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Design of a Virtual Platform to Counter Economic Recession

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Abstract. This paper aims to present the proposal of a platform founded on a Virtual Breeding Environment (VBE) as an alternative for resource sharing, survival, and growth of organizations that were impacted by the economic recession caused by COVID-19. Considering this, an informational platform model is presented, based on the theoretical framework of VBE and the potential to meet the needs of actors who are part of this environment. The result is a platform called Collabore. This platform helps with resource sharing between companies and enables the development of new network technologies. It also facilitates the co-creation of value between actors, allows lobby creation to compete with large companies in the global market, ensures new jobs and income generation, and facilitates the collaboration between companies dispersed globally, connected by Information and Communication Technologies (ICTs).

Keywords: Covid-19; Virtual Breeding Environment; Resource Sharing; Ecosystem; Collaborative Networks.

1 Introduction

With the outbreak of the COVID-19 pandemic, companies worldwide felt the urge to increase the speed of their decision-making process, improve productivity, change their ways to use technology and data, and accelerate their scope and scale of innovation. The management thinking model includes factors such as using talent in new ways, launching new business models, improving productivity, developing new products, and promoting changing operations in various spheres. Therefore, it was necessary to reinvent organizations promptly.

The stimulus for these changes came in a hard way, for the pandemic's consequences are still underestimated. More than 30 million Americans have lost their jobs, and estimates suggest that the unemployment rate in Brazil should reach 14.2% by the end of 2020 [3], while in 2019, studies already pointed out that 68% of small businesses were unprepared for a recession [3].

Accordingly, some strategic decisions need to be made, such as determining the position the organization may reach during and after the pandemic and how prepared

it is to perform its plans and projects. There is a need to apply intelligent strategic decisions to understand the organization's position in its environment [9] and its core competencies, performed roles, sold products, and available resources.

In face of the scenario provided by the COVID-19 pandemic, many companies collapsed, mainly small and medium-sized, mostly because they did not have enough resources to remain active during this economic recession. It aggravates unemployment and income reduction, impact sales, and reduces the number of organizations that provide.

Among the alternatives to overcome these problems, emerges the development of a platform to enable new ways of creating products and services, improve productivity, enhance competitiveness, reduce costs [6], generate flexibility, and incite partnerships with other organizations. Due to ecosystems being favorable environments for sharing resources through collaborative networks, that virtuality acts to bring organizations together through Information and Communication Technologies (ICTs), regardless of their geographic location, enabling collaboration between organizations physically located in any country.

The objective of this paper is to present the proposal of a platform founded on a Virtual Breeding Environment (VBE) as an alternative for sharing resources and promote organizations' growth and survival.

This work is divided from this introduction onwards to the theoretical framework where all the concepts necessary to understand the topic are explored, followed by the methodological procedures section, and then the fourth section is the requirements for the platform, next section is where the main research results are presented so that in the last section, the conclusions are presented.

2 Theoretical Framework

The term Business Ecosystem is an analogy to biological ecosystems that are used to explain business environments, which gradually move from a random collection of elements to a more structured community that produces goods and services of value to customers their capacities and roles.

These types of networks seek to preserve local specificities, tradition, and culture, often benefiting from government incentives. A business ecosystem is a cluster or industrial district though it is not limited to a specific sector of activity. It typically promotes standard business processes, providing interoperable collaboration infrastructures and facilitating the building of trust among its members as a prerequisite for any effective collaboration. Thus, defining a common foundation of ICT infrastructure and cooperative business rules between autonomous, geographically distributed, and heterogeneous companies [4]. Trust is a significant component in the configuration of networks. Its shape depends on the environment in which the organizations are inserted, which considers institutionalization, agreements, contracts, standards, and regulations that can favor trust between organizations that are components of the ecosystem [12].

A Virtual Breeding Environment (VBE) is a long-term strategic alliance between organizations, which provides a suitable environment for the rapid formation of goal-

oriented networks, such as Virtual Enterprises (VE), targeting specific business opportunities [7]. VBEs are also known as home networks or support networks, designed to offer the necessary conditions (for example, human, financial, social, infrastructure, and organizational) to support virtual companies' fast and fluid configuration [11].

In this structure, all organizations know each other and maintain their activities independently, that is, they buy, produce, and sell products and services that are part of their duties. An information system also stores data about each company's strategy, financial information, production, shareable resources, that they depend on but do not have ownership of, and their primary competencies.

VBE recognizes the market and consumers' needs, and when opportunities arise that an organization cannot undertake individually - either due to a lack of resources or any other factor that does not enable them to meet the fullness of a new project -, a new organizations' network (derived from VBE) is formed, complementing its resources and competences to fulfill the opportunity. This network is called Virtual Enterprise (VE) or Virtual Organization (VO) [5].

Accordingly, while VBE is a long-term strategic network, VE can be conceptualized as a temporary network of organizations gathered through the analysis of essential complementarity competencies. It is a network focused on objectives supported by ICTs. Albeit, the life span of a VE is usually restricted, created for a defined task, and dissolved after its completion [5].

The VE results add value to the client, promote the development of the constituent actors of the VE, and contribute to the VBE. This occurs because after the end of the VE, the actors that constituted it remain in the VBE, ready to compose new VEs, and with each new experience of participation in VEs, the actors become more prepared for this purpose.

The discontinued nature of VE operations increases flexibility, agility, and efficiency in the use of resources, but also causes challenges for their management, such as the risk of increased coordination costs, and loss of information, knowledge, or other resources. Precisely to avoid these problems, the governance within the network needs to be maintained between the different VEs [8].

Before joining the networks, organizations must be prepared for collaboration to be ready to react quickly and take advantage of business opportunities. Romero et al. [11] establish a readiness assessment for organizations that are candidates to take part in VBE and future VEs. It starts with assessing corporate governance by identifying the strategic alignment with the VBE. After this stage, an analysis is performed regarding the organization's past performance in collaborative initiatives. If approved, the organization is admitted to the VBE, being able to form VEs with other organizations, with an analysis of the alignment of the organization's competencies with the competencies required by the VE.

Readiness for collaboration is the organization's ability to lead, support collaborative activities, allocate and assign resources across organizational boundaries, and link to a common ground for successful collaboration (common operating principles, common ontology, interoperable infrastructure, and cooperation agreements) [11]. This evaluation process should be routine for companies that will compose the platform, to make it a successful project.

3 Methodological Procedures

The COVID-19 pandemic has changed the way society is organized and how it works. In the beginning, it was necessary to concentrate efforts to preserve lives and the interruption of activities that were not considered essential was a fact. Consequently, many companies did not survive and ended their activities permanently [2], especially small ones. Those who remained active had their resources reduced, many jobs were lost, and, consequently, income was reduced, even for the most stable workers in the job [1], which in turn reduces consumption. Alternatives need to be considered, seeing this low-income scenario, the lower number of companies, and the increase of unemployed people.

In this scenario, an ecosystem based on VBE was planned, to make it possible to face these problems through:

1. Sharing of resources between the companies that make up the VBE;
2. Development of new ways to create products and services;
3. Co-creation of value between the companies that make up the VBE;
4. Creating a lobby to compete with large companies in the global market;
5. Generation of new jobs and income; and
6. Possibility of collaboration between companies and people dispersed globally, connected by ICTs.

The platform was named *Collabore*, a derivation of the latin word "Collaborare" that means "work together", in the sense of establishing a connection, which in the universe of the VBE Ecosystem is a connection that is mainly established between the actors on the platform.

A platform design and prototype were developed based on the requirements represented by the needs previously discussed. After suggestions for adjustments were proposed by the authors, the final version of the screens' prototype was prepared, resulting in the main *Collabore* screen (figure 1), dashboard, project list, project overview, partners, and employees. The prototype screens were developed using the Adobe XD® software and can be consulted fully at the following URL: <https://bit.ly/3KNxRrj>. The results are presented in section 4.

4 Requirements

For the development of the *Collabore* Platform, it is important to identify and structure the requirements. Among the functional and content requirements, the following stand out:

1. Functional requirement: Partnership management tools for administrators and brokers. Content requirement: Lists of projects, collaborators, and tasks, schedule for carrying out tasks, meeting companies and collaborators in projects.
2. Functional requirement: Sharing of resources and information among companies that are part of *Collabore*. Content Requirement: List the resources and information that each company has, and their availability, general information about the resources, and the company.

3. Functional requirement: Development of new ways to create products and services. Content Requirement: Make available the possible forms of partnerships among companies, assets, information, and detailed documentation on the competencies and specifications of each company.

4. Functional requirement: Generation of new jobs and income. Content requirement: Detailing the expertise of each company's employees, for possible partnership, efficient search engine for forming partnerships in an agile way, and facilitating meetings of possible partners.

5. Functional requirement: Possibility of cooperation among companies and people located in any region of the world, connected by Information and Communication Technologies (ICTs). Content requirement: Allow the registration of companies from several geographic regions, with a statement of location via GPS, the possibility of searches by distance, in case it is a project that requires proximity among companies.

5 Results

Collabore was planned considering its lifespan, which involves policy procedures, standards, vision, mission and values, criteria for selecting organizations, and people who meet the readiness and preparedness requirements [11]. The operation stage involves ecosystem governance, as well as conflict resolution, coordination of activities, infrastructure, and technology. The evolution phase is the growth stage, with the formation of an increasing number of VEs, consolidating the model. Lastly, the dissolution stage is when the ecosystem has fulfilled its objectives or has transformed and no longer supports maintaining this model as planned.

The VE broker can be represented by the ecosystem administrator or by any actor who has identified an opportunity, described, and elaborated preliminary planning. The preliminary planning will foresee from the objectives of the VE to the products or services that will be carried out, also going through the search and selection of partners among the members of the ecosystem [10]. Then, together they can prepare more detailed plans, remaining operative at a VE until its dissolution. After the dissolution, the VE heritage will be distributed among the participants, and part returns to VBE [8] for platform maintenance and growth, according to the agreements of which the organizations are signatories. Usually, a VE is established for a short period. However, it may be intentionally planned for a longer-term, in both cases, until reaching the objective that established it [5].

The product or service developed by VE will consider the policies, rules, and regulations that govern all platform participants to improve production processes while developing new products or services to meet the market's needs.

Briefly, the ecosystem administrator or any actor exercising the broker's role will be able to see a problem or an opportunity that will require collective action. The actors will be gathered in VEs from their registered profiles, considering their skills and abilities, starting from an analysis of complementarity made by the administrator or the broker. Based on an information system, Collabore will present a group of actors and each one's percentage in meeting the necessary criteria for a profile or role, based on the information provided in the VE project. It will also have an Artificial

Intelligence (AI) system that will learn over time, making the formation of new VEs more intuitive and based on past choices promoted by Brokers.

The platform administrator will validate the registration of new members of the platform according to readiness and preparation criteria based on Romero et al. [11] through the submission of data, documents, and responses from the candidate to a member of Collabore.

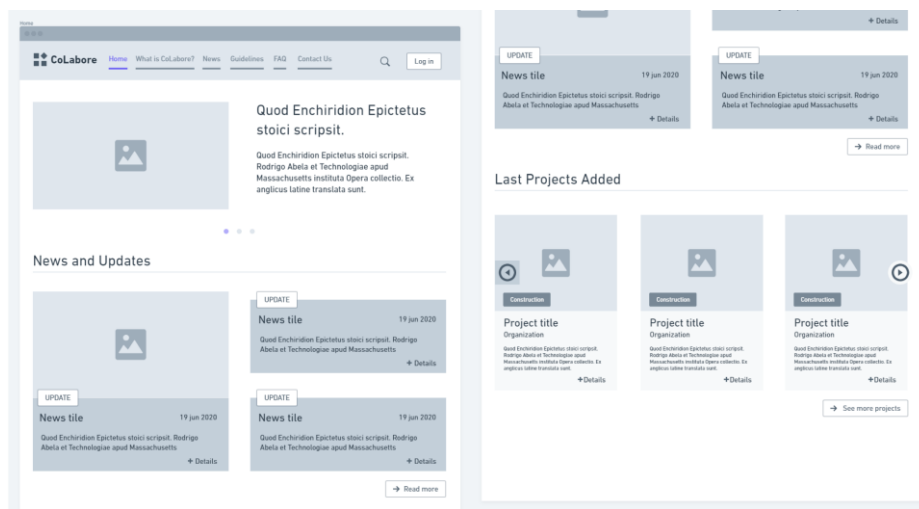


Fig. 1. Collabore main page. Source: Created by the authors.

The main page of Collabore (fig. 1) will contain a menu with links to the home page, a page about the platform, news, a guide for navigation of the platform, frequently asked questions, and a contact form. It will also have the option to log in with three types of profiles: a) being Collabore administrator, b) an organization, or c) a person component of the platform and client. For each profile, the platform will present the information in a more complete or restricted way, depending on the level of access required by each type of user.

The user with the highest level of access is the platform administrator, who will initially be one of the researchers who envisioned Collabore. However, once the platform is active, the platform administrators will be chosen among its other components for a limited period. As seen in the wireframes (<https://bit.ly/Managersboard> - Manager's Board), this user's access has control over all employees and projects (VEs), as well as tasks and execution schedules, thus being able to assist the broker whenever necessary.

The dashboard for projects (VE), as seen in the wireframes (<https://bit.ly/AllprojectsVE> - All Projects (VEs) dashboard), offers an overview and allows the management of each project. However, the management of all projects will only be available to Collabore's administrator, while any organization or person, as a broker, will manage the projects corresponding to their brokerage. The project dashboard will present general information about it, in addition to partners

(organizations), collaborators (people involved), tasks, schedules, and documentation (from partners, collaborators, and VE). Both partners and collaborators will be chosen among platform members. Eventually, there may be tasks that are not within the competencies of any component of the platform. In such cases, external members may join the VE to meet the requirements and by individual agreement.

On the dashboard of each project, as can be seen in the wireframes (<https://bit.ly/ProjectVE> - Project (VE) dashboard – overview), it is possible to obtain an overview of the project, such as tasks, completion rate, requirements, and basic data. It will also be possible to generate different reports regarding the project.

The partners, as can be seen in the wireframes (<https://bit.ly/PartnerVE> - Partner's Dashboard), will be organizations that are part of the platform (eventually external partners, for some specific task) and have collaborators working on the project. For partners, it is possible to access the data of each partner, such as the business area and the number of collaborators. As a broker or Collaborator's administrator, it is also possible to add or remove partners and check the completion status of tasks developed by collaborators.

Collaborators, as can be seen in the wireframes (<https://bit.ly/CollabVE> - Collaborator's Dashboard), will be individuals who are part of the platform or employed by some organization that is part of the platform and is appointed to exercise some role in the VE, or professionals who, even if not part of the platform, are assigned to exercise any function in the VE, that no other member has the capacity to execute. For collaborators, it will be possible to view the profile, photo, capabilities, and completion status of tasks performed in the project; the broker can also add or remove collaborators from the project.

6 Conclusion

This paper aimed to present a proposal for a platform founded on a Virtual Breeding Environment (VBE) as an alternative for resource sharing, survival, and organizations' growth. The research was stimulated mainly by the severe economic recession that the world is going through due to the COVID-19 pandemic.

Among other elements, the platform presented in this study will contribute to resource sharing between companies that compose it, an important aspect considering the scarcity of resources caused by the pandemic. It will also provide the development of new network technologies among actors that will help supply the society with goods and consumables on which they depend. The co-creation of value between companies and consumers can accelerate this process.

For small and medium-sized companies, stimulating the creation of lobby to compete with large companies in the global market will favor survival and competition on a much larger scale, generating new jobs and income for society. The reach may be increasingly greater, given the possibility of collaboration between companies dispersed globally, since they will be connected by Information and Communication Technologies (ICTs). This study showcased a prototype of the platform, meaning a practical application and development is still needed.

This research's limitation is the concentration on a specific type of ecosystem, the VBE. Other researchers are welcome to explore other alternatives. More research is needed to determine the level of readiness of organizations to participate in the platform, studies on governance and legal instruments, and the application of this study to other types of crises.

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