new sales opportunities [7]

Segmentation in social networks

Allows gathering specific content with a specific audience. It allows gathering the appropriate message with the appropriate person. It is something very useful when selling, although it does not offer all the solutions:

- ✓ It is helpful because business owners can send people with certain specific characteristics (such as age, purchasing power, geographical area of residence, etc.) specific messages of interest to them about a product you sell.
- ✓ Insufficient because not all the data allows identifying if they are ready to buy. No social network can do that on its own because [8]

Main objectives of SMEs in social networks

The main goals that social media marketing professionals have are:
- ✓ Increase brand awareness.
- ✓ Increase community engagement.
- ✓ Increase website clicks.

Making sure businesses have them is one of the biggest bets because the conditions for talking to the community would have improved [9]

Digitization of MSMEs

Electronic commerce has been an ally for customers and merchants during the pandemic, with which physical contact has been avoided. Small businesses have looked for a way to ride this "digital wave", which has more impact on sales every day. To help micro, small and medium-sized enterprises (MSMEs) take their first steps in the world of electronic commerce, the Government recently launched a digitization plan, with the support of the Organization of American States (OAS) Kolau technology company. It is a regional initiative, which has been taken to 11 countries in Latin America, whose objective is to promote that MSMEs can create their web pages, to offer and sell their products and services. In Ecuador, the idea is coordinated by the Ministry of Tourism [10]

In Ecuador, 780,000 households make their purchases through electronic commerce. This was reported in the webinar of the consulting firm Kantar called "A vision of the new shopper for the growth of Latin America". The company explained that online purchases are all those processes that are made through applications, Internet sites, or WhatsApp [11]

What motivates people to buy?

There are several interests and motivations of people to buy and make use of electronic commerce, and that is where companies must put their efforts. Customers are looking for a good product, at a good price, with secure payment and timely delivery [12]
- ✓ Have a guarantee of return and/or exchange of product and/or service
- ✓ Guarantee of confidentiality of customer information
- ✓ More information on how to buy the product or service
- ✓ Customer service during the purchase [12]

Online businesses have to work with more responsibility and seriousness because it will be one of the channels of preference for all consumers. If it does not end up being the most important sales channel, it will at least be among the top five most important inside the company. There are *more expert* users, much more constant users, and new users who must be served in the best possible way. The future of electronic commerce is very great and positive and it must be taken with great responsibility [13].

Electronic commerce, also known as e-commerce, is buying and selling products or services, mainly through computer networks and the internet. Thanks to the mass use of the internet, which in Ecuador covers more than half the population. This type of trade proliferated in the world, moving millions of dollars [14].

Ecuador has increased the demand for internet

According to the Association of Telecommunications Companies of Ecuador (Asetel) and the Association of Internet Providers, Added Value, Carriers and Information Technologies (Aeprovi), Ecuador experienced a 30% growth in the demand for internet services during the last months [15]. Likewise, according to statistics from the report "Digital State Ecuador 2020" presented in January, the country has 80% of users with internet access, 33% are concentrated in Quito and Guayaquil, and 63% of the total are older than 24 years old, who register 92% of income and interaction in social networks, of which Facebook, Instagram, WhatsApp and Messenger maintain the leadership with 13 million integrated users [15].

Objectives, policies, and projects of the 2016-2021 national plan

In the National Plan for Telecommunications and Information Technologies of Ecuador 2016-2021,

international trends in the ICT sector show in recent years a greater penetration of portable devices with high storage capacity, development of free transmission products (for example, Netflix, Whatsapp), an exponential increase in storage capacity and the expansion in the supply and demand of cloud computing services. In the future, the abundance of data is expected to multiply more and more through the Internet of Things, social networks, and Big Data analytics, and processing capacity will continue to increase along with greater ease of use of these technologies by the population [16].

For the development of this study, mathematical modeling for decision-making was applied using neutrosophic logic and plithogenic logic. Neutrosophic sets are a part of Neutrosophy, which studies the origin, nature, and scope of neutralities and their interactions with different ideational spectra. Neutrosophic sets are relatively new extensions of fuzzy intuitionist sets, while Plithogeny advocates for the connections and unification of theories and ideas in varied fields of science, as it is an extension of the classical set, fuzzy set, fuzzy intuitionist set, and neutrosophic set [17].

2 Methods

To determine the impact that the use of social networks as a marketing strategy for their products or services has on businesses during the quarantine period due to the COVID-19 pandemic, a survey was applied to business owners who are doing this activity. As well as the observation of the offer in the Marketplace and the groups on Facebook: purchase sale Santo Domingo and OLX Santo Domingo de Los Tsáchilas.

Analytical-Synthetic: It facilitates the processes and the unification of said study based on its constituents, allowing information to be obtained on each of the aspects required in the survey carried out with entrepreneurs.

Inductive-Deductive: With this method, the conclusions are reached from the premises obtained [18].

Techniques
Mathematical modeling through neutrosophic logic and plithogenic logic

Documentary research to obtain data related to Small and Medium-sized companies that are marketing through social networks.

Neutrosophic sets were introduced in the literature by F. Smarandache since fuzzy intuitionistic sets could only handle incomplete information, but not the indeterminate and inconsistent information, which commonly exists in fuzzy systems. Thus, the term neutrosophic means knowledge of neutral thought and this neutrality represents the main distinction between fuzzy logic and fuzzy intuitionist [19-27].

In neutrosophic sets, the indeterminacy is explicitly quantified through a new parameter I. True membership (T), indeterminate membership (I), and false membership (F) are independent of each other and the sum among them satisfies the inequalities $0 \leq T + I + F \leq 3$. In fuzzy intuitionistic sets, the uncertainty depends on the degree of membership and the degree of non-membership [28]. In neutrosophic sets, the indeterminacy factor (I) is independent of the true and false values. There are no restrictions between the degree of truth, the degree of indeterminacy, and the degree of falsehood [19, 28-31].

If U is a universe of discourse, a Neutrosophic Set (NS) is characterized by three membership functions, uA (x), rA (x), vA (x) :X →] 0−, 1+ [, which satisfy the condition $0 \leq -$ inf uA (x) + inf rA (x) + inf vA (x) ≤ sup uA (x) + sup rA (x) + sup vA (x) ≤ 3 + for all x∈X. uA (x), rA (x) and vA (x) are the membership functions of the trueness, indeterminacy and falsehood of x in A, respectively and their images are standard or non-standard subsets of] 0−, 1+ [.

When approaching the perspective of indeterminacy and contradiction, as is the case with Gödel's incompleteness theorem, it states that any proposition in a mathematical axiom system will present a degree of truth (T), falsehood (F), and indeterminacy (I). Neutrosophy, therefore, establishes a unique solution for the existence of paradoxes in philosophy.

Plithogeny is the genesis or origin, creation, formation, development, and evolution of new entities from dynamics and mergers of multiple contradictory and/or neutral and/or non-contradictory previous entities. Plithogeny advocates for the connections and unification of theories and ideas in varied fields of science. "Knowledge" is taken as "entities" in various fields, such as social sciences, technical sciences, theories of arts, and so on [31].

Plithogeny is the dynamics of various types of opposites, and/or their neutrals, and/or non-opposites and their organic fusion. Plithogeny is a generalization of dialectics (dynamics of a type of opposites: <A> and <antiA>), Neutrosophy (dynamics of a type of opposites and their neutrals: <A> and <antiA> and <neutA>), since Plithogeny studies the dynamics of many types of opposites and their neutrals and non-opposites (<A> and <antiA> and <neutA>, <B> and <antiB> and <neutB>, etc.), and many non-opposites (<C>, <D>, etc.) all together. As an application and particular case derived from Plithogeny, the plithogenic set extends the classical set, fuzzy set, fuzzy intuitionist set, and neutrosophic set, and has multiple scientific applications [31].

So, (P, a, V, d, c) is called a plitogenic set

1. Where "P" is a set, "a" is an attribute (multidimensional in general), "V" is the range of attribute values, "d" is the degree of membership of the attribute value of each element x to the set P for some given criteria (), and "d" means "" or "" or "", when it is a fuzzy degree of membership, an intuitionistic fuzzy membership or a degree of neutrosophic membership, respectively, of an element x to the plithogenic set P; $x \in Pd_F d_{IF} d_N$

2. "c" means "" or "" or "", when it is a fuzzy attribute value contradiction degree function, intuitionistic fuzzy attribute value contradiction degree function, or neutrosophic attribute value degree of contradiction function, respectively. $c_F c_{IF} c_N$

The functions are defined according to the applications that the experts need to solve. $d(\cdot,\cdot) c(\cdot,\cdot)$
So, the following notation is used:
$x(d(x, V))$, where $d(x, V) = (d(x, v),$ for every $v \in V), \forall x \in P$
The attribute value contradiction degree function is calculated between each attribute value concerning the dominant attribute value (denoted by) in particular and other attribute values.v_D
The function of the degree of contradiction of attribute value c evaluated between the values of two attributes is used in the definition of plithogenic aggregation operators (intersection (Y), union (OR), implication ($\Rightarrow$), equivalence ($\Leftrightarrow$), inclusion (order partial) and other plithogenic aggregation operators that combine two or more degrees of attribute values based on a t-norm and a t-conorm

Most of the plithogenic aggregation operators are linear combinations of a fuzzy t-norm (indicated by $\wedge_F$) with a fuzzy t-conorm (indicated by $\vee_F$), but non-linear combinations can also be constructed.
If the t-norm is applied on the value of the dominant attribute denoted by, and the contradiction between and is, then it is applied on the value of the attribute as follows:

$$[1 - c(v_D, v_2)] \cdot t_{norm}(v_D, v_2) + c(v_D, v_2) \cdot t_{conorm}(v_D, v_2), \tag{1}$$

Or, using symbols:

$$[1 - c(v_D, v_2)] \cdot (v_D \wedge_F v_2) + c(v_D, v_2) \cdot (v_D \vee_F v_2), \tag{2}$$

Similarly, if the t-conorm applies to the value of the dominant attribute denoted by v_D, and the contradiction between v_D and v_2 is $c(v_D, v_2) v_2$, then it applies to the value of the attribute:

$$[1 - c(v_D, v_2)] \cdot t_{conorm}(v_D, v_2) + c(v_D, v_2) \cdot t_{norm}(v_D, v_2), \tag{3}$$

Or, using symbols:

$$[1 - c(v_D, v_2)] \cdot (v_D \vee_F v_2) + c(v_D, v_2) \cdot (v_D \wedge_F v_2), \tag{4}$$

The plithogenic neutrosophic intersection is defined as:

$$(a_1, a_2, a_3) \wedge_P (b_1, b_2, b_3) = \left(a_1 \wedge_F b_1, \frac{1}{2}[(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \vee_F b_3 \right), \tag{5}$$

The plithogenic neutrosophic junction is defined as:

$$(a_1, a_2, a_3) \vee_P (b_1, b_2, b_3) = \left(a_1 \vee_F b_1, \frac{1}{2}[(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \wedge_F b_3 \right), \tag{6}$$

In other words, if something applies to membership, the opposite applies to non-membership, while in indeterminacy it is the average what applies. Plithogenic neutrosophic inclusion is defined as follows:
Since the degrees of contradiction is:
$c(a_1, a_2) = c(a_2, a_3) = c(b_1, b_2) = c(b_2, b_3) = 0.5,$
|Applying $a_2 \geq [1 - c(a_1, a_2)]b_2$ $a_2 \geq (1 - 0.5)b_2$ o $a_2 \geq 0.5b_2$, while $c(a_1, a_3) = c(b_1, b_3) = 1$
Having the opposite is true for $a_1 \leq b_1$ if and only if $a_3 \geq b_3$ therefore $(a_1, a_2, a_3) \leq_P (b_1, b_2, b_3)$if and only $a_1 \leq b_1, a_2 \geq 0.5b_2,$ and $a_3 \geq b_3$

Next, an algorithm for the resolution of this research is presented where Plithogeny will be merged with the algorithm of Neutrosophy.
From this moment on, expressions 2 to 8 must be applied to execute the operations of the classical algorithm with plithogenic numbers.
To elaborate a single decision matrix, the median of the plithogenic numbers is calculated for each combination for all specialists. The median is calculated using the following formula:

$$\text{median}_{i=1}^{m}\{PN_i\} = (\text{median}_{i=1}^{m}\{T(PN_i)\}, \text{median}_{i=1}^{m}\{I(PN_i)\}, \text{median}_{i=1}^{m}\{F(PN_i)\}), \tag{7}$$

Where PN_i, are plithogenic numbers, $T(PN_i)$ are their true components, $I(PN_i)$ are their indeterminate components and $F(PN_i)$ are their false components. In other words, Equation 7 means that the median of a set of plithogenic numbers is defined as the plithogenic number of the medians of its components:

To compare the relationships between the quadrants, the following formula is used to blur a neutrosophic number [32]:

$$S([T, I, F]) = \frac{2+T-I-F}{3}, \tag{8}$$

- Determine for each line of the pairwise comparison matrix, a weighted sum based on the sum of the product of each cell by the priority of each alternative or corresponding criterion.
- For each line, divide its weighted sum by the priority of its corresponding alternative or criterion
- Determine the mean $ʎ_{max}$ of the result of the previous stage.
- Calculate the consistency index (CI) for each alternative or criterion

$$CI = \frac{ʎ_{max}-m}{m-1} \tag{9}$$

    Where m is the number of alternatives
- Determine the Random Index (RI) from table 2
- Determine the consistency ratio index (the ratio between the consistency index and the random index.

3 Results

The investigation resulted as follows:
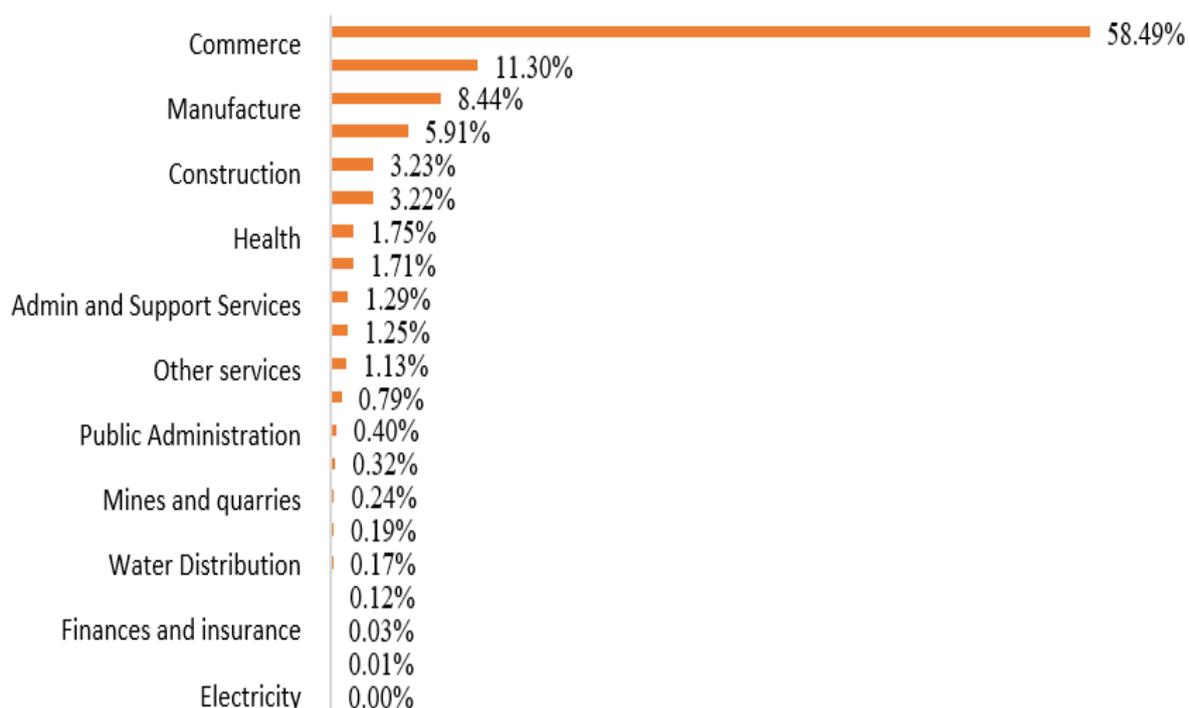
Figure 1. Average distribution of registered sales by type of economic activity in the province of Santo Domingo de Los Tsáchilas, in percentages, period 2011-2016. **Source**: Internal Revenue Service, September 2017.

The productive activities of the province of Santo Domingo de Los Tsáchilas have been influenced by its strategic geographical location, fostering commercial exchange between the coast and the mountains. Thus the main economic activity of the territory is trade, representing 58.49 %, agriculture contributes with 11.30%, manufacturing with 8.44%, transportation, and storage with 5.91%, among others.
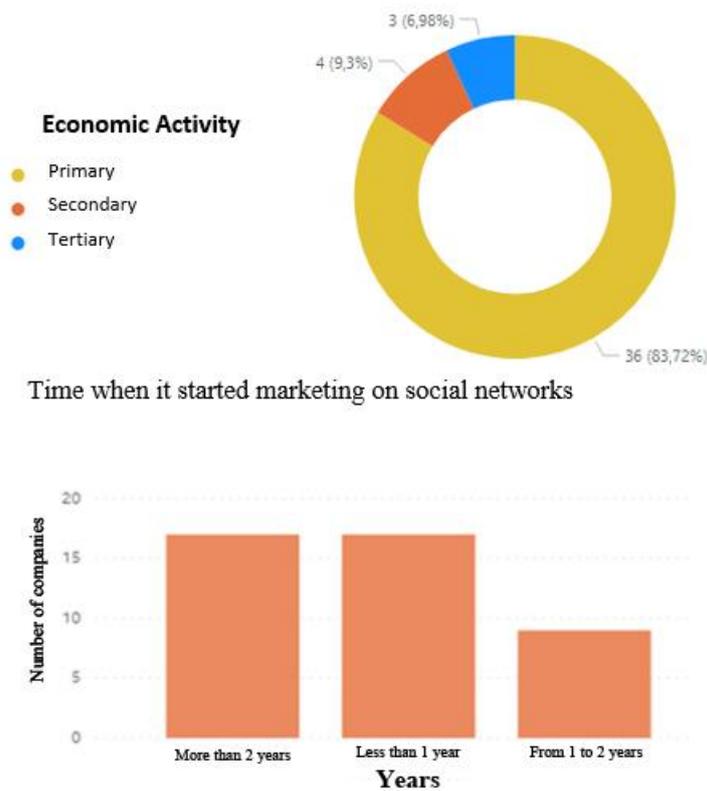
The results of the survey are set out below

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Figure 2. Results by type of economic activity of the companies.

One of the sectors most affected by the quarantine was the tertiary sector of trade in products and services, which in turn constitute the majority of economic activity in Santo Domingo (84% in the survey), followed by secondary activities (9.3% manufacturing and production of goods or services) and primary (6.98% livestock, agriculture and other tasks related to the treatment of raw materials). 60% of those surveyed were already doing social media marketing (40% are positioned in the market and 20% in the growth stage) before the pandemic, and the remaining 40% started social media activity during the pandemic.
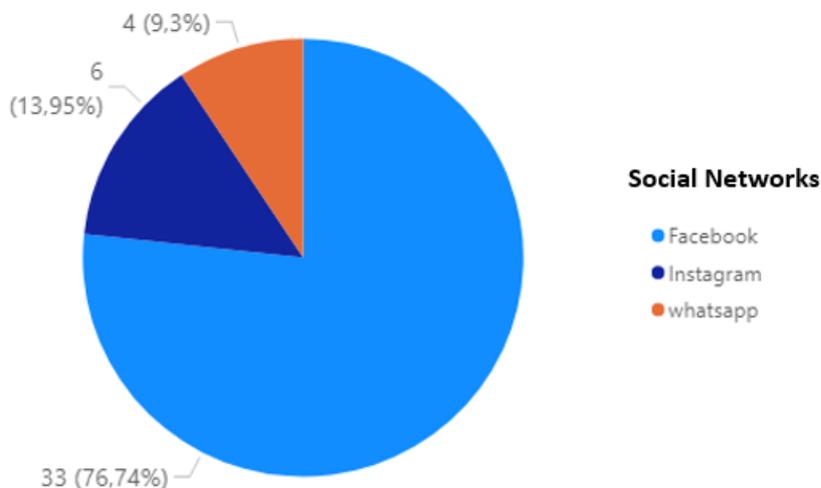
Figure 3. Social networks are used to promote the business or service.

Most entrepreneurs use Facebook as a social network to market their products, Instagram is followed in a lower percentage, and others pointed to WhatsApp (Although it is not a social network), they did not point out as social networks used: LinkedIn, Twitter, and Pinterest, which were among the response options.
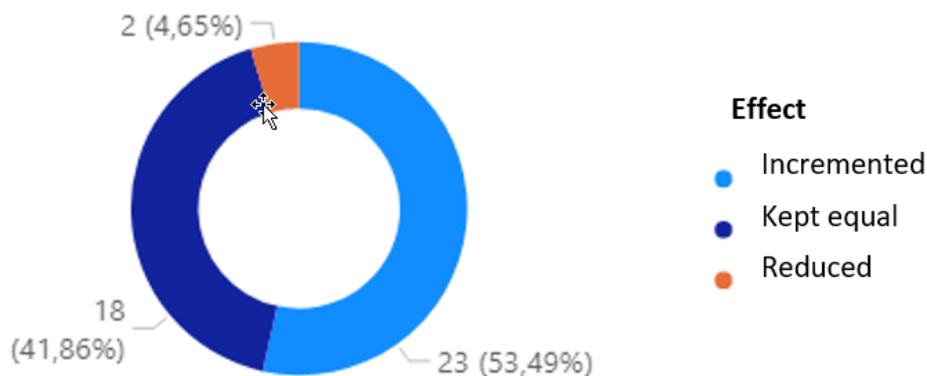
Figure 4. Impact of social networks on marketing and sales.

53% of companies that carried out marketing through social networks have experienced an increase in their sales, 42% indicate that sales remained the same, and only 5% saw their sales reduced.
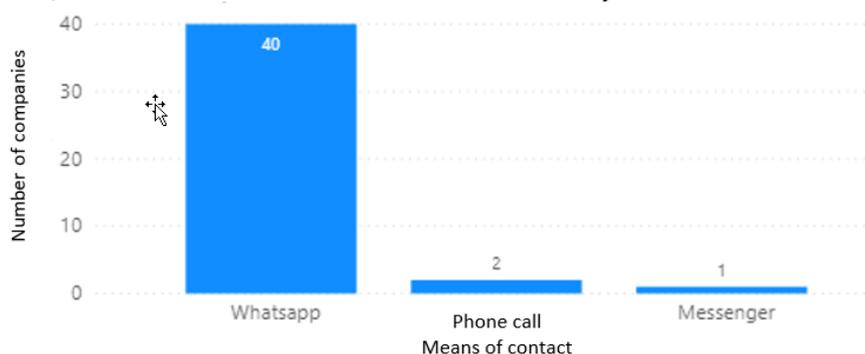
Figure 5. Means of contact to make sales.

The most used means of contact to make sales was WhatsApp, with a minimum percentage of telephone calls and Messenger, they did not consider email, telegram, or any other means of contact.

4 Discussion

4.1 Development of mathematical modeling for decision making with plithogenic logic in the digital transformation of marketing

Plithogenic Set: Digital Transformation of Marketing

That is why a plithogenic set is defined that consists of 4 attributes, each of these attributes contain possible V values that appear between parentheses.

The attributes are defined as follows and the possible values appear in parentheses:

V1	Reputation and ranking in the market	v11	Advertising
		v12	Perception of the brand image in the client
V2	Marketing and sales	v21	Natural resources, livestock, agriculture, and other related tasks
		v22	Manufacture and production of the goods or services
		v23	Trade in products and services
V3	Quality of customer service	v31	Provision of the service
		v32	Customer acquisition
V4	Social networks and platforms	v41	Increase in web traffic
The multi-attribute of dimension 5 has cardinality 2x3x2x1 = 12.			

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The degrees of contradiction between the values for each attribute are defined below:

cN (v11, v12) = 0.2
cN (v21, v22) = cN (v22, v23) = cN (v22, v23) = 0.5
cN (v31, v32) = 0.3
cN (v41, v41) = 0

As you can see, the dominant values for each attribute are: v12, v23, v32, and v41

Linguistic Expression	Plithogenic number (T, I, F)	$\mathcal{S}([T,I,F]) = \frac{2+T-I-F}{3}$
Very Weak (MMD)	(0.10, 0.75, 0.85)	0.16
Weak (D)	(0.25, 0.60, 0.80)	0.28
Medium Weak (MD)	(0.40, 0.70, 0.50)	0.40
Medium (M)	(0.50, 0.40, 0.60)	0.50
Medium Strong (MF)	(0.65, 0.30, 0.45)	0.63
Strong (F)	(0.80, 0.10, 0.30)	0.80
Very Strong (MMF)	(0.95, 0.05, 0.05)	0.95

Table 3 Plitogenic numbers

Figure 6. Neutrosophic matrix under the neutrosophic logic

Figure 7. De-neutrosophic adjacent matrix and the values of the extremes of the MCN under the neutrosophic logic

When v12 is activated, all other nodes are activated, which means that the value of the *brand image perception* on the client in the subset of the reputation and ranking in the market will cause a positive influence by projecting as the dominant value within the plithogenic set.
The evaluation of the digital transformation of marketing in the subset *reputation and ranking in the market* is determined by the results obtained

v11	v12
F (0.95, 0.05, 0.05)	**MF** (0.65, 0.30, 0.45)

Table 3: Subset evaluations reputation and ranking in the market

The plithogenic conjunction of these values gives the following results, taking into account that the degree of contradiction is 0.5; first, it is calculated

(v1) Reputation and ranking in the market

Plitogenic Neutrosophic Intersection	$\delta([T,I,F]) = \frac{2+T-I-F}{3}$	Evaluation
(a1, a2, a3) $\wedge_p$ (b1, b2, b3) = (a1$\wedge_D$ b1,$\frac{1}{2}$ [(a2$\wedge_D$ b2)+ (a2$\vee_D$ b2)], a3$\vee_D$ b3) (a1, a2, a3) $\wedge_p$ (b1, b2, b3) = (0.617, 0.175, 0.4775)	0.65	It is located on a sublevel between MF and F

The Reputation and market ranking subset is classified between medium strong and strong within the plithogenic set using the Plithogenic Neutrosophic Intersection operator. Similarly, evaluations can be carried out for the rest of the subsystems, even between the different subsystems.

Conclusion

The study determines the projection of social networks for marketing based on the attributes analyzed. The use of mathematical modeling for decision making through neutrosophic logic and plithogenic logic establishes the order and relationship between resulting criteria based on:

✓ Social networks for marketing are widely used to improve economic activity in companies of different types of activity, but an adequate way to manage them is not determined.

✓ The group of companies that belong to Facebook is the most used in companies in Santo Domingo, with Facebook and Instagram being the most used social networks for marketing and WhatsApp as a means of communication and contact.

✓ All companies have presented promising results based on SMEs and their digitization process in social networks, but they must have an official website to present greater confidence and credibility of their corporate image.

References

[1] P. R. P. López, S. S. C. Cerda, and J. Y. V. Villegas, "El cuadro de mando integral como modelo de gestión en la cooperativa de ahorro y crédito de la pequeña empresa de Pastaza," Universidad y Sociedad, vol. 13, pp. 433-442, 2021. Forbes, "Forbes Technology Council," 20 08 2020. [Online]. Available:

[2] https://www.forbes.com/sites/forbestechcouncil/2020/08/20/direct-your-digital-transformation-with-these-15-expert-tips/#497df057b6c9.

[3] Analytics Insight, "Digital Transformation: Paving a New Path to the Digital World," 01 23 2020. [Online]. Available: https://www.analyticsinsight.net/digital-transformation-paving-a-new-path-towards-digital-world/?utm_content=136794925&utm_medium=social&utm_source=twitter&hss_channel=tw-328329853.

[4] Andimol, «SOCIAL NETWORKS FOR SMEs,» 2020. [Online]. Available: https://www.andimol.co/redes-sociales-para-pymes.

[5] ML Abal, «Social Networks • Inbound Marketing,» 07 04 2020. [Online]. Available: https://info.andimol.co/duenos-de-pymes-sobre-redes-sociales#vender.

[6] E. Sanchez, «Main objectives of SMEs in social networks,» 12 02 2019. [Online]. Available: https://www.merca20.com/pymes-redes-sociales-objetivos/.

[7] Lideres Magazine, "780,000 Ecuadorian households make their purchases through electronic commerce," 05 10 2020. [Online]. Available: https://www.revistalideres.ec/lideres/comercio-electronico-hogares-ecuatorianos-lideres.html.

[8] Líderes Magazine, «An idea that promotes the digitization of MSMEs,» 08 09 2020. [Online]. Available: https://www.revistalideres.ec/lideres/kolau-idea-promueve-digitalizacion-mipymes.html.

[9] PwC Asesores Comerciles Cia Ltda, «E-Commerce in Ecuador,» 2020. [Online]. Available: https://www.pwc.ec/es/publicaciones/assets/e-commerce-ecuador.pdf.

[10] Diario El Universo, «What is the projection for online businesses after the pandemic ?,» 01 06 2020. [Online]. Available: https://www.eluniverso.com/noticias/2020/06/30/nota/7889859/ecommerce-day-comercio-electronico-impacto-covid-19-region.

[11] Ministry of Telecommunications and the Information Society, «Electronic commerce, an opportunity for business development through the web,» 01 06 2020. [Online]. Available: https://www.telecomunicaciones.gob.ec/comercio-electronico-una-oportunidad-para-el-desarrollo-de-negocios-a-traves-de-la-web/.

[12] J. Caurin, «Marketing,» 21 02 2018. [Online]. Available: https://www.emprendepyme.net/comercializacion.

[13] Refugee and Argentine Migrants, «Marketing in social networks,» April 11, 2016. [Online]. Available: http://www.mirares.com.ar/wp-content/uploads/2016/11/04-redes.pdf.

[14] J. Freire García, «In Ecuador, the demand for the internet and the consumption of content have increased due to isolation,» 30 06 2020. [Online]. Available: https://www.eluniverso.com/larevista/2020/06/29/nota/7888932/ecuador-ha-aumentado-demanda-internet-consumo-contente-debido.

[15] Ministry of Telecommunications and the Information Society, "National Plan for Telecommunications and Information Technologies of Ecuador 2016-2021," 08 2016. [Online]. Available: https://www.telecomunicaciones.gob.ec/wp-content/uploads/2016/08/Libro_plan_tti_REGISTRO-OFICIAL_30_AGOSTO.pdf.

[16] JP Del Alcázar Ponce, «Mentinno - Innovation & Lifetime Value Partners,» 01 06 2020. [Online]. Available: https://drive.google.com/file/d/1NXemb3epywHpjcaiQFGYECW4B_GcXgGb/view.

[17] CA Viña Castillo and GE Cevallos Uve, «FEASIBILITY STUDY OF THE TECHNOLOGICAL ACADEMIC OFFER FOR THE TSA'CHILA SUPERIOR INSTITUTE, ECUADOR,» Atlante, pp. 1-15, 2018.

[18] F. Smarandache, An introduction to the Neutrosophic probability applied in quantum physics: Infinite Study, 2000.

[19] F. Smarandache, Neutrosophy, a new Branch of Philosophy: Infinite Study, 2002.

[20] EJH Antepara, Competencies Interdepencies Analysis based on Neutrosophic Cognitive Mapping: Neutrosophic Sets and Systems, 2017.

[21] F. Smarandache, Physical plithogenic set. APS Annual Gaseous Electronics Meeting Abstracts, 2018.

[22] Pérez-Teruel, Neutrosophic logic for mental model elicitation and analysis .: Neutrosophic Sets and Systems, 2012.

[23] M. Á. Quiroz Martínez, G. A. Granda Villon, D. I. Maldonado Cevallos, and M. Y. Leyva Vásquez, "Análisis comparativo para seleccionar una herramienta de reconocimiento de emociones aplicando mapas de decisión difusos y TOPSIS," Revista Dilemas Contemporáneos, vol. Año VIII, 2020.

[24] D. H. P. Moran, "Chatbot for Technical Support, Analysis of Critical Success Factors Using Fuzzy Cognitive Maps," in Applied Technologies: Second International Conference, ICAT 2020, Quito, Ecuador, December 2–4, 2020, Proceedings, 2021, p. 363.

[25] G. Á. Gómez, J. V. Moya, J. E. Ricardo, and C. B. V. Sánchez, "Evaluating Strategies of Continuing Education for Academics Supported in the Pedagogical Model and Based on Plithogenic Sets," Neutrosophic Sets and Systems, vol. 37, pp. 16-23, 2020.

[26] L. E. Álvarez Cortés, J. G. Sailema Armijo, V. M. Quintanilla Sánchez, and R. González Ortega, "Evaluation of the Impact of Informal Trade using Neutrosophic Cognitive Maps and Weighted Power Mean Operator," Neutrosophic Sets and Systems, vol. 37, pp. 208-214, 2020.

[27] J. E. Ricardo, D. F. C. Flores, J. A. E. Díaz, and K. P. Teruel, "An Exploration of Wisdom of Crowds using Neutrosophic Cognitive Maps," Neutrosophic Sets and Systems, vol. 37, pp. 08-15, 2020.

[28] F. I. Estrabao, M. L. Vázquez, S. A. F. Rojas, and R. G. Ortega, "Mapas cognitivos neutrosóficos para el análisis de la vulnerabilidad socioeconómica. Neutrosophic cognitive maps for the analysis of socioeconomic vulnerability," Neutrosophic Computing and Machine Learning, p. 11, 2020.

[29] F. Smarandache, "Plithogenic Probability & Statistics are generalizations of MultiVariate Probability & Statistics," Neutrosophic Sets and Systems, vol. 43, pp. 280-289, 2021.

[30] G. K. Robles Zambrano, P. M. Moreno Arvelo, M. E. Gaspar Santos, and A. R. Pupo Kairuz, "A Trialist Perspective of the Labor Inclusion of Indigenous People in Ecuador through PESTEL and Neutrosophic Cognitive Maps," Neutrosophic Sets and Systems, vol. 37, pp. 31-38, 2020.

[31] F. Smarandache, "A Unifying Field in Logics: Neutrosophic Logic. Neutrosophy, Neutrosophic Set, Neutrosophic Probability: Neutrosophic Logic. Neutrosophy, Neutrosophic Set, Neutrosophic Probability: Infinite Study.," 2005.

[32] M. Abdel-Basset, M. El-hoseny, A. Gamala, and F. Smarandachec, "A novel model for evaluation Hospital medical care systems based on plithogenic sets," Artificial Intelligence In Medicine, vol. 100, p. 101710, 2019.