IBM Brazil: The implementation of an innovation-based strategy

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Abstract

The internet and digital revolution brought a lot of changes into society, including businesses. Companies had to find ways to reinvent themselves to survive on these new markets and develop new competitive advantage. Innovation is considered to be a smart way for companies to place themselves in a relevant market space. However, the choice to have an innovation-based strategy can be tricky and requires investments on internal capabilities.

To better understand innovation-based strategies and its implications, this case study investigated a Blockchain implementation project developed by IBM Brazil. The development of this case study took in consideration interviews performed with IBM employees, extensive literature review on innovation capabilities, innovation as strategy on high-tech companies and Blockchain for business, and analysis of secondary sources.

From this study we can highlight the findings that: (1) Innovation-based strategies can cause disturbance on operations that can led to amateur mistakes even on well-established companies. (2) Constant development of innovation capabilities is essential to guarantee high-tech companies' competitiveness. (3) Pet projects among a well-developed product ecosystem can bring great publicity, clients, and a steady revenue stream.

In addition to the case study and the Literature Review, this dissertation includes a Teaching Note in order to help instructors to prepare the in-class case discussion.

Keywords: Strategy, Innovation capabilities, High-tech companies, Blockchain for business

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Resumo

A internet e a revolução digital trouxeram diversas mudanças para a sociedade, incluindo para as empresas. As companhias tiveram de encontrar maneiras de se reinventar para sobreviver nesses novos mercados e desenvolver novas vantagens competitivas. A inovação é considerada uma maneira inteligente para as empresas se colocarem em uma posição de mercado relevante. Entretanto, a escolha de ter uma estratégia baseada na inovação pode ser complicada e requer investimento em capacidades internas.

Para clarificar as estratégias baseadas em inovação e suas implicações, este estudo investigou um projeto de implementação da Blockchain desenvolvido pela IBM Brasil. O desenvolvimento deste estudo levou em consideração entrevistas realizadas com funcionários da IBM, revisão de literatura sobre capacidades de inovação, inovação como estratégia em empresas de alta tecnologia e Blockchain para negócios, e análise de fontes secundárias.

A partir deste estudo, podemos destacar as conclusões: (1) As estratégias baseadas na inovação podem causar distúrbios nas operações que podem levar a realização de erros amadores mesmo em empresas bem estabelecidas. (2) O desenvolvimento constante das capacidades de inovação é essencial para garantir a competitividade das empresas de alta tecnologia. (3) Pequenos projetos juntos de um ecossistema de produtos bem desenvolvido podem trazer grande publicidade, clientes e um fluxo constante de receita.

Além do estudo de caso e da revisão da literatura, esta dissertação inclui uma nota didática a fim de ajudar os instrutores a preparar a discussão de casos em sala de aula.

Palavras-chave: Estratégia, Capacidades de inovação, empresas de alta tecnologia, Blockchain para negócios

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1. Introduction

In the 21st century, information and digital technology are among the main triggers for changes on society. It is no different for businesses. New generations that grow up with computers are used to have information on the palm of their hands with instant access. They keep demanding faster, easier, and smarter ways to consume products and services. The old fashion manual way of conducting business is not acceptable anymore, and old and established organizations are now competing with several start-ups that are born into this modern world.

IBM is a company more than 100 years old and was responsible for developing several technologies, like the first Personal Computer, that provided the ground for the internet and the digital revolution. However, after several years of losses, the company had to reinvent itself to survive. This tough moment led the company to focus its strategy on innovation and its main business became the offering of services to help other businesses modernize themselves.

Based on the analysis of a Blockchain network implementation project that was done by IBM Brazil in partnership with CIP, this case will present the challenges of sustaining an innovation-based strategy in real life operations.

2. Case Study

It was early-July 2019 at IBM's Brazil Headquarters, and Gabriella Macedo, a project manager of Global Business Services (GBS) unit, was in a meeting with Adriana Nascimento, executive for Blockchain at Global Business Services (GBS) unit, and Tonny Martins, IBM's Brazil President.

Earlier that year, Gabriella had accepted a groundbreaking project to implement a Blockchain network at the Brazilian national financial system (RBSFN)[1]. In spite of IBM Blockchain Platform being ranked number one in the world by several analyst firms[2], this project was particularly challenging because of its industrial scale and tight schedule.

Since the early 2000, IBM had switched its business model to start focusing on providing services to its clients instead of producing hardware, reaching in 2018 total revenues of $79,591 million U.S Dollars and $8,7 billion U.S Dollars in income from continuing operations.

The innovative network focused on preventing banking fraud was sold by Adriana to the Brazilian Interbank Payments Clearinghouse (CIP)[3]. The first use case, called Device ID, would allow the exchange of information between all the partners, enhancing their own anti-fraud systems. CIP presented its new network at CIAB, an exhibition fair for the Brazilian financial sector in June.

With the support of other's IBM business units, like Global Technical Services (GTS), Software e Security, Gabriella got together a "dream team" for the project, but the work did not go as it was supposed to. International resources from IBM had already been called to help but with no success. Costs ran above budget and Gabriella now had to explain to Tonny what happened.

2.1. IBM

IBM was a technology company that focused on serving corporate customers. Its clients were mainly multinational leaders in their sectors, financial services, airlines, manufacturing, consumer goods and retail. According to the 2018 financial statement,

[1] In Portuguese: Rede Blockchain do Sistema Financeiro Nacional – RBSFN

[2] Juniper Research and Everest Group.

[3] In Portuguese: Câmara Interbancária de Pagamentos

“IBM’s mission is to help its clients transform their companies and lead in their industries”. Its technology development led the company to be number one in the world in number of U.S. patents. Six IBM employees were Nobel laureates.

The company started in early 1900 with the merge of four other business, a tabulating company, two time recording companies and an industrial scale company. In 1917 the company opened its first office outside North America, in Rio de Janeiro. From the 20th century forward, the company began to heavily invest in Information Technology, becoming a partner of the U.S Government. At the early 50’s, IBM was responsible for projects as the “U.S Security Act” and the development of the Naval Ordnance Research Computer (NORC), used by the American Navy and considered one of the most powerful computers by the time.

On the 80s, IBM made a hugely successful launch that would change the technological world: the IBM Personal Computer. It was sold for $1.565 and brought a revenue of 29.7 billion dollars.

The IBM Personal Computer was also IBM’s biggest failure, because at the early 90’s other companies like Apple and Microsoft had also launched their versions of personal computers and were dominating the market. IBM’s product was not able to keep up with the tough competition and by 1993 IBM had loses of 8 billion dollars.

As IBM’s main competitors took away most of its market share and after several years of losses, IBM decided to make a strategic switch, looking for a new market where it could compete.

The company started to slowly sell its hardware business to smaller competitors, in order to focus its resources on developing software and e-business. In early 2000 IBM acquired the consulting unit from PricewaterhouseCoopers (PWC), which allowed for the full transition to a B2B service company.

IBM’s operation consisted of five business areas: Cognitive Solutions, Global Business Services, Technology Services & Cloud Platforms, Systems and Global Financing, being able of providing software, systems, technological research, and related financing. By having this assortment of business, IBM was able to combine capabilities and provide an integrated solution with multiple platforms to its clients.

Global Business Services (GBS) was one of the most important areas in the company, even though it had one of the smallest revenues ($16,817 M) and the smallest gross margin (26,7%) among all IBM’s business units. GBS was responsible for being

IBM's face among the clients. The area was responsible for bringing proof of concepts and industrial use cases of initiatives like Artificial Intelligence (AI), Blockchain, Robotic Process Automation (RPA), Analytics, Business Intelligence, and Cloud Services among others.

Those initiatives become projects where GBS was responsible for providing consulting, application management and business process services while other units, like IBM Watson, IBM Cloud, IBM Research and GTS, were responsible for providing IBM's products to support the project's needs. Therefore, IBM was responsible not only for the consulting part but for the implementation and technological support.

The integrated delivery network and integration between units created a bundle that intensified the client's relation with IBM. According to IBM, "these professional services deliver value and innovation to clients through solutions which leverage industry, technology and business strategy and process expertise". By applying this business strategy, IBM could develop clients' accounts that were divided by industry with executives taking care of them. Those clients had several contracts with IBM for different products, and, as long as they had a positive experience with IBM's business, they were more susceptible of signing new contracts.

2.2. IBM's Strategy

Due to the constant loses, in April 1993 IBM hired a new CEO, Lou Gerstner. Lou, with his successful history at American Express, was responsible for the big strategic shift at IBM. By this period, the service unit was responsible for only 27% of revenues and there was no software unit. The new CEO implemented a customer-oriented strategy, that made possible for IBM to change from delivering manufactured products to provide to their clients end-to-end integrated solutions.

Sam Palmisiano, that became IBM's CEO in 2002, continued the revolution using advanced technology and software to improve internal processes and incorporate fast-trading data within IBM's subsidiaries, reducing costs and allowing for knowledge sharing between employees.

Those changes turned IBM into a "on-demand business", which helped their executives to respond faster to market movements and made possible the delivery of innovative solutions to clients. IBM became a globally integrated enterprise and was seen as "one IBM".

According to Sam, “the emerging globally integrated enterprise is a company that fashions its strategy, its management, and its operations in pursuit of a new goal: the integration of production and value delivery worldwide”.

To complement its new strategy, IBM invested in developing its dynamic capabilities driving an internal transformation of its process and operations. Initiatives as deep dives, winning plays (contests) and general managers’ ownership in the strategy making promoted strategic insights, while the Strategic Leadership Forum and the Corporate Investment Fund promoted execution.

By doing this, IBM was able to engage its employees into the company’s situation, encouraging organizational learning, and innovative and curious thinking. Therefore, IBM could make small but frequent investments in new technological bets and learn from them.

Guided by Sam’s belief that IBM’s clients would value more companies that could provide solutions that integrates various technologies and suppliers into their processes. IBM had on its portfolio consulting and IT implementation services, cloud, digital and cognitive offerings and enterprise systems and software, all supported by a research unit that worked to explore new technology developments.

For IBM, “Competitive advantage will be created through data and analytics, business models will be shaped by cloud, and individual engagement will be powered by mobile and social technologies.” Therefore, its strategy was based on 3 pillars: to create markets by transforming industries and professions with data, to remake enterprise IT for the era of cloud, and to enable systems of engagement for enterprises, while leading by example.

IBM’s priority was to help its clients to “derive competitive advantage through insights and the latest digital technologies. As IBM clients embark on the next chapter of their digital journey, the proper collection, use, safeguarding and management of data is of paramount importance.” IBM believed that once its clients reinvented their business digitally, they would become “Cognitive Enterprises”.

IBM’s business model supported its consolidation into a cloud and service delivery company. Being developed over time considering its strategy, capabilities and technological growth, the business model was dynamic and could be easily adapted to the continuously changing industry. According to the company, the business model had two main pillars: “helping enterprise clients to move from one era to the next by bringing

together innovative technology and industry expertise and providing long-term value to shareholders."

To strengthen its position in the market, IBM constantly performed investments and acquisitions in higher value business, integrating more technological expertise. In addition, keeping the company up to date into modern initiatives, IBM implemented an agile innovation driven culture, encouraging its employees to look for new technological solutions that could bring value to its clients, while keeping high productivity.

2.3. IBM Blockchain

As part of IBM's effort to keep developing new technologies, in 2017 IBM US launched a public Blockchain initiative with Walmart. "Blockchain enables multiple parties to conduct business with each other on a single, unified distributed system, eliminating the costly and time-consuming hand-offs of fragmented systems" (IBM, 2018)

The initiative was called IBM Food Trust and consisted in a platform that connected the whole food production chain (growers, processors, distributors, and retailers). The network created a trustful record of all production chain data, where all parties could provide digitalized certifications and detailed documentation of their processes. Consumers could have a clear vision from "farm to table" of the product that they were consuming, and companies and regulators could have easy access to information in case of an investigation, for example.

In Brazil, driven by the success of the United States case, GBS started an Blockchain team. An early problem of this team was that no one at IBM had previous expertise on Blockchain. The team included four people: Mauricio, the team leader with finance background, Fernando, the main developer with Artificial Intelligence expertise, Adriana, the analyst with an insurance background and an intern, that had just started at IBM, with no previous technology knowledge. They were chosen as they were already interested on Blockchain, with some internal and external training.

The first use case for Blockchain in Brazil was basically an adaptation of the IBM Food Trust, although at a smaller size. Called "Porkchain" internally, the initiative was a Proof of Concept (PoC) that included BRF Foods and Carrefour Brazil. The PoC allowed the tracking information of a pork loin product, starting from the farmer, passing through the whole processing inside BRF Foods, transportation and logistics until the shelfs of

Carrefour, where customers could use their cellphones to read a QR code and access all tracking information.

Even though the PoC was a success, BRF Foods and Carrefour Brazil were not interested in following up with a project. That same situation repeated several times around the years of 2017 and 2018. Mauricio and Adriana were able to run different PoCs with IBM's main clients but the understanding of Blockchain was not disseminated in Brazil and most clients were not interested enough in spending millions in a technology that did not enjoy much awareness. Clients would rather invest in Artificial Intelligence that was a trendy topic and would bring them more publicity and customers.

IBM's Brazil Blockchain team members left, and Adriana was the only one that stayed in the team. She became team leader and invested hardly on her training, participating on internal and external workshops. She was then capable of putting together a team and helping on their training and knowledge development.

Over the years market interest also changed, with the popularity of cryptocurrencies and its constant mention on the news. IBM's clients started to better understand Blockchain technology and grow an interest on its usability. In early 2019 after several Proof of Concepts, Adriana signed the first contract for a Blockchain project with CIP.

2.4. Câmara Interbancária de Pagamentos (CIP)

The Interbank Payments Clearinghouse was created in April of 2001 to support the development of the Brazilian System of Funds Transferring[4] in real time.

Nonprofit organization CIP was part of the Brazilian Payments System[5], a link on the digital network that connected a diversified number of participants and all their operations and procedures. According to the classification of the Bank for International Settlement, CIP was considered a financial market infrastructure.

The establishment of CIP came at a moment in Brazil where the advancement of technology, economy growth and easy credit made consumption more accessible to middle and lower classes. That situation brought an increase on the number of banking

[4] In Portuguese: Sistema de Transferência de Fundos – SITRAF

[5] In Portuguese: Sistema de Pagamentos Brasileiros – SPB

transactions, needing faster trades. Therefore, the Brazilian banking system required technical solutions that were robust, transparent, safe, and efficient.

According to CIP, their solutions and services "bring reliability, availability, and safety to the financial market. All systems are monitored and operate with total accessibility to maximize the efficiency of our partners business." CIP offered sixteen different solutions and services, including System of Funds Transference, Service of Cards Liquidation, and the most recent one, National Finance System Blockchain Network.

With the objective to "develop collaborative solutions considering technology, innovation and human value while minimalizing risks and reducing costs", CIP had as clients financial and payments institutions, accrediting and sub-accrediting companies, credit cards providers, notary offices, hedge funds, data bank managements, consortiums, leasing companies, credit cooperatives and the Brazilian government.

2.5. National Finance System Blockchain Network & Device ID

The National Finance System Blockchain Network was launched in June 2019 at CIAB, an exhibition fair for all the Brazilian financial companies to show the new technologies and innovations that were implemented in the sector. In a partnership between CIP and IBM the network was the first of its kind to be implemented in Brazil.

Using Hyperledger Fabric platform, a collaborative and open source Blockchain environment, according to IBM "the enterprise allows sharing information between partner institutions, guaranteeing that all data are protected and can be easy accessed in an agile and safe way since the first moment". The network had as participants the largest Brazilian banks, such as Bradesco, Banco do Brasil, Caixa, Itaú, Santander, JP Morgan, Banrisul, Siccob and Original.

The first use case implemented on the blockchain network was the Device ID. Focused on preventing banking fraud, the initiative allowed that information about the security status of cellphones could be shared in a safe, transparent, and trustful way, bringing more data and enhancing securement of the anti-fraud systems of all financial partners.

As an example, if a client from Santander had the cellphone stolen or lost, when the Santander security team added that information to their system the whole network would get the notification that the cellphone was not a trustful device anymore. Therefore,

if the client also had accounts on any other bank, the other institution could also block the client's mobile application, preventing any fraudulent transaction.

2.6. Project Complications

Team staffing could be a challenge in consulting companies where diversity in backgrounds and roles was inherent to business. All project leaders had been working with technology for a long time (table 1), but most of them had little experience with Blockchain technology. Two participants had no previous experience with Blockchain at all.

The project was also a possibility of career change for some of the participants. Those who took the opportunity to specialize on Blockchain technology ended up as current practice leaders. Carlos Duarte, responsible for the network governance, started studying blockchain by his own interest, trying to understand better one of the Mainframe[6] offers that he was selling. He became specialist on the topic, being the Blockchain leader for Latin America.

Table 1: Project leaders' profiles

Name	Role in the project	How long working with tech	How long working with Blockchain
Fabricio Freitas	Technical leader	15 years	First time
Carlos Duarte	Responsible for network governance	23 years	3,5 years
Gabrielle Macedo	Project management	20 years	First time
Adriana Nascimento	Blockchain executive	29 years	3,5 years
Fábio Ulmann	Relationship manager for CIP	-	-

[6] Mainframes are high-performance computers with large amounts of memory and processors that process billions of simple calculations and transactions in real time. The mainframe is critical to commercial databases, transaction servers, and applications that require high resiliency, security and agility. (IBM, nd)

Before starting the implementation of the project, it was clear for all participants how important it was for CIP to meet the deadline. CIP was already advertising its new blockchain network launch at CIAB. When the negotiations between IBM and CIP started, it was taken as a principle that the delivery should be at early June. According to Gabriella, “this was not a project that a delay would cause only a client’s dissatisfaction, a delay would sink the project”.

The aggressive due date created some adverse situations. Despite IBM’s effort to hurry the work, taking less than 15 days to write a contract, CIP took more than 118 days to sign it, which caused some delay. A lot of involvement of executives from both companies was needed, with the two presidents being constantly in touch with the delivery team.

For IBM the main concern prior to the project start was the fact that this was its first industry size implementation of Blockchain technology. Until then it had just done Proof of Concepts and most of its employees were still in the learning stage. In addition, there was some specific technological factors that could turn the implementation more complex. Until 2019, IBM had only worked with Blockchain network inside the company’s own platform and had never installed a network on-premises[7] as it was foreseen in this project.

Everything was new, a new team and an installation in an unknown environment. IBM had no idea what was peripheral on CIP’s machine since it was not a reformatted and clean machine, with thousands of packages supporting different applications.

Another complication for IBM was that although for CIP they were seen as “one IBM”, internally they had to engage four business units. It was necessary to identify in each business unit who was the right staff with the necessary skills for each solution component. Furthermore, due to the tight schedule IBM would not have enough time to conclude all legal discussions and write one unified contract. So, each of IBM’s business units had to write different contracts with CIP.

[7] On-premises refers to IT infrastructure hardware and software applications that are hosted on-site. This contrasts with IT assets that are hosted by a public cloud platform or remote data center. Businesses have more control of on-premises IT assets by maintaining the performance, security and upkeep, as well as the physical location. (Insight, nd)

Once the project started some of those apprehensions proved to be true. The tight schedule led to extensive extra work hours, which brought a cost that was not forecasted on the project's financial planning. Moreover, some members of the team had to work in a very short period to compensate for other's delays. As an example, the developers had only a month to code and implement the new Blockchain network.

For Fabrício Freitas, technical leader, the lack of know-how on installing a Blockchain environment on-premises was the key problem. The technical team struggled a lot to implement the infrastructure needed. Neither IBM's team nor the banks' technical teams had experience on how to build a Blockchain's infrastructure with a totally different set up. Everyone was learning on the go, so a lot of time and effort was directed to read, learn, and prepare documentation.

To mitigate this situation, Gabriella along with Fábio Ulmann, client relationship manager, chose to search among IBM's international employees to see if they could find someone that had better skills within Blockchain technology. They found a Mexican employee that flew to Brazil with the expectations that he would turn around the operational environment until the end of the week.

Nonetheless, the addition to the team was not helpful as the background of the Mexican employee was not true. His only experience was inside a laboratory. The new allocation also brought an extra staff cost to an already over budget project. As a last resource solution, a developer from the team took the responsibility of studying and ended it solving the problem.

For Carlos, the main non-technical issue was how to manage the network governance. When the project started, the team was worried about the technical problems that they were facing, failing to consider that the complex relationship between the financial institutions could undermine the whole network.

Carlos had to go through a variety of articles, papers and legal documents to write a document that would describe the technology and the fit to CIP's business. The complexity for the governance team was not only the new technology differences, but also the fact that all financial institutions were extremely reserved with their data.

None of the banks wanted to disclose any type of information that could give the public the impression that they had any vulnerability on their systems or that their competitors could use to leverage any commercial advantage. This ended up going against

the principle of a blockchain network, that can only thrive on highly collaborative business networks.

Despite all the technical problems the Blockchain network was delivered on time for the exhibition. But after the exhibition, it was not used by any of the participants except for some tests, with no enthusiasm from the banks.

According to Fabricio, the Device ID use case was considered too fragile, simple, and poorly established. The case lacked on high traffic of information exchange, reliability between the participants and cyber-security, factors that were imperative to a Blockchain network. In spite of the Brazilian banking system efforts to be more modern and digital, it was still very regulated and not all private initiatives could be done. Therefore, it was really hard to make all banks get into an agreement with regard to all network criteria and business rules.

2.7. Project overview

After talking with the others project leaders and team participants, Gabriella was able to gather information and insights for her meeting with Tonny. She knew that due to the publicity that this project had and its own nature, first of a kind, she eventually would have to give better explanations to IBM's Brazil President.

Even though the project had a lot of problems, it was delivered on time and should still be considered as a success by the IBM team. The Device ID was broadly announced and published in different specialized newspapers and blogs, highlighting IBM and CIP on their markets.

Gabriella was sure that she did everything on her power to solve the different situations while keeping a good relationship with CIP, exactly what was expected from an experienced project manager. She followed all IBM guidance and used the most of IBM global resources.

She was aware that for CIP, the project accomplishments were broader than good publicity. Considering its own nature, an intermediary, its business could be at risk by new technological innovations. And by creating the first Brazilian financial Blockchain network, IBM helped CIP positioning as owner and controller of the network, keeping itself needed on the market.

For Gabriella, she followed exactly what the IBM culture said, she had innovative thinking and fast decision making with high performance, as the team had to work around the clock to meet the schedule. She hoped that Tonny would agree that when high

technological innovation was the main strategic objective, positive financial results would not be always guaranteed.

The main focus was to show to the market that the Blockchain network was viable and to affirm IBM's position as an innovative partner for its clients. In her and other team member's opinions, the project paid itself by the publicity and by generating market awareness.

3. Literature Review

To allow a better understanding of the issues raised by the case, the following section will include a Literature Review of several relevant academic topics such as innovation capabilities, innovation as strategy in high-tech companies, what is Blockchain and Blockchain network for business.

3.1. Innovation Capabilities

Innovation has been largely discussed in modern corporate strategy theories and it is a word constantly seen on companies' strategy statements, but not all executives understand what business innovation means. Even though, most of them considerate innovation as critical to their enterprise's success. (Sawhney et al, 2006; Immelt, 2004)

Executives may associate innovation solely with new product development or traditional research and development. As presented per Hannan & Freemen (1989), such short seeing and inertia can lead organizations to over time become more similar to others in the same industry and therefore cause a systematic erosion of competitive advantage.

Firms in a same industry trying to look for new opportunities to compete or solutions for the same problems typically will end up coming with the same innovations. Adding to that situation, we have the Knightian uncertainty that affirms that decision makers find it difficult to identify the "right" response, as well as the potential consequences of their choices and their likelihood of it occurring. (Knight, 1921)

Companies that do not invest on innovation and incorporate entrepreneurship into their business can be seen as out of touch with fundamentals from modern markets. (Alvarez et al, 2020) And laboratory innovations do not always convert into customer value, therefore business innovation should be seen as a more extensive topic than product or technological innovation.

To prevent that situation, Sawhney et al (2006) suggest the anchoring of business innovation analyzes on results and customer outcomes. Their definition of business innovation is "the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system." To that definition, Drucker (1985) can add that it is "the effort to create purposeful, focused change in an enterprise's economic or social potential."

Christensen (1997) categorizes corporate innovations in three types: disruptive innovation, sustaining innovation and efficiency innovation. Disruptive innovation is

aimed at early adopters, it creates net growth and jobs, but it needs a lot of financial investments. Sustaining innovation is the most common one, it focuses on creating or improving products to keep the firm's position and usually it does not create net growth or jobs. Efficiency innovation is focused on resources economy, usually reducing jobs but creating free cash flow.

The majority of innovations, especially the successful ones, originate as a result of a determined and conscious search for possibilities that were presented in a very small number of circumstances. Drucker (1985) defines that there are four internal situations that create opportunities: unexpected occurrences, incongruities, process needs, and industry and market changes. And three external situations that create opportunities: demographic changes, changes in perception, and new knowledge.

Analyzing the sources of emerging opportunities is the first step towards systematic and purposeful corporate innovation. Based on the firm's circumstance, the significance of sources may change. Due to the intellectual and perceptual nature of innovations, aspirant innovators must always get out of the company to gather insights by looking, inquiring, and listening to the market.

Companies can have different approaches to corporate innovation, Wolcott & Lippitz (2007) defend that there are two identifiable dimensions that are management responsibility and that can differentiate how firms will approach innovations. The first one is organization ownership, who is the person or group in the company responsible for creation of new businesses. The second one is if there is financial resources allocation directed specifically to innovation or if the budget is spread out though the area's existing funds.

For De jong et al (2015), there are eight essentials in corporate innovation: aspire, choose, discover, evolve, accelerate, scale, extend and mobilize. The first four create a group of strategic and creative propositions, that can be used to set and prioritize the conditions for successful innovation. The next four propositions are responsible for delivering and organizing the company for constant innovations with high value and meaningful contribution to overall performance.

When companies apply those essentials propositions, according to their context, capabilities, culture and risk taking, "they will improve the likelihood that they, too, can rekindle the lost spark of innovation. Companies must get these strategic, creative,

executional, and organizational factors right to innovate successfully." (De jong et al, 2015)

Internally business innovations should have a target with high level aspirations and estimates of value that will be generated, aligned with the company's financial-growth objectives. Exhibiting how innovation is a part of the strategic plans, helps to consolidate the idea and creates accountability on employees. For this approach to be successful, it is important to assign the target value responsibility to the executive and managerial level, so they can funnel down that value to their areas in the form of performance goals and deadlines.

Companies should find ways to encourage their employees into sharing their ideas and knowledge freely. They should embed innovation into the core of their business, stimulating, encouraging, supporting, and rewarding innovative behavior among their workers. A partnership between a dedicated innovation team and operations is important. To guarantee a high performance and integration managers should be able to divide the labor, assemble the dedicated team and mitigate any conflicts (Govindarajan & Trimble, 2010)

No one can predict whether a specific innovation will turn out to be a major success or a minor accomplishment. Innovations are naturally risky, and that risk cannot be eliminated, therefore it should be well managed. Executives who want to explore certain opportunity sectors must set up some constraint boundaries. The risk paradox (individual risk aversion and risk taking) exists, and it is not disturbing or harmful for the firm performance, although executives must always be aware of the complexity of risk taking and their organizational consequences (Antoncic, 2003)

Companies need governance mechanisms that continuously evaluate the expected value, timing, and risk of the initiatives on their innovation portfolio, while giving transparency to their employees on what they are working on and analyzing each project's overall composition.

Well done innovations can create "Blue Oceans", a concept created by Kim & Mauborgne (2005) where a firm fulfills an unexploited demand creating a new market where there are no boundaries or competition, avoiding a "Red Ocean" situation where growth is limited due to high competition that adds "blood" to the water.

Almost all successful innovations bring a combination of three factors: valuable issue to be addressed, technology that makes a solution possible, and a business strategy

that profits from it. Innovation discovery have to include proper gathering, synthesizing and coalition of different insights that are brought from those factors and will increase the changes of profits. The idea of antifragility, things that benefit from shocks and chaos (Taleb, 2012), can be applied to corporate innovation, as it benefits from unpredictability and market disorder.

Often businesses restrict their own efforts only at creating a new product/market, jumping into conclusion with high conviction that an idea is right. However, innovation is made possible through cross-functional cooperation, continuous learning cycles, and clear decision-making processes. Companies should look for managers that are superforecasters, individuals that are humble and able to work in teams, pragmatic and open-minded, aware of their biases and willing to recognize and change course of action when making a mistake, and most important is not jumping into conclusions. (Tetlock & Gardiner, 2016)

Managers should be making the critical choices quickly and with the appropriate knowledge. A well-connected manager, who can say yes rather than no, should take command of an innovation project. The project team must also be cross-functional in practice as well as on paper. This means ensuring that they dedicate a large portion of their time to the project, developing a culture that prioritizes the success of the innovation project over their individual performance. “Innovation is usually brought about through iterative steps of an ideational design process. Innovation also requires creativity, and all innovation is in some manner creative.” (Rajsingh, 2016)

The firms’ resources and capabilities must be mobilized to ensure that a new product or service can be provided rapidly at the necessary volume and quality. “Each unique project is critically dependent on a dedicated number of individuals from a variety of disciplines such as engineering, computing, business, and the arts, all cooperating towards a common set of objectives.” (Rodgers & Winton, 2010) By using the abilities and talents of their employees, successful innovators were capable of substantially multiply their financial investment in an invention. By doing this, they increase creativity and find new ways to benefit their ecosystem partners and customers.

High-performing innovators put a lot of effort into establishing the ecosystems that will support the benefits of their invention. They aspire to be people's first choice as partners and a good way to do this is by adopting storytelling. When telling a story, companies are not only transmitting a lot information but they are also arousing the

listener's emotions and energy, making an idea emotional enough to be memorable. (McKee & Fryer, 2003)

Innovation can be particularly difficult for big companies that are already well established. Often they can find it difficult to reinvent themselves as cutting-edge innovators. Culture and too many routines might be obstacles, innovation excellence is frequently produced through a multiyear effort that involves most, if not all, elements of the company.

A qualitative analysis made by Manimala et al (2006), brought that the main organizational restraints on business innovation are absence of failure-analysis systems, lack of patenting initiatives, lack of recognition for innovations in non-core areas, poor handling of change management, informal team formation, low emphasis on dissemination and commercialization, inadequacy of rewards and recognition, procedural delays, poor documentation and maintenance of records, easy access to foreign technologies, unclear norms on linking innovations with career growth, lack of recognition for contributions by support functions, ambivalent support from the immediate supervisor, inadequate systems for the promotion and management of ideas and lack of facility for pilot testing.

Executives have already acknowledged the value and utility of business innovations for companies. However, the paradox is that depending on their situation on the market firms are less able to innovate. Although most, especially the large and established, companies have research and development departments, without the necessary organizational support the area keeps doing more of the same, instead of innovation. Without the right strategies and supporting initiatives, companies will not reach the right business innovations and create value to their customers.

3.2. Innovation as strategy in high-tech companies

Strategy can be considered as the broad concept for using resources in order for the firm to obtain a competitive advantage. Based on Porter (1996), Ovans (2015) defines that a company's strategy should be seeking competitive position in an industry, adopting industry's best practices, partnering to improve efficiency, focusing on critical resources and core competencies and able to respond to market changes.

A successful strategy is one that will produce greater economic results, guaranteeing competitive advantage. Effective strategy should include a diagnostic that characterizes or explains the complexity of the situation, a guiding policy for addressing

the situation and meaningful methods for implementing the guiding policy (Rumelt, 2011).

According to Magretta (2011), “competitive advantage means you have created value for customers, and you are able to capture value for yourself because the positioning you have chosen in your industry effectively shelters you from the profit-eroding impact of the five forces.”

Raynor (2007), defend that commitments to a particular strategy, unique assets, or specific competencies are necessary to satisfy clients in ways that rivals cannot match. Commitments are strong predictors of success since they make a plan hard to be reproduced. The company can benefit from a period of very low competition since rivals will only want to copy a strategy that they already know that it is correct, therefore they will need some time to reproduce the talents that were meticulously developed. For the author, “the most successful strategies are those based on commitments made today that are best aligned with tomorrow’s circumstances.”

Strategies are based on commitments. However, for high-tech companies to maintain their source of competitive advantage, they are required to constantly be acquiring new technological know-how, establish first-mover advantages, adjust to competitor’s actions, and combat the entry of unexpected players. Therefore, those companies must maintain certain strategic flexibility to be able to quickly reposition themselves according to market movements. (Hoyt & Sherman, 2004; D’Aveni, 1994; Stalk & Hout, 1990)

Innovation is a crucial topic in businesses strategies, it “plays a significant role in the development of new technologies, providing sustainable competitive advantages, and thereby, in the growth and efficiency of the economic system” (Babkin et al, 2015; Gaynor, 2002). In super competitive markets, typical strategic movements like lowering costs and improving quality are not enough to create differentiation and value. Some corporations have to keep developing and promoting a continuous influx of unique services and practices that push the boundaries of technology.

For high-tech companies, business innovation is what assures business survival, once that is the main source of competitive advantage and growth. Considering the fact that the need of technological products and services is the foundation of the viability and financial well-being on those companies, innovation capabilities are critical factors and should be the primary focus of those businesses’ strategies. (Ince et al, 2016)

An innovation focused strategy should reflect the company's innovation behavior and its innovation capabilities. Choosing which path must be followed can present a big issue to executives in innovative businesses, as the company's decision on how to pursue and use technology will have a significant impact on future performance and commercial success.

Wang et al. (2008) state that while analyzing and measuring Innovation capabilities, it is necessary to take into consideration both quantitative and qualitative factors. Those capabilities are the ability to allocate resources, recognize and meet market demands by creating new products, anticipate technological advancements, effectively react to unanticipated innovations implemented by competition, and plan the internal training process. (Babkin et al, 2015)

According to Babkin et al (2015), although a lot of studies resort to the make or buy decision theory when explaining companies' reactions towards product development innovation, this theory considers that all business is the same, with an universal view. Fey & Birkinshaw, (2005) use the theory of "make or buy" to explain companies knowledge gathering and analyzing their R&D performance. Babkin et all (2015) defend that those strategies do not fully apply to the high-tech sector and its specific features, where a lot of resources are directed to innovation.

A better classification of the different strategic approaches that high-tech companies do into business innovations, would be the one provided by Jaruzelski et al (2014). As stated by the authors, the technological sector is separated in three identifiable categories according to their innovation strategy: need seekers, market readers and technology drivers. Still according to their definition:

Need seekers are first movers. They are firms that actively and directly develop new goods and services based on an enhanced end-user understanding internal skill and are the ones to first come to market with new offers that engage current and future consumers.

Market readers are second movers. They are firms that maintain a close watch on their clients and rivals while focused on creating value by placing a high priority on incremental change. Therefore, making the most on well-established industry trends.

Technology drivers are the least proactive of them all when related to customer insights. They are firms that use their investment in R&D to create both breakthrough

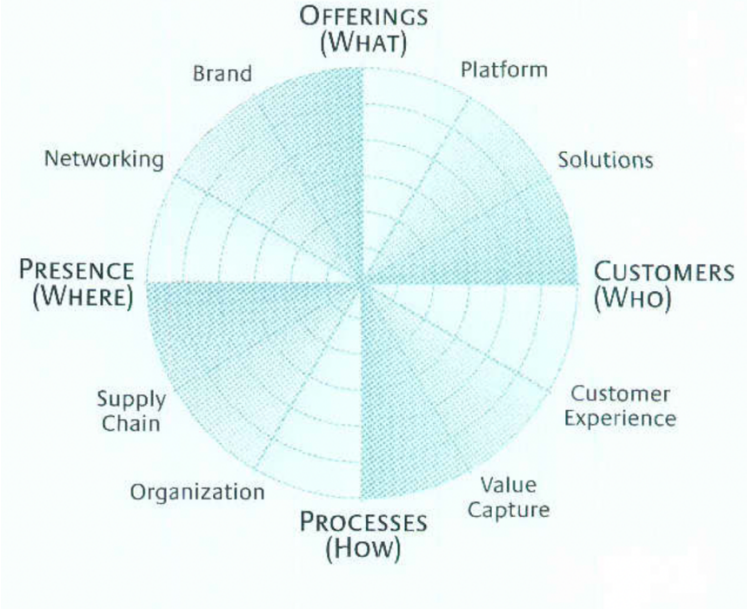
innovation and gradual change. Following their established technical capabilities and attempting to address the implicit desires of their consumers through new technologies.

High-tech companies commit with innovation, having it as a main driver for their strategy. McKelvey (2020) defends that to achieve disruptive business ideas, companies should focus on solving the right problem, build products/services that will bring value and disrupt status quo and create fully integrated solutions.

When a company is able to be the first to identify and pursues unexploited innovation dimensions, it may change the dynamic of the market's competitiveness putting their rivals at a substantial disadvantage as competitors can only copy visible elements from a solution (McKelvey, 2020)

Therefore, choosing and implementing the principles that define an organization's innovation strategy is extremely important and must involve a thoughtful, capabilities-based, plan. To facilitate that selection, Sawhney et al (2006) developed a framework called "the innovation radar".

Figure 1: The innovation radar



Source: Sawhney et all, 2006

The innovation radar should be used by executives as a guide around the way that companies manage the complex business systems, enabling the creation of value through innovation around the whole system, beyond the vision of only products and technology. (Sawhney et al, 2006) The framework offers a broader view of the company's dimensions and connects every aspect a company might use to search for innovative prospects.

3.3. What is Blockchain?

The start of Blockchain technology is related to the development of the cryptocurrency "Bitcoin", the better-known use case of the technology. Bitcoin was launched in 2009 by the anonymous developer (or group of anonymous developers), Satoshi Nakamoto. In an e-mail chain about cryptocurrency, Nakamoto attached a paper called "Bitcoin: A Peer-to-Peer Electronic Cash System", where it would describe the intentions and specifics of the network.

According to Nakamoto (2009), Bitcoin is a network of users of electronic money that allow on-line payment transactions that can be sent directly between the parts, without the need of passing by a finance institution, intermediary or a central authority.

Blockchain is the technology that allows the existence of Bitcoin. It is basically similar to a shared ledger that can be used to register different transactions of tangible, intangible or digital assets. It removes the need of a middleman for authentication and addition of information into the ledger (Risius & Spohrer, 2017).

"At its core, the blockchain is a technology that permanently records transactions in a way that cannot be later erased but can only be sequentially updated, in essence keeping a never-ending historical trail" (Mougayar, 2016).

On a Blockchain network every transaction is registered on a block with all its information, including its timestamp[8], the block's hash[9] and the hash of the previous block. This recording of timestamps and hashs is what guarantees that the information registered on the block is trustworthy and was not tempered with.

The chain of blocks is transmitted between all network participants and after being validated by them all, it enters on the sequency of the network. This peer-to-peer authentication, with a standardized protocol is what guarantees the integrity and veracity of transactional information, protecting the data against alteration (Risius & Spohrer, 2017).

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[8] Timestamp: A timestamp is the current time of an event that a computer records. Through mechanisms, such as the Network Time Protocol, a computer maintains accurate current time, calibrated to minute fractions of a second. Such precision makes it possible for networked computers and applications to communicate effectively. (Lutkevich, 2022).

[9] *Hash:* A digital fingerprint or unique identifier (Gupta, 2018).

“Under the security optics, due to its own infrastructure, the blockchain has as central point the combination of three modern systems security pillars: confidentiality, integrity and availability” (Vasconcelos & Oliveira, 2019). This immutability and incorruption of data is what makes it possible the displacement of intermediaries (Tapscott & Tapscott, 2016).

A Blockchain network can be public, private or a consortium. Public networks are the ones that are behind cryptocurrencies like Bitcoin. Its participants are anonymous. Everyone on the network has visibility of all transactions but only the participants on the transaction can see all details. Private networks are the ones usually used on business. On them all peers know who the participants are, usually being business partners or participants on a supply chain. The participants see only the transactions where they are related, and what it is allowed. The last model is the consortium. A consortium behaves like a private network, but it is ruled by few companies, therefore there is not the possibility of a participant to be a centralizer. It happens when companies, sometimes even competitors, get together to share the costs and responsibilities of a Blockchain network.

The network has different classifications according to how they are spread out: it can be centralized or decentralized (which can be distributed or not). A centralized network has an owner, usually a big market player that has mobilized its own business partners, usually involved on its supply chain, to develop the Blockchain network. The owner is the meeting point between all other participants and network systems. He is responsible for sharing information and the only with full copies of all transactions (Borrengo, 2019).

On a decentralized network all participants have similar responsibilities, copies of the network and all the systems are integrated with each other. The extreme of a decentralized network is a distributed network, where all participants have equal access and visibility. Peers will accomplish collaboration without having a central node that act as rent-seeking or dominator (Drescher, 2017).

Table 2: Comparison between the different networks

	Public	Private	Consortium
Network management	Decentralized	Centralized	Hybrid (multiple organizations)
Access	Anyone (no need for permission)	Members only	Users must be approved
Transaction speed	Slow	Light and fast	Light and fast
Number of users	Millions	Dozens	Thousands
Benefits	High security (transactions are validated through the whole network) Transparency (transactions are public and anonymous)	Efficiency (validations are made only by few) Private	Efficiency Private There is no consolidation or control of the network
Challenges	Can be inefficient as all participants have to verify transactions	Consolidation or control of the network Can be hard to collaborate with different organizations	

Source: Elaborated based on Borrengo, 2019

A Blockchain network for business is usually private or a consortium network. Gupta (2018) states hat a private network has four pillars: shared-ledger, permissions, consensus, and smart contracts[10] between participants. On those networks there is no need for cryptocurrencies (Xu et al., 2017) and all peers have to have authorization to become a node on the network (Peters & Panayi, 2016).

Permissions on a Blockchain network allow companies to be in compliance with laws of data protection, such as the European General Data Protection Regulation (GDPR). Each participant will only see the information that is relevant to their business,

[10] Smart contracts: Business terms embedded in transaction database and executed with transactions. (Gupta, 2018)

while there is the possibility of the creation of an auditor profile, that can view all transactions on the network.

Contrary to current business trust-based centralized practices, Blockchain ensures immutability, transparency and veracity of information (Yli-Huumo et al, 2016). Davidson et al (2018) believes that due to the potential of Blockchain for business use cases, it will undoubtedly have a significant influence on business and society. Reenforcing that idea, the World Economic Forum (2015) predicted that by 2025 Blockchain networks will be transitioning 10% of the world's Gross Domestic Product.

3.4. Blockchain network for business

Technology has been transforming how companies operate and conduct their business for ages. Technical innovations and trends are capable of shaping and change market structures. Recent developments in digitalization led to a competitive market that is not only very unpredictable but also extremely complicated (Chong et al, 2019). Blockchain is a disruptive technology innovation that is in constantly being researched and has rapidly grown into business (Chunguang et al, 2019).

Information technology is one of the main triggers of disruptive innovations in business. As modern organizations must invest resources in turning new technologies into a long-lasting and sustainable competitive advantage, digital business models have become an essential component of strategic planning (Hamel, 2000).

Lyytinnen & Rose (2003) affirm that there are three identifiable categories for disruptive technology innovations: improvements on the technology itself, development of processes and different services that can be provided.

Blockchain enthusiasts state that new business models based on distributed consensus will be developed in the future due to current explorations (Crosby & al, 2016). As the technology brings benefits like acceleration and cost reductions (Kuebler, 2018), according to Pirson et al (2016) the introduction of Blockchain has been embraced as a possibility to achieve new peaceful and collaborative economic models through empowering people and challenging the privileges of the mainstream business.

Predictions about how blockchain may be used to transform social and corporate structures that traditionally relied on trust have been ignited by the technology's openness and robustness. Businesses who can embrace it and benefit from it, may be able to build dominance on profitable markets. Executives must be conscious of how Blockchain technology might affect their industry. (White, 2017)

Developed to encourage transactions without the need to trust the other participant, Blockchain's business use cases are diversifying on extent and number, including applications on finance, law enforcement, education, health care, supply chain and manufacturing (Queiroz & Wamba, 2019). That growth is due to the fact that basically all institutions on our modern society are based on contractual obligations and transactional data records (Iansiti & Lakhani, 2017).

"Blockchain is challenging the status quo in several areas in a radical way providing a decentralized database of any transaction involving transfer of value. This generic nature is what makes it attractive to many business areas today" (Konstantinidis et al, 2018). The authors were able to identify six organizational areas that benefit from Blockchain use cases. They are cryptocurrencies, e-Government, healthcare, supply chain, energy and banking.

Cryptocurrencies are the most famous application of Blockchain, with a broad availability on the market. In a more creative manner, according to O'Leary et al (2017), cryptocurrencies could also be applied as a mean of encouraging participants working in initiatives with cross-functional teams to submit new ideas. Another application is the OpenBazaar, a bitcoin-based decentralized marketplace that does not charge any operational fees (Kshetri, 2017).

E-government services for individuals, organizations, and government agencies have significantly increased in recent years. Blockchain can work as a foundation for the development of applications and the management of data including the digitalization of assets (such as money, stocks, and land property rights) and decentralized trade (peer to peer exchange) (Konstantinidis et al, 2018).

Another industry where Blockchain technology can be beneficial is on healthcare. Healthcare companies could use a Blockchain network to perform high-volume and high-throughput transactions, as sharing patient's medical records. The technology guarantees the management of health data in a secure and private way, ensuring anonymity and integrity of the data. (Konstantinidis et al, 2018; Bhardway & Kaushik, 2018).

Focusing on local energy grids that produces green energy, Blockchain can be used to conduct transparent transactions between customers and prosumers (active consumers who both produce and consume power), facilitating their relationship (Munsing et al, 2017; Sikorski et al, 2017; Aitzhan & Svetinovic, 2016).

Supply chain is an industry that has several players that can highly benefit from Blockchain trustful and transparent network. Toyoda et al (2017) present a use case where the network can ensure product ownership governance and facilitates assets traceability during operations.

Several banks and financial institutions have been researching and experimenting the implementation of Blockchain networks into their business. As an example, Guo & Liang (2016) present the use of Ripple, an enterprise blockchain platform, by the UK-based bank Standard Chartered to operate cross-border transactions. In such fast-paced industry, Blockchain networks can reduce the cost of transactions and facilitate exchanges between partners.

As presented per Chong et al (2019) the way that companies pursue Blockchain implementation to generate value to their business can be categorized into five business models: platformer, disintermediator, transformer, mediator, and co-innovator. Platformers seek to dominate the market by positioning as the benchmark on which future innovations could be established. According to the authors, platformers are competing based on their technology, aiming to increase the appeal of its own proprietary Blockchain network by offering an open platform upon which third parties can develop their business applications.

The disintermediator and mediator enter existing value chains by altering the way competitors deal with one another. Disintermediators adopt a more disruptive posture by attempting to disturb market leaders. They capture value by acting as market equalizers for players who have been marginalized in traditional value chains. Mediators aim to elevate market leaders by addressing inefficiencies on their existing value chains. They generate value by offering firm-specific advantages to each participant involved in these value chains (Chong et al, 2019).

Transformers and co-innovators opt to cooperate with distinct organizations in order to deliver company-specific business applications. They extract value through enhancing the current business methods implementing different channels. Transformers develop Blockchain-based solutions that support current business operations rather than attempting to replace them. They generate value by collaborating with a small number of businesses to develop practical Blockchain implementations for handling current business concerns, applying the lessons learnt to other sectors and their related issues. Co-innovators undercut established business processes by creating parallel solutions that

compete with how traditional corporations operate. Creating company-specific blockchain alternatives to current business methods, the co-innovator captures value through co-licensing agreements, therefore creating a consistent stream of revenue (Chong et al, 2019).

Blockchain networks can bring a lot of rewards to business adopters but also have several challenges. First, security concerns, even though one of Blockchain's main pillar is data safety. The technology is on constant development and research, vulnerabilities are still being explored and issues are being found. On the cryptocurrency use case, Halim et al (2018) present the "Transaction Malleability" situation, where an attacker can change the transactions ID before the transaction is confirmed. By doing that the attacker is able to change the transaction information and move the asset to his account.

On some business use cases like health care or financial situations the anonymity of data and customer's privacy must be guaranteed to ensure that the company is on compliance with current legislation. Even though the identity of the Blockchain user is encrypted, people can be identified by the use of big data and combination of other information that may be available online (Shae & Tsai, 2017). Another Blockchain duplicity is latency, despite its aim to save time and costs. Its consensus protocols where all peers have to validate every transaction can make some processes to take longer to be completed. (Konstantinidis et al, 2018). The main set back related to Blockchain is the computational cost related to its implementation, as the required robust and costly hardware also brings higher energy consumption (Suhaliana et al, 2018).

An additional important discussion is about how ethical is the Blockchain network. Due to its nature of anonymity and facilitation of transactions, Blockchain can be used to support illegal activities and markets. According to Seele (2018), cryptocurrencies have been enabling money laundry and anonymous black markets for drugs, illegal pornography and weapons. A real nefarious case is the cryptocurrency-based prediction market AUGUR. Although it was created to allow secret placing of bets, it has been used as an "assassination market" with death pools, while the platform refuses to control or accept any responsibility about the way that people are using its solution (Orcutt, 2018; Oberhaus, 2018).

Another phenomenon that has increased is the occurrence of "cryptojacking" episodes, where programs are secretly implemented on high-performance organizational computers using it to mine cryptocurrencies. This comes at the cost the general population

as in several cases “cryptojackers” aim on public utilities and providers of infrastructure (Li, 2017; Newman, 2018). Nonetheless, Dieksmeis & Seele (2020) defend that although the negative use of Blockchain is extremely serious and require attention from global regulators, the technology comes in a needed moment and has enormous potential to be used on behalf of the common good.

4. Teaching Notes

4.1. Learning objectives

This case study aims to highlight how a gap between strategy and operations can be key for daily execution. Students should discuss whether the decisions made by the company are sustainable and if they bring value to stakeholders. From this case students will learn the importance of having a strategy aligned with current market trends, how companies can develop capabilities to support that strategy and the difficulties that organizations face when trying to innovate.

4.2. Class plan and analysis

Q1 - What has been IBM's business development model in the past?

IBM was established at the start of the 20th century. The American multinational is a huge conglomerate that has been responsible for several technological outbreaks. The company grew by expanding to other countries and investing heavily on research. In the 50s, the company was responsible for developing the most powerful computer by its time and in the 80s the company developed the first Personal Computer, that nowadays is on everyone's houses.

By investing so hard in research and development of new products, IBM was able to get better profit margins by charging a premium due to the aggregation of the latest modern tech available on their products and good technical support. The company would position itself on the market by differentiation based on its products quality and brand trust. IBM used to operate on B2B and B2C profiles.

For B2B, IBM placed themselves as the "go-to partner", presenting technological solutions that were already ready for use and would increase efficiency. The company participated on several tech research with the U.S. Government and were able to develop robust and revolutionary computers that could be adapted to be used for several scientific and commercial objectives. All those investments brought to IBM a lot of brand trust and value. The company used to offer hardware and software to big enterprises and governments agencies, such as the American Navy.

For B2C, IBM customers were early adopters of technology that were interested in having a computer at home. IBM opened its first store and started to heavily advertise on television, the company benefited from being the first one and even though their personal computers were not the best one in technical components, it had all the most

desirable computer features in a “at home” machine. The B2C approach was a success and brought to IBM a revenue of 29.7 billion U.S dollars in the 80s.

However, the Personal Computer was also responsible for IBM’s downfall. Around the end of the decade, IBM lost its competitive advantage when competitors were able to copy its technology and improve it, launching their own version of personal computers. Aiming to speed up the manufacturing processes, IBM was not producing all components for its Personal Computer. Instead, the company decided to buy its components from others, which ended up helping their competitors. By 1993, Microsoft with Windows and Apple with Mac were dominating the market, bringing losses to IBM of 8 billion U.S dollars.

After several years of losses, aiming to guarantee its survival IBM decided to waive its B2C customers. IBM started to slowly sell all its hardware operations to smaller competitors, to focus its resources on offering software and e-business related services. The sell happened so IBM could have the cash flow to stabilize itself on a moment of crisis and focus on the opportunities that the company would have bigger margins.

Q2 - Explain how IBM developed its client ecosystem and how that allows for developing innovative solutions.

The cash flow stabilization allowed new investments that were aligned to the new strategy. On the early 2000s, the firm bought its consulting department which allowed the company to do a full switch to having service only offers and provide to its clients end-to-end solutions. This brought a new way to approach B2B customers, allowing IBM to restore its value of being a “go-to partner” to businesses.

IBM was able to provide to its customers everything tech related that they needed with the guarantee of IBM’s quality. On a time of big technological chances, thanks to the broad adoption of internet, IBM helped several businesses in different industries to adapt their operations to more modern solutions, saving them costs and time. This way, IBM was able to keep its position of differentiation by quality and price.

To improve its competitive advantage, IBM started a redesign at its internal processes, aiming to make the company more efficient on the use of fast-trading data, reducing costs and encouraging knowledge sharing between national and international employees. By doing that, IBM turned itself into a “on-demand business”, which

facilitated fast decision making from their executives that were able to offer better market aligned solutions to its clients.

IBM also implemented the idea of "one IBM", where even though the company has different business areas, all of them should work together to delivery to the client the most complete and higher value solution. The consulting area, GBS, became the face of IBM with its clients, responsible for sparkling the interest on clients and then developing and implementing projects that would use IBM products and therefore would need the engagement of other business areas. Tactics of cross-selling, where clients can keep adding features to their existing solutions, and bundling, where clients can get several products on the same project for a discounted price, were responsible for the growth of the company by retaining customers while increasing revenue.

IBM then created dedicated teams to big clients, responsible for the continuous offering of services and maintenance of good relationship. Once the clients were so integrated into IBM's services, the switching costs were high. A client would have to buy several different systems from different suppliers and would lose all the knowledge already acquired, losing time with training, and spending a lot of effort in the purchasing process.

This approach brought closer to IBM its clients that were interested on offers that not only could integrate several different technologies to their operations but that could also join them on innovative developments and with reduced risk due to expertise. By becoming a "top of mind" partner, even if competitors could copy one or another innovation, they would hardly be able to provide services on the same level as IBM, with fast and smart integrated solutions, which guarantee to the company its competitive advantage.

Q3 – What are the main problems presented in the case?

Before the start of the project the IBM's team was already aware that it would be challenging due to its being a first of a kind in Brazil. However, during the implementation the project turned out to be more difficult than expected. The aggressive due date (CIP wanted to show the networking working on an exhibition show in June) brought a lot of stress to the team. IBM had to deliver the project before that date and delays were unacceptable. In Gabriella's words "this was not a project that a delay would cause only a client's dissatisfaction, a delay would sink the project".

There was also a lack of knowledge as the team had little to none experience with Blockchain technology, most employees were still on the learning stage as until this project all that IBM Brazil had developed were Proof of Concepts. The company had no know-how on how to implement the network on an industry size. IBM's bureaucracy also brought the problems that even though the company would present itself as one, it had to spend time on scanning and analyzing through the different areas staff in order to find the right people with the necessary skills. IBM also spent time on writing several contracts, one for each business areas with CIP. Most of the technical issues were the lack of knowledge on how to implement the infrastructure needed for the network. No one on IBM's team had ever worked with Blockchain outside IBM's computers, they had no idea what was running into CIP's systems, and they could not make any mistake that would risk CIP's operations. The team had to learn on the go and put a lot of effort on preparing documentation.

Operations were also tricky and the rush to sign a new contract led the team to make some amateur mistakes that impacted the implementation. The extra work hours due to tight schedule and the need of recruitment of an international IBM employee that ended up not adding much to the work, brough costs that were not forecasted leading to an overbudget. Some teams had to work in a short period to compensate for delays and at the start not much attention was given to governance, which resulted at the end on a problem with how much data the banks wanted to disclosure.

In addition to that, the team failed to educate on all participants on the Blockchain technology making the use case fragile. As the banks were avoiding to disclosure information because they were afraid to give to the public the impression of vulnerability or that their competitors could use certain information to gain competitive advantages. Fabricio considered the case simple and poorly stablished, lacking on high traffic of information exchange, reliability between the participants and cyber-security. Therefore, even though the network was delivered on time, it was hard to make all banks to agree upon network criteria and business rules, so none of the participants ended up using it.

Q4 - Identify the type of Blockchain use case applied to the project and what is IBM's Blockchain business model. Is IBM capable of creating value to its own business?

The project done by IBM in collaboration with CIP is a blockchain banking use case. On this situation, both IBM and CIP used Blockchain technology to improve the services that they provide, aggregating value by development and improvement of processes. The implementation of Blockchain network on the fraud analysis process aimed to speed up the communication mechanism and the exchange of information between clients and several banks, to reduce costs and to increase perceived security for the bank's clients.

According to the definition of Chong et al (2019) about Blockchain business models, IBM could be classified as a transformer. The transformers position themselves in the market as cooperators with distinct firms to deliver specific blockchain applications developed especially for that business. This category will develop solutions among other partners to help them to transform and improve their current business operations instead of trying to replace their business. Those partners can have secondary business models classification according to what they are aiming to reach. At CIP's situation the partner is aiming to become a platformer.

Transformers generate value by developing several Blockchain network projects with partners from different industries and use cases applications. By doing that they enhance current research and can keep a continuous development of internal knowledge and team expertise, while applying lessons learnt to new projects and their related issues. This definition is aligned with IBM's business strategy and the corporate idea of generation of value. Clients that are already used to IBM services and trust it brands, are more open to innovate with IBM's support. On the Device ID case, even though IBM had no big profits from it, the company was able to put their employees in a real-life situation, gaining know-how and developing its skills. This project was a trigger to several employees that after the delivery kept studying the technology and became experts on it. IBM was also able to prove to the market that they have intelligence needed to develop Blockchain networks, which can generate interest from existing clients and bring new clients.

Q5 - Is IBM's strategy sustainable in the long-term?

With the business model restructuring made in the past, IBM chose to focus on B2B and stay on markets where the company had bigger margins. The company was able to find a sustainable way to stabilize its financial situation and develop a competitive advantage which allowed a growth of revenue and cash flows, guaranteeing the company's survival.

However, the restructuring by itself was not enough to move the company to the top of the market, especially due to the higher prices charged, IBM had to find other ways to add value to its business. The company then invested on developing its dynamic capabilities, implementing incentives that promoted strategic insights and execution. Those initiatives aimed to engage IBM's employees into the business strategy while encouraging organizational learning and development of innovative and curious thinking on their staff.

Technology is in constant development. Hence, IT companies must build strategies that can allow certain movement and fast response to the market situation. IBM's new business model and internal initiatives allowed the company to conduct small investment bets on innovative projects with lower risk while learning from it.

The company also built a strong customer attraction and retention method. When offering product implementation and support, IBM builds a trust relationship with its clients that are willing to pay the premium price for a high-level service. IBM's clients are aware that their important business operations will not stop due to a technical issue. That added to the fact that they are already used to IBM services creates brand loyalty. On this method, new clients come to the company driven by the good media and respectable brand.

IBM strategy is sustainable in the long-term and it is developed exactly to allow that the company moves according to its clients' needs and new technology development. Guaranteeing that even though the company has several years on the market, it can be constantly modern and aligned to market's swings. In 2018, IBM services had signed new 47 client agreements that were worth more than $100 million each and contributed to the growth of its net income on 51.7% in comparison with 2017.

Q6 - Considering all the risk and ethics problems of Blockchain networks, do you think that companies should keep investing on disruptive innovations?

Blockchain is still a developing technology, therefore there is a lot of studies and research going on in order to understand the network's vulnerability. Most of discoveries happen "on the go", so security and data safety are still being explored. There have been some security breaches confirmed like the cryptocurrency transaction malleability or use of big data to discover the identity of users. Other problems that were found is network latency, that can take longer to complete processes, and the high cost related to the need of robust computational resources and the increase on energy consumption. The nature of anonymity and facilitation of transactions also bring some obscure uses of the network. Users have been using the network for illegal or immoral reasons, like money laundry and drugs, pornography, assassination, and weapons black market. Hackers have also been hijacking high-performance organizational computers to mine cryptocurrencies.

However, even though there are several problems with the Blockchain network, Dieskmeis & Seele (2020) believe that the technology has enormous potential to be used on behalf of the common good. Innovative solutions can only be improved by the constant use of the new technology, and it is on that daily use that flaws will appear and will be corrected. Companies should invest on Blockchain solutions with caution, taking into consideration that it is safe but it is still a bet. To reduce risks, at this moment companies should look for use cases that are small, where transactions do not have classified data involved and that are not essential to operations.

In modern business, innovation is essential to the sustainability of a company and disruptive solutions can bring huge competitive advantage and even the creation of new markets. When a disruptive innovation hits the market, usually there is a lot of discussion around it, although once its benefits are proven and clients accept it, other businesses start to adopt the idea and therefore there is a push to the creation of regulations to avoid misuse. Similarly to what happened with Uber and Airbnb, usually innovation brings regulation and not the other way around.

Q7 - What are your recommendations for the managers of IBM Brazil?

IBM needs to guarantee that the innovation-based strategy and operations are aligned, therefore avoiding that the same problems found on the case happen again.

Hence, the company could implement the following recommendations that are separated in three distinct groups:

In order to acquire and develop innovative technology knowledge, the company first needs to invest on internal and external training to their employees, where they should learn the theorical part and do some inside laboratory experimentations. In order to add more hands-on experience, IBM should organize coding bootcamps where developers should train in a real-life situation and hackathons where developers should be encouraged to explore any vulnerability of the technology, looking for any risks that IBM should be aware of and could correct before offering it to its clients. For last, in order to expose their employees to real corporate situations, IBM could develop a partnership with innovative startups to allow them to use some IBM products and computational infrastructure to develop their projects if they let less experienced IBM employees to join the team.

Aiming to improve its internal operations, IBM could develop a system that uses Artificial Intelligence to help project managers with information on each individual employee's skills during the staffing process. IBM could create an International Innovation Committee where every month one IBM location should present the most innovative project recently developed by its team. That project should be chosen by the regional general manager and aim to spread awareness and sparkle curiosity about the innovation topic. The project manager of each project presented should be available to answer questions and recommend where other employees can find more information and training on that technology.

Focusing on developing innovative and disruptive teams and solutions, each team should have an analyst with experience on the given technology responsible for checking if there is a match between the use case proposed by the sales team and the technology specifies, and benefits. IBM could also separate a budget that each innovative team must use to invest on small pet projects. And each team must apply Agile methodology on their projects, since this approach of breaking the development into small phases and "fail often and recover faster", is more appropriate to technological bets. The project managers should also keep a log of mistakes and lessons learned that should be used to avoid making the same mistakes on next projects.

5. Conclusion

Innovation is a trendy word on the strategic statement of many companies, and it can be the main differential when trying to gain competitive advantage. However, innovation capabilities are not easy to obtain. Innovation is not only a pretty word to be added to make the organization look more modern. It requires a lot of research, knowledge development and acquisition, internal investment, and cultural changes.

On the IBM and CIP Blockchain implementation project, we can see how hard the implementation of an innovation-based strategy can be, even for a well-known enterprise like IBM. From its statements one would expect that its operations were well trimmed and efficient, and that is also what its clients believe. In spite of the company believing that they are chasing the right objective, aligned with modern needs and aiming to guarantee the company's survival, the case shows that reality of conducting an innovative business can bring problems.

IBM has several years of experience on high-technology and has been part of the technological revolution. However, when implementing a completely new technology the company made amateur mistakes. Most of those mistakes were due to the urge of selling a new project to keep the company position as an innovator.

This case study also showed how the development of innovation capabilities are essential to the survival of high-tech companies and how investments on pet projects can bring great publicity. This consequently brings more clients and with the right product ecosystem and good client's retention initiatives can build a steady revenue stream.

Nonetheless, risks and ethical discussion are inherent to innovation and organizations must find ways to keep pushing the limit while learning from their mistakes to bring value to stakeholders and capture the most from current and new markets.

If I had more time for my Dissertation, it would have been interesting to study other IBM projects, especially those focusing on Artificial Intelligence, to see how the companies' initiatives worked to build on such a strong tradition initiated with IBM Watson.

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