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Research Article

COVID-19 fueling innovation capabilities: the case of medicine innovation Lab (MIL)

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Abstract

Organizations have been long seeking for building innovation capabilities to become game-changers in the market or being flexible against the changes that threaten them. An increasingly adopted approach is the establishment of an internal Innovation Function (IF) to coordinate the diverse and complementary innovation efforts within and around the organization. Although companies typically engage with initiatives for innovation capability building in good times and tend to quickly turn the focus back on short term issues in periods of crisis, this paper discusses a somewhat contra-intuitive case of a niche-focused Health Insurance Company in which the unprecedented power of the COVID-19 fueled the efforts towards establishing an IF despite the risks it first represented to the business. Based on a 4-month participative observation, we present the case of the Medicine Innovation Lab implementation (MIL), showing how the raising of the pandemic crisis affected the dynamics of MIL implementation, identifying and discussing the associated deployments of COVID-19 distinct dimensions, such as legal, funding availability and internal projects nurturing. Lastly, we propose paths for further investigation, including the post-crisis effect.

Keywords: COVID-19 crisis, innovation management capability, innovation function.

1. Introduction

Innovation is all about change. The Schumpeterian idea of creative destruction shows how a technology paradigm may sustain incremental innovations for a period until a disruption changes the game and the market (Schumpeter, 1934), a similar idea found in Utterback (1994) in the debate of technological change and dominant solutions. In this context, companies are considered a part of the broader technology entrepreneurship movement, which is often taken to be one of the main engines for creative destruction (Ratinho et al., 2015; Schumpeter, 1934).

According to Montalvo (2006), innovation can be triggered in the firms by a wide variety of factors, depending on the type of innovation and the internal and external contexts of the firm. More broadly, It is well known the role that events like world-wars and geopolitical tensions played for the rising of technologies and fields such as Operational Research (Kirby, 2003), Lean Manufacturing (Holweg, 2007), the internet (Targowski, 2005), the atomic-nuclear energy (Weart & Weart, 2009; Roehrlich, 2016), the penicillin (Quinn, 2013), among others. Other studies highlight the role of economic crises and scarcity in boosting innovation and entrepreneurial behavior (Laperche et al., 2011; Block et al., 2015; Bosma & Kelley, 2019; Keupp & Gassmann, 2013; Ang, 2004).

Less researched, however, is how companies might innovatively respond to big external and unpredictable crises that have the power to redefine the entire global context and vigorously shake markets in noticeably short times, rather than just being negatively hit by them – like the case of COVID-19 global epidemy. Outbreaks like the somewhat recent Ebola crisis in Africa could give us clues (*e.g.* Goldstone & Brown, 2015; Michaels-Strasser et al., 2015), but the studies focused on social innovations, specific advances in health care or debates at the government or public policy level.

In order to add insights to the previous debate, this study relies on a longitudinal case study (van de Ven & Huber, 1990) involving a participant observation in a Medical Health Insurance Company, which created a Department for speeding up innovation when the COVID-19 crisis arose. We map the implementation process of this new Department – the Medicine Innovation Laboratory (MIL) - and, following, we discuss the transformational effects of the pandemic crisis.

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2. Theoretical background

2.1. Organizational studies: innovation, uncertainty, and change

The term "game-changer" is widely used in literature to refer to new technologies or tech-trends, companies, or even people that are perceived as the key to promote relevant changes in a given setting, such as, a company, a social practice or an entire market. Thus, as far as the "game" changes, a turbulent environment open paths for business opportunities, new product or process standards and new forms of organizations might take place and arise as the new rule, whereas some products, organizations, and other pieces of the older game get defeated (Schumpeter, 1934; Utterback, 1994). Therefore, being the changer and being able to adapt to external changes are the abilities of companies that survive over time and, as so, they are in the roots of the reasons for companies to seek flexibility and systematic innovation.

This current debate has been evolving through several strands and constructs in innovation-related literature in the last decades such as in dynamic capabilities (Teece et al., 1997), organizational ambidexterity (Tushman & O'Reilly III, 1996), systematic radical innovation (O'Connor et al., 2008), Corporate Entrepreneurship (Covin & Miles, 1999) and others. In general, in a journey to become innovative and flexible enough to face and lead changes, a company may adopt an innovation management model (Bagno et al., 2017a) and undertake actions in distinct levels, like corporate venturing investments (Basu et al., 2011; Battistini et al., 2013, Enkel & Sagmeister, 2020), open innovation initiatives (Chesbrough, 2003; Chiaroni et al., 2011; Onetti, 2019), designing internal structures to balance routine and innovation (Alänge & Steiber, 2018; Duncan, 1976; Matos et al., 2019), among others. Particularly, in regard to future changes, companies as well as sectoral organizations and even governments have been increasingly conducting foresight exercises, applying a diverse set of methods and techniques to catch signals of what the future may come to be, based on the current knowledge and available information (Ciarli et al., 2016; Porter, 2010). In doing so, managers try to prepare the company better and move forward actions and projects that best fit to likely (or desired) future scenarios.

2.2. The Innovation Function (IF)

To integrate the diverse actions and approaches for systematic innovation, some companies have been setting what O'Connor et al. (2008) call Innovation Function – IF. The IF refers to an identifiable team that has the responsibility to lead the innovation efforts in the company. To do that, IF should have its own leadership, metrics, vocabulary, career paths, and permanent power in the companies (O'Connor, 2012; O'Connor et al., 2008). Experiences on IF implementations have been reported in studies that cover different industries (*e.g.* Swisher, 2012; Börjesson et al., 2014; Labitzke et al., 2014; Paula et al., 2016; Oliveira et al., 2016; Melo et al., 2020).

O'Connor et al. (2008) argue that the IF team should: stimulate the generation of ideas; involve senior leadership in clarifying the strategy; seed-funded projects; support innovation project teams; scan the external environment to capture trends; invest in small businesses; interact with other organizational functions; help to develop governance over innovation efforts, support decision-making and facilitate portfolio reviews and; monitor the innovation capability. Bagno et al. (2017b) identify 12 assignments that characterize the typical work done in IF, viz, (a) raising funds and getting tax incentives; (b) establishing partnerships with Science and Technology Institutes; (c) establishing partnerships with other partners such as industry associations, clients, suppliers or government instances; (d) managing the innovation portfolio and projects; (e) managing company's intellectual property rights associated with technological innovation; (f) conducting R&D-related activities (in cases where no R&D function is in place); (g) conducting foresight studies (strategic, technological and/or market); (h) diffusing an innovation culture internally; (i) building competences (individuals and teams); (j) managing new ideas and ideation programs; (k) knowledge management-related efforts; and (l) leveraging new businesses and/or conducting corporate venturing programs.

Efforts in a single company to implement an IF may be triggered by some events as a lost market opportunity, a dramatic drop in performance, a new top management's strategic vision, or even heroic initiatives that emerge from the company's mid-managers (O'Connor et al., 2008). Bagno et al. (2017b) add aspects of the local market, public policy, funding availability, and the characteristics of S&T infrastructure as potential levers for IF implementation.

Noteworthy to this debate is the fact that implementing organizational structures for systematic innovation in a company can take a long time until the first tangible outcomes arise, which challenges the IF legitimacy in corporate environments. In the cases studied by O'Connor et al. (2008), on average, some financial impact could be seen only after three years of work. Other studies such as Hansen & Birkinshaw (2007) and Gibson (2010) report numbers around five years, whereas Chiaroni et al. (2011) present a case that required 18 years to implement open innovation practices fully. Even though many initiatives do not sustain over time and, especially in times of crisis, the efforts towards systematic innovation are often suffocated by short-term needs (Kelley, 2009; Kötting, 2019; O'Connor et al., 2018).

2.3. The role of Digital Technologies

Recently, complementing the vision of a knowledge-based economy, an important phenomenon that has been boosting a sense of urgency in industries for disruption is the digital transformation (Prashantham & Kumar, 2019). According to Basu et al. (2011), commitment with activities like corporate venturing are greater in industries with rapid technological change, high competitive intensity and weak appropriability. Moreover, digital platforms and platform-oriented companies are currently getting increasingly recognition as the main enablers of ecosystem innovations. Erzurumlu (2018) considers digital technologies as the main driver of the current revolution as they are far from any saturations and have the potential to transform every sector in the economy. The author emphasizes five digital technologies, considered fundamental for businesses in the contemporary context: cloud, big data analytics, cognitive computing, internet of things (IoT) and augmented / virtual reality (AR/VR). Minsky (2019) highlights that companies of almost all sectors are paying special attention to technologies such as IoT, robotic process automation (RPA), artificial intelligence, VR and blockchain. Likewise, Alänge & Steiber (2018) pose that the internet and cheap information processing have accelerated the rates of change and product life cycles in many industries, also fostering new collaborative approaches to innovate. Lastly, Bogers et al. (2018) point to a new wave of digital technologies in that relevant impacts are expected even in highly regulated sectors such as health, energy, transport, or finance.

3. Method

3.1. The case

The research setting was a Health Insurance Company ("MED") created in 2010. It has 450 employees, 39.000 beneficiaries (clients), and approximately US$ 60 million annual revenue during the period of our data collection (early 2020). The company focuses on the senior public (over 49 years) with a business model centered in preventive medicine to reduce avoidable treatments. MED has several care units such as diagnosis centers, eye and oncology clinics, pain therapy, and was about to launch its first hospital, which will increase the staff to 800 employees.

Three sampling criteria (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) justify the case selection. First, MED presented literature-based contextual conditions concerning capability creation for innovation management such as top management support, dedicated individuals to accomplish the mission, and an emerging portfolio of innovation activities. Second, the COVID-19 crisis has affected MED's operation directly by the fact it belongs to the Health Sector. Third, MED has a distinguished position in the Health Sector – the company has a 92% customer satisfaction index, and the lowest death loss ratio (46% against 76% on market average), both calculated by the National Health Agency. Finally, the company got the first position in World Bank's ranking World Bank considering its financial results when compared to competitors at the same level of revenues (*e.g.* 20-22% net profit, 30% EBITDA). Besides that, several empirical reasons support the case selection: (i) MED was engaged in the process to create a new organizational unit to manage innovations; (ii) the researchers had full access to MED's participants (both top and middle levels), documents, and also routines (*e.g.* participation in general internal events, management rituals, board meetings), enabling richness for the case analysis (Eisenhardt et al., 2016); (iii) the case represents a huge acceleration in a firm's innovation capability by coronavirus pandemic which could be observed in real time.

3.2. Data collection and analysis

Data were initially collected by one of the authors through four month longitudinal participant observation (Langley et al., 2013). During this period, several documents were collected through the interaction with more than 40 stakeholders, the observer participated actively in the routine of the new innovation area (30h/week in average), in weekly meetings with the Vice-President (more than 15 over the period) and monthly presentations to the Board Council. The Vice-President formally validated the data used in this study in an interview at the beginning of May/2020 (fully recorded and available to be published).

The first step of analysis consisted of sequencing the main events of the case (Table 1). Events can be defined as actions of a determined agent on a given object, at a specific moment in time (Heise & Durig, 1997), and may include decisions, meetings, and conversations (Langley, 1999). After that, we prepared a detailed narrative concatenating all the collected data in a meaningful way (from theoretically informed reading), without losing their adherence to the case and language settings. The narrative strategy is recognized as an efficient strategy for analysis and not only as a mere step to prepare chronology (Langley, 1999). As pointed by Pentland (1990), narratives, if based on typical features (*e.g.* sequence in time, focal actors, identifiable voice, an evolutive frame of reference, content/context indicators), can be valuable to build process theories.

Table 1. The main events.

#	EVENT	MOMENT
1	Vice-President participates in a leadership program at INSEAD	2019
2	Vice-President approves the MIL concept with the Board Council	2019
3	IT Department develops the first innovation projects	2019
4	Vice-President structures a dedicated physical area for MIL activities	2019
5	Vice-President hires a consultancy to design and implement the MIL	2020
6	MIL execute the first engagement workshops with MED employees	2020
7	MIL presents projects to Science and Technology Institutes (STIs)	2020
8	COVID-19 crisis emergence	2020
9	MIL develops several digital projects ("Teleconsultation Platform", "Digital Sales", "Financial Default Analysis System", "COVID-19 Portal", "Unique Medical Record")	2020
10	STI suggests a scope change in "My Health App" project to attend a national funding program	2020
11	STI invites MIL to engage in "COVID-19 Sorting Platform" project	2020
12	Top Management decided to create a new legal identity for MIL	2020

4. Case narrative

4.1. The foundations

MED was founded in 2010 by a group of five doctors with the idea to build a Health Insurance Company focused on senior public. In 2015, the major transformation began when the new shareholders (including the current Vice-President) assumed the company's control. This group promoted two main changes considered the basis for MED's success: the operation's verticalization (*i.e.* proprietary customer service units) and a focus on the assistance cost (*i.e.* to reduce medical treatments/interventions by developing managerial prevention practices) – this transformation can be evidenced by evaluating the death loss ratio, from 76% in 2010 to approximately 46% nowadays.

In the beginning of 2019, the company started a new phase, called by the Vice-President (VP) as "informatization", – when an IT Manager was hired. This Manager guided the development of several systems aiming to substitute the labor-intensive processes, such as dedicated Enterprise Resource Planning (ERP) and chatbots at the call center. In mid-2019, a specific happening altered the course of MED's history. The Vice-President engaged in a professional course at Insead, France. He did a pitch of MED's business model and fast growth over the years to two collogues – a successful startup founder in the media sector and an ex-President of a multinational IT company. The VP had a clear statement in his mind: "*my company needs technology to provide quality health to seniors who do not have proper incomes*". Back to the headquarters, the VP approved in the Board Council a budget to create a new organizational structure to handle with technology and innovation – the "Medicine Innovation Lab (MIL)". The two collogues from Insead were invited (and accepted) to form a Technology Council in the company, as they represented (in the VP's vision), in one hand, the "startup world" vision, and on the other hand, the "mature technological company" vision. A third member was invited to the group – a scholar to represent the "science" vision. This Council was primally designated to guide MIL's activities.

At the end of 2019, a physical area was created to accommodate MIL's collaborators. Inspired in Insead work environments, this new room carried distinct features compared to MED's installations – moving workstations, open meeting rooms, and colored sofas. In this first moment, the IT Manager was designated to lead the structure. A first squad of software developers was set up to start some digital projects, for example, a totem to support customer reception in the attendance centers ("Digital Totem" project).

At the beginning of 2020, indicated by one of the Technology Council members, a consultancy company was hired to design and support MIL's implementation. One of the first activities was putting together MED and MIL's employees in "Engagement Workshops" to present the consulting approach regarding innovation management, innovation concepts (*e.g.* ecosystem actors, national programs), and to promote professional training involving innovation frameworks and toolkits. At this moment, several individual interviews were carried out with more than 20 employees (*e.g.* directors, middle managers, back office, doctors) to identify current innovation projects. More than 100 initiatives were identified, mostly new ideas for future development, and consolidated in the first vision of portfolio.

In parallel, a structuring work front regarding MIL's design was performed by the consultancy led by the VP – for example, defining the mandate of the new area, with three main strategic pillars to orient innovation efforts: (i) commercial – "*strengthen our commercial channels to attract and retain the largest number of beneficiaries*"; (ii)

preventive medicine – "*promote the health of our beneficiaries, avoiding the need for treatment*"; (iii) assistance – "*ensure the assertiveness of treatments keeping the cost of the plan accessible to the widest public*". Alongside these main pillars, MIL received other assignments: to engage MED's collaborators in its activities, to articulate partnerships with the innovation ecosystem, to capture external funding for innovation projects, to be a reference in new working models (*i.e.* agile mindset), to foster innovation and entrepreneurship culture, among others.

During the first quarter of 2020, several issues involving MIL's management model were defined: the organizational structure design, with more than 20 fixed positions (including technology, health, customer experience, open innovation, funding, strategy, and agile leaderships); governance rituals at the portfolio and project levels; legal scenarios (*i.e.* "MIL will be an internal business unit or a separated company?"); innovation toolkits including prioritization rules, idea templates, and Kanban dashboards. In this period, a specific occasion marked MIL's trajectory – the first "Pitch-Day". Employees were invited to present a pitch in order to get support from MIL to articulate partnerships and seek external funding. Ten initiatives were presented: monitoring wearables; billing automation; a device for identifying drug overflow; intelligent systems for hospitals; digitalization in the preventive medicine program; account audit; social network chats; blockchain applied to management systems; "my health" app; artificial intelligence (AI) for exams. This event was a fruitful experience as pointed by the VP: "*I am stunned with the power of a proper environment for creativity*".

The first exercise of portfolio prioritization was performed by MIL using the pre-defined prioritization rules and four initiatives from the Pitch-Day (*e.g.* billing automation; account audit; my health app; AI for exams) were selected to be part of a "fast-track" program – the idea relied to find potential partners to engage in the development of such projects. The decision at that moment was to focus on Universities and Science and Technology Institutes (STIs) for two reasons: (i) the selected projects require nonexistent technical competences (*e.g.* AI, machine learning) at MED; (ii) the National Government provides financial support (non-refundable) to firms which engage in this kind of partnership. After selecting eight potential STIs, and signing non-disclosure agreements (NDAs), MIL initiated the discussion of these opportunities to get robust work plans.

4.2. In times of COVID-19

"*Every crisis brings pain, which is the best teacher*" (Vice-President). This speech represents how COVID-19 impacted MED's operation and, especially, served as a trigger to accelerate MIL's evolution. Several incremental innovation projects were developed over three weeks. One example is a teleconsultation video platform that promotes remote assistance to customs as social distancing becomes a reality with the virus. There was an additional challenge for MIL not only about the technical solution itself but also about the customer experience view. As an example, there was a need to create a simple button in WhatsApp to directly access the teleconsultation platform because this kind of technology should be "*available for an 88 years old customer*" (Vice-President). Other project examples are listed: the "Digital Sales App" (*i.e.* an app to perform the sales broker activities, from the register until approval of a new customer); the "Financial Default Analysis System" (*i.e.* a digital system to monitor financial default due to impact of the coronavirus crisis of customer's incomes); and the "COVID-19 Portal" (*i.e.* an online webpage charged with a the COVID-19 medical protocol to provide orientation for the beneficiaries rapidly).

The "fast-track" projects discussion with the Science and Technology Institutions were also directly impacted by the COVID-19. MIL opened negotiations, for each project, with 2-3 potential partners. The relationship with one institute (designated as "CIM" in this study) draws attention. When the crisis emerged, CIM invited MIL (and it accepted) to collaborate in an informal open source initiative (*i.e.* involving other global partners), to provide x-ray thorax images for the building of software to detect the disease anticipatedly. This workforce helped to approximate both entities. In sequence, the National Government launched an "emergency call" for innovation projects regarding coronavirus specific themes (*i.e.* respirators, wearables, masks, among others). This call would provide 90% of external subsidized funding for the projects. CIM's business partners suggested to MIL to adapt "My Health App" in order to attend the call, adjusting both timeframe (*i.e.* maximum 3-month) and scope (*i.e.* not a "general" app but focused on COVID-19 quick diagnosis using artificial intelligence and integration with wearables to capture vital signs from patients). It's important to note that a wearable project was discussed at the "Pitch Day". MED's top management treated this partnership as a unique opportunity to handle both challenges (*i.e.* "my app" and "wearables").

CIM also presented to the same call a project to integrate in a "COVID-19 Sorting Platform" (*i.e.* including data from x-ray exams, thermal imaging, and camera/sensors) with another set of partners. However, the private company, which was the primary supporter of this project, declined to the partnership after its approval. CIM invited MIL to participate in that project and, even not affecting MED's business directly and not have been designed by MIL, the VP accepted to invest to reinforce the partnership with CIM and to make a social contribution. In his words, "*the relationship with STIs must be win-win, and the company has support society in this crisis moment*". Both "My Health App" and "COVID-19 Sorting Platform" are in the process of contract signatures.

At this moment, MED's top management decided to create a new company to hold MIL. This decision has some triggers. First, they recognize MIL's relevance to the business and the impact generated in short time. Second, there is a possibility to maximize tax incentives. Third, MED has some legal restrictions imposed by the National Health System to participate in some National Innovation Programs. Finally, there is an expectation regarding MIL for the commercialization of its innovation solutions in the future as an independent unit.

5. Discussion

As declared by the Vice-President: "a defined structure and processes [for innovation management] plus team engagement were the bases for our quick response when facing the crisis". From the narrative analysis, it becomes evident that MIL represents the emergence of an Innovation Function (IF) in O'Connor et al. (2008)'s sense (*i.e.* there is an identifiable structure and people to manage an innovation portfolio). Moreover, the assignments proposed by Bagno et al. (2017b), which makes the IF more tangible, are observed in the case. For instance, the "Engagement Workshops" involving training, awareness of the company regarding innovation, and idea presentations reinforce the "diffusion of innovation culture" assignment. The "fast-track" program and the associated selection of four projects following a defined prioritization rule (*i.e.* a scoring model) elucidate the "portfolio and project management" assignment. Regarding "funding and tax incentives", the case shows how, especially during the COVID-19 crisis, the company incorporated external subsidized non-refundable financial resources to increase its budget for innovation projects. Finally, "partnerships with Science and Technology Institutes" were always sought since the creation of the new area and materialized through the projects with CIM.

This study represents an exception when compared to previous studies contradicts at some level previous studies (Kelley, 2009; O'Connor et al., 2008) about how external crises may constrain the development of innovation capabilities. MED had many reasons to stop MIL's implementation due to the uncertainties brought by coronavirus plague (*i.e.* expectation of billing drop caused by defaults and reduced sales, increasing in death loss ratio, mainly because 100% the beneficiaries belong to the disease risk group). However, the company made the crisis an opportunity to digitalize its operation and to accelerate IF implementation and its legitimacy in the whole company. The literature on innovation capabilities (*e.g.* Börjesson et al., 2014; Chiaroni et al., 2011; O'Connor et al., 2008, 2018) argues that the innovation capability building implementation takes typically a long-time period, an aspect that MIL case also seems to challenge.

At the company level, the crisis provoked notable changes. First, it boosted the investment capacity for innovation projects. In the beginning, there was an expectation of investing in the four projects mapped during the "fast-track". The projects approved in the National "emergency call" have twice the budget compared to the previous ones. Second, the pandemic crisis directly influenced the portfolio management system. New projects emerged, like the "X-Ray COVID-19" or "COVID-19 Sorting Platform". These projects fulfilled the expected portfolio capacity and forced the company to pause other initiatives (*e.g.* the "artificial intelligence (AI) for exams"). Third, there is a remarkable influence on the project level. "My Health App" scope was changed entirely to address a solution for coronavirus prevention, including new features (*e.g.* wearable integration as an input data source).

A common debate in Open Innovation literature is that partnering efforts for innovation projects in established companies tend to start with inbound ideas and resources from external partners but then evolve to more complex networks and forms to profit from innovation-related activities as a company matures its open approach, one that combines inbound and outbound shares with single and multiple partners (Bagno et al., 2017b; Brunswicker and Chesbrough, 2018; Huizingh, 2011). In this regard, it is also arguable that COVID-19 crisis catalyzed such a process in MIL case once, after the first incursions seeking partners to complement the firm's capabilities to move forward its project portfolio, the company began to be unexpectedly invited by other partners from the innovation ecosystem for joining innovation projects outside its market domains.

From an external perspective, the crisis generated an effect to some extent similar to Schumpeter's creative destruction, causing environmental turbulence and unleashing pressure on governments for flexible regulations and companies to quickly develop new business models. For instance, the Telemedicine subject has long been an ethical and multifaced debate over the medical community and other associated stakeholders. During coronavirus, the National Government sanctioned this practice, and MED got the opportunity to develop its own "Teleconsultation Platform". Besides, the context of social isolation and the imminence of saturating medical services capacity boosted a series of actions concerned with introducing digital technologies in the business. This project was at some kind action for surviving since the clients were supposed to be directly affected by the virus (elderly public), and the company should be able to provide medical assistance in time to avoid hospitalizations.

6. Conclusion

This study explored the debate on how mature companies can foster innovation capabilities during extreme crises. From an in-depth case narrative analysis, we discussed the COVID-19 impacts on the building process of an Innovation Function (IF), both at portfolio and project levels. Future studies should investigate this phenomenon post-coronavirus crisis and incorporate other processual methods (*i.e.* Event Structure Analysis – Heise, 1991) to enrich the case analysis.

7. Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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