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Social Media Information Literacy vs. Fake News: Probing the Business Decisions under COVID-19 times as Innovation skills with fsQCA

Alfabetización en la Información de las Redes Sociales vs. las Falsas Noticias: Probando la Toma de Decisiones de Negocios en tiempos de COVID-19, como habilidades de Innovación con fsQCA

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ABSTRACT

Purpose. This research aims to probe a framework explaining how the social media user professionals in digital marketing and e-business can use social media information literacy (**SMIL**) for business decisions under COVID-19 times as innovation skills to combat fake news narratives (**FKN**) to the next normal.

Methodology. A literature review was done with Delphi-Focus Group and Analytic Hierarchy Process (**AHP**) under academics and professionals' supervision as **SMIL** experts. The survey was on **400** young Mexican SMEs' digital marketing and e-business from Jul-Sep 2021.

Findings and Originality. The original findings confirm a framework with five factors, nineteen variables, **71** items, and five paths as innovation skills**.**

Originality. The fuzzy-set Qualitative Comparative Analysis (fsQCA) technique to discover relationships.

RESUMEN

Propósito. Esta investigación tiene como objetivo probar un modelo que explique cómo el usuario profesional de las redes sociales en el marketing digital y el comercio electrónico puede utilizar la alfabetización en información de las redes sociales (**SMIL**) para tomar decisiones comerciales bajo los tiempos del **COVID-19,** como habilidades de innovación para combatir las narrativas de noticias falsas (**FKN**) para nueva normalidad.

Metodología. Se realizó una revisión de la literatura con Delphi-Focus Group and Analytic Hierarchy Process (**AHP**) bajo la supervisión de académicos y profesionales como expertos en **SMIL**. La encuesta se centró en el marketing digital y el comercio electrónico de 400 jóvenes pymes mexicanas entre Jul-Sep de 2021.

Hallazgos. Los hallazgos originales confirman un modelo con cinco factores, diecinueve variables, 71 ítems y cinco caminos como habilidades de innovación.

Originalidad. La aplicación de la técnica fuzzy-set Qualitative Comparative Analysis (**fsQCA**), para descubrir las relaciones.

1. Introduction

As infections from the **COVID-19** pandemic continue increasing worldwide, social media keep producing fake news, accepted in multiple sectors of the population with adverse effects in numerous areas such as health, education, business, economy, public policies, etc. (Fernández-Rúa, 2020). In this sense, to combat fake news, the researchers have proposed interventions and solutions to the authorities from both perspectives: the technology (e.g., improving algorithm of platforms or introducing, for instance, bots and botnets), and the individuals (e.g., social media information literacy) (Berthon & Pitt, 2018; Burkhardt, 2017). Hence, the improvement for

business because (Ranatunga et al., 2020) because fake news can cause irreversible damage to companies and sink their stock price (Atkinson, 2019). Evidence-based on algorithm analyses data sets of fake stock promotion articles prosecuted by the U.S. Securities and Exchange Commission (SEC). Their initial findings reveal that fake news has a price impact on small-cap companies with high retail ownership but not a particularly significant impact on large enterprises. Businesses must combat fake news (Loeb, 2019). The business's recovery for the next normal is digital (Mischke et al., 2021), and the development of digital skills based on literacy for firms, employees, and users is vital. Digitalization and innovation are an intertwined couple representing competitive advantages (LaBerge et al., 2020; Baig et al., 2020), but first, it is necessary to prepare those involved through digital literacy based on social media. The research novelty is reached from the proposal to empower individuals to cultivate skepticism and determine the underlying variables that constitute social media information literacy (**SMIL**) as innovation skills to be developed to combat the fake news for the next normal to improve business performance.

1.1.Digitalization, Innovation and Social Media Information Literacy (SMIL)

The **COVID-19** pandemic has speeded the adoption of digital technologies by several years, and that many of these changes could be here for the long haul (La Berge et al., 2020). Therefore, firms must digitize their business to protect employees and serve customers facing mobility restrictions because of the **COVID-19** pandemic (Baig et al., 2020). Next-generation of products and services will be developed in several innovation trends, just like open-innovation processes (Deiser & Newton 2013). The **SMIL's** importance as innovation skills to be developed is due to its digitalization nature. According to OECD (2018), digitalization provides a wealth of innovation opportunities for firms based on economic and social activities that provide innovative data sources, advanced digital technologies, and data analytics. Digital-based innovations include business process innovations or products that contain ICTs, for their development or implementation (Beig, 2020; OECD, 2018). To summarize, the **SMIL** as innovation skills of the workforce is essential due to digital technologies for collaboration, communication, and value exchange. Academics and specialists perceive digital marketing and e-business as two business activities of a technological high speed-changing environment (Wymbs, 2011), the main reason to select executives as research subjects in this paper.

1.2.The Fake News and SMIL Skills

Although it is not a novelty, its popularity in social media is increasing. It has a pervasive presence, which allows the interaction and dissemination of distorted ideas (Zhou et al., 2020b). Unfortunately, social media has become a tool for the rapid spread of misinformation and fake news (Rampersad et al., 2019). It affects the organization's reputation several times with top venue through Facebook, Twitter, Blogs, and other social media tools with topics ranging from products and services, organizations, and brands to individuals (NACM, 2018)). For instance, in Latin America, two out of five organizations have been affected by fake news (LCM, 2019). In early education, we have significant problems. The Commission on Fake News and the Teaching of Critical Literacy Skills in United Kingdom (NLT, 2018) reported that only 2% of children and young people have critical digital literacy skills. They need to tell if a news story is real or fake; 49.9% of children are worried about not being able to spot fake news; 60.6% of children now trust the news less as a result of fake news. Teachers (60.9%) believe fake news harms children's well-being, increasing their anxiety levels; 53.5% believe that the national curriculum does not equip children with the literacy skills they need to identify fake news. Indeed, in the **COVID-19** pandemic era, it is considered the *"perfect storm"* for conspiracy theories, gossips, and fake news (Fernández-Rúa, 2020), provided by social media sources, and concluding: *"much is known, but a lot is ignored"* (Muñoz-Sanz, 2021). According to United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018), we have:

1. Disinformation usually refers to an attempt to confuse or manipulate people deliberately (usually carefully planned) by delivering false information to people combined with parallel and intersecting communication strategies and other tactics (such as hacking or compromising persons).
2. Misinformation usually refers to misleading information created or disseminated without manipulative or malicious intent.
3. Malinformation referred to information based on reality but used to cause harm to individuals, organizations, or countries. It is essential the capability of messages and information distinction if they are false or true in different levels (e.g., messages with some truth) and how they were created, produced, or distributed by entities with or not intentions to harm rather than serve the public interest. All the information disorder (dis-information, misinformation and misleading information) that violates a person's privacy without public interest justification go against the

journalism standards and ethics. These three types of information disorders are problems facing society. However, dis-information is incredibly harmful and dangerous because it is often planned and executed using automated technology, with abundant resources and strengthened. Hence, fake news is a deliberate, intentional lie and points to people being actively misinformed by malicious actors (Karlova & Fisher, 2012). See **Table 1.**

Table 1. The Information Disorder

FALSE		**INTENT TO HARM**
Misinformation	**Disinformation**	**Malinformation**
False Connection; Misleading Content	False Context; Imposter Content; Manipulated Content; Fabricated; Content Deception	(Some) Leaks; (Some) Harassment; (Some) Hate Speech
FAKE NEWS Tendency		

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018), with own adaptation

Furthermore, there are seven narrative categories recognized and present in the news, disinformation, misinformation, and malinformation embedded in what facts are selected as salient in the news (or in what facts are made up or taken out of context in toxic communications). See **Table 2**.

Table 2. Different Fake News Narratives (FKN)

Fake News Narrative	Description
1. Satire and Parody (**S&P**)	No intention to cause harm but has potential to fool
2. False Connection (**FCN**)	When headlines, visuals or captions don't support the content
3. Misleading Context (**MSC**)	Misleading use of information to frame an issue or individual
4. False Context (**FCT**)	When genuine content is shared with false contextual information
5. Imposter Content (**IMC**)	When genuine sources are impersonated
6. Manipulated Content (**MPC**)	When genuine information or imagery is manipulated to deceive
7. Fabricated Content (**FBC**)	New content is 100% false, designed to deceive and do harm

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018) with own adaptation

Moreover, automatic fake news detection has been developed in recent years, where current methods can be generally grouped into content-based (**IMC**, **MPC,** and **FBC**) and propagation-based methods based on context (**MSC** and **FSC**) (Zhou et al., 2020a). Hence, this research involves fake news, which those dimensions in all the seven narratives of information disorder according to UNESCO (2018).

3.1.Fake News and Business

There is an increasing number of academics works about the impact of fake news on business. For instance, there is evidence that brands have been impacted in **4** scenarios based on firms:

a. Those that appear in fake news stories or being the targeted,

b. Corporate ads that are appearing by the side of fake news stories,

c. Corporate ads are appearing on liberal (or conservative) leaning news websites

d. Companies are being found to finance fake news indirectly or directly (Berthon & Pitt, 2018).

Indeed, fake news is bad for business, and social media platforms must help users identify fake news. Ignoring the problem could lead to substantially weaker user engagement (Jacobs, 2018). The prevalence and impact of fake news from crowd-sourced origins continue to grow and generate attention and concern in the financial markets. Markets are most vulnerable when high real-time information costs and the ability to take corrective action immediately are limited (Loeb, 2019). Edelman Trust Barometer (ETB, 2021) reveals the epidemic of misinformation and widespread mistrust of societal institutions and leaders around the world. One tool to achieve it is the development of **SMIL** for business innovation skills. It is a successful key factor for business models, how they work, perform, and manage different skills to be developed in the workplace. This context changes the expectations of business owners' traditional leadership skills and models because they are no longer enough to foster market-leading innovation and entrepreneurial returns. It is necessary to assess the **SMIL** effect for business decisions (Oluwakemi, 2019). It is recognized that highly **SMIL** contributes to minimizing business uncertainty and thereby increases the firms' economic performance, and it is a novel perspective (Ranatunga et al., 2020).

3.2.From Digital Literacy, Information Literacy, Media literacy to SMIL

There is currently a call for cultivating a combination of digital literacy, information, and media literacy (Lee & So, 2013) and, recently, social media information literacy (Bühler et al., 2020). However, this situation will require the researchers' viewpoint according to their needs to study three separate fields because there are still unclear boundaries, although they share the same goals. Their publications might overlap in several terms (Lee & So, 2013). See **Table 3.**

Table 3. Some definitions of digital, information, media literacy

Author	Definition
American Library Association (ALA, 2021a)	Digital literacy : "is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills."
American Library Association (ALA, 2021b)	Information Literacy is set of abilities requiring individuals to: "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." To be information literate, then, one needs skills not only in research but in critical thinking.
Center for Media Literacy (CML, 2021)	"Media Literacy is a 21st-century approach to education. It provides a framework to access, analyze, evaluate, create and participate with messages in a variety of forms – from print to video to the Internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy."
United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020)	"Information literacy and media literacy together as a combined set of competencies necessary for life and work today."
National Association for Media Literacy Education. (NAMLE, 2020).	"Media literacy is the ability to access, analyze, evaluate, create, and act using all forms of communication. In its simplest terms, media literacy builds upon the foundation of traditional literacy and offers new forms of reading and writing. Media literacy empowers people to be critical thinkers and makers, effective communicators and active citizens."
Schilder & Redmond, (2019)	"Media literacy works to develop audiences' awareness and abilities to decode key areas of message construction, dissemination, and effects."
Deiser & Newton (2013)	" It is the interplay of leadership skills and related organizational-design principles organizational media literacy, which we define along six dimensions that are interdependent and feed on one another (exhibit): producer, adviser, architect, analyst, recipient, distributor"
OFCOM (2010)	"Media literacy is the ability to access, understand and create communications in a variety of contexts."
Lee (2010)	"Media literacy is considered to be a series of communication competencies, including the ability to access, analyze, evaluate, and communicate information in a variety of forms"

Notes: **DIL.** Digital Information Literacy; **INL.** Information Literacy; **MEL.** Media Literacy
Source : several authors with own adaptation

Nonetheless, here **SMIL** means the combination of information and media literacy socially accepted as a set of competencies necessary for life and work with critical thinking, creativity, literacy, intercultural, citizenship, knowledge, and sustainability published by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018). As the 21st century in the **post-COVID-19** pandemic or the next normal era, after a large lockdown, people's learning skills have been transformed from conventional methods into a social and technological environment based on the internet. It elicits gradually but rapidly shifts to a knowledge society influenced by social media. For instance, this situation has forced individuals to be warned: "Don´t everything you see, hear, or read on social media" (Burkhardt, 2017).

3.3.The Main Variables of Social Media Information Literacy Factor

The lack of frameworks explaining the **SMIL for business decisions as innovation skills factor**s related to face the different **FKN** elicited to undertake a bibliometric analysis using **VOSviewer** software on the **SCOPUS** and **Web of Science** databases. The aim was to search the meaning of **SMIL for business decisions as innovation skills** factor, the main underlying variables, and items related to the social media user to be used as a proposed framework to combat the fake news in the next normal. Afterward, we made a qualitative study of this research, applying a Delphi Panel Focus Group and Analytic Hierarchy Process (**AHP**) (Saaty, 2008). This procedure implied three academics and three professionals, both **SMIL** experts, to determine the main underlying variables and items involved as a conceptual framework. The results of the underlying factors and variables of **SMIL** are depicted in **Table 4.**

Table 4. Delphi Panel-Focus Group with AHP

Objective	Social Media Information Literacy (SMIL) factor with underlying variables			
	ID	Names suggested by three SMIL professors (academic vision)		Weighing suggested by three SMIL professionals (expert vision)
		Factors	Variables	AHP weighing (%) importance
Alternatives	1	A&R	AWN	30
	2		REC	30
	3		UST	40
	Total			100
	4	SFU	SEA	40
	5		FND	35
	6		UND	25
	Total			100
	7	ASM	EVA	50
	8		SKP	35
	9		REE	15
	Total			100
	10	AOI	CRE	60
	11		COM	20
	12		FAC	20
	Total			100

Notes: **SMIL.** Social Media Information Literacy; **A&R.** Awareness and Recognition; **AWN**. Awareness of Information; **REC.** Recognition**; UST.** Use of Technology; **SFU.** Search and Find to Understand; **SEA**. Search; **FND.** Find; **UND.** Understand; **ASM.** Assessment; **EVA.** Evaluation; **SKP.** Skepticism; **REE**. Reevaluation; **AOI.** Abilities over Information; **CRE.** Creation; **COM.** Communication; **FAC.** Final Action
Source: Own.

3.4.Describing the framework

Awareness and Recognition (**A&R**) is the factor in being warned about true and fake information. It is described in two variables:

a. Awareness (**AWN**) can apply critical thinking to explain the information clearly (Burkhardt, 2017). It means people often mistake a surface-level awareness for more profound understanding; a cognitive bias occurs when people mistake familiarity or awareness for actual understanding (LFJ, 2017). Mainly, for young people, information seems more easily obtained by entertainment media (e.g., a video in-class demonstration or comic-book than a written check-list handout), but they do not warn that could be not true (Burkhardt, 2017).

b. Recognition (**REC**). This is a capability to recognize the information needings, the need of information (Bühler, 2020), and the information's value according to the online site reputation (NACM, 2018).

Use of Technology (**UST**). It is the capability to use different devices, mainly: desktops, laptops, tablets, and smartphones, by social media users (AMX, 2021).

Search and Find to Understand (**SFU**). This factor is the capability of searching and finding the information to interpret and understand the information's meaning. It is described in three variables:

a. Search (**SEA**) is a capability to search and decide how and where to find the information needings with technical access, applying adequate search strategies for information (e.g., using date, hashtag, keywords, user, etc.).

b. It is relevant to choose appropriate sources when searching the information (Bühler et al., 2020).

c. Find (**FND**). This variable can find, collect, retrieve, and choose appropriate information (Bühler et al., 2020).

Understand (**UND**). This variable specifies how to interpret and identify the intention and the different points of agreement among the sources to understand the information (Bühler et al., 2020).

Assessment (ASM). This factor involves the capability to process the evaluation and revaluation of the information with a unique feature: skepticism. This factor is described in three variables as follows:

a. Evaluation (**EVA**). This variable specifies capabilities of evaluation of the relevance, credibility, accuracy, quality of information. It is helpful to evaluate and identify if the

information is a piece of fake news (Bühler et al., 2020; Zhou et al. 2020a; NACM, 2018); LFJ, 2017). According to Burkhardt (2017), social media users can evaluate several capabilities, such as visiting sites for fact-checking to evaluate the news (e.g., Snopes, PolitiFact, FactCheck). Besides, they seek experts in a subject to evaluate and clear the information; to evaluate and confirm the links after receiving information; to evaluate and improve their abilities to identify fake news; to evaluate and distinguish a real source of information; to evaluate and evaluate distinguish bias information. Following Burkhardt (2017), young people spent fewer than 15 seconds actively on a page as social media users dedicated to read, understand, and evaluate a headline.

b. Skepticism (**SKP**). This variable can invoke a moment of doubt as to the truth of the information among the processes of evaluation (**EVA**) and reevaluation (**REE**) to prevent the spread of fake news. Based on Burkhardt (2017), this variable describes the mistrust in friends' social media to get information. It is associated with the sentence: "the more times I hear something repeated, more likely I think it is not true".

c. Reevaluation (**REE**) is the variable conceived as a capability of subsequent evaluation or rating that reflects the evaluation information practice. It is based on Bühler's (et al. 2020) work that suggests: "users' reaction evaluation of the content; reevaluation information from another user; reconsidering the capability existing evaluation of information and identifying the benefits of reevaluating information".

Abilities over information (AOI). This factor is implying the capability to process what to do with the information obtained. It is described as follows:

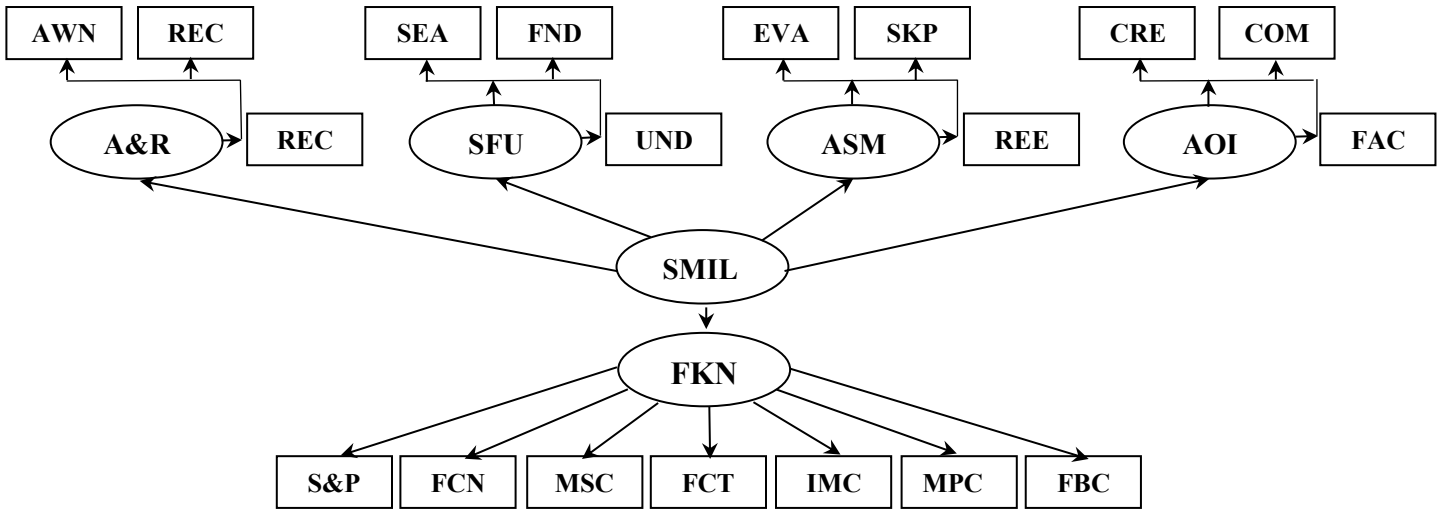
a. Creation (**CRE**) is the variable described by Bühler (et al., 2020) with several capabilities to treat the information, such as rephrasing, merges to create, modification, or clear its meaning. The creation of new information context changes the scope by reducing information, enriching identified information, and designing new information, amongst others.

b. Communication (**COM**). Bühler (et al., 2020) describes this variable as capable of displaying, sharing, exchanging, and providing feedback with positive criticism to other users.

c. Final Action (**FAC**). This variable can determine what action to take, no matter if the information is genuine or fake. Such actions are: keep and storage; delete; modify and share; share (Zhou et al., 2020a; NACM, 2018; Burkhardt (2017); LFJ, 2017)).

Because there is no exist SMIL model enough consolidated, we proposed the following hypothesis: *"**H:** There is no single best combination of underlying factors, variables, and indicators that lead to the better use of **SMIL** in digital marketing or e-business issues. These combinations of underlying factors could be considered innovation skills for business decisions to combat **FKN**."* The final proposal of the framework is depicted in **Figure 1.**

Figure 1. Final Proposal of framework underlying factors SMIL vs FKN



Notes: **SMIL.** Social Media Information Literacy
A&R. Awareness and Recognition; **AWN**. Awareness of Information; **REC.** Recognition**; UST.** Use of Technology **SFU.** Search and Find to Understand; **SEA**. Search; **FND.** Find; **UND.** Understand; **ASM.** Assessment; **EVA.** Evaluation; **SKP.** Skepticism; **REE**. Reevaluation ; **AOI.** Abilities over information; **CRE.** Creation; **COM.** Communication; **FAC.** Final Action; **S&P.** Satire and Parody; **FCN.** False Connection; **MSC.** Misleading Context; **FCT.** False Context; **IMC.** Imposter Content; **MPC.** Manipulated Content; **FBC.** Fabricated Content.
Source: own

4. Research Method

Stage1. It implied a qualitative study based on a literature review involving consistent research on the **SMIL** for business decisions to combat **FKN** to precise a set of criteria researchers used. The configurational approach enables the understanding to identify underlying factors, grouping the variables and indicators as components to serve a conceptual model empirically proved.

Stage 2. A literature review was done based on Delphi-Focus Group and **AHP** with three academics and three professionals in digital marketing and e-business, both experts in **SMIL**. The

final questionnaire consisted of five underlying factors, nineteen variables, and 71 items**.** See **Appendix**.

Stage 3. This research was based on **400** young Mexican executives of SMEs digital marketing and e-business from Jul-Sep, 2021 hat were asked to answer the questionnaire created to capture the **SMIL** for business decisions as skills facing the concepts of the seven fake news narratives. To achieve it: the sample subjects were exposed to see different fake news narratives (based on the next normal and involving themes digital marketing or e-business). The subjects were noticed with a brief explanation of the concepts treated; after the research scope exposition and explanation, they answered the questionnaire. The questionnaire´s reliability is high (**0.7-0.9**) (Mejía-Trejo, 2020) with Cronbach`s Alpha = **0.802** for N= **400** and **71** items per record. The participation was voluntary, confidential with no reward for the participants, and using survey monkey forms from Jan to Jul 2021. The final **400** questionnaires were analyzed under the **fsQCA 3.0** program determining the several underlying factor patterns to get the same outcome. The **SMIL** for business decisions as innovation skills produces the same outcome: to combat the **FKN** to determine the several solutions and prove them. Result analyses, discussion, and conclusions.

4.1.Frequency distributions of demographic data

According to the results obtained from the frequency analysis of **400** subjects, the sample is considered representative of a young executive social media user expert in digital marketing or e-business**.** The sample consisted of more female executives (**62.5%**), the majority of respondents are between 25-35 years old (**100%**). In terms of educational status, all of them are undergraduates in marketing (**35% female/15%% male**) and international business (**15% female/35% male**).

4.2.The fsQCA analysis technique

The **fsQCA** (*fuzzy-set Qualitative Comparative Analysis*) technique allows determining multiple paths leading to the same outcome can be captured, known as *the principle of equifinality* (Ragin, 2008; Ordanini et al., 2013; Schneider & Wagemann, 2010). The **fsQCA** contains "*sufficient"* and *"necessary"* conditions (may exist or not in the solution) marked by their existence, nonexistence, or *"irrelevant"* conditions. The outcome relationship with strong causality is called *"core conditions,"* and the weaker "*peripheral conditions"* for both cases are sufficient and necessary (Fiss, 2011). **fsQCA** calibrates the data (logarithmic conversion of raw data, from **0** to **1**)

(Ragin, 2008; Rihoux y Ragin, 2009), and a fuzzy algorithm generates a solution. The solution represents the combination of the conditions leading to a unique outcome producing a *"truth-table"* where each row represents the observations quantity in each combination (Ragin, 2008; Mejía-Trejo, 2020). The *"consistency"* is measured; this is the correspondence level among the sample cases sharing a configuration or a causal condition in displaying an outcome-focused (Ragin, 2008; Fiss, 2011). The **fsQCA** provides three sets of *"complex, parsimonious, and intermediate solutions"* to reach the same outcome to be explained under the *"coverage"* and *"consistency"* concepts for each solution generated.

5. Results

The main configurations to obtain high values of the underlying factors of **SMIL** and getting low values to fake news narratives (**FKN**), as findings from the **fsQCA** are shown in **Table 5.**

Table 5. Sufficiency condition analysis

SMIL (Social Media Information) vs ~FKN							
Solutions /Conditions	**A&R**	**SFU**	**ASM**	**AOI**	**Raw Coverage** ***(0.25 to 0.65= informative)***	**Unique Coverage (>0.01)**	**Consistency (>0.75)**
1	**O**	**o**	**O**	**o**	**0.51**	**0.05**	**0.95**
2	**O**	**o**	**O**		0.45	0.04	0.90
3	**o**	**o**	**o**		0.33	0.03	0.85
4	**o**	**o**	**o**	**o**	0.29	0.02	0.80
5	**o**		**o**		0.27	0.01	0.77
6	**o**			**o**	0.20	0.01	0.39
7		**o**	**o**		0.18	0.009	0.30
8		**X**		**X**	0.15	0.006	0.25
Overall Solution Coverage (a)				0.82			
Overall Solution Consistency (>0.75) (b)				0.77			
Frequency cutoff				1			
Consistency cutoff (>0.75)				0.83			

Notes *according to Ragin (2008):* **o .** Presence of a condition or "*core conditions".* **o** . Presence of a condition as *"peripheral conditions".* **X** . Negation of a condition (Absence) or *"peripheral conditions".* . Blank spaces indicate *"do not care"* conditions. (a). Similar to a R square in MRA (b). Similar to a correlation
Source: Own data using **fsQCA 3.0**

The results can be interpreted by the introduction of the Boolean algebra algorithm:

*High **(A&R)** * Low/Medium **(SFU)** * High **(ASM)** * Low/Medium **(AOI)** + High **(A&R)** * Low/Medium **(SFU)** * High**(ASM))** + Low/Medium **(A&R)** * Low/Medium **(SFU)** * Low/Medium **(ASM)** + Low/Medium **(A&R)** * Low/Medium **(SFU)** * Low/Medium **(ASM)** **

*Low/Medium (**AOI**) + Low/Medium (**A&R**) * Low/Medium (**ASM**) + Low/Medium (**A&R**) * Low/Medium (**AOI**) + Low/Medium (**SFU**) * Low/Medium (**ASM**) + Negated/Absence (**~SFU**) * Negated/Absence (**~AOI**)-> Negated/Absence (**~FKN**)*

Thereby, regarding the high values in media information literacy (**SMIL**) young executives in digital marketing or e-business issues will show low levels to combat fake news narratives **(FKN)**; this unique outcome is reached through eight combinations of the variables as solutions (*"recipes,"* Ragin 2008) as follows: according to the **Table 5, solutions 1, 2, 3, 4, and 5** are the only ones that fulfill *"raw coverage"* (**0.15** to **0.51**), *"unique coverage"*>0.01, and "*consistency"*>**0.75**. All these solutions, we have the presence or *"do not care"* of the underlying factors (but not the absolute absence or negation of them). **Solutions 1,2**. The young executives in digital marketing and e-business have impact in low values of **FKN** when they have high **A&R** or high **ASM** or at the same time low/medium values of **SFU** or at the same time low/medium values of **AOI** for solution 1 and no matters the value in **AOI,** for solution 2. These solutions explain the values of the **SMIL** underlying factors in **51%** and **45%**, respectively. **Solutions 3, 4.** The young executives in digital marketing and e-business have an impact in low values of **FKN** when they have low/medium **A&R** or low/medium **SFU** or low/medium **ASM** or at the same time no matters the value of **AOI** in solution 3 and at the same time low/medium values of **AOI** in solution 4. These solutions explain the values of the **SMIL** underlying factors in **33%** and **29%**, respectively. **Solution 5.** The young executives in digital marketing and e-business have an impact on low values of **FKN** when they have low/medium **A&R** or the value of **SFU** or **AOI.** However, the solution (configuration or *"recipe")* cannot predict all cases with a high score on the result like the other four solutions because there are other configurations that can predict high scores for the same result (i.e., in the figure upper left corner). Solutions with consistency greater than **0.80** are useful and can be used to advance the theory (Woodside, 2017).

6. Discussion and implications

According to the specialists (Mischke, 20201; Baig et al. 2020, La Berge et al., 2020), the worldwide economic recovery for the next normal is based on digital actions that foster innovation. In that case, all the actors involved must develop social media information literacy skills (Bühler et al., 2020; Zhou, et al., 2020a; NACM, 2018; Burkhardt, 2017; LFJ, 2017; Deiser & Newton, 2013). Besides, it is important to digital marketing and e-business to practice the **SMIL** for

business decisions because of the mentioned digital expectations about the next normal, making digital media the primary (or only) customer-facing communication method for most organizations (SPS,2020).

There are studies around the use of **SMIL** as innovation skills can be embedded successfully in young executives in digital marketing or e-business (Johnson et al., 2013) and studies about the relationship between technological developments and curriculum design (Wymbs, 2011). The research novelty of this research involved such concepts and applications of digital information technology and social media information literacy to combat the fake news narrative in one concept, the **SMIL-FKN** for business decisions innovation skills.

6.1.Theoretical implications

This research has a novelty methodology and approach based on **fsQCA** analysis. Previous studies to analyze the effects of fake news narratives. The **fsQCA** involves complex construction and configuration theories based on the asymmetry between the young executives in digital marketing and e-business with **SMIL** for business decisions to combat **FKN**. This research contributes to the following theoretical issues:

First. The expectation about innovation and other digital advances (even in progress) to propose and improve over how both can increase productivity growth, dynamic, and sustained in the digital next normal (Baig et al., 2020; La Berge et al., 2020; Mischke et al., 2021). In this sense, through the assimilation and implementation of SMIL innovation skills (Deiser & Newton 2013).

Second. We determine the crucial role for the **SMIL** proposal framework composed of a combination of four underlying factors as awareness and recognition (**A&R**), search and find to understand (**SFU**), assessment (**ASM**), and abilities over information (**AOI**). This research also extended the **SMIL** framework by examining the underlying variables in correspondence with each of the twelve underlying factors, such as awareness of Information (**AWN**); recognition **(REC); use** of technology (**UST); Search** (**SEA**); find (**FND**); understand (**UND**); evaluation (**EVA**); skepticism (**SKP**); reevaluation (**REE**); creation (**CRE)**; communication (**COM**); final action (**FAC**) (Bühler et al., 2020; Zhou et al., 2020a; NACM 2018; OECD, 2018; Burkhardt, 2017; LFJ, 2017).

Third. With **fsQCA3.0** software, we determine how interacting as underlying factors of **SMIL** with their twelve variables and **64** items to minimize the **FKN** effects under several patterns to achieve it. The **fsQCA** (Ragin, 2006, 2008; Fiss,2011; Woodside, 2017) expands the scope of previous works in this regard (Xing-Zheng & Niann-Chung, 2021; Apuke & Bahiyah, 2020; Chen & Cheng, 2018; Lee et al., 2018).

Fourth. These results about the **FKN** violation pattern categories could be a proposal tool to measure a charge, level, degree of misleading or clouding information and categorize it. A fake news narrative could be associated with exaggeration when the quality principle based on truth is violated or a redundant presentation style when quantity has been reached. For instance, prior research shows that fake reviews are represented extremely using exaggeration and fantastic descriptions (Lee et al., 2018). Our findings show in solutions **1 and 2,** have the awareness & recognition (**A&R**), search & find to understand (**SFU**), and assessment (**ASM**) with a constant presence; this assures the presence (or *"don't care"*, but not the negation) of the underlying variables: awareness of information (**AWN**); recognition (**REC**)**;** use of technology (**UST**); understand (**UND**); evaluation (**EVA**); Skepticism (**SKP**) and creation (**CRE**) according to **Table 5**, being **AWN**, **REC**, and **SKP** common whether **FKN** or **~FKN**.

Besides, solutions **1 and 2** show that awareness & recognition (**A&R**) and assessment (**ASM**) are with high presence as *"core factors,"* suggesting that they have a critical role in driving the **SMIL** to combat **FKN** (Zhou et al., 2020a; NACM, 2018); Burkhardt, 2017; LFJ, 2017). The young executives are expected to analyze the top headlines not requiring increased effort if they are not warned enough about the information's quality assessment. Hence, the opportunity to reinforce the **A&R** and **ASM** into the **SMIL** for business decisions as innovation skills to combat **FKN.** Thereby, ***H:*** **It is positive**; in other words, eight combinations of underlying factors, variables, and indicators lead to the better use of **SMIL** for business decisions for young executives in digital marketing or e-business issues. Only five of such combinations could be considered innovation skills to combat (**FKN**).

6.2.Practical implications

The research findings provide valuable implications for expert academics, expert consultants, and professional practitioners of social media literacy information (**SMIL**) to develop business decisions as innovation skills in digital marketing and e-business issues and general social media users. Based on the questionnaire (see **Appendix**) results, where the first main sentence is: "*have you ever ear, read and practice some about digital media literacy, information literacy, media literacy, or social media literacy in your career?"* reveals that more than **80%** of the respondents show low levels about this topic demonstrating not to be sure about what it does it mean. Besides the **Figure 3** results where the best **solution 1** reports only **35/400** (less than the 10% of the sample) of young executives in digital marketing and e-business following the **SMIL** for business decisions as innovation skills to combat **FKN,** demonstrated a lack of **SMIL** culture. According to the demographic data, involving the ages of (25-35 years old) the respondents we detected the great necessity to start at early professional education stages the **SMIL** to avoid and combat fake news narratives. The media education needs to enable young executive experts in digital marketing or e-business to apply both media and cultural studies' critical legacies alongside literacy education to the contemporary media ecosystem rather than producing competence frameworks for **SMIL**. It is a neutral set of skills for citizens (McDougall, 2019) where early education must change to adopt a dynamic approach to media literacy, increasing the experience and reflexive in handling information aspects of digital media practice.

Incorporating **SMIL** for business decisions in the curriculum is essential to respond academically to digital media education (McDougall, 2019; Burkhardt, 2017). Also, it is vital to add for social media users a critical exploration of several innovative concepts such as algorithms of AI, bots, botnets, big data, data science, the internet of things, etc. If these novelty concepts are adopted into the media education curriculum, **SMIL** will avoid and combat **FKN**. It must be applied in practical learning in their uses for social justice instead of training the next generation to use these for even further commercial and political exploitation of one another (McDougall, 2019; Burkhardt, 2017; LFJ, 2017).

By another hand, the study suggests (see **Table 5**) at least the practice about awareness (**AWN**), recognition (**REC**) with skepticism (**SKP**) to combat **FKN**. This suggests it is not only among the young executives in digital marketing and e-business but also among other professionals who do not stop practicing under any circumstances for business decisions. Based on the **Table 5** results about the **FKN** violation pattern categories, a measurement tool to verify a previous level of

misleading or clouding information and the categories could be helpful for many kinds of professionals, not only the young executives in digital marketing and e-business.

7. Conclusions

We offer insights into the body of knowledge about **SMIL** for business decisions as innovation skills to combat **FKN** to the next normal to be considered in the curriculum of all kinds of professionals, in our case, the young Mexican executives of **SMEs** digital marketing and e-business. Also, we offer a design of a proposal framework of **SMIL-FKN** composed of five underlying factors, nineteen variables, and **71** items. Finally, the evidence of five combinations could be considered **SMIL** business innovation skills to combat fake news narratives (**FKN**).

8. Limitations and future studies

First, It is necessary to include other communication theories such as cognitive dissonance theory (**CDT**), persuasion knowledge management (**CKM**), or Social Information Processing Theory (**SIP**) and their effects to update such theories with **SMIL** to improve. **Second.** There is a unique concept called *"self-efficacy"* (Bandura, 1997); as a faculty of an individual, what can do with the gained skills, and it would be interesting to be applied and updated under the **SMIL** scope. **Third.** It would be interesting to apply Covariance-Based Structural Equation Modeling (**SEM**) to measure the validity of the **SMIL** framework proposed here.

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APPENDIX

Questionnaire designed on literature review with operational definition of constructs

Social Media Information Literacy (SMIL)			
Factor	**Variables**	**Indicators. [Respond according to Likert Scale 1-5: 1 – Not at all aware; 2 – Slightly aware; 3 – Somewhat aware; 4 – Moderately aware; 5 – Extremely aware.**	**Authors**
A&R	**AWN**	**1.** I am aware that information must be under critical-thinking to be explained. **2.** I am aware that information is more easily obtained if it is by entertainment media. **3.** I am aware of information features by means of workshops, tutorials, YouTube videos, games, etc. **4.** I am aware that easy information obtained by entertainment media could be not true (e.g., a video in-class demonstration or comic-book than a written check-list handout)	NACM (2018); Burkhardt (2017); LFJ (2017).
	REC	**5.** I have the capability to recognize the information I need. **6.** I have the capability to recognize my need of information. **7.** I have the capability to recognize the value of the information according to the online site reputation.	Bühler (et al. 2020); NACM (2018); Burkhardt (2017); Learning for Justice (LFJ, 2017).
	UST	**8.** I have the capability to use a desktop more than other device to handle information. **9.** have the capability to use a smartphone more than other device to handle information. **10.** I have the capability to use a tablet more than other device to handle information. **11.** I have the capability to use a smartTV more than other device to handle information. **12.** I have the capability to know and manipulate several types of software to achieve the communication (e.g., Zoom, Meet, Jeans, Teams, etc.)	AMX (2020)
SFU	**SEA**	**13.** I have the capability to search and decide where and how to find the information I need. **14.** I have the capability to search and technically access information. **15.** I have the capability to apply appropriate search strategies for information (e.g., use of meaningful keywords, date, hashtag, user). **16.** I have the capability to search and choose appropriate sources when searching for information.	Bühler (et al. 2020); Burkhhardt (2017)
	FND	**17.** I have the capability to find and collect information. **18.** I have the capability to find and retrieve information. **19.** I have the capability to find and choose appropriate information.	
	UND	**20.** I have the capability to understand the context and actors of information. **21.** I have the capability to understand the meanings and intention of information. **22.** I have the capability to identify points of agreement and disagreement among sources to understand the information	
ASM	**EVA**	**23.** I have the capability to evaluate the relevance of information. **24.** I have the capability to evaluate the credibility of information. **25.** I have the capability to evaluate the accuracy of information. **26.** I have the capability to evaluate the quality of information. **27.** I have the capability to evaluate the veracity of information. **28.** I have the capability to evaluate and identify if information is a fake news.	Bühler (et al., 2020; Zhou (et al. 2020a); NACM (2018); LFJ (2017).
		29. I have the capability to evaluate and visit sites for fact-checking to evaluate the news (e.g., Snopes, PolitiFact, FactCheck) to compare critically. **30.** I have the capability to evaluate and seek out experts with expertise in a subject to evaluate and clear the information. **31.** I have the capability to evaluate and confirm the links after receiving information.	Zhou (et al., 2020a);NACM (2018); Burkhardt (2017); LFJ (2017)

		32. I have the capability to evaluate and improve my abilities to identify fake news. **33.** I have the capability to evaluate and distinguish an original source from a bot source of information. **34.** I have the capability to evaluate and distinguish bias information. **35.** I have the capability to evaluate and remember better if I have done something by myself to get better information.	
		36. I have the capability to evaluate news headlines from different perspectives: Clickbait patterns based on phrases and expressions; Readability; Sensationalism with sentiment; Sensationalism with punctuation; Sensationalism with similarity; News worthiness with quality; News worthiness with informality	Zhou (et al., 2020a)
	SKP	**37.** I have the capability to not trust in my social media friends to get information **38.** I have the capability to do not trust more on my friends than the authority based on social media **39.** I have the capability to identify : "*the more times I hear something repeated, more likely I think it is not true"* **40.** I have the capability to read deeply in the search of information. **41.** I have the capability to encourage me for asking questions **42.** I have the capability to practice the information skepticism **43.** I have the capability to apply immediately my critical-thinking skills to assess the information **44.** I have the capability to be careful about accepting social media friends requests	Burkhardt (2017)
	REV	**45.** I have the capability to use reflective practices in order to re-evaluate information. **46.** I have the capability to evaluate users' reaction on my content. **47.** I have the capability to evaluate information from interaction with other users. **48.** I have the capability to reconsider my existing evaluation of information. **49.** I have the capability to identify the benefits of re-evaluating information.	
AOI	**CRE**	**50.** I have the capability to create a rephrase information to clarify its meaning. **51.** I have the capability to create context for information. **52.** I have the capability to modify identified information. **53.** I have the capability information. **54.** I have the capability to change the scope by reducing information. **55.** I have the capability able to enrich identified information. **56.** I have the capability to design new information.	Bühler (et al. 2020)
	COM	**57.** I have the capability to display information for a given audience. **58.** I have the capability to share information with others. **59.** I have the capability to provide feedback. **60.** I have the capability to communicate information safely and securely. **61.** I have the capability to exchange information. **62.** I have the capability to provide positive criticism to other users.	
	FAC	**63.** I have the capability to decide if the information is true: -Keep and storage; -Delete; Modify and share; -Share **64.** I have the capability to decide if the information is fake: -Keep and storage; -Delete; Modify and share; -Share	Bühler (et al. 2020); Zhou (et al., 2020a); NACM, (2018); Burkhardt (2017); LFJ (2017).

Fake News Narrative (FKN) Factor		
Variables	**Indicators. [Respond according to Likert Scale 1-5: 1 – Not at all aware; 2 – Slightly aware; 3 – Somewhat aware; 4 – Moderately aware; 5 – Extremely aware.**	**Authors**
S&P	**65.** About fake news, I have the capability to identify of any social media message the no intention to cause harm but has potential to fool.	UNESCO (2018).
FCN	**66.** About fake news, I have the capability to identify of any social media message when headlines, visuals or captions don't support the content.	
MSC	**67.** About fake news, I have the capability to identify of any social media message the misleading use of information to frame an issue or individual	Zhou (et al. (2020a); UNESCO, (2018).
FCT	**68.** About fake news, I have the capability to identify of any social media message when genuine content is shared with false contextual information.	

IMC	**69.** About fake news, I have the capability to identify of any social media message when genuine sources are impersonated.	
MPC	**70.** About fake news, I have the capability to identify of any social media message when genuine information or imagery is manipulated to deceive.	
FBC	**71.** About fake news, I have the capability to identify of any social media message new content is 100% false, designed to deceive and do harm.	

Notes: **SMIL.** Social Media Information Literacy; **A&R.** Awareness and Recognition; **AWN**. Awareness of Information; **REC.** Recognition; **UST.** Use of technology; **SFU.** Search and Find to Understand; **SEA**. Search; **FND.;** Find; **UND.** Understand ; **ASM.** Assessment; **EVA.** Evaluation; **SKP.** Skepticism; **REV**. Revaluation ; **AOI.** Abilities over information; **CRE.** Creation; **COM.** Communication; **FAC.** Final Action; **FKN**. Fake News Narrative; **S&P**. Satire and Parody; **FCN**. False Connection; **MSC**. Misleading Context; **FCT**. False Context; **IMC**. Imposter Content; **MPC**. Manipulated Content; **FBC**. Fabricated Content.
Source: several authors with own adaptation