



Engaging stakeholders in traditional food products through dissemination of knowledge and innovation based in digital platforms

LEANDRO OLIVEIRA^{1*}, AND EDUARDO LUÍS CARDOSO¹

¹Universidade Católica Portuguesa, CBQF Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal

* CORRESPONDING AUTHOR: l oliveira@porto.ucp.pt

Data of the article

First received : 30 March 2020 | Last revision received : 23 October 2020

Accepted : 10 November 2020 | Published online : 29 November 2020

DOI:10.17170/kobra-202010131946

Keywords

Social network; stakeholder engagement; agrofood sector; traditional food products; NEWFOOD; knowledge transfer.

The agrofood sector has a wide sectorial and business dispersion, constituting, in parallel, a relevant space of the European and national economy. In addition to the economic and social impact, the growth of the sector is an opportunity for the development of rural areas and agriculture, particularly given Europe's shortages in raw food materials. The need for continuous improvement, and market developments of this sector, require that innovation processes occur. These innovation processes have been facilitated by the development of information and communication technologies, and by the emergence of social networks that facilitate knowledge sharing. The NEWFOOD — Food Technologies Valorization Project is framed in the field of Knowledge and Technology Transfer and is oriented towards innovation in traditional food products. One of its objectives is to actively disseminate knowledge, skills and resources to the entities involved, including stakeholders from the relevant economic sectors.

This paper aims to identify and describe the role of social networks and other digital platforms used to meet this goal and the impact achieved. This research involved a single exploratory case study, with a conceptual knowledge management model and included primary data collected through documents developed for the NEWFOOD project, social networks/digital platforms, and observations of some project actions. Several digital contents were developed and distributed to bring innovators and researchers to promote innovations in traditional food products and to raise sector stakeholder's awareness about the potential of exploitation. Social media support tools associated with the project (Instagram, Facebook, Twitter, YouTube), and the platforms (Knowledge Portfolio, innovation platform) reached some 6000 followers/shareholders like students, entrepreneurs and other professionals in the sector. NEWFOOD project allowed the participation of 15 teams of stakeholders in an innovation program and contest and added innovation to 15 Portuguese traditional food products. Our results supported by the dissemination materials developed and by the social networks used contributed to promoting technological innovation and for generating of new ideas for products in this sector, and the alignment between stakeholders.

1. Introduction

Social media platforms have essentially become a medium, not only for communication among individuals

but also for aspects of the business sectors, including decision making process (Choi et al., 2017), knowl-

edge-based decision support systems (Chen et al., 2012; Hashem et al., 2016), brand promotions (Kaplan & Haenlein, 2010), among others. Social networks have undergone a high growth over the last decade as a result of technological developments as well as evolutions of the Internet, which has created some of the most well-known social networks today such as Facebook, Instagram, Twitter and YouTube (Brennan & Croft, 2012). It changed patterns of interaction, communication, and personal habits and work routines, turning the world into that already known expression, "Global Village". Distance has become purely physical, and this digital space has become an ally in the daily life of society (Forman et al., 2005). Social networks are characterised by a large group of individuals who use a certain network, and in a way, are production and sharing of content (Kaplan & Haenlein, 2010). They have a high innovation potential, particularly when interacting with customers or the community (Ioanid et al., 2018).

The food and beverage industry plays a crucial role in the Europe Union (EU) economy; it employs 4.72 million people, generates a turnover of €1.2 trillion and €236 billion in added value, making it the largest manufacturing industry in the EU. In half of the EU's 28 Member States, the food and drink industry is the biggest manufacturing employer. About ¾ of EU food and drink exports are destined for the Single Market. At the same time, the EU is the largest exporter of food and drink products in the world with extra EU exports reaching €110 billion and a trade surplus of €36 billion (FoodDrinkEurope, 2019). In Portugal, data from 2016 reveal that this sector is composed of 11 089 companies (mostly in the North Region), employing around 110 thousand people, and has a turnover of €15.6 billion, equivalent to 4.6% of the total national industry. The sector is characterised by a high number of small and medium-sized enterprises. However, 70.6% of production is concentrated in medium and large enterprises (Instituto Nacional de Estatística, 2018). Thus, it appears that the agrofood sector has an important role in the Portuguese economy, still having high growth potential.

In the agrofood sector, as well as in other sectors of the economy, innovation is the main driver of productivity growth, competitiveness, and sustainability. In general, there is a consensus that innovation processes are not spontaneous or isolated, and they do not occur

by decree. They occur in society and are conditioned by the level of internal development of that society, the accumulation of human capacities, favourable conditions for innovation, the demands raised by society itself, and by the regional and global environment (Tomaél et al., 2005).

The agrofood innovation system approach considers the interrelationships between all actors, public and private, in the creation, diffusion, adaptation and use of knowledge and innovations in all links of the value chain, as well as for the creation of a favourable environment for innovation. It also recognises the importance of both technological and institutional, social, organisational and commercial innovations. The role of the market for consumers as a driver of innovation and as criteria for its success places particular emphasis on the role of policies that promote innovation (ETP 'Food for Life', 2016). This also applies to traditional food products, despite the apparent controversy between innovation and tradition and the challenges that this controversy involves [e.g. Jordana (2000), Cagri Mehmetoglu (2018)]. According to Guerrero et al. (2009), a traditional food product is "a product frequently consumed or associated with specific celebrations and/or seasons, normally transmitted from one generation to another, made accurately in a specific way according to the gastronomic heritage, with little or no processing/manipulation, distinguished and known because of its sensory properties and associated to a certain local area, region or country."

In this way, innovation in the traditional food sector makes it possible to strengthen and expand the market of traditional food products according to societal challenges. For example, making the agrofood sector sustainable and competitive may allow safer and healthier diets, safe food, healthy and high quality, informed consumer choice, dietary solutions and innovations and methods that use fewer resources and additives and with fewer by-products and pollutants (Horizon 2020 Advisory Group, 2016). The most frequent innovation applied to traditional foods is based on product innovation, namely in packaging, product composition, size and shape or new ways of using the product. Other less common innovations refer, for example, to process innovations as they impact the identity and authenticity of the product and its production process. In the case of organisational or market innovation, despite having valuable potential, it is not



perceived or recognised by all stakeholders in the traditional food sector chain (Gellynck & Kühne, 2008). CEOs and business owners are primarily responsible for innovation strategies in the food sector, with other internal stakeholders (employees) or even external stakeholders having minimal participation (Capitano et al., 2009). These innovation strategies end up focusing on innovation for competition, encouraging the development of new products, with a mindset oriented towards the potential markets to be reached in the future and the use of territorial specialities, which in general are characteristic of large companies (Arditó et al., 2015). Since the majority of companies in the agrofood sector are small and medium-sized enterprises (ETP 'Food for Life', 2016), these strategies indicate a high level of innovation. It seems that the entrepreneurial vision overcomes the limitations of the innovation capacity of a small company, highlighting the importance of creating new products to keep satisfy existing consumers, and attracting new customers, focusing on the use of local material for manufacturing (Dadura & Lee, 2011).

The transition from an industrial society to one based on knowledge and information has brought significant changes to the social and organisational environment. We live a moment mixed with opportunities and great challenges, with rules and styles that directly and indirectly reflect the way of life of people and organisational systems (Pereira et al., 2009). Contradictions, inconsistencies, dualities and oppositions are part of the daily life of companies, with successful ones being those who take advantage of them as a competitive advantage (Scharf, 2007).

Knowledge can be classified into tacit (Polanyi, 1966), the one held by the individual and stemming from personal experience, and explicit, which can be articulated, coded, stored and shared. These two types of knowledge are in constant interaction, following a spiral composed of four forms of sharing: Socialisation, Externalisation, Combination and Internalisation, therefore called the SECI process. The transformation and creation of knowledge occur through the interaction between the various modes of conversion, in a continuous flow of knowledge creation (Nonaka & Takeuchi, 2008). The term "knowledge management" can be conceptualised as the review of the main processes, policies, and managerial and technological tools in light of a better understanding of the process

of generation and creation, identification, storage, dissemination, sharing and use of organisational knowledge to generate financial results for a company (Terra, 2001). The author adds that knowledge management is not a project, but the centralisation of management processes in the knowledge variable. From this view, it is suggested that knowledge management is a practice that becomes cyclical, that starts with creation, goes through the steps listed above, and reaches the final use or application. In general, it is associated with incremental or radical innovations in products and services.

Knowledge management allows the exchange of information between stakeholders, fostering innovation and cooperation within companies (Hamdoun et al., 2018). It should also be noted that the management of information flows creates beneficial changes in the knowledge management of organisations, allowing the sharing of information with different sectors and groups of employees, improving their strategy (Nisar et al., 2019).

Thus, three research questions arise in this context:

1. Which social networks/digital platforms could be used in the Portuguese traditional food products sector to engage stakeholders?
2. How can social networks/digital platforms contribute to innovation in Portuguese traditional food products?
3. How can knowledge management be done in the context of Portuguese traditional food products?

This paper aims to answer these questions through a case study, identifying and describing the social networks and other digital platforms used in NEWFOOD project to actively disseminate knowledge, skills and resources to involved entities, including stakeholders from the relevant economic sectors, especially in the Portuguese traditional food products sector.

2. Materials and Methods

2.1. Type of study and case selection

This research follows the NEWFOOD project along with an entrepreneurship contest based on the innovation and valorisation of traditional food products implemented in a research university in Portugal,

using a unique case study method. According to Yin (2001), the purpose of the case study is to explore, describe or explain something. The author states a case study is the most commonly used strategy when the researcher has little control over real knowledge or even when it is non-existent and intends to know the "how" and the "why". The case study represents a suitable research method, mainly because it is based on intense and in-depth research of a particular object of study. Thus, studying a single case has the advantage of being able to describe in detail the described phenomenon (Eisenhardt & Graebner, 2007) to broaden the understanding of a complex issue, in addition to adding consistency to existing research (Merriam, 1998).

In this study, we present the case of an agrofood entrepreneurship contest at a research university in the north of Portugal to contribute and better understand innovation-based technologies, which can also have implications in other industrial environments. The article describes the merits and challenges of the dissemination of innovation and knowledge management through digital platforms involving stakeholders in the agrofood area. It should be noted that the objective of the present study is not to generate statistical generalisation, but to achieve analytical generalisation (Yin, 2001), and so compare the results of a case study to a previously developed theory (Eisenhardt & Graebner, 2007). For this reason, although the results of our research are not necessarily generalisable, they can be transferable insofar as they can be applied or made relevant in another context (Shenton, 2004).

2.2. Case study

2.2.1. The NEWFOOD project

NEWFOOD — Food Technologies Valorization project joined the ambitions of four public universities of the North Region (University of Trás-os-Montes and Alto Douro, Portuguese Catholic University Porto Regional Center, University of Minho and University of Porto) and was designed to accelerate the processes of expansion and consolidation of the so-called "traditional products" through a proposal of innovation catalysed by the transfer of knowledge and technology. NEWFOOD responds to the clear identification of "traditional" products, evolution, and adaptation

of these products to modern markets as a priority for the development of the economy in the North Region. NEWFOOD uses the Regional Intelligent Specialization plan — RIS3 (CCDRN, 2014) merging agricultural and agrofood competences and resources held in the region, articulated through the four universities. There are very strong, productive and structured cooperation links of varied forms between relevant actors in the agrofood sector and the universities involved. These links include bilateral relations between companies and researchers, formal protocols, and associations formed specifically to advance the Research and Development agenda for the sector.

This project proposes three Actions that are articulated (Table 1): (1) develop a knowledge and skills map of the Region and an inventory of the needs of the sector to ensure the innovation process focused on the central axes of expansion and consolidation of the sector; (2) promote innovation projects aimed at generating new products/solutions of economic relevance in the "Traditional Products" sector and (3) actively disseminate knowledge, skills and resources to the entities involved, including stakeholders from the relevant economic sectors.

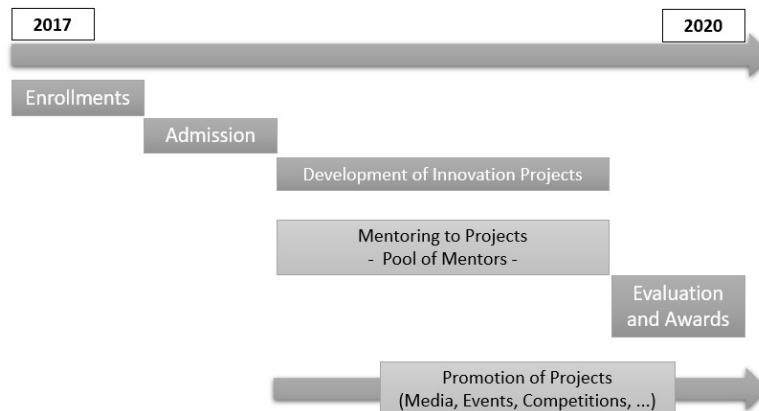
The NEWFOOD and Food Valorization Program and Contest that we refer to in this paper are organised by the Faculty of Biotechnology of the Portuguese Catholic University and took place between 2017 and 2020 – Figure 1. The NEWFOOD and Food Valorization Program and Contest had 4 phases: Admission, Development of Innovation Plans, Presentation of Products and Services in Media and Public Events, and Attribution of NEWFOOD and Food Valorization Awards, based on the following general criteria applied to the final proposals submitted to the Contest: consistency of proposals, depth of developments, correctness, application potential, innovation in the respective market, involvement of promoters and public utility.

2.3. Collection and analysis of information

The purpose of data collection is to obtain a set of information that addresses the research questions defined and captures the contextual complexity of the topic under study (Tuli, 2010). Thus, the present study collected primary data through documents developed for the NEWFOOD project, social networks and dig-

Table1. Action and description of Newfood Project.

Action	Description
1- Knowledge and Needs	Mapping existing knowledge and the needs of the economic fabric in order to promote opportunities through the correspondence between knowledge - needs, generating added value. Two characterization studies will be carried out by each University, of the knowledge produced and existing, with potential for transference to the Stakeholders of the value chain. There will also be eight studies on Sector Needs conditioned by trends relevant to the value chain, supported by technical visits and participation in international events relevant to the intended dynamics. A set of Seminars / Workshops will ensure the Public Disclosure and discussion in the territory of the results of the studies carried out, including International Benchmarking with territories with dynamics in the area. The formation of the correspondence between Knowledge and Needs will be characterized in the Knowledge-Needs Matching Study with the respective public presentation to the target audience.
2 - Program for the Promotion of Innovation Projects	Valuation of knowledge through its application in the development of projects oriented to the innovation and competitiveness of "Traditional Food Products" based on the differentiation of endogenous resources to the territory, with results along the value chain (primary production, processing, ingredients, industry, packaging, distribution and food service). The intention is to promote two approaches, one, the "Food Valorization" competition, based on the support of proposals for innovative projects involving Proofs of Concept and Business Projects for Entrepreneurship - oriented to new business initiatives in the value chain; another, the "NewFood" competition, based on support for a selection of innovation proposals with projects of economic relevance and with added value for Prototyping. The projects and their results will be presented publicly at the Fine Showcase and Food Festival sessions, seeking to create conditions for stakeholder evaluation and promotion of knowledge transfer in the sector.
3 - Promotion of Knowledge and Innovation	Promotion of the transfer of knowledge to the economic fabric, extended to the whole value chain, through practical and demonstrative actions as well as through concrete projects with companies, of innovation for the availability of the capacities and resources existing in the Research Centers. Promotion of applied knowledge and innovation potential in the area to the national business community, the national and international consumer, and the technical and scientific community through a set of actions that include videos, campaigns on social networks, communications and publications of different nature at the level National and international.

**Figure 1.** Calendar and phases of the NEWFOOD and Food Valorisation Program and Contest.



ital platforms, and observations of some project actions.

Knowledge management was developed in the environment of business organisations, and its research and applications are focused on the perspective of organisational knowledge. However, there are other contexts in which knowledge management can be studied, such as, for example, the academic context, focused on the perspective of scientific knowledge. The benefits from efficient management of this knowledge, not only add value to the institution itself but to society as a whole, also leading to a quality of the services offered (Garcia & Valentin, 2009).

In this sense, Leite and Costa (2007) propose a conceptual model of scientific knowledge management, which consists of five processes used in this study:

- Identification: refers to the process of mapping the knowledge of the academic community (knowledge internal to the institution) in its tacit and explicit aspect and also to the mapping of knowledge external to the institution from scientific communities. Thus, the objective of knowledge mapping in the academic environment is to answer those who research what and where;
- Acquisition: is related to the process of acquiring internal and external knowledge that is necessary to provide the creation and maintenance of scientific knowledge and skills of the academic community.
- Storage/organisation: process related to the organisation and storage of explicit scientific knowledge in order to make it easily recoverable.
- Sharing: a process that has as its basic and fundamental assumption for the transformation of information and isolated experiences into something that the entire organisation can use.
- Creation: the process is one of the essential elements of knowledge management. It is related to the creation of new skills, competences and knowledge in the institution. In the academic context, the creation of new scientific knowledge occurs through scientific research.

However, it is counterproductive to mention processes such as the creation and sharing of scientific knowledge (phases of scientific knowledge management) without necessarily considering the communication

that contributes and makes such processes viable (Leite, 2007).

3. Results

To meet the objectives under study, the social networks used by NEWFOOD were analysed. These included the Web platform and YouTube page, along with the Facebook, Twitter and Instagram accounts of the Faculty of Biotechnology – Portuguese Catholic University. Besides, other digital platforms were analysed: NEWFOOD website, Innovation platform, and Google photos (Table 2).

The promotion of the NEWFOOD and Food Valorization Program and Contest through social networks allowed 15 teams to be brought together with a total of 40 participants (mostly females), including PhD students, researchers, and other stakeholders of the Portuguese traditional food products sector. The teams developed 15 products to meet the sector's needs raised previously, adding innovation based on the research results of the associated laboratory. The project teams were supported, in this phase, by a pool of scientific and business mentors. It allowed the teams to get a more industrial perspective and a closer market drive to improve the potential for transferring their products and services to the market. Some examples of these products are cheeses with probiotics or with differentiated processing that allowed to improve its food safety, traditional sweets with functional bioactive compounds, application of new technologies applied to non-dairy drinks acorn based, use of bioactive substances as a way improve food safety in fermented meat products, among others. Additionally, dissemination materials were developed. Flyers, posters, and videos about the team's products were prepared and disseminated through the NEWFOOD website and Facebook page, as well as the innovation platform. Based on the evaluation of a panel of judges, 2 NEWFOOD Awards and 4 Food Valorisation Awards were awarded a value of € 2000 each. Participation in these competitions allowed the teams to exhibit the products developed to scientific and business stakeholders in national and international events.

According to the conceptual model of knowledge management (Leite & Costa, 2007) — Table 3, we found that the Innovation Platform, Google Photos,

Table 2. Social networks/ platforms used by NEWFOOD (31-01-2020).

Social network/ digital platform	Followers/ subscribers	URL
Newfood		
Facebook	195	https://www.facebook.com/newfood.esbucp/
Youtube	10	https://www.youtube.com/channel/UC4Az6gVP-eKLHGClaN9gdWQ/
Website	Not applicable	http://www.esb.ucp.pt/pt/newfood
Google photos	Not applicable	https://photos.google.com/share/AF1QipO4YjhOT_k9MSAtnpqRnOx1o_WTNHpBY8SFCvF6L7RlmO2hTm1HJVJdRfL5hRRxA?key=REdJazZ3ZFNDelBZbUw5alBibi1HYWt6WlZsVjZB
Faculty of Biotechnology – Portuguese Catholic University		
Facebook	5627	https://www.facebook.com/catolicaportobiotecnologia/
Instagram	956	https://www.instagram.com/catolica.porto.biotecnologia/?hl=pt
Twitter	123	https://twitter.com/BiotecCatolica
Innovation platform	Not applicable	http://inovacao.esb.ucp.pt/
Knowledge Portfolio	Not applicable	http://www.cbqf.esb.ucp.pt/en/cbqf-projects?c=16002&l=en&o=datedesc&s=

YouTube and the NEWFOOD website were used as information storage platforms that could be disseminated through the social networks used by the project, fitting in the storage and organisation process of the conceptual model. On the other hand, the social networks themselves (Facebook, Instagram and Twitter) served as platforms for storing photos and videos of the project, but also played a pivotal role in the dissemination of knowledge, being part of the sharing process of the conceptual model of knowledge management.

4. Discussion

The objective of this study was to answer the following questions: which social networks/digital platforms could be used in the Portuguese traditional food products sector to engage stakeholders; how can social networks/digital platforms contribute to innovation in Portuguese traditional food products; and, how can knowledge management be done in the context of Portuguese traditional food products? To answer the questions, the NEWFOOD Project was

analysed through a case study in the sector of Portuguese traditional food products. A survey was made of the social networks and digital platforms used by the NEWFOOD project to disseminate knowledge regarding Portuguese traditional food products. These platforms were used to launch an innovation program and contest to bring together different stakeholders in the Portuguese traditional food sector. Finally, the knowledge management process focused on the promotion of Portuguese traditional food products by the NEWFOOD project was described.

Analysing the data collected on the social networks used by NEWFOOD (Twitter, Facebook, Instagram and YouTube) it is possible to state, based on the studies of Nonaka and Takeuchi (2008), that explicit knowledge is predominant. It is characterised by objectivity and rationality, being a sequential and digital knowledge. The interaction between explicit knowledge is a form of knowledge creation identified in these social networks, an idea corroborated by Choo (2003), who highlights that the processes of information conversion, in which the combination would result, through

Table 3. A conceptual model of scientific knowledge management (Leite & Costa, 2007) for NEWFOOD.

Process	Description
Identification	Thought the innovation Platform and Knowledge Portfolio of the Center of Biotechnology and Fine Chemistry / Faculty of Biotechnology of Portuguese Catholic University we mapping the knowledge of the academic community - knowledge internal to the institution - in its tacit and explicit aspect. We also mapping of knowledge external to the institution from scientific communities by studies conducted in NEWFOOD's Action 1.
Acquisition	On Action 2 of NEWFOOD we promote a team building that brought together 15 teams of PhD students, researchers and stakeholders that applied to the NewFood contest and program supporting Knowledge and Technology Transfer to the Portuguese traditional food sector. The team attended meet with business mentors to provide the creation and maintenance of scientific knowledge and skills of the academic community on business issues.
Storage/ organization	Developed materials were Stored/ organized. Videos on Facebook and Youtube, photos on Facebook, Instagram, Google Photos. Other informative materials with text on innovation Platform and Knowledge Portfolio websites.
Sharing	The sharing process was accomplished by social networks (Facebook, Instagram, Twitter, Youtube) and digital platforms (innovation Platform and Knowledge Portfolio, Google Photos, website).
Creation	We support 15 PhD students and researchers teams to develop new products in the field of traditional foods. These teams develop business projects, communications plans and prototypes exposing the to business tissue. Until now, it allowed the beginning of the patenting of 4 technologies associated with the developments, different technical publications, and range of business contacts for trials.

the interaction of explicit knowledge, in the generation of new ones. This possibility was observed on the networks through the posting of information and the ability to post comments. Davenport and Prusak (2003) state that for knowledge to be transmitted it needs to be presented; on social networks, this is done through text publications, images and videos, using a channel that allows the encoding of that knowledge and its storage in a virtual way. Although the authors claim that knowledge needs to be absorbed and used in order to contemplate its transfer process, Choo (2003) argues that this process is linked to the processing of information. Therefore it can be recognised in the social networks used by NEWFOOD.

Linked to the presentation of the content, Davenport and Prusak (2003) cite that knowledge must be coded to be shared, meaning it should be adapted to a common language that the interlocutor can easily understand. The publications made by NEWFOOD social networks use the respective languages of each type of social network — short information on Twitter and Instagram and medium and long on the others. According to the authors, the codification of knowl-

edge allows it to become permanent, and not only in the mind of those who transmitted it. The level of reach of the information published by NEWFOOD demonstrates the break of frontiers characteristic of the Knowledge Society, as previously exposed. It can be assumed that the contents have been viewed in countries other than Portugal by Portuguese speakers abroad, with common interests in national matters. Alternatively, for example, the content may have reached English speaking countries since some publications were translated into English to facilitate the sharing of knowledge with outside readers as it is the predominant language in various cultures. Visualisations of the content of the four social networks used by NEWFOOD demonstrate that there is an audience that is interested in publications. When evaluating the subjects of the posts, most of them are informative, often not allowing debate, discussion and exchange of information, as is the case with the post about agro-food issues. It is possible, therefore, that the type of content published is responsible for the low interaction between members of the network.

It was also found that the social networks and digi-

tal platforms used by NEWFOOD were able to reach around 6000 (followers) stakeholders in the sector of Portuguese traditional food products. Ioanid et al. (2018) study on the impact of social networks on the innovation potential of small and medium-sized enterprises, found that interviewees consider that stimulating innovation through social networks helps to retain customers and win new customers, offer better product customisation and services that meet the needs of customers and enables entering the market with new innovative products, inspired by ideas posted on social networks. However, they emphasise that it is very difficult to quantify the innovative ideas gathered on social networks and other sources, such as private discussions with partners or suppliers.

The engagement of interested parties has been considered a key factor for innovation, as it allows to improve the company's capacity and innovation strategy (Iturrioz et al., 2015) through the generation of ideas, which allows identifying critical points at an early stage of the innovation process (Widén et al., 2014). The number of different stakeholders involved in the process depends on the nature of the innovation and can be decisive in the success of the innovation project (Barlow et al., 2006).

In the case of the NEWFOOD Project, the launch of the innovation program and contest, through social networks and digital platforms, allowed to bring together different stakeholders from the sector of traditional Portuguese food products, including PhD students, researchers, among others with skills in biotechnology, food engineering, and nutrition sciences. A total of 15 teams participated in the innovation program and contest, in which they added innovations to 15 traditional Portuguese food products, essentially product and process innovations. The teams were supported by scientific and business mentors who helped make the innovation plans more realistic and adjusted to the needs of the market. Thus, demonstrating that social networks and digital platforms can bring together different stakeholders to promote innovation in Portuguese traditional food products.

It has been reported that the networks created in entrepreneurship programs led to the sharing of knowledge, experiences and resources, thereby generating greater interest among the involvement of and in-

teraction between stakeholders (Galvão et al., 2020). Besides, the involvement of academic stakeholders in the innovation process allows adding human capital, consisting of a wide variety of scientific knowledge, experience and knowledge of laboratory techniques, for the development of a scientific strategy. As well as social capital, essential for innovation management and the development of entrepreneurship, since scientific knowledge can be transported to scientific networks that incorporate the knowledge generated in the scientific community, creating the basis for the development of relationships between entrepreneurs, company and members of their social networks (Murray, 2004).

To think about how to manage knowledge for the promotion of the sector of Portuguese traditional food products it is essential to outline innovation strategies and attract stakeholders and create synergies for the development of companies in the sector. In the case of Portuguese traditional food products, taking the NEWFOOD project as an example, the conceptual model of knowledge management (Leite & Costa, 2007) was described, which included five processes: identification, acquisition, storage/organisation, sharing, and creation. The first three processes of knowledge management were described above, namely through the description of the social networks/digital platforms used by the NEWFOOD project, as well as by its innovation program and contest.

In general, results show that knowledge management practices could contribute to innovation, directly and indirectly, as in the study of Ode and Ayavoo (2020). Knowledge sharing indirectly contributes to innovation through the application of knowledge. The application of knowledge, through the creation of knowledge, makes it more active and relevant to the creation of value (Choi et al., 2010). Also, the application of knowledge responds to the different types of knowledge available in an organisation and assists in the use of knowledge that has been created and shared (Shujahat et al., 2018), in the case of the NEWFOOD project we contribute directly to innovation through the creation of knowledge in Portuguese traditional food products, with the innovation program and contest. In fact, according to Pantano and others (2019), the involvement of external stakeholders such as universities can help to establish a balance between business

innovation and the resources available in the market and technology. Stakeholder engagement could help penetrate existing markets with new products in terms of developing innovations to satisfy new segments; as well as exploring new markets with the development of incremental innovations.

This study has some limitations and opportunities that should be noted. Firstly, some of the results of this study are extracted from direct observation. Moreover, the fact that it is a case study does not allow the extrapolation of the results to other situations. The approach used in this study is transversal and does not reflect the performance of the mechanisms examined in this research in the long term. The knowledge management practices are multidimensional, and, in this study, we focused on only five knowledge management processes: identification, acquisition, storage/organisation, sharing, and creation. Other dimensions of knowledge management have not been examined and can be equally useful to explain innovation in the traditional food products sector. As a suggestion for future research, the effect of other knowledge management and innovation practices in different sectors can be examined using quantitative methodologies, and it can also adopt a longitudinal approach examining the long-term effect of these practices. Despite these limitations, this study provides practical empirical evidence to promote and link knowledge management and innovation in the traditional food sector.

5. Conclusions

Business innovation is the result of a company's efforts to develop and place on the market new business models, processes, products or services, with added value recognised by customers. Given the unpredictable and increasingly accelerated competitive environment, companies are challenged to identify new ways to create value and explore market opportunities. Social networks have accelerated some of these processes, revealing a simple and easy way to connect people anywhere in the world and allow interaction on different subjects between members of those networks. Accounts were created on social networks or other digital platforms to achieve the objective of actively disseminating knowledge, capabilities and resources to the entities involved, including stakeholders in the sector of Portuguese traditional food products. Besides, during the NEWFOOD initiative,

several materials for the dissemination and promotion of Portuguese traditional food products were developed. It verified that disseminated information and knowledge, as well the launch of the innovation program and contest, contributed to the promotion of technological innovation involving the generation of new ideas for products and services, and the alignment between stakeholders.

Acknowledgement

This study was conducted under NEWFOOD — Food Technologies Valorization (NORTE-01-0246-FEDER-000043) that was cofunded by the Regional Operational Program of the North (Norte2020), under the PORTUGAL 2020 Partnership Agreement, through the implementation of the European Regional Development Fund (ERDF).

Conflict of interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

References

- Ardito, L., Messeni Petruzzelli, A., & Albino, V. (2015). From Technological Inventions to New Products: A Systematic Review and Research Agenda of the Main Enabling Factors. *European Management Review*, 12(3), 113–147. doi:10.1111/emre.12047
- Barlow, J., Bayer, S., & Curry, R. (2006). Implementing complex innovations in fluid multi stakeholder environments: Experiences of 'telecare'. *Technovation*, 26(3), 396–406. doi: <https://doi.org/10.1016/j.technovation.2005.06.010>
- Brennan, R., & Croft, R. (2012). The use of social media in B2B marketing and branding: An exploratory study. *Journal of Customer Behaviour*, 11(2), 101–115. doi:10.1362/147539212X13420906144552
- Cagri Mehmetoglu, A. (2018). Food safety challenges associated with traditional foods of Turkey. *Food Science and Technology*, 38, 1–12. Retrieved from http://www.scielo.br/scielo.php?script=sci_arttex

t&pid=S0101-20612018000100001&nrm=iso

Capitanio, F., Coppola, A., & Pascucci, S. (2009). Indications for drivers of innovation in the food sector. *British Food Journal*, 111(8), 820–838. doi:10.1108/00070700910980946

CCDRN. (2014). NORTE2020 — Estratégia Regional de Especialização Inteligente Comissão de Coordenação e Desenvolvimento Regional do Norte.

Chen, H., Chiang, R., & Storey, V. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly*, 36, 1165–1188. doi:10.2307/41703503

Choi, S. Y., Lee, H., & Yoo, Y. (2010). The Impact of Information Technology and Transactive Memory Systems on Knowledge Sharing, Application, and Team Performance: A Field Study. *MIS Quarterly*, 34(4), 855–870. doi:10.2307/25750708

Choi, T. M., Chan, H. K., & Yue, X. (2017). Recent Development in Big Data Analytics for Business Operations and Risk Management. *IEEE Trans Cybern*, 47(1), 81–92. doi:10.1109/tcyb.2015.2507599

Choo, C. W. (2003). A Organização do conhecimento: como as organizações usam a informação para criar significado, construir conhecimento e tomar decisões. São Paulo: Senac.

Dadura, A. M., & Lee, T. R. (2011). Measuring the innovation ability of Taiwan's food industry using DEA. *Innovation: The European Journal of Social Science Research*, 24(1–2), 151–172. doi:10.1080/13511610.2011.583863

Davenport, T., & Prusak, L. (2003). Conhecimento empresarial: como as organizações gerenciam o seu capital intelectual. (15 ed.). Rio de Janeiro: Elsevier.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building From Cases: Opportunities And Challenges. *Academy of Management Journal*, 50(1), 25–32. doi:10.5465/amj.2007.24160888

ETP 'Food for Life.' (2016). Food for Tomorrow's Consumer. Brussels, Belgium: ETP 'Food for Life.'

FoodDrinkEurope. (2019). Data & Trends of the Eu-

ropean Food and Drink Industry 2019. Retrieved from https://www.fooddrinkeurope.eu/uploads/publications_documents/FoodDrinkEurope_-_Data__Trends_2019.pdf

Forman, C., Goldfarb, A., & Greenstein, S. (2005). How did location affect adoption of the commercial Internet? Global village vs. urban leadership. *Journal of Urban Economics*, 58(3), 389–420. doi:<https://doi.org/10.1016/j.jue.2005.05.004>

Galvão, A. R., Marques, C. S. E., Ferreira, J. J., & Braga, V. (2020). Stakeholders' role in entrepreneurship education and training programmes with impacts on regional development. *Journal of Rural Studies*, 74, 169–179. doi:<https://doi.org/10.1016/j.jrurstud.2020.01.013>

Garcia, C. L. S., & Valentin, M. L. P. (2009). Gestão do conhecimento em universidades: uma proposta de mapeamento conceitual para o departamento de ciência da informação da universidade estadual paulista (unesp). In III SEMINÁRIO EM CIÊNCIA DA INFORMAÇÃO: Tendências para a organização e o compartilhamento da informação. Londrina, Paraná: Universidade Estadual de Londrina, Departamento de Ciência da Informação.

Gellynck, X., & Kühne, B. (2008). Innovation and collaboration in traditional food chain networks. *Journal on Chain and Network Science*, 8, 121–129. doi:10.3920/JCNS2008.x094

Guerrero, L., Guàrdia, M. D., Xicola, J., Verbeke, W., Vanhonacker, F., Zakowska Biemans, S., . . . Hersleth, M. (2009). Consumer driven definition of traditional food products and innovation in traditional foods. A qualitative cross cultural study. *Appetite*, 52(2), 345–354. doi:<https://doi.org/10.1016/j.appet.2008.11.008>

Hamdoun, M., Chiappetta Jabbour, C. J., & Ben Othman, H. (2018). Knowledge transfer and organisational innovation: Impacts of quality and environmental management. *Journal of Cleaner Production*, 193, 759–770. doi:<https://doi.org/10.1016/j.jclepro.2018.05.031>

Hashem, I. A. T., Chang, V., Anuar, N. B., Adewole, K., Yaqoob, I., Gani, A., . . . Chiroma, H. (2016). The role of big data in smart city. *International Journal of In-*

- formation Management, 36(5), 748–758. doi:<https://doi.org/10.1016/j.ijinfomgt.2016.05.002>
- Horizon 2020 Advisory Group. (2016). Horizon 2020 – Societal Challenge 2 “Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research, and the Bioeconomy. Brussels: European Commission.
- Instituto Nacional de Estatística. (2018). Principais indicadores. Retrieved from https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_princindic&menuBOUI=13707095&contexto=pi&selTab=tab0
- Ioanid, A., Deselnicu, D. C., & Militaru, G. (2018). The impact of social networks on SMEs' innovation potential. *Procedia Manufacturing*, 22, 936–941. doi:<https://doi.org/10.1016/j.promfg.2018.03.133>
- Iturrioz, C., Aragón, C., & Narvaiza, L. (2015). How to foster shared innovation within SMEs' networks: Social capital and the role of intermediaries. *European Management Journal*, 33(2), 104–115. doi:<https://doi.org/10.1016/j.emj.2014.09.003>
- Jordana, J. (2000). Traditional foods: challenges facing the European food industry. *Food Research International*, 33(3), 147–152. doi:[https://doi.org/10.1016/S0963-9969\(00\)00028-4](https://doi.org/10.1016/S0963-9969(00)00028-4)
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59–68. doi:<https://doi.org/10.1016/j.bushor.2009.09.003>
- Leite, F. C. L. (2007). Comunicação científica e gestão do conhecimento: enlaces conceituais para a fundamentação da gestão do conhecimento científico no contexto de universidades. *Transinformação*, 19, 139–151. Retrieved from http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-37862007000200005&nrm=iso
- Leite, F. C. L., & Costa, S. M. d. S. (2007). Gestão do conhecimento científico: proposta de um modelo conceitual com base em processos de comunicação científica. *Ciência da Informação*; v. 36, n. 1 (2007). Retrieved from <http://revista.ibict.br/ciinf/article/view/1189>
- Merriam, S. (1998). Qualitative research and case study applications in education. San Francisco: Jossey-Bass.
- Murray, F. (2004). The role of academic inventors in entrepreneurial firms: sharing the laboratory life. *Research Policy*, 33(4), 643–659. doi: <https://doi.org/10.1016/j.respol.2004.01.013>
- Nisar, T., Prabhakar, G., & Strakova, L. (2019). Social media information benefits, knowledge management and smart organisations. *Journal of Business Research*, 94. doi:<https://doi.org/10.1016/j.jbusres.2018.05.005>
- Nonaka, I., & Takeuchi, H. (2008). Gestão do Conhecimento. Porto Alegre: Bookman.
- Ode, E., & Ayavoo, R. (2020). The mediating role of knowledge application in the relationship between knowledge management practices and firm innovation. *Journal of Innovation & Knowledge*, 5(3), 210–218. doi: <https://doi.org/10.1016/j.jik.2019.08.002>
- Pantano, E., Priporas, C. V., Viassone, M., & Migliano, G. (2019). Does the stakeholder engagement result in new drinks? Evidence from family owned SMEs. *Journal of Business Research*. doi:<https://doi.org/10.1016/j.jbusres.2019.04.037>
- Pereira, M., Melo, P., Dalmau, M., & Harger, C. (2009). Transferência de conhecimentos científicos e tecnológicos da universidade para o segmento empresarial. INMR – Innovation & Management Review.
- Polanyi, M. (1966). The Tacit Dimension. London: Routledge and Kegan Paul.
- Scharf, E. R. (2007). Gestão do conhecimento aplicada ao Marketing. Florianópolis: Visual Books.
- Shenton, A. (2004). Strategies for Ensuring Trustworthiness in Qualitative Research Projects. *Education for Information*, 22, 63–75. doi:[10.3233/EFI-2004-22201](https://doi.org/10.3233/EFI-2004-22201)
- Shujahat, M., Ali, B., Nawaz, F., Durst, S., & Kianto, A. (2018). Translating the impact of knowledge management into knowledge based innovation: The neglected and mediating role of knowledge worker satisfaction. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 28(4), 200–212. doi:[10.1002/hfes.12202](https://doi.org/10.1002/hfes.12202)



hfm.20735

Terra, B. (2001). A transferência de tecnologia em universidades empreendedoras: um caminho para a inovação tecnológica. Rio de Janeiro: Qualitymark

Tomaél, M. I., Alcará, A. R., & Di Chiara, I. G. (2005). Das redes sociais à inovação. Ciência da Informação, 34(2), 93–104.

Tuli, F. (2010). The Basis of Distinction Between Qualitative and Quantitative Research in Social Science: Reflection on Ontological, Epistemological and Methodological Perspectives. Ethiopian Journal of Education and Sciences, 6, 97–108. doi:10.4314/ejesc.v6i1.65384

Widén, K., Olander, S., & Atkin, B. (2014). Links between Successful Innovation Diffusion and Stakeholder Engagement. Journal of Management in Engineering, 30. doi:10.1061/(ASCE)ME.1943-5479.0000214

Yin, R. K. (2001). Estudo de Caso: planejamento e métodos. (2 ed.). Porto Alegre: Bookman.