ANALYSIS OF BUSINESS MODEL INNOVATION IN POST-COVID ECONOMY: DETERMINANTS FOR SUCCESS

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***Abstract**: Post COVID economy addressed in this paper as "The Low Touch Economy" is already undergoing dramatic trends changes and behavioural modifications. Business model innovation subject has gained vital traction within the past years as an academic subject and corporate and start-ups management alike. Nowadays, more than ever, business model innovation could provide answers on where the winners and losers of are in the new normal. There is significant lack of empirical research regarding the increasing diversity of business model innovations in post-COVID global economy, and on their impact on community, business growth and sustainability. With this research, we use a comparative method fs/QCA to assess the business models of a sample of 51 companies in this new emergent economy. Leveraging a set of qualitative data, our analysis identifies 5 dimensions of potentially sustainable business models, revealing a typology comprising 5 ideal types.*
Keywords: *sustainable business models; fsQCA; typology; qualitative comparative analysis; innovation; post crisis pivots.*

INTRODUCTION

"The truth is that our finest moments are most likely to occur when we are feeling deeply uncomfortable, unhappy, and unfulfilled. For it is only in such moments, propelled by our discomfort, that we are likely to step out of our ruts and start searching for different ways or truer answers". (M. Scott Peck)

The term VUCA originated in the US War College to describe "situations that are volatile, uncertain, complex, and ambiguous". In this world, "unknown unknowns" can emerge that place teams in "white areas" that models cannot predict. COVID-19 events deliver the unexpected daily to every organization, from health care specialists to government officials.

The coronavirus pandemic is dramatically changing the way companies make business, as Harvard Business School teaching staff estimate (Gerdeman, 2020): "shifts in trust-base from employees and customers; shifts in perceived value creation (more engaged customers); balance shift between remote and on-site interactions; shifts in teaming up to co-create solutions for new problems arising; shifts in shortening supply chains or "islandization" of economies; thinking around traditional structures; raising health concerns to bring substantiated changes to the physical structures we live/ work in, and also to the collection of personal data".

According to OECD Policy Responses to Coronavirus report (OECD, 2020) , the initial direct impact of the economy taking a forced break could be a decline in the level of output of "between one-fifth to one-quarter in many economies, with consumers'

expenditure potentially dropping by around one-third". This kind of changes over surpasses the experience from the global financial crisis in 2008-09. Also, estimation only covers the initial direct impact in the sectors involved and does not consider any additional indirect impacts that may appear.

The implications for annual GDP growth will depend on several factors, from magnitude and duration of national shutdowns, the extent of reduced demand for goods and services in other parts of the economy, to the speed at which significant fiscal and monetary policy support takes effect. There is one thing certain, the impact will weaken short-term growth prospects substantially. There is no surprise of the arising interest and relevance of the subject of business model innovation to help business survive in this new normal. Are sustainable business models, circular or sharing / collaborative economy a go-to direction for business model innovation? Were talks about the emergence of a stakeholder capitalism premature (Govindarajan, 2020)?

In the last months, a theme appeared: " Survival is determined by those who adopt the path of solidarity, in comparison to those who continue to travel down the path of disunity – solidarity, realized and recognized as both the inter-dependencies among communities, and the inter-dependencies among people and organizations within communities" (Haywood, 2020). Could it be a call for a moral form of capitalism (Young, 2003) that reinstates moral principles for business and collective obligations – from people to community to company and vice versa?

While post-COVID renewal calls for higher degrees of cooperativeness, changing the competitiveness ethic, promulgated by World Economic Forum (2019), is bound to remain a challenge, even though the institution makes great efforts to improve sustainability. Business model innovation is a powerful tool for companies to achieve resilience and growth, especially in a global crisis and instability context (Lindgart, Reeves, Stalk, & Deimler, 2009).

"Only when the tide goes out, do you discover who has been swimming naked" - Warren Buffet

In boom times, most businesses profit. However, an economic damaging event will separate the companies with sound practices that will make them survive. It will be easier to understand which businesses were more vulnerable to the tide going out. Firms that are crisis-resilient can seize opportunities provided by the crisis to find better and more efficient ways of growing.

Business model innovation is an important tool for building a business that creates maximal value for all stakeholders: customers, shareholders, employees, and the society at large. This kind of three pillar approach creates several benefits or opportunities:

- Increased value creation will lead to increased growth
- As business model innovation often requires new operating models, it becomes harder for competitors to replicate
- …which can lead to a longer period of competitive advantage
- The right kind of business model also helps create positive brand recognition
- Some business models can make the business much more resilient towards market cycles and unexpected "black swan" events, such as the recent COVID-19 crisis.

There is lack of research on the potentially successful business model innovations or "pivoting" for sustainability in the post-COVID era, so this research is focused on understanding the complexity of business model innovation and elaborating on the

diversity of business models types, from the point of view of sustainability and crisis resilience.

In order to understand the particularities of many emerging business models in 2020, following dramatic shifts in behaviour, trust system and essentially the way companies operates, we analysed a range of secondary data from 71 different business model innovation patterns, representing 4 categories sourced from a massive community collective research The Low Touch Economy, performed by the consulting firm Board of Innovation (Board of Innovation, 2020). The Low Touch Economy model designs a strategy matrix based on crisis impact on company's prospects then identifies six categories of white space triggers with high potential of business model innovation.

Leveraging the data obtained from the collection of already in-place business model innovation, we rated the sample on six dimensions of their business model. Applying a configurational comparative research method (fs/QCA), an empirical typology comprising 5 emerging business models was observed.

We believe that this paper contributes to literature in several ways. First, we perform a literature review of consistent research on business models and business model innovation, to identify a set of criteria researchers used to identify sustainable business model innovations. To date there is much more reference found in conceptualizing BMI models, frameworks and approaches that reference to sustainability of business models innovations through times of volatility, crisis or market shifts, due mostly to the fact that this field of research emerged just in the last 15 years. Our configurational approach enables a thorough understanding of the sustainable business model innovations space. It tests a range of components for sustainable business model innovation and empirically demonstrates the many ways in which these components combine to create unique business models.

This paper is structured as follows. First, we present a literature review focused on business model and business model innovation concepts. Secondly, we describe our methodology and sampling approach; in respect to low touch, economy identified societal shifts. Thirdly, we describe the typologies identified and the new sustainable type of business model in the post-COVID shifts and ripples.

BUSINESS MODEL & BUSINESS MODEL INNOVATION IN LITERATURE

Before elaborating on business model innovation and its applications to leverage business sustainability and continuity in crisis, we will develop a basic understanding of the business model concept itself.

Business Model Concept in literature

Historically, the business model as a concept emerged as a buzzword in the media in 1990s. Ever since, it has raised significant attention from both practitioners and scholars and nowadays forms a distinct feature in multiple research streams. In general, the business model can be defined as scientific manner describing how the business of a firm works. More specifically, the business model is often depicted as an overarching concept that takes notice of the different components a business is constituted of and puts them together as a whole (Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002; Demil and Lecocq, 2010; Johnson, Christensen, and Kagermann, 2008; McGrath, 2010; Morris, Schindehutte, and

Allen, 2005; Osterwalder and Pigneur, 2010) - a notion formulated by Magretta (2002, p.91): *"Business models describe, as a system, how the pieces of a business fit together"*.

There are several well-known conceptualizations of a business model, from business model canvas (Osterwalder, Pigneur, & Tucci, 2005) to the 4 I Framework of St Gallen University researchers (Frankenberger, Gassmann, & Csik, 2013). A main utilization of business model concept is that it supports understanding the big picture of the business, by combining factors located inside and outside the firm (Teece, 2010). Therefore, referencing it in innovation approaches is related to as a boundary-spanning concept (Frankenberger, Gassmann, & Csik, 2013), (Teece, 2010) that explains how the company interacts with its ecosystem, from a systems thinking approach (Brandstaedter, Harms, & Grossschedl, 2012). The business model often is used to explain how the company creates and captures value for itself and its various stakeholders within this ecosystem – shareholders and community included.

The capability to move into new business models rapidly and successfully is "an important source of sustainable competitive advantage and a key leverage to improve the sustainability performance of organizations. The sustainable business model concept model might eventually supersede the business model concept" (Geissdoerfer, Vladimirova, & Evans, 2018). This type of model is defined in literature review as one that "incorporates pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders and holds a long-term perspective".

Business Model Innovation: Concepts & Emerging trends

Business Model Innovation provides companies a way to breakout of intense competitors, under which product or service innovation are easier imitated. It can also help to address disruptions – regulatory, technological, and pandemic – that demand fundamentally different competitive approaches.

In "normal" times of operating, obtaining approval from stakeholders or consumer's adoption of a radical or divergent approach could be difficult, if not impossible. In times of crisis, business model innovation in a divergent way is easier to address (Lindgart, Reeves, Stalk, & Deimler, 2009). A crisis can be a lever for companies to start fresh, instead of employing defensive pricing or operational tactics. Business model innovation delivers superior return than process or product innovation. An analysis from Boston Consulting Group and Business Week, performed in 2008 on sample of companies survivors of 2008 economic crisis (Lindgart, Reeves, Stalk, & Deimler, 2009) discovered that "business model innovators earned an average premium that was four times greater than that enjoyed by product or process innovators. BMI also delivered more sustainable results."

St.Gallen University researchers (Gassman, Frankenberger, & Csik, 2014) conceptualize the business model in the form of a "magic triangle":

1. The customer – who are our target customers? Every business model conceptualization has at center the customer and the value created.
2. The value proposition – what do we offer to customers?
3. The value chain – how do we produce our offerings? To put the value proposition into effect the company needs to perform processes and activities, which leads to close

connection to resources and capabilities available, and interdependence with the ecosystem.

4. The profit mechanism – why does it generate profit? This area includes aspects related to cost structures and revenue generated mechanisms, providing answers to the question on how to provide value to the stakeholders and shareholders.

We would extend the fourth dimension related to the profit mechanism and value created for shareholders to encompass the value created for the ecosystem, in respect to community.

By answering the four associated questions and explicating (1) the target customer, (2) the value proposition towards the customer, (3) the value chain behind the creation of this value, and (4) the revenue model that captures the value, the business model of a company becomes tangible and a common ground for its re-thinking is achieved. Innovation of the business models requires at least changes at two of the four dimensions of the "magic triangle", which sets the difference from product or process innovation, which operates at only one dimension of the model. Successful business model innovation "creates value for the customers and captures value for the company" (Gassman, Frankenberger&Csik, 2014), which in turns sets the pre-requisites for sustainable success.

There is a pattern to the types of innovators that emerge from a crisis, linked to the types of assumptions that they overturn. Overturn an assumption, and the opportunities that emerge form the nucleus of a new company archetype for innovation (McKinsey Digital, 2020). In a recent study, (Ludeke-Freund, Carroux, Joyce, & Breuer, 2019) identified a set of patterns leading to sustainable business model innovation. The purpose was to use the taxonomy as a decision-making heuristic in business model development projects, for example, by moving from sustainability issues (e.g., ecological issues related to waste) to pattern groups (e.g., eco-design) and finally to specific patterns (e.g., hybrid or gap-exploiter models). At the heart of a sustainable business model is a value proposition that is valuable to both a company's customers and other stakeholders who might otherwise be directly or indirectly affected by a company's activities.

From the 2008 financial crisis, we can draw conclusions of radical shifts in consumers and business behaviour that stuck with us until now. The sharing economy was born when assumptions about the use of assets and nature of possession were challenged. It is defined until now was "a socio-economic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of under-utilized resources in society" (Munoz & Cohen). The low touch economy or the next normal already has clear trends that will stay with us to overturn assumptions about the way organizations and consumers operate.

The consultancy firm McKinsey identifies 7 trends that emerged in 2020, that are challenging the creation of new business models (McKinsey Digital, 2020). These are completed with the societal trends and estimated economy ripples identified by other consultancy firm (Board of Innovation, 2020):

- Social distancing and "islandization" of economies.
- Resilience and efficiency
- Rise of the contact free economy
- More government intervention in the economy
- Mission driven, the "triple bottom line" – profit, people and planet, or the idea that shareholder value should not be the only corporate value (already emerging since August

2019, when more than 181 US CEOs signed a statement committing themselves to other priorities—investing in employees, supporting communities, and dealing ethically with suppliers—in addition to shareholder value.

- Changing industry structures, consumer behavior, market positions, new regulations, sector attractiveness, new tech, access to resources
- The coronavirus is forcing both the pace and the scale of workplace innovation or digitization of those lagging.

METHODOLOGY

To analyse the structure of emerging business models in post-COVID global economy, we performed a two steps research. First, we performed a literature review of academic and consulting firms' literature to identify and elaborate a set of key indicators for business model innovation sustainability. Second, in dealing with the complexity of characteristics upon business model innovation and pivoting emerge at present days; we applied a multiple-conjectural causality and polythetic typology building (Munoz & Cohen, 2017). The econometric chosen approach is fuzzy set qualitative comparative analysis (fs/QCA) which is a rising method in entrepreneurship and innovation research (Krauss, Ribeiro-Soriano, & Schussler, 2018).

When causality in the research phenomenon is both multiple – when an outcome has more than one cause – and conjunctive – when these causes work together to produce the outcome, fs/QCA represents an appropriate method. Multiple conjunctural causations are identified by testing various combinations of antecedent conditions. Fs/QCA aims to show conditions that are sufficient but not necessary to cause an outcome (Ott, Sinkovics, & Hoque, 2018). Thus, rather than estimating some net effects of independent variables, fs/QCA employs Boolean algebra logic to examine the relationships between an outcome and all binary combinations of the independent variables. This methodological approach provides the opportunity to detect relevant configurations that guarantee a high performance in the outcome condition.

fsQCA is a technique that identifies meaningful cases and "sits midway between exploratory and hypothesis-testing research", being particularly accurate when causality is complex. (Vis, 2010).

DATA

Key predictors for future business model innovation success

Based on the literature review, we identified a set of key predictors subject to further testing using fsQCA approach:

- Consider the societal new emerged trends
- Learn from the past. A McKinsey study analysed the performance of 1000 publicly traded companies from multiple sectors (McKinsey Digital, 2019) and identified a subgroup of resilient organizations that delivered a growth in total return to shareholders that was structurally higher than the median in their sector. The conclusion was that those companies have moved faster and further than the competitors, before, during and after the crisis.

- Innovate at least 2 out of 4 areas of the business model – to qualify for business model innovation according to St Gallen model (Gassman, Frankenberger, & Csik, 2014).
- Create impact and value on community (mission-driven enterprises). Sustainable business models, in this respect, are those that create useful value for the company if it helps the company to achieve its purpose (Geissdoerfer, Vladimirova, & Evans, 2018). Examples of useful value thus could be profit, strategic fit, and employee motivation. On a larger scale, such business could incorporate as Benefit Corporations (B Corp – following the example of Kickstarter to change its business model to be legally bound by social and ecological objectives) or social enterprises.

Based on the literature review above, we designed our typology development.
Next, we will present the methodology chosen for the research and the typologies of business models, which emerged from the unique combinations of these key predictors for future business model innovation success, present or absent, in the sample of business model pivots we used for our research.

Causal and outcome conditions

As observed in our literature review, the use of conceptual terms is often coinciding. To harmonize this dispersion, we built upon our business model research and recent reports on post-COVID emerging trends and identified seven archetypes for post-crisis business builders for business innovation:

- Service automation (Remote services providers) – or "low touch economy"
- Digital platforms for collaboration
- High touch digital retailer
- Analytics and data automation
- Virtual workforce mobility (or job conversion)
- Crisis resilient and agile
- Mission driven (value creator for community, including helping lowering infection curve, protecting general health, etc.)

We also take into account when selecting data sets the definition of business model innovation proposed by the "magic triangle" concept (Gassman, Frankenberger, & Csik, 2014), meaning factual changes to at least two out of four dimensions (customer, value proposition, value chain and profit / value creation).

The methodological approach for testing our assumptions related to archetypes of post-crisis business innovation models is as follows:

- Identify which of the seven archetypes can be considered an outcome variable.
- Identify the one with the most predominance within the sample.

In order to do so, we noticed that PLATFORM for collaboration or Community Platform was used in most literature and is consistent to sustainable business models definitions (Ludeke-Freund, Carroux, Joyce, & Breuer, 2019) and (Geissdoerfer, Vladimirova, & Evans, 2018). We followed the econometric approach proposed by (Munoz & Cohen, 2017) and considered Digital platform for collaboration as the Outcome Condition, measuring the extent to which the business delivers its value proposition (B2B or B2C) through a digital platform.
Remote service providers or LOW TOUCH ECONOMY measures the extent in which service delivery to B2B or B2C customers is provided through a distance enablement manner – in line with the "low touch economy" concept. HIGH TOUCH digital retailer

measures the extent the new business model entails a human interaction through digital channels that steers free from social media marketing and automation (Treadgold & reynolds, 2017).

ANALYTICS and DATA AUTOMATION measures the extent the business model innovation includes automatized processes and data manipulation, including social media marketing without human interaction.

WORKFORCE MOBILITY, either virtual (people being able to work or operate in a different country) or by job reconversion (flight attendants trained to operate as nurses, or supermarket chains that hire temporary workforce – entire teams – from other fields) measures the extent in which business model innovation is changing HOW is the value proposition delivered from the point of view of people structure.

Crisis RESILIENT (or agile) criteria measures the extent the business model innovation is showing preparedness for future crisis in a way that is generates cash flow and has apt operational processes (McKinsey Digital, 2019).

MISSION DRIVEN seeks to capture how much social and environmental value is generated by the business (Ludeke-Freund, Sustainable entrepreneurship, innovation, and business models: Integrative framework and propositions for future research, 2019)

Table 1 provides a summary of the evaluation criteria.

Table 1. Data and evaluation criteria, including scoring

Archetype	Data	Scoring criteria
Platform for collaboration	Types of platforms used for value creation Role of the platform (B2B or B2C) and specific use Degree of importance of the platform in company's business model	0 = No evidence of platform for collaboration 50 = presence of platforms, but not essential for business operations 100 = full dependence of platforms for collaboration, essential in the success of business model
Post-COVID business model: Low touch economy	Way of reaching customers – in-person versus remote / distance Presence of "distance" or nonhuman interaction	0 = Business model requires human 2 human physical (face2face) interaction for business operations 50 = human interaction is reduced or of short duration, or full protective (shielding measures) are in place 100 = there is little no nonphysical interaction in operating essentially the business model
High touch digital retailer	Customer interaction and value creation is performed in a digital manner but with human counterparts Customer service representatives, call centers, focusing on creating quality customer experience	0 = there is no human counterpart or no digital interaction 50 = presence of remote human touch, but not essential for business model operations; customer service excellence is not the focus 100 = human interaction is performed in a digital manner, in a way that enhances customer service excellence and allows service / product personalization
Data automation	Data collection, analytics and automation, including social media marketing is key to delivering the value proposition	0 = no data automation 50 = basic data automation and analytics used, non-essential to value creation and delivery 100 = business model is oriented around data collection, analytics, deept tech, IoT or automation

Workforce mobility	Virtual mobility – virtual immigration (delivering services in another country) or using temporary job reconversion due to flexibility of job roles in industry ubiquity	0 = no evidence in workforce impact 50 = presence of some workforce mobility or inter-changeability, but not essential for business model operations 100 = business model is centered on high workforce mobility (virtual emigration feature)
Crisis Resilient	Crisis Resilient = companies move further, faster before, during and after the crisis	0 = no evidence of pre-crisis or during crisis agility 50 = presence of some pre- or during crisis agility and operations change 100 = business model is completely pivoted during crisis, based on pre-crisis preparations
Mission Driven	Formal mission statement Relevance of societal and community impact in relation to creating business value and social value The mission is implemented through consistent practices and stated strategies	0 – no evidence of social impact 50 = presence of societal and community impact, but it is not a core business value 100 = the mission is driving the whole business value creation. Evidence of implementation.

Data selection and analysis

The advantages of using fsQCA approach is that it facilitates a dialogue between theory and cases. Case selection consider a specific combination of properties within a specific context (maximum homogeneity in an area of heterogeneity). There needs to be an in-depth case understanding, before configuration the evaluation criteria; the cases should be comparable in terms of context, but the chosen sample should exhibit a heterogeneous selection of positive and negative outcomes. (Ott, Sinkovics, & Hoque, 2018). Given this criteria, our cases were collected during a collective research effort orchestrated by The Board of Innovation (Board of Innovation, 2020) in a public effort to identify the effects, trends and changes of business model pivots in post-COVID evolution. The cases were organized around business model patterns and characteristics, shared a similar background (post-COVID), but with a maximum heterogeneity, due to several industry verticals and global geographical diversity.

We have selected several 50 cases based on fs/QCA and scoring criteria defined. We have assigned scores for each case based on the defined criteria and in-depth analysis of the situation described (business model pivot). In comparative research, calibration is an essential step, allowing comparability. Using a simple estimation technique, calibration process transforms variable raw scores into set measures (Ragin, 2008), transforming the original scores into scores ranging from 0.0 (full exclusion) to 1.0 (full inclusion). Therefore, we defined a calibration process through three thresholds:

- Full inclusion (>=0.95)
- Full Exclusion (<=0.05)
- Crossover point (0.5), based on which we will establish deviation scores.

We assume that a variance below 25 and over 75 scores is irrelevant, based on other fsQCA research on business model innovation (Munoz & Cohen, 2017).

Table 2 Calibration scores

Threshold	0	0.05	0.25	0.5	0.75	0.95	1

Case ID	1) Low touch	2) Platforms for collaboration	3) High touch digital retailer	4) Analytics and data automation	5) Virtual workforce mobility	6) Crisis resilient	7) Mission driven
https://homesuitehome.co	1	1	1	0	1	0	1
https://www.opentable.com/	1	1	1	1	0	0	0
https://intelligo.uk/	1	0	1	1	1	0	0
https://boozi.com.au/	1	0	1	1	0	0	0
https://musicmessages.encoremusicians.com/	1	1	1	1	0	0	0
https://www.artnight.com/	1	1	1	1	0	0	1
https://www.kigili.com/ev-market/	1	0	1	1	0	0	0
https://www.panerabread.com/en-us/panera-grocery.html	1	1	1	1	0	1	1
https://www.stagekings.com.au/store/isoking	1	0	1	1	0	0	0
https://keepyourcitysmiling.com/	1	0	1	0	1	1	1
https://crave-emenu.com/news/servesafely-solutions-to-protect-restaurant-staff-and-customers-from-covid-19/	1	1	1	1	1	1	1
https://www.debuurtwinkel.nl/inloggen	1	1	1	1	1	1	1
https://delivery.citybee.lt/	1	0	1	0	0	1	1
https://youtu.be/GzSoa751Vtw	1	0	1	1	0	1	0
https://www.athome.com/pickup/	1	0	1	0	0	1	1
https://www.woolworths.co.za/?ds_rl=1256865&gclid=Cj0KCQjws_r0BRCwARIsAMxfDRgRLj4fHp5y_QZm6__Sy_QcXudDMlEDwgM0C2m8OqW1sv1ujyyv5zAaAmpoEALw_wcB&gclsrc=aw.ds	1	1	1	1	0	1	1
https://www.elmundo.es/motor/2020/04/16/5e9810ddfdddff0e948b459c.html	1	1	1	1	1	1	1
https://room.com/	1	0	0	0	1	1	1
https://linktr.ee/breadahead	1	1	1	0	1	1	1

airbnb.com	1	1	1	0	1	1	1
https://www.g4s.com/nl-be/companies-and-government/technology-solutions-and-monitoring/integration-camera-and-guarding	1	1	1	0	1	1	1
http://www.sklavenitis.gr/	1	1	1	1	1	1	1
https://www.engine-cw.be/keep	1	1	1	0	1	1	1
https://www.emicontrols.com/en/disinfection/	1	0	0	0	1	1	1
https://www.craftydelivers.com	1	0	0	0	0	1	1
https://www.ellanacosmetics.com/	1	0	0	0	1	1	1
Waze – navigates to emergency food cenetrs and Corona testing centers	1	1	0	1	0	1	1
Forte – top Vegas restaurant, selling gourmet kits	1	1	1	0	0	1	1
IKEA – engaging people from their homes using AI and digital tools	1	1	1	1	0	1	1
Lin Qinqzhan (cosmetic company China)	1	1	1	1	1	1	1
Global confectionary manufacturer CH	1	1	1	1	0	1	1
Girl Scouts going digital	1	0	1	0	1	0	1
www.gurme212.com	1	0	0	0	0	1	1
www.tcgcenter.com	1	1	1	0	0	1	1
https://granadillaswim.com/	1	1	1	1	0	1	1
https://intelligenceindustrielle.com/fr/signalisation/	1	1	1	1	0	1	1
https://myeongdongtopokki.com/	1	1	1	1	0	1	1
https://www.facebook.com/OrangeEsportsCafe/	1	1	1	1	0	1	1
https://esportsnederland.nl/home	1	1	1	1	0	1	1
https://mittliv.com/se/	1	1	1	1	0	1	1
https://www.sinews.es	1	1	1	0	1	0	1
https://centurionthermal.com	1	1	1	1	0	1	1
https://www.storehub.com/blog/storehub-launches-beep-delivery-for-fnb/	1	1	1	1	0	1	1

https://www.waylandsyard.com/shop	1	1	1	1	0	1	1
https://www.gympass.com/	1	1	1	1	0	1	1
https://groundupmusic.net	1	1	1	0	0	1	1
Car hood mask company company Mexico	1	0	0	0	1	1	1
https://lingkaran.co/	1	1	1	1	1	1	1
https://www.transferfi.com/	1	1	0	1	1	1	1
https://www.merco.mx/	1	1	0	0	1	0	0
http://www.onceagainhostel.com/	1	1	0	0	1	0	1
http://sofarsounds.com	1	1	0	0	1	1	0
https://edition.cnn.com/2020/05/07/world/dutch-restaurant-reopen-greenhouse-trnd/index.html	1	0	0	0	0	1	1
WithLocals (https://www.withlocals.com/es/)	1	1	0	0	1	1	0

Calibration procedure requires creating a truth table, which lists all different logically possible combinations of causal conditions along with the cases that are belonging to each combination.

Table 3 shows the truth table with the resulting cases, the selected outcome being **crisis resilience** – chosen as an indicator for long-term success, instead of crisis only temporary business model pivoting. Out of those, we have 31 relevant for the outcome (the lowest acceptable consistency set at 0.95).

Table 3 Truth table

Case ID	1) Low touch	2) Platforms for collaboration	3) High touch digital retailer	4) Analytics and data automation	5) Virtual workforce mobility	7) Mission driven	6) Crisis resilient	Consistency
https://www.craftydelivers.com, www.gurme212.com, https://edition.cnn.com/2020/05/07/world/dutch-restaurant-reopen-greenhouse-trnd/index.html	1	0	0	0	0	1	1	1
https://room.com/, https://www.emicontrols.com/en/disinfection/, https://www.ellanacosmetics.com/, x	1	0	0	0	1	1	1	1
https://delivery.citybee.lt/, https://www.athome.com/pickup/	1	0	1	0	0	1	1	1
https://keepyourcitysmiling.com/,	1	0	1	0	1	1	0	0.5
https://boozi.com.au/, https://www.kigili.com/ev-market/, https://www.stagekings.com.au/store/isoking, https://youtu.be/GzSoa751Vtw	1	0	1	1	0	0	0	0.25
https://intelligo.uk/	1	0	1	1	1	0	0	0
https://www.merco.mx/, http://sofarsounds.com, WithLocals (https://www.withlocals.com/es/)	1	1	0	0	1	0	0	0.666666687
http://www.onceagainhostel.com/	1	1	0	0	1	1	0	0
	1	1	0	1	0	1	1	1
https://www.transferfi.com/	1	1	0	1	1	1	1	1
, www.tcgcenter.com, https://groundupmusic.net	1	1	1	0	0	1	1	1
https://homesuitehome.co, https://linktr.ee/breadahead, airbnb.com, https://www.g4s.com/nl-be/companies-and-government/technology-solutions-and-monitoring/integration-camera-and-guarding, https://www.engine-cw.be/keep, https://www.sinews.es	1	1	1	0	1	1	0	0.666666687
https://www.opentable.com/, https://musicmessages.encoremusicians.com/	1	1	1	1	0	0	0	0
https://www.artnight.com/, https://www.panerabread.com/en-us/panera-grocery.html, https://www.woolworths.co.za/?ds_rl=1256865&gclid=Cj0KCQjws_r0BRCwARIsAMxfDRgRLj4fHp5y_QZm6__Sy_QcXudDMlEDwgM0C2m8OqW1sv1ujyyv5zAaAmpoEALw_wcB&gclsrc=aw.ds, , , https://granadillaswim.com/, https://intelligenceindustrielle.com/fr/signalisation/, https://myeongdongtopokki.com/, https://www.facebook.com/OrangeEsportsCafe/, https://esportsnederland.nl/home, https://mittliv.com/se/, https://centurionthermal.com, https://www.storehub.com/blog/storehub-launches-beep-delivery-for-fnb/, https://www.waylandsyard.com/shop, https://www.gympass.com/	1	1	1	1	0	1	1	0.933333337
https://crave-emenu.com/news/servesafely-solutions-to-protect-restaurant-staff-and-customers-from-covid-19/, https://www.debuurtwinkel.nl/inloggen, https://www.elmundo.es/motor/2020/04/16/5e9810ddfddff0e948b459c.html, http://www.sklavenitis.gr/, , https://lingkaran.co/	1	1	1	1	1	1	1	1
Outcome: 6) Crisis resilient								

RESULTS & CONCLUSIONS

We further applied the fsQCA approach as an add-in to Excel file (Cronqvist, 2019) on selected cases, using a consistency threshold of 0.85 and a frequency of 1, to a solution table (table 4) comprising 6 simplified combinations of "implicants" or "causalities", in order to create business models leading to crisis resilience in the low touch economy. Out of the 16 possible causalities (the presence or absence of: Low touch; collaboration platforms; data automation; virtual workforce mobility; mission driven), the presence of platform for collaboration, high touch retailer, data automation, virtual workforce mobility and mission driven are all together causal mechanisms that exhibit a strong causal relationship with the outcome. Despite the strong relationship of each condition with the causal outcome, none of them are, on their own, sufficient for creating sustainable crisis resilient new business models. "Low touch" was considered irrelevant since all cases were collected based on the low touch economy assumption.

Table 4 Solutions table

# Solutions: 15	Consistency	Coverage
2) platforms for collaboration*3) high touch digital retailer + 2) PLATFORMS FOR COLLABORATION*4) ANALYTICS AND DATA AUTOMATION*5) VIRTUAL WORKFORCE MOBILITY + 5) virtual workforce mobility*7) MISSION DRIVEN	0.971	0.809
2) platforms for collaboration*3) high touch digital retailer	1	0.166
2) PLATFORMS FOR COLLABORATION*4) ANALYTICS AND DATA AUTOMATION*5) VIRTUAL WORKFORCE MOBILITY	1	0.166
5) virtual workforce mobility*7) MISSION DRIVEN	0.958	0.547
2) platforms for collaboration*3) high touch digital retailer + 4) analytics and data automation*5) virtual workforce mobility + 4) ANALYTICS AND DATA AUTOMATION*7) MISSION DRIVEN	0.971	0.809
2) platforms for collaboration*3) high touch digital retailer	1	0.166
4) analytics and data automation*5) virtual workforce mobility	1	0.190
4) ANALYTICS AND DATA AUTOMATION*7) MISSION DRIVEN	0.956	0.523
2) platforms for collaboration*3) high touch digital retailer + 4) ANALYTICS AND DATA AUTOMATION*7) MISSION DRIVEN + 5) virtual workforce mobility*7) MISSION DRIVEN	0.971	0.809
2) platforms for collaboration*3) high touch digital retailer	1	0.166
4) ANALYTICS AND DATA AUTOMATION*7) MISSION DRIVEN	0.956	0.523
5) virtual workforce mobility*7) MISSION DRIVEN	0.958	0.547

In Table 5, we represent the solutions as five simplified combinations of conditions. Black circles indicate the presence of conditions and white circles the absence of conditions.

Table 5 Solution Table: Low Touch Economy Crisis Resilient Business Models

Configurations	Solutions				
	1	2	3	4	5
Platforms for collaboration	●		●	O	O
High Touch digital retailer	●		●	O	O
Analytics and Data Automation	O	●	●	O	●
Virtual Workforce mobility	O	●	●	●	O
Mission Driven	O		●	●	●
Consistency	1	1	0.971429	0.95833	0.956522
Coverage	0.16	0.19	0.809524	0.547619	0.52831
Overall solution consistency	0.96				
Overall solution coverage	0.442				
Model: low touch economy = ft(platforms, high touch digital, analytics and data automation, virtual workforce mobility, mission driven) N=31, consistency cutoff = 0.95, frequency threshold = 1					

As expected, the highest consistency score is of Platform for collaboration with 0.97, followed by "Virtual Workforce Mobility" + "Mission Driven" with 0.95 and "Analytics and data Automation" + "Mission Driven" with 0.95.

CONCLUSIONS

Already, we can see companies, pushed by necessity, starting to overturn assumptions about the way organizations and consumers operate. Out of this, we can point out six early archetypes for post-crisis business builders:

The remote services provider. The COVID-19 crisis forced a massive shift to online delivery of society important services such as medical services and education. In many countries, online medical consultations and online education have suddenly become reality. Researchers and consultants expect this trend to go further, to law services, architecture firms and marketing & advertising. Business model pivoting is the norm, changing delivery channels, from videoconferencing to virtual reality and data automation. Zoom and other

videoconferencing providers have more than doubled their market value since the start of the crisis. The next step will be to reimagine delivering physical services in a remote manner. (McKinsey Digital, 2020) is envisaging trend extension to "equipment maintenance and other services we think of as in-person only. Imagine if home appliances such as dishwashers were built in a way that non-expert homeowners could swap out a modular part as easily as they swap out printer cartridges."

The collaboration platform. Although the platform concept is nowhere new (it has been a main feature of the sharing economy), the model development was catalyzed by the self-isolation situation. There is a sudden benefit and opportunity from interaction possibilities between people separated by geography but connected by technology. There are already several viable examples, from education platforms, to expert collaboration platforms or social benefit platforms.

The virtual work force "immigration". One of the possible benefits of this crisis is developing new recruiting pools for talent sourcing around the world, re-designing application process, employee engagement, resource allocations or cross-industry re-qualification. Talent becomes more mobile and more virtual. Many companies are learning now about reskilling at scale.

The high-touch digital retailer. Retail categories that have traditionally required a high-touch experience, because of either the customer base or category itself, will migrate online, due to the "low-touch" economy. Or traditional sectors (as grocery shopping) turning mainly online.

The data visionary. Data was already the currency of the future. More and more, companies are looking at ways to leverage the data, from automating functions as monitoring machinery in a remote manner instead of on-site operators to monitoring staff working remote or obtaining sector-level insigts from analysing real-time mobile location data.

The purpose of this research was to identify typologies of potentially sustainable business model innovation in post-crisis economy, in a developing context – post-COVID economy. We leveraged existing theory from business model literature to identify key components or conditions of sustainable (meaning crisis resilient) business models. The emerged typologies are intended to be used as a guide for companies trying to pivot during or post-crisis or for further research to validate or refine our findings.

There is further room for exploration, especially related to the obvious connection to circular economy or social innovation business models (due to the platform for collaboration as a main typology). The limitations of this research is that we selected business model pivots appeared at the beginning of COVID crisis, without further referencing of their medium term sustainability. A more comprehensive research would follow the selected sample over a longer period and re-assess the scores derived from the real evolution of these business models, including financial data and market peer comparison.

Nevertheless, our research managed to capture a living moment in out economic history and pinpoint the emerging trends that are here to stay. The study is relevant to business activity from any sectors or geographical location, since the sample and trends analyzed were heterogeneous and widely dispersed over business sectors and from several continents.

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