The Potential of Tag-Based Contextualization Mechanisms to Leverage the Sale of Regional Products and Promote the Regions Through Products

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Abstract In small and rural regions, where we can many times find top quality products, there is, many times, a greater difficulty in promoting their products. This difficulty begins in the nature of the companies that manufacture these products. These companies are typically family-owned or small-sized, not having large capacity to carry out very elaborate marketing strategies. They often depend of the tourist attractiveness of the regions themselves to leverage their sales. This paper discuss the challenges for the promotion of regional products and rural regions, review the role of smartphones and the main tag-based contextualization mechanisms and their potential for leverage the sale of rural regional products and, finally, presents a cooperation-based conceptual model, where are combined contextualization-tags and mobile devices to promote regional products, leverage sales and promote rural regions by attracting new visitants, making regional products a window-mechanism to the promotion of rural regions heritage and tourism-related services.

Keywords Rural regions · Rural products · Model · Tag-based contextualization · Promotion

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1   Introduction

Local Products, Quality and Typicity (LPQTP) of Trás-os Montes have a set of much more real features that confer authenticity. Often, referred to as typical, regional, artisan, among others, can be more respected, bringing together producers, consumers and regions. Given their distinctive characteristics, they can respond to the dynamics and challenges of promoting the territory, ensuring the achievement of new quality standards in the creation of a brand that is recognized by the demand.

The LPQTP, are easily identified by their geographical origin and can be in the context of economic and social restructuring one of the most fruitful potential development alternatives in rural areas (Ribeiro and Martins 1996).

Currently, associated with tradition, innovation and creativity, they have been positive developments as a result of use of ingredients (natural and artificial) of varied and complex chemical composition, for preserving, blush, gasify, among many others, increasing the terms of shelf life (Treager et al. 2007) in compliance with EU regulations and certifications.

In Portugal, the Protected Designation of Origin (DPO), Protected Geographical Indication (PGI) and Guaranteed Traditional Specialty (GTS) protect the products, methods of production, assuring the consumer that the product has a different flavour and aroma and that was obtained or processed in a traditional way. They are a regional endogenous potential that attribute value to the territory, translating all the distinguishing characteristics of a place, a space and a region that generates and multiplies feelings of belonging and collective identity (Ribeiro and Martins 1996). When a consumer chooses a certified product, he or she understands that that product is different from a noncertified product because it is guaranteed to be socially more equitable, to cause less environmental impact, and is generally healthier. They have a specific positioning and distribution channel in specialty stores (national/international), meeting the new demands, needs and expectations of consumers (Bernart 1996). They are strategic assets of reputed value for the territories, but when they are acquired do not reflect and/or make available information on the characteristics of the territories as tourist destinations. This is, nevertheless, a differentiating product, the consumer, when he acquires them, does not know the local idiosyncrasies associated with the product as well as the local gastronomy, the landscape, human and monumental heritage of the region, churches, convents and monasteries, houses and palaces, squares and archaeological sites, historical centers, regional literature and music, among other patrimony of their territories of belonging. However, because of their authenticity, they can work more and better the territory component, ambassadors and facilitators of the communicational process as a promotional tool that can create attraction, influence in perception and induction, promoting a consumer persuasion effect on potential tourists, seeking to convert them into effective tourists. This effect, perhaps, to build a joint and holistic strategy to promote the rural environment and awaken in producers, technicians, politicians, legislators, researchers, entrepreneurs, among others, who wish to fight against desertification and depopulation of rural areas, thus combating asymmetries.

The rural tourism industry is characterized by small firms where a lack of trust and cooperation predominates (Correia 2006). These constraints have created problems in the rural tourism sector, reflecting the need for technical assistance to destinations and rural organizations to develop management strategies. Also, the shift from a basic rural economy to a new economic specialization involves experimentation, learning processes, new capabilities, new policies, adjustment and reconfigurations (Debashis and Amitava 2003). In the context of rural tourism is essential to create cooperation networks that favouring competitiveness and the complementarity of companies (Gao et al. 2007), allowing economic agents offer a wider range of products and services to its customers (Hall and Mitchell 2002). This reality shows, in our opinion, that any conceptual model to leverage sales and/or promotion system must be based on a cooperative approach and not by isolated individual organizations. Considering the context of tourism in rural regions, and especially in disadvantaged regions, where small economic operators are dominant, it is essential to create conditions and promote ways to increase their competitiveness. As such, any proposed models to leverage sales and promote regions, must support/create synergies among the small agents and promote cooperative arrangements, and consequently, increasing the capacity of installed response.

In this work we have used the Action Research method, one of the four that form the Applied Research methodology (action research, case-study research, ethnography and grounded theory), (Rapoport 1970), which is mainly focused on four stages: plan, action, observation, reflection and revision (Kemmis and Taggart 1988).

2 Mobile Devices and Tag-Based Contextualization Mechanisms

Mobile-devices, mainly smartphones, combined with their ability to access the Internet in an unexpansive way, are embedded in daily routines and represent the most common and widely used technology today. As such, educational level is not a serious barrier to their use. Studies have shown that in Portugal, at the end of 2017, the penetration of the mobile service amounted to 170.5 per 100 inhabitants. The penetration rate of mobile stations with effective use was 127.4 per 100 inhabitants. According to the Marktest Telecommunications Barometer data, 95.5% of Portuguese residents in the quarter were Mobile Telephone Service customers (ANACOM 2017). As a rule, "everyone carries at least one mobile-device". This wide availability makes them an ideal tool for interacting with information technology and on-demand services. This idea is reinforced by the current evolution trends in mobile-devices, which suggests an enormous potential that can be tapped to support enterprise information and services platforms, specially m-commerce, as discussed in (Mahatanankoon et al. 2005; Ngai and Gunasekaran 2007; Cunha et al. 2010) making them the key technology to access data services and support ubiquitous frameworks.

Tags, as a machine-readable representation of data (Gao et al. 2007), have been largely used to represent data and to link objects to digital information. There are several tag-based ID technologies, such as barcodes and radio-frequency identification (RFID) tags. The combination of 2D visual tags with an easy-to-use on-the-fly decoding system yields an effective, powerful and innovative way of providing real time contextualized information and on-demand services.

Found almost everywhere, 1D barcodes or simply barcodes are a tag-based ID technology that have the capability to store and represent data through parallel lines of different width. They are massively used in retail commerce, linking products to databases, making automatic management and accounting systems possible. Two-dimensional or 2D barcodes represent another step in the tag systems technological evolution. They have emerged as the natural way to encode large quantities of alphanumeric data and to link objects to web-based information and services, through the encoding of an URL (Parikh and Lazowska 2006; Rekimoto and Ayatsuka 2000; Toye et al. 2005). RFID tags are transponders that can be placed in one package or product, among others. It contains silicon chips and antennas that allows it to respond to radio signals sent by a transmitter base. Table 1 shows a comparison between different types of tag-based ID technologies.

The current trends in the evolution of smartphones have made built-in cameras a standard component and NFC support present in many models; as a result, almost all smartphones are portable decoding devices, transforming a low-cost widespread consumer electronics device into a visual or non visual inspection system.

Tags can be easily and inexpensively embedded in real-world objects and their decoding systems are based on image recognition algorithms. Because of their ability to handle more data per tag area, visual tags are replacing the well-known EAN13 barcodes. Putting together barcodes with information storage capabilities and smartphones as decoding systems represent a natural approach as a reliable mechanism to quickly look up information or initiate an object-specific action. In fact, visual 2D visual tags, NFC tags and mobile-devices are already used in several activities.

Tags can also provide an attractive and transparent way to enable user access to product-oriented contextualized information and services, as stated in (Gao et al. 2007), which allows the creation of innovative interface between companies and

Table 1 Comparison between common tag-based identification technologies (Cunha et al. 2010)

	Barcodes	2D Visual tags	RF tags
Strengths	Printable; Low-cost; Suitable for visual decoding	Printable; High data store capability; Low-cost; Suitable for visual decoding	Automatic non-visual reading: Can be decoded while inside objects
Weaknesses	Low data store capability; Decoding in dirty environments	Decoding in dirty environments	Not Printable; Cost; Reading problems; RFID portable decoder

customers: new Client Relationship Management (CRM) and Business-to-Consumer (B2C) tools allowing a rich multimedia experience by using smartphones and contextualization mechanisms, which allow for example, the use of augmented reality contents, sound and image in well defined geographic spots, thus significantly improving the understating of a given context or situation benefiting the B2C interactions.

The bridge between a site-specific action and the information system that provides the on-demand services is accomplished by the contextualization element, placed in the targeted objects. This translate the fusion-vision of physical and digital world.

3   Making Regional Products a Point of Entry for Rural Regions: Challenges and Opportunities

Smartphones are becoming a primary platform for information access and a primary application area for mobile applications is tourism. Understanding and exploring the capabilities of mobile channel is of great importance (Pesonen and Horster 2012). Also Wang et al. (2011) state that smartphones have a huge potential to influence in a significantly way the touristic experience. Mobile media are compelling channels for digital marketers and advertisers due to their potential to support one-to-one, one-to-many and mass communication both cheaply and effectively (Watson et al. 2013). In a complementary way, the use of contextualisation elements is already part of many products, however, presenting results that often fall far short of expectations. Lindsey et al. (2014) discusses the role of QR codes and wine apps in consumer wine purchases, stating that we must increase the utility of the QR code by providing deals, in the form of value, to the QR code users. In a study conducted by Yeong and Woo (2016), is discussed that the use of contextualization elements in gastronomic products can help marketers to develop effective strategies, as the results suggest that it is important to emphasize food information for consumers. The study findings demonstrate that consumer considers QR code for food traceability system to provide detailed information about foods and much information that helps them in their buying-decision.

Contextualization tag-based mechanisms have also strong implications for marketing in general, and especially in service marketing. From a marketing perspective tags, such as QR codes, can be used to promote brands and attract customers in new ways and be used in advertising and promotion in general (Mostafa 2015; Walsh 2009). There are also, in the field of heritage promotion, several untapped opportunities to regions. According Rujijan and Ralangarm (2015), tourists have use the ability of smart devices to scan contextualization tags that subsequently processed and rendered various information, including pictures, history and several details about historical places.

In our opinion, there is an untapped potential for combining mobile devices and contextualization mechanism for leverage regional products sales and, through them, promote and "sale" rural regions heritage and touristic services. This potential must be explored by a cooperative a cross selling approach.

4   Proposed Conceptual Model

In a context in which the strategic alliances, consolidated in interorganizational cooperation networks, affirm themselves as strategic, we propose, as presented in Fig. 1, the development of a Cooperative Marketplace System in order to promote and leverage the sale of products and/or services in rural spaces.

The system should allow the various cooperating agents (manufacturers, tourism operators, local government entities) to have access to a platform in which they share information about products, services, regional events, among others.

On the other hand, customers will have access to the information of a product from reading the identifier of that product. Therefore, the platform based, for example, on customer location and user behavior may provide access to other products, services and/or related events, promoting cross-selling practices and facilitating relationship management with customers in a cooperative manner.

The proposed model paradigm starts in the ability of put contextualization mechanisms in regional products (e.g. olive oil bottles, regional sausages, etc.). This possibility doesn't represent difficulties (e.g. almost all products already, have at least, 1D barcodes), and in many cases aren't expensive.
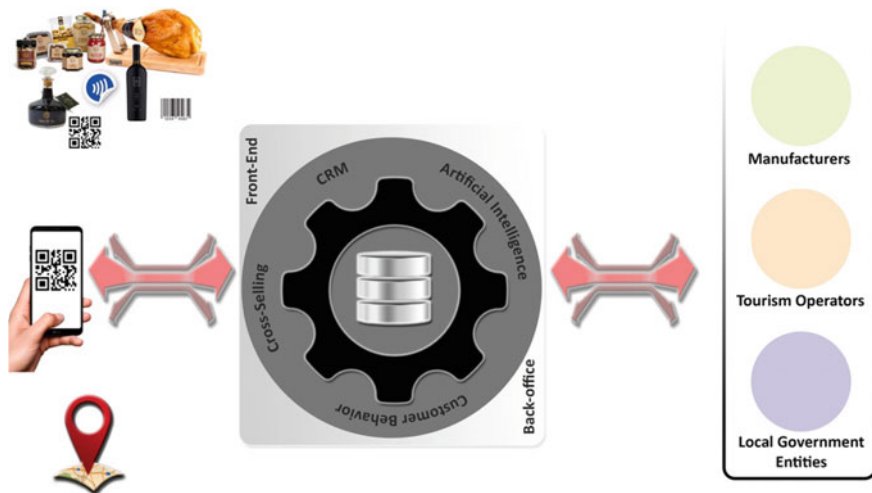

Fig. 1 Conceptual model: cooperative marketplace system

   With today smartphones, that have the ability of decode the major contextualization tags, and that also have Global Positioning System (GPS), we can understand the product and the location interaction that clients are experience. With these two elements we can redirect "the client", through, native decoding applications or service-providers developed mobile applications (this scenario enable much more potentialities), to our cooperative marketplace. This proposed marketplace, intend to materialize a cooperative network combining local governmental entities, tourism operators, regional products manufacturers, among other. With this cooperative approach we can centralize the promotion of regional products, heritage and services related to tourism. This makes products a window to regions.

   Such platform could represent and integrated approach capable to generate knowledge about the clients' expectations and one unique opportunity to an innovative CRM strategy. In rural regions, characterized by small players and several lacks related to financial and technological capabilities, we think that making products the window to promote regions and leverage the sales of regional products and services is the right path to take.

5   Conclusion and Final Remarks

This paper has discussed the role of regional products and considerate the context of tourism in rural regions, and especially in disadvantaged regions, where small economic operators are dominant, being essential to create conditions and promote ways to increase their competitiveness. As such, the model that we have presented intends to create synergies between the small agents and to promote cooperative arrangements, and consequently, increasing the capacity of installed response. In order to achieve this goal, we believe that it must be through the products that we can operationalize the leverage of the products themselves and the regions where they are inserted. Regions are fixed objects, yet their products travel the world. This R&D work will, in is next stage, develop a prototype platform to materialize the proposed model.

References

ANACOM. (2017). Relatório do Serviço Telefónico Móvel 3º Trimestre de 2017, Autoridade Nacional de Comunicações, Portugal, Relatório Técnico de 3º Semestre.

Bernart, E. (1996). Los nuevos consumidores o las nuevas relaciones entre campo y ciudad através de los produtos de la tierra. *Agricultura y Sociedad, no, 80–81,* 83–116.

Correia R. (2006). Wine, tourism and collective action. In *Proceedings of Academy of the 2nd World Business, Marketing & Management Development Conference*, (pp. 60–68). Paris, France.

Cunha, C. R., Peres, E., Morais, R., Bessa, M, & Reis, M. C. (2010). Contextualized Ubiquity: A new opportunity for rendering business information and services (extended version). *Journal of Theoretical and Applied Electronic Commerce Research*, 5(3), 55–64. ISSN 0718–1876, Universidad de Talca—Chile.

Debashis, S., & Amitava, M. (2003). Pervasive computing: a paradigm for the 21st century. *Computer, 36*(3), 25–31.

Gao, J. Z., Prakash L., & Jagatesan R. (2007). Understanding 2D-barcode technology and applications in mcommerce—design and implementation of a 2D barcode processing solution, In *Proceedings of 31st Annual International on Computer Software and Applications Conference* (pp. 49–56). Beijing, China.

Hall C. M. & Mitchell R. (2001). Wine tourism in the Mediterranean: A tool for restructuring and development, *Thunderbird International Business Review*, Wiley, *42*(4), 445–465.

Kemmis S., & Taggart, R. M.(1988). *The Action Research Reader*, Victoria: Deakin University Press.

Lindsey, H. M., Wolf M. M., & Wolf M. J. (2014). Technological change in the wine market? The role of QR codes and wine apps in consumer wine purchases, *Wine Economics and Policy, 3* (1), 19–27, ISSN 2212-9774.

Mahatanankoon, P., Wen, H. J., & Lim, B. (2005). Consumer-based m-commerce: exploring consumer perception of mobile applications. *Computer Standards & Interfaces, 27*(4), 347–357.

Mostafa, A. (2015). The effectiveness of product codes in marketing, In *Procedia—Social and Behavioral Sciences*, (vol. 175, pp. 12–15). ISSN 1877-0428.

Ngai, E. W. T., & Gunasekaran, A. (2007). A review for mobile commerce research and applications. *Decision Support Systems, 43*(1), 3–15.

Parikh, T. S. & Lazowska, E. D. (2006). Designing an architecture for delivering mobile information services to therural developing world, (pp. 791–800). ACM, 2006, Edinburgh, Scotland.

Pesonen, J. & Horster, E. (2012) Near field communication technology in tourism, *Tourism Management Perspectives*, (vol. 4, pp. 11–18). ISSN 2211-9736.

Rapoport, R. N. (1970). The three dilemmas in action research, *Human Relations*, (pp. 499–513).

Rekimoto, J. & Ayatsuka, Y. (2000). Cybercode: Designing augmented reality environments with visual tags, In *Proceedings of DARE 2000 on Designing augmented reality*, (pp. 1–10). Denmark: Elsinore.

Ribeiro, M. & Martins, C. (1996). La certificación como estrátegia de valorización de produtos agroalimentarios tradicionales: la alheira, um embutido tradicional de Trás-os-Montes. In *Agricultura y Sociedad*, 80–81, pp.313–334.

Rujijan, V. & Ralangarm, S. (2015). Temple information retrieval system using quick response code via mobile application, In *Procedia—Social and Behavioral Sciences*, (vol. 197, pp. 998–1005). ISSN 1877-0428.

Toye, E., Sharp, R., Madhavapeddy, A., & Scott, D. (2005). Using smart phones to access site-specific services. *IEEE Pervasive Computing, 4*(2), 60–66.

Treager, A., et al. (2007). Regional foods and rural development: The role of product qualification. *Journal of Rural Studies, 23*(1), 12–22.

Wang, D., Park, S., & Fesenmaier, D. (2011). The role of smartphones in mediating the touristic experience. *Journal of Travel Research, 51*(4), 371–387.

Watson C., McCarthy J., Rowley J. (2013). Consumer attitudes towards mobile marketing in the smart phone era, *International Journal of Information Management*, *33*(5), 840–849, ISSN 0268-4012.

Walsh, A. (2009). Quick response codes and libraries. *Library Hi Tech News, 26*(5/6), 7–9.

Yeong G. K. & Woo E. (2016). Consumer acceptance of a quick response (QR) code for the food traceability system: Application of an extended technology acceptance model (TAM), *Food Research International*, (vol. 85, pp. 266–272). ISSN 0963-9969.