

Innovation Strategies for Adaptation of Organizations in a VUCA World

Márbia Araújo, Luciana Reis and Isabela Moraes

Universidade Federal de Ouro Preto (UFOP), João Monlevade, Brazil

marbia.araujo@aluno.ufop.edu.br

lucianapaula@ufop.edu.br

isabela.moraes@ufop.edu.br

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Abstract: Startups are inserted in a VUCA world, characterized by aspects of volatility, uncertainty, complexity, and ambiguity, having to respond quickly to sudden changes and turbulent environments. The drivers of innovation are fundamental elements in determining innovation strategies. For a better adaptation of organizations to the VUCA world, innovation becomes a key element, allowing them to respond quickly and with better performance in the market. Recent studies suggest that effectuation has a positive effect on innovation strategies and has been defined as a decision-making process used by entrepreneurs who are specialists in conditions of uncertainty. Therefore, this paper aims to identify which drivers and innovation strategies impact the adaptation of organizations in a VUCA world in the light of the principles of effectuation. There is a gap in the literature on how effectuation contributes to the innovation strategy in organizational contexts, mainly in high-tech enterprises, and which innovation drivers allow these organizations to adapt to the VUCA world. From a literature review, a theoretical model was developed. This shows the internal and external drivers, which depending on how they are used by organizations, can contribute to adaptability to the VUCA world. To validate the theoretical model, a case study was carried out in two Brazilian fintechs. The results show how and which innovation strategies contribute the most, and which effectuation principles are most used for fintech's adaptability. This study contributes to innovation strategy research and provides deeper insight into the missing links between innovation management and decision-making in a VUCA world.

Keywords: innovation drivers, innovation strategy, effectuation, VUCA world

1. Introduction

Organizations are inserted in a dynamic and turbulent environment (Frynas, Mol, and Mellahi, 2018). They need to respond quickly to sudden changes. The VUCA world, which means Volatility, Uncertainty, Complexity, and Ambiguity, represents the environment experienced especially by technology companies (Jaiswal and Manoj, 2019). The COVID-19 pandemic is an example of turbulent environments that shows how organizations are not prepared to adapt and react quickly. "The COVID-19 crisis came like any other natural disaster, finding people and organizations unprepared for disruptive power and social nexus" (Bratianu and Bejinaru, 2021, p. 1).

Companies can use different decision-making approaches to guide the paths to achieve their goals, innovate and adapt to the VUCA world. Among these approaches, the article will study effectuation and causation, as two logics of the decision-making process. Studies point to the use of both logics, ambidexterity, as a way to contribute to innovation processes, for exploration and exploitation (Bai et al., 2021; Evers and Andersson, 2021).

These logics directly affect the management of innovation strategies and, consequently, the performance of companies during their adaptations in the VUCA world. Thus, it is important to analyze how companies have dedicated themselves to the practice of innovation as a strategy, since innovation is vital for economic development and business growth, value creation and competitive advantage (Ramukumba, 2017; Rocha, 2018). The literature also points out that there is an incipience of how and where to use effectuation and its relationship with innovation management (Frederiksen and Brem, 2017; Futterer, Schmidt, and Heidenreich, 2018; Guo, 2019; McKelvie et al., 2019; Roach, Ryman and Makani, 2016; Sarasvathy, 2001). Thus, in this context, this research seeks to answer the following questions: How and what innovation strategies do fintechs use to adapt to the VUCA world? Does effectuation help in this innovative adaptation process? How and what effectuation principles are used?

Therefore, this study aims to identify which drivers and innovation strategies impact the adaptability of fintechs in a VUCA world in light of the effectuation principles. Besides, this research is important for the innovation area, highlighting strategies that can guide the decision-making process and the best performance of organizations in the competitive market.

2. Theoretical framework and hypotheses

2.1 Innovation strategies and adaptation to the VUCA world

Companies are creating adequate innovation management, specifically with quick and timely responses, to deal with a dynamic context (Frynas, Mol, and Mellahi, 2018). Each component of the VUCA world, shown in Table 1, influences the formation of this dynamic context.

Table 1: Components of the VUCA world

Component	Meaning
Volatility	Relatively unstable change
Uncertainty	A lack of knowledge of whether an event will have meaningful ramifications
Complexity	Many interconnected parts form an elaborate network of information and procedures
Ambiguity	Cause and effect are not understood, and there is no precedent for making predictions on what to expect

Source: Adapted from Frynas, Mol, and Mellahi (2018)

Innovation strategies are developed through drivers. According to Leo and Tello-Gamarra (2020), innovation drivers are composed of internal and external factors and, depending on the way they are used, guide the organization towards innovation. Based on the structure of service innovation drivers proposed by Leo and Tello-Gamarra (2020), a literature review was carried out to determine the internal and external strategic drivers that contribute to the achievement of innovation in organizations. Therefore, Table 2 shows the strategies and their respective drivers.

Table 2: Innovation strategies. Source: Author's elaboration

Drivers	Strategies	References
Employees	The company has an employee who is responsible for establishing an observation and direct contact with customers.	Larivière et al. (2017)
	The company constantly trains its employees to develop innovative activities and use new technologies.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018)
	The selection and recruitment process of the company considers the innovative profile of the candidate.	Leo e Tello-Gamarra (2020); Tuzovic et al. (2018)
	The company uses integrated teams to develop its activities.	Dangelico (2016); Johansson, Raddats e Witell (2019); Kariyapperuma (2016); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018)
Innovation	The company has innovation as a strategic element for its consolidation in the market.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017)
	The company communicates its innovation strategies to its employees.	Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017)
Innovation	The company has partnerships with research institutions or external R&D (Research and development) contracts.	Dangelico (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019)
	The company has an internal R&D center to create new knowledge and technologies.	Dangelico (2016); Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Yan et al. (2018)
Knowledge Management	The company manages its learning to adapt to new market changes based on previous experiences.	Kariyapperuma (2016); Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018); Taghizadeh, Rahman e Hossain (2018)
	The company documents the knowledge generated by the relationship with its	Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019); Soto-Acosta, Popa e Martinez-Conesa (2018)

Drivers	Strategies	References
	customers, suppliers, and other external partners.	
	The company maps out the experiences and skills of its employees.	Kariyapperuma (2016); Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019)
Culture	The company promotes an organizational climate in favor of innovation.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018); Yan et al. (2018)
	The company has reward programs for innovative suggestions.	Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017)
	The company constantly analyzes the possible future risks of activities, projects, and launches of new products or services.	Leo e Tello-Gamarra (2020)
	The company develops a leadership spirit in its employees.	De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Yan et al. (2018)
Structure	The company renews and adapts its resources (physical, financial, and human).	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018); Tuzovic et al. (2018); Yan et al. (2018)
	The company renews and adapts its processes.	De Guimarães, Severo e Vieira (2017); Kariyapperuma (2016); Ozorhon e Oral (2017); Silva et al. (2019); Tuzovic et al. (2018)
	The company renews and adapts its technologies.	De Guimarães, Severo e Vieira (2017); Gupta e Nanda (2015); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Soto-Acosta, Popa e Martinez-Conesa (2018); Tuzovic et al. (2018); Yan et al. (2018)
Sustainability	The company promotes social responsibility actions in the medium and long term.	Dangelico (2016); Martinez-Conesa, Soto-Acosta e Palacios-Manzano (2017); Ozorhon e Oral (2017)
	The company promotes environmentally sustainable actions in the medium and long term.	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Varadarajan (2017)
Customers	The company captures and understands the customer's experiences, feedback, and needs in relation to its product or services.	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Johansson, Raddats e Witell (2019); Kariyapperuma (2016); Larivière (2017); Leo e Tello-Gamarra (2020); Leonidou et al. (2018); Ozorhon e Oral (2017); Salunke, Weerawardena e Mccoll-Kennedy (2019); Taghizadeh, Rahman e Hossain (2018); Tuzovic et al. (2018)
Customers	The company encourages its customers to participate in its development projects.	Dangelico (2016); Johansson, Raddats e Witell (2019); Larivière (2017); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Salunke, Weerawardena e Mccoll-Kennedy (2019); Silva et al. (2019); Taghizadeh, Rahman e Hossain (2018); Yan et al. (2018)
Suppliers	The company maintains good relations with its suppliers.	Dangelico (2016); Leo e Tello-Gamarra (2020); Leonidou et al. (2018); Silva et al. (2019); Tuzovic et al. (2018)
	The company has a system for evaluating the performance of its suppliers.	Leo e Tello-Gamarra (2020)
Competitors	The company participates in experience sharing networks with its competitors.	Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019)
	The company constantly monitors the market to direct its technological developments.	Leo e Tello-Gamarra (2020); Silva et al. (2019)(Leo and Tello-Gamarra, 2020)
Government and Society	Changes in society behavior impact the company's management processes.	Dangelico (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018)
	Government incentives and barriers impact the company's management processes.	Dangelico (2016); Gupta e Nanda (2015); Leo e Tello-Gamarra (2020); Leonidou et al. (2018); Ozorhon e Oral (2017); Silva et al. (2019)

In summary, since the discussions suggests that innovation management allows organizations to respond more quickly and with better performance in a VUCA world, this leads to the following hypothesis:

H1: Innovation strategies have a positive effect on adapting the organization to the VUCA world.

2.2 Effectuation as a moderate variable between innovation and adaptability in the VUCA world

Effectuation and causation are two alternative decision-making principles. The causation process focuses on selecting means to achieve a certain goal, while the effectuation analyzes the available means to achieve the effects (Henninger et al., 2020).

Guo (2019) highlights that effectuation is a theory that has spread in the area of entrepreneurship, and that has also gained relevance in the areas of strategy and innovation, allowing companies to develop innovation strategies with limited resources and under a context of uncertainty.

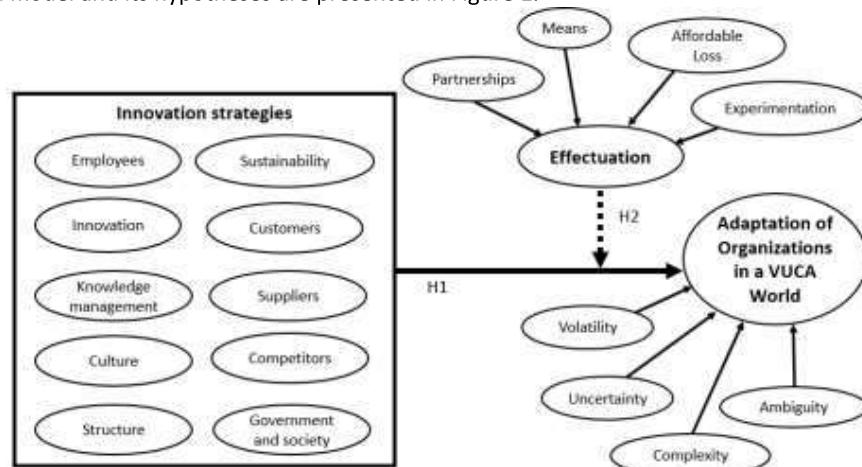
In this description of effectuation, it is possible to see the centrality of its concept concerning the innovation processes. In the same way, Roach, Ryman, and Makani (2016) and Futterer, Schmidt, and Heidenreich (2018) define the aspects of effectuation in:

- Means: use resources and key questions for guidance, such as “what do I know”, “who am I” and “who do I know”. Within environments with limited and uncertain or contingent resources, the resources of means provide new possibilities and innovations;
- Experimentation: leads to new approaches and seeks to enhance the “surprises” that result from the design process;
- Partnerships: stakeholders are used as a way to provide support and work together to share experiences and mitigate the risks inherent in the innovation process;
- Affordable loss: calculation of losses versus the unpredictability of gains.

In summary, since “effectuation has a positive effect on innovation strategy” (Guo, 2019, p. 4), and “effectuation has been defined as a decision-making process used by expert entrepreneurs under conditions of uncertainty” (Lingelbach et al., 2015, p. 5), it is assumed that effectuation can also begin in the VUCA world. Thus, the following hypothesis is proposed:

H2: Effectuation plays a positive moderating role in the relationship between innovation strategies and the organization's adaptation to the VUCA world.

The research model and its hypotheses are presented in Figure 1.



Source: Author's elaboration

Figure 1: Research model

3. Methodology

Fintechs were selected as the objects of this research because they are inserted in an environment filled with innovation and technological solutions, having to respond quickly and manage their decisions in an increasingly VUCA world of changes and dynamism in the financial market.

Therefore, a case study was carried out with two Brazilian fintechs. Online interviews were conducted with professionals who work daily with innovation, being the product owner at fintech A, and a partner, and a customer success manager at fintech B. Each interview lasted an average of 1 hour and 15 minutes. Table 3 shows the characteristics of the companies.

Table 3: Fintechs' characteristics

Characteristics	Fintech A	Fintech B
Number of employees	50 to 99	More than 99
Size	Medium	Large
Actuation segments	Investments	Loan and debt negotiation
Foundation	2011	2018
Products	Investment strategies and automated investment in the stock market	Anticipation of federal precarities

Source: Author's elaboration

For data analysis, tables were structured containing the constructs presented in the research model. Thus, a comparison will be made between the strategies used by fintechs A and B.

4. Results

The interviews were transcribed, and the interviewees' responses were summarized. Tables 4, 5, and 6 show the comparative results between fintechs A and B.

Table 4: Innovation strategies used in fintech A and B

Drivers	Strategies	Fintech A	Fintech B
Employees	Has a customer success area as an employee contact channel with customers	X	X
	Conducts practices for exchange of experiences between employees as a form of training	X	X
	Conducts innovation challenges in the selection process for new employees	X	
	Created a specific sector for the engagement of its employees		X
	Partners with universities to select interns		X
	Has multifunctional teams in the stages of product management and development	X	X
Innovation	Uses disruptive innovation as a way to consolidate itself in the market	X	
	Uses technological innovation as a way to consolidate itself in the market	X	X
	Uses multifunctional teams, Scrum methodology, and meetings to align all employees on innovation strategies and technologies	X	X
	Partners with universities	X	X
	Originated a company in the same group, a quantum fund, only focused on R&D	X	
	Has a laboratory with people from different areas who are responsible for carrying out R&D		X
	Each sector carries out R&D activities	X	
Knowledge Management	Constantly carries out retrospectives of its completed projects, seeking to develop action plans with possible improvement and learning practices	X	X
	The customer success team talks to customers and records feedback and improvements. Thus, the team reports to the other areas possible problems and solutions that can satisfy customers	X	X
	Uses a standard template to map its employees' tacit knowledge	X	
	Records videos with its customers about positive past experiences with the company		X
	Maps its employees' experiences through an organizational climate survey		X

Drivers	Strategies	Fintech A	Fintech B
Culture	Uses the managing objectives and key results method (OKR) and, thus, each area defines how it will innovate and for what reason	X	
	Emphasizes transparency as a company value in the onboarding process, and constantly encourages employees to present new projects and ideas		X
	Encourages the hiring and promotion of employees who innovate	X	X
	Has special awards related to the general performance of its employees	X	
	Quarterly, the company offers courses to its employees that have tendency to innovate		X
	Analyzes risks and how to mitigate them	X	X
	Has already hired outsourced consultants or has leadership improvement practices for managers	X	
Structure	Stimulates the career development of its employees, opening opportunities in the future for them to become leaders		X
	Renews and adapts its resources, such as equipment, infrastructure, and renovations to improve the work environment	X	X
	Every quarter the company seeks to review and adapt its processes to better adapt or expand the business	X	
	Has a partnership with an executive university to develop the business skills of its employees		X
	Seeks to renew and adapt its technologies through R&D	X	X
Sustainabilty	Elaborates its entire technological structure when they founded the company with cloud services and call recording		X
	Promotes competitive innovation dynamics, where the employees who win the dynamic receive part of the prize and the social institutions receive the other part	X	
	Seeks to carry out socially responsible actions and campaigns with donations to social institutions and encourages the participation of its employees		X
Customers	Has a contact channel on Telegram with almost 3,000 subscribers	X	
	Allows customers to choose which is the best means of communication to contact them		X
	Conducts individual conversations with users through the Google Meet platform, seeking to better understand their needs through interview techniques	X	
	Uses net promoter score (NPS) as an indicator to assess customer satisfaction and collect feedback to improve the user experience	X	X
	Recorded videos from its customers' previous experiences		X
	Seeks to collect and understand the reasons for the cancellation of the service or product to make future improvements	X	
	Performs a testing and validation stage, in which it encourages the participation of consumers, who collaborate for free and provide feedback and suggestions	X	
	Has a laboratory with employees who carry out tests of new products, services, or processes, looking for the optimal product to meet the customer's needs		X
Suppliers	Maintains a long-lasting relationship with suppliers and requests new demands from them	X	X
	Validates information received through codes	X	
Competitors	Monitors the market and analyzes and plans its medium- and long-term strategies	X	X
	Engages in benchmarking with partner companies	X	X
	Participates in events with its competitors	X	
Government and Society	The company constantly seeks to adapt its management processes due to the impacts related to society's behavior	X	
	Maps risks and adapts its management processes to government-related impacts	X	X

Source: Author's elaboration

Table 5: Effectuation strategies used in fintech A and B

Constructs	Strategies	Fintech A	Fintech B
Means	Plans its future projects	X	X
	Adapts available means and resources, such as codes and past experiences	X	
	Uses new features		X
Experimentation	Experiments in some areas where interaction with the user is possible, so that the product is validated before its launch	X	
	Has a laboratory that tests new products, services, or processes, seeking to meet the needs of its customers		X
Partnerships	Believes that partnerships reduce risks, generate value, and create new opportunities	X	X
Affordable Loss	Seeks to minimize its losses through studies of risks, prices, and returns	X	X
	Takes risks in the market, as it believes that the business is attractive even if there are government barriers		X

Source: Author's elaboration

Table 6: Adaptability strategies used in fintech A and B

Constructs	Strategies	Fintech A	Fintech B
Volatility	Uses agile methodologies	X	X
	Meets frequently to improve the alignment of information and plan future actions	X	X
Uncertainty	Constantly monitors the market, risks, and opportunities	X	X
	Researches for information about its competitors	X	
	Analyzes if there is any deviation in the market data that could impact the company		X
Complexity	Restructures its infrastructure, processes, and resources	X	X
Ambiguity	Has a laboratory with a cross-functional team that seeks to carry out experiments and proposes new discoveries and projects		X
	Has a discovery and delivery process, in which it seeks to meet the customer's needs based on experiments and validations of the product for them	X	

Source: Author's elaboration

The results show that fintech A seeks more technological and disruptive innovation strategies. It is looking for a more pioneering differential in the market, monitoring, and making more contact with its competitors and partners, and establishing greater involvement and proximity to its consumers, making them more collaborative. fintech B seeks more employee engagement, technological, and incremental innovation strategies, aimed at more efficiency, more customers, and greater consolidation in the market.

During the interview, fintech A informed that it believes that the strategies related to employees are the most impactful for the innovation and adaptability of companies to turbulent contexts. The way an employee will be selected and recruited and whether he will adapt to the company's culture that will make a difference in alignment with the company's growth prospects. For fintech B, strategies related to organizational culture are the most impactful, as the way the company provides an attractive culture to its employees will make a difference in engagement for the company's growth prospects.

5. Discussion, implications, limitations, and conclusions

In general, although fintechs A and B operate in different segments of the financial market, both have similar innovation-oriented practices adapting to the VUCA world, corroborating with the studies in Table 2, such as the use of start-up methodologies (e.g., agile methodology), experimentations, innovation culture, structure, and stakeholders. However, strategies related to environmental sustainability are non-existent in both fintechs.

Analyzing the data collected, it was observed that some principles of effectuation help in the innovative adaptation process. Specifically, fintech A uses more effectuation strategies than fintech B, and both use

effectuation and causation in means and strategies of affordable loss, similar to what was mentioned in the study by Lingelbach et al. (2015) who believe that the joint use of effectuation and causation in the innovation process depends on the sector studied.

Thus, this study contributes to some interesting theoretical gaps and opportunities for future research: What characteristics and factors of fintechs influence the joint use of effectuation and causation? What makes one fintech use effectuation more than others? Does the type of innovation used by the company, such as disruptive innovation, cause it to use more effectuation principles? Do the characteristics of the entrepreneur, such as the instinct to believe in your own business, influence the choice between effectuation and causation?

As in the study by Bennett and Lemoine (2014), strategies such as restructuring and using experimentation, information, and agile methods were effective ways of dealing with the VUCA world in fintechs A and B. During the COVID-19 pandemic, both fintechs focused on restructuring their resources. Fintech A focused on adapting internal processes to improve the alignment of information among its employees, while fintech B focused on improving the engagement of its employees. Although the VUCA world is full of turbulence and dynamism, both companies believe that the COVID-19 pandemic has had positive impacts, such as the growth of the financial market and better maturation of their respective companies.

Therefore, this study demonstrated "which" and "how" the strategies provide greater adaptability of fintech to a VUCA world. It limited itself to qualitatively validating the conceptual model, bringing quantitative research as future opportunities, whether in the fintech market or other organizations.

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