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EatLOCAL: a platform that connects local farmers, consumers, municipalities and non-governmental organisations

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Abstract

The COVID-19 pandemic has brought unprecedented challenges to public health and supply chain systems around the globe. Local farmers businesses were impacted by the lockdowns and they still face difficulties in commercializing their production while requests for social, economic and food support pile up at municipalities and non-governmental organisations (NGOs). Meanwhile, working from home, constraints to workout, business and social life, are impacting citizens' work-life balance, eating habits and impacting populations' physical and mental health globally. *EatLOCAL* proposes to address this issue by providing a service that is supported in an innovative digital platform that strengthens connections between suppliers, consumers, municipalities and NGOs working on food privation issues. Besides maximizing the opportunities for business to local farmers, this platform also creates a facilitated channel that promotes de access to fresh food by citizens and minimizes the social impact of the pandemic in most vulnerable groups.

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1. Introduction

The emergence of the COVID-19 pandemic and corresponding containment measures dictated by governments since 2019 inevitably spawned the development of a new economic crisis worldwide. [1] The restrictions applied to commercials, restaurants and hotels by governments to contain this virus imposed new challenges to small size business local farmers, who have been facing numerous difficulties in marketing their products and assuring the subsistence of their businesses. [1,2]. The economic slump has also led to a social crisis and many people have seen their socioeconomic status getting worse, with food insecurity and requests for food support increasing exponentially around the globe [3-6]. On the other hand, the curfew measures and the home-office work brought new risks and opportunities to human diets with direct impacts in health and wellbeing. [7,8]

The *EatLOCAL* project addresses a need to review the supply chains globally and aims to better connect local farmers, consumers, municipalities and NGOs, in order to help to restore the local economy, to reduce food waste, to promote food safety and to reduce foodborne disease, by promoting healthier and sustainable eating patterns. In this article, we first present a literature review that describes the problem, then we present the *EatLOCAL solution* (project charter, plan, IT solution) and finally we do a brief discussion about the impacts of the project and future work.

2. Background

The COVID-19 pandemic brought a health and economic crisis that radically impacted nutrition habits, food security and climate change. According to the World Health Organization (WHO), the economic and social disruption caused by the pandemic is devastating: tens of millions of people are at risk of falling into extreme poverty, while the number of undernourished people, currently estimated at nearly 690 million, could increase by up to 132 million by the end of this year. The spectrum of containment measures has impacted economies worldwide and particularly shaken a part of the population made up of local farmers with small local business. [1,2] The decrease of commerce caused by the imposed restrictions, like the closure or restricted opening hours of the fairs and markets, as well as the drastic reduction of the activity of the restaurants and hotels, had led to a sharp decline in product sales and business incomes. [1,2] In addition, the lack of agricultural products outlet also has been contributing to food insecurity and waste. Only when food is safe will it meet dietary needs and help ensure that everyone can live an active and healthy life. The WHO estimates that more than 600 million people fall ill and 420.000 die every year from eating food contaminated with bacteria, viruses, toxins or chemicals. Food waste is also a huge problem that generates the loss of thousands of million euros, but also tremendous costs for the living environments. [9] The outbreak is deeply connected to actual fragile food systems that degrade the environment through unsustainable land-use. According to the United Nations, the management of the food supply chain has become more complex and food safety incidents brought negative effects to public health. Unsafe or contaminated food leads to trade rejections, food loss and waste. So good practices along the supply chain - an issue that *EatLOCAL* proposes to address - may improve sustainability, minimize environmental damage and the amount of agricultural product to be discarded. The food acquisition through the short distribution chains allows the establishment of a closer relationship between consumers and local farmers, contributing to the development of agricultural production good practices, to increase the consumption of fresher and healthier foods, to practice fairer values, to reinforce the rural and urban connections and to boost sustainable development. [9,10] Agricultural workers also regularly face high levels of working poverty, malnutrition and poor health, so guaranteeing their safety and health is also critical to save lives, to reduce foodborne diseases and protect people's livelihoods. [12]

Beyond the local farmers, COVID-19 pandemic also contributed to worsening the socioeconomical status of many disadvantaged people and increased the socioeconomical inequalities around the world. [4] The unemployment and the lower families' incomes have increased the social, economic and food support requests during this period. [3-6]. According to the survey about food and physical activity in the context of social restraint REACT-COVID, developed in Portugal during the first mandatory confinement period in 2020, 32.7% of the people surveyed reported concern or uncertain food access caused by economic difficulties and 8% reported effective economic difficulties in access to food. [8]

Additionally, since the beginning of the pandemic, the mandatory confinement periods have become recurrent and home work has become a routine in European countries. According to REACT-COVID study, 45.1% admit to have changed their eating habits during the mandatory confinement period in 2020 and 18.6% declared changes in appetite caused by stress. These were major reasons for changes in eating patterns. [8] Both in Portugal and in other

countries, people have shown a trend to *snacking* during the day which led to a sweet snack increased consumption. [7,8] However, the precooked meals have decreased significantly and people have spent more time cooking at home, also growing their consumption of fruits and vegetables. [7,8] The increased vegetable consumption and cooking at home became an opportunity for low sugar, low fat and low salt diets, protective factors that reduce the risk of chronic diseases (e.g.: obesity, heart disease) and some types of cancer. [11]

3. EatLOCAL: the platform

3.1. Mission

The *EatLOCAL* project aims to connect local farmers, consumers, municipalities and NGOs through an interactive digital platform for food products orders. Food products are supplied by local farmers who sign up on the platform to sell their products to citizens. The platform managers are responsible for managing the orders and deliveries are assured by the farmers. Municipalities acquire part of the food products and food surplus, when it occurs, donating it to NGOs that provide food support for vulnerable groups. Additionally, informative content related to food and eating habits like recipes, nutritional recommendations, food conservation strategies and ways to reduce food waste will be uploaded and made available to consumers according to their profiles and product requests. So the *EatLOCAL* has the mission of establishing a cohesive connection between these local community players, supporting economic & sustainable development, social solidarity and reducing disease burden. **Table 1** provides an overview of the short-term impacts, milestones, goals, benefits and success factors of *EatLOCAL* project.

Table 1. *EatLOCAL* charter: goals, success factors, milestones, benefits and impacts

EatLOCAL project		EatLOCAL pilot	
Short-term impacts Increase local farmers selling capacity Innovative and effective food supply engaging local farmers, citizens, municipalities and NGOs	**Goals** 5 municipalities in December 2021 Start orders in December 2021 Break-Even point in 1.5 years	**Success factors** Software: user friendly, high-level content design, usability and navigability Institutional support by municipalities Young and dynamic team Dissemination and communication plan Local farmers adherence	**Milestones** Business model Requirements map Platform (pilot version) Platform go-live Local farmers registered Start sales 50 orders placed 500 visits to the platform

Benefits				
Local farmers	**Municipalities**	**NGOs**	**Consumers**	**Society**
- Enhance their business visibility - Increase agricultural productivity - Increase sales and income	- Boost local economy - Promote sustainable environmental resources - Support fresh and local food products consumption - Reduce disease burden and support the resilience and sustainability of health systems - Strengthen social cohesion	- Receive fresh food to provide social support and avoid food waste	- Adopt an healthier and sustainable diet - Increase health and food literacy - Purchase fresh and local food products at fair and affordable prices - Receive food products in a practical and safe way	- Sustainable Development Goals (SDG) - Positive environmental impact

3.2. EatLOCAL development

The *EatLOCAL* project is developed through 4 phases, following the traditional lifecycle model and an hybrid approach that combines waterfall and agile in IT development. The project work packages, tasks and deliverables are detailed in **Figure 1**.
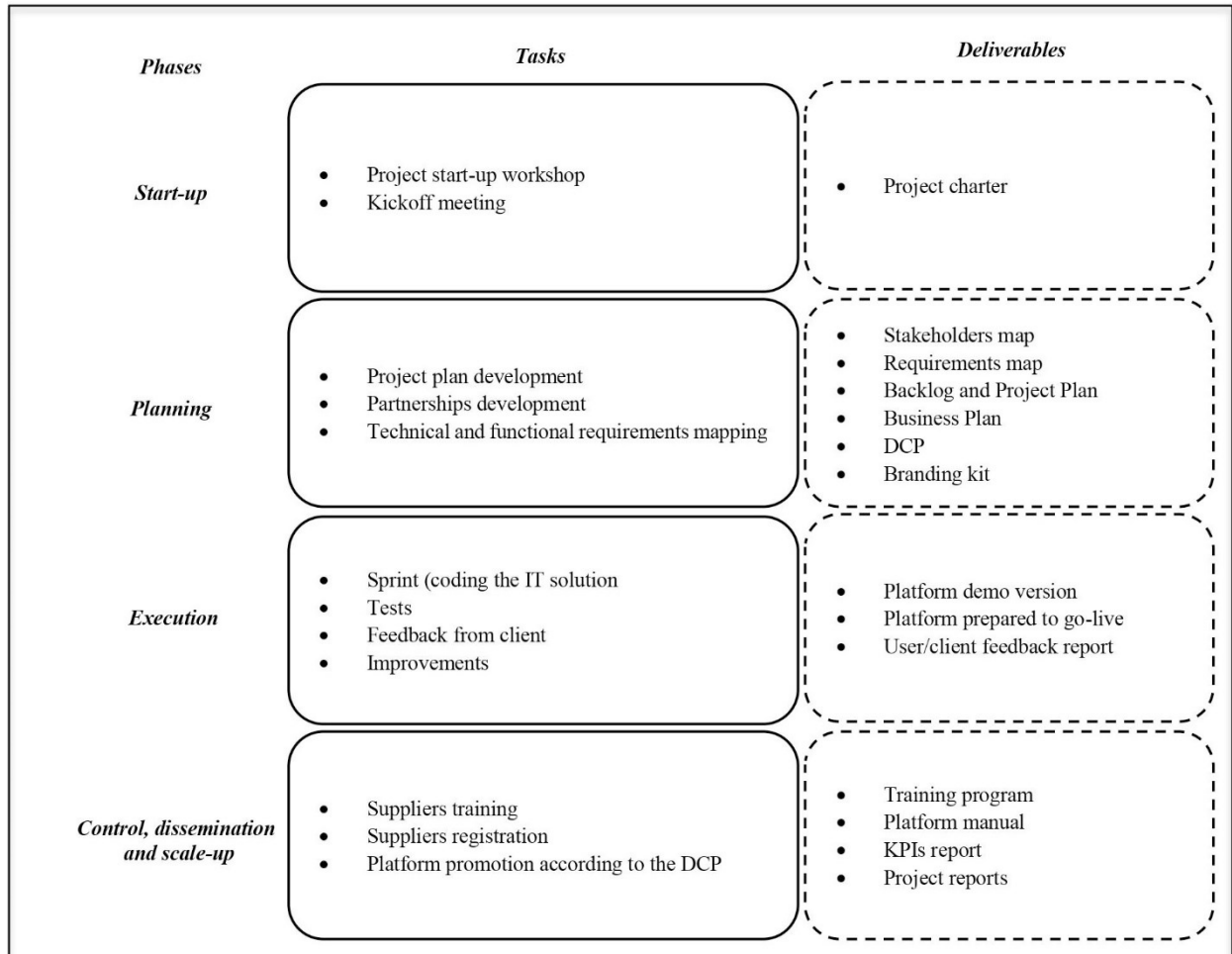

Figure 1. *EatLOCAL* plan: phases, tasks and deliverables

3.3. The IT solution

The *EatLOCAL* project has been developed with an active involvement of the major players of the supply chain: local farmers (suppliers), customers (consumers) and intermediate organisations (municipalities). A Content Management System was defined, which assures greater flexibility in platform use and ensures application of the best practices of web content development. This type of system allows an efficient management of the store contents, as well as orders management, products stock and customers management through the backoffice it provides. High-quality interfaces for potential clients (consumers) were designed. Considering the innovative character of the project and the need to develop a technological component that fully addresses the players' needs, we also decided to apply design thinking techniques and followed agile principles on IT development - requirements mapping, design, implementation, tests and solution go-live - focused on user experience and guaranteeing usability and navigability in the platform. At the requirements stage, profiles and processes for fully portal functioning and use in its full potential

were defined: sellers (local farmers), buyers (consumers and municipalities), digital payment (all payments will take place digitally, through an external company according to national legislation), stock control (sales chain controlled and monitored and updates available in real time) and order tracking (using the data stored on the portal, along with location technologies, it is possible track orders with the shortest time, being purchases and time-to-deliver predictable for the final customer) (**Figure 2**). It was decided to use a decentralized cloud provider service, making services available and independent from the data center. We also decided to use the On-Demand payment method, where only the amounts related to the computational power used will be paid. This way, the cost of computational power is proportional to the platform evolution, being optimized. The payment method made through an external company generates security to the process, once payment security related items are responsibility of the financial company. Still referring to the requirements stage, a microservices model was adopted to each component. For example, stock, delivery, payment and registrations related items are independent services but fully communicable between each other. Therefore, an occurrence with an item only corresponds to that item, causing no problems to the other components, thus bringing resilience to the portal. All the technologies adopted are OpenSource, assuring cost optimization in relation to licenses. The platform is governed through the general data protection regulation, guaranteeing the safety of the personal users´ data and the use of data only when authorized by the customers. In respect to the interfaces defined, the *EatLOCAL* platform assures the common features of an online store, like product searching and categorization, social media communication, product comparison, shopping cart, orders tracking by customers, online payment methods, wishlist, product packs, products pre-ordering, users' login with personal data and customer support contacts. *EatLOCAL* will measure the traditional digital marketing KPIs such as number of registrations, new and recurrent users' trends, number of sales, daily/monthly active users, retention rate, churn rate, average session length, platform rating. For assuring full portal functioning (usability, navigability and high-level user experience), we have a maintenance plan to ensure that the platform is up-to-date with low technical errors, new features and updated novel content. The dissemination and communications plan (DCP) includes actions to target suppliers and consumers and is an essential tool to expand the market and increase *EatLOCAL* solution visibility in the sector it operates. The DCP presents a strategy and specific actions for large-scale visibility, integrates passive methods (e.g.: publications; mass mailings), but also active approaches tailored to reflect, match and address the needs of intermediate and end-users. Therefore, the strategies for the dissemination plan will include press releases and media coverage, newsletters, social media posts. We pretend to develop advertising campaigns through Google AdWords, in order to share our products and services available on *EatLOCAL* platform and, at the same time, lead people to the online store.
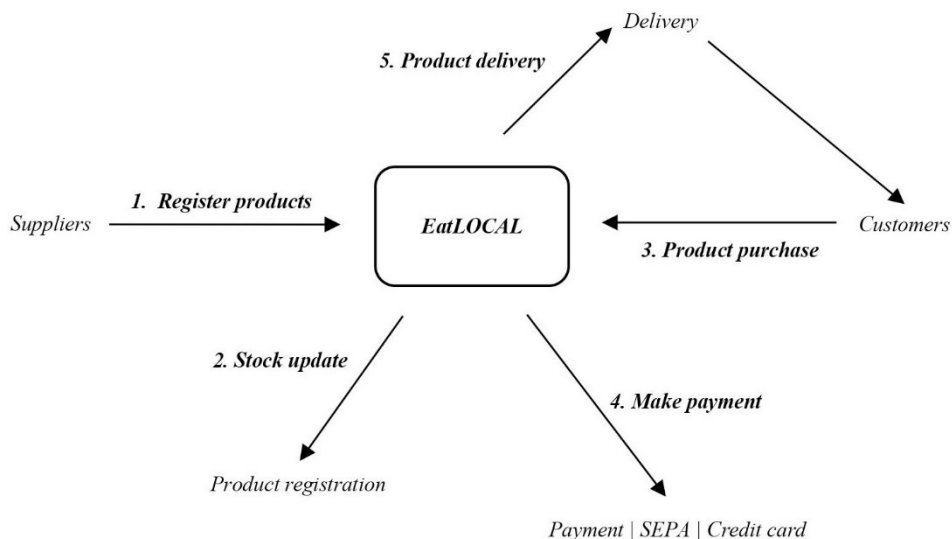

Figure 2. *EatLOCAL* platform: operations flowchart

4. Conclusions and future work

The supply chain for local farmers is a topic that has not been fully explored and so maximized in terms of processing and automation. The *EatLOCAL* platform provides a solution for this issue based on a business model establishing that food products distribution is assured by the local farmers. So the platform supports and streamlines the overall supply chain, making orders properly organized geographically for better efficiency and resource saving by farmers. Sooner we will explore the use of municipalities' resources, namely electric vehicles, in order to promote a more sustainable delivery model based on electric mobility and green energy. Finally, in the near future, we will discuss with local farmers the outsourcing of the distribution pathway as a way to increase efficiency and control costs.

In summary, the *EatLOCAL* project embraces a solidarity nature by improving the access to baskets of fresh products by citizens, institutions and particularly vulnerable groups and by doing so attending community-based needs emphasized during the pandemic period. From an economic and social perspective, it contributes to improve agricultural productivity, accelerating the local economy, as well as strengthening social cohesion. From a societal perspective, it contributes to the protection of the planet natural resources, fighting food waste and promoting environmentally friendly production practices. Finally, it also works on the determinants of health, being a social entrepreneurship project that impacts multiple SDGs.

5. References

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