BIG DATA DRIVEN SMART MARKETING:

A pilot project for the City of Madrid

Introduction and objectives

According to the Annual Report on European Small to Medium sized Enterprises (SMEs) 2018/2019 by the European Commission, in 2018, "there were slightly more than 25 million SMEs in the EU-28, of which 93% were micro-SMEs. SMEs accounted for 99.8% of all enterprises in the EU-28 (…), generating (…) 66.6% of employment in the (…)."
Taking a closer look at Spain and according to the Spanish Institute of National Statistics (INE), the Spanish business structure consists to 97.23% of SMEs, including family businesses. SMEs can be considered not only the economic backbone, but the economic engine of the European economy. In the year 2019, Spanish SMEs generated 71.9% of the overall national employment with more than eight million employed.
The country is divided into 17 regions called autonomous communities with each community being divided into different provinces. Communities have limited autonomy. The community of Madrid is one of the most populous counting around 6,5 million citizens. Within this community, the City Council of Madrid is promoting SME digitalization and offers subsidies to facilitate the digital transformation of SMEs. The researchers joined a Big Data cluster to explore opportunities, challenges, and initiatives linked to digitalization as a pioneer concept for Smart City solutions.

With this in mind, Madrid City Council has invited practitioners, companies and Universities to join forces with the aim of providing the best services for citizens and SMEs. By generating and using Big Data from consumers, suppliers, SMEs and public service administrations, cutting-edge technology such as Artificial Intelligence (AI), coupled with 5G, the Internet of Things (IoT) and Blockchain initiatives, will enable innovation that will accelerate the reactivation of Madrid´s local economy. It will furthermore serve as a reference model to be replicated in other cities to boost the economic landscape.

This paper describes different steps in this unique initiative. It analyses the processes and dynamics of constructing a Big Data Cluster as a driver of strategic initiatives based on a collaborative model for SMEs, City Council, practitioners and Higher Education Institutions, in specific Universities. The construction of an intelligent and collaborative platform will allow SMEs to become companies managed from data, ensuring the quality, traceability and availability throughout the operational process. The presented research aims to connect different disciplines and by integrating different areas into one single platform. Gawer and Cusumano define a platform "as a set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products" (Gawer and Cusumano 2014). Thus, the gathered insights and extracted information will be more meaningful. The approach is based on four initiatives: the construction of an intelligent and collaborative platform, the introduction of a strategic scorecard, the initial focus on the municipal markets, and, finally, the dynamization of the local SMEs.

The city of Madrid has 46 municipal markets that promote employment and offer territorial balance between the districts. During the last decade, the municipal markets have experienced a profound renewal and transformation of the network of markets changing the scenarios and

converting these markets to a commercial format, adapted to the actual consumption trend. However, digitalization can lead to a new understanding in the value chain (Parviainen et al. 2017) and Big Data is still to be fully exploited. As Kergroach (2020) states, digitalization brings undeniable benefits to SMEs contributing to the identity and cohesion of local communities.

The cluster will initiate the revitalization of the markets and SMEs. First, a diagnosis of the level of digitalization of SMEs operating in the municipal markets takes place. Then, large data sets provided by suppliers, the markets themselves and the Internet of things will compile Big Data enabling the construction of a platform to prioritize solutions and resources, dynamize the market, better serve the consumer and engage a Smart City.

The aim is to gather data through a quantitative and qualitative research approach that will allow investigating the level of digitalization. Furthermore, Big Data is nowadays the most valuable source of information and the basis for strategic decision-making. As an analysis report from McKinsey Global Institute indicates, thanks to insight gathered from Big Data, companies, and this includes SMEs, are able to make more efficient demand forecasts and respond more effectively to municipal market concerns ((Manyika et al., 2011).

All this aligns with the objective of Smart Cities, to use technology and innovation of this digital era and connect everybody with everything: citizens with businesses with city administrations, transportation infrastructure, utility management, etc. and to develop overall new economic opportunities, which will allow the increase of the city's overall competitiveness and wealth.

Research question

A digitalization approach of SMEs is key for a City to transform into a Smart City. It is essential to assess in which stage of digitalization the businesses are in. The sheer volume of data, the velocity, the quality and the veracity of this data are enormous. Data originates from many different sources in a staggering variety of formats, which makes it hard to integrate (The Economist, 2020).

The fundamental question is to examine the status-quo of the level of digitalization of the SME (Bogner et al 2016). Defining the relevant issues impeding businesses from obtaining real time Big Data and knowing what tools to use, need to be at the centre of the research. This is closely linked to identifying the needs of SMEs in questions of digitalization and required resources.

What are the challenges for the SMEs? What Big Data is necessary? What are the needs for becoming a role model Smart City? What are the variety of tools, techniques, and methods needed to implement Big Data solutions?

With these questions at hand, a road map will enable SMEs to manage Big Data and this will lead to a collaborative model. Building an intelligent platform will allow information to be segmented. Real time data will permit to allocate resources and generate employment, enable economic dynamization by boosting revenues and profits and pushing innovation.

Conceptual framework

Reviewing existing literature (mostly from professional articles), many authors have described Smart Cities and have investigated potential ideas. However, there seem to be no academic studies that to date have examined the reactivation of the economy using Big Data and Smart

Marketing initiatives for the innovation of SMEs, with specific focus on Municipal Markets. The authors of this paper aim to fill this gap and share their perspective, which will help boost growth and initiate a new way of commercialization.

Back in May 2017, The Economist hailed data as "The world's most valuable resource" on their cover page (The Economist, 2017). The Santa Fe Institute claims Big Data "will be part of a more democratized platform" (the Economist, 2020). Brian Arthur form this Institute mentions that most of the Big Data is in the hands of a few companies such as Amazon, Apple, Microsoft and Facebook among others.
As pointed out by Sen et al, 2016, SMEs' adoption to changes entail a larger macro-economic effect due to their weight in the overall economy, which holds especially true for Spain, where SMEs make up the vast majority of the business landscape (as mentioned in the introduction). The authors also highlight the advantages of SMEs in the area of Big Data, since they can potentially be faster and more flexible adapting to changes in this context, albeit issues regarding the ability of financing the technological change, the limitations of processing information, handling security and privacy amongst other difficulties.

However, as Löfgren K, Webster (2020) indicate adequately, there are a number of issues that need to be addressed regarding the ownership and privacy of data. Mixing public and private data may lead to confusion regarding ownership. But not only this, other issues such as the reliability and quality of data should be addressed in order to be able to provide Big Data that adds value for SME decision making, but also for the Smart City Environment.

Method

In order to work fact based and understand the challenges that SMEs in Madrid are facing in the area of digitalization, it was important to perform a diagnosis to reflect the current situation. Therefore, in a first phase and as preparation for the actual study, desk research was performed to prioritize the sector on which to focus.

After careful revision, the decision was taken to first focus on the Municipal Market of Madrid, with the possibility to expand to the hotel and restauration sector. Data provided by the Municipal Market was used to gain a more in-depth knowledge of the readily available (big) data.

A questionnaire was then designed to conduct an exploratory survey and to gain deeper knowledge and insights of the actual digital situation. The survey will be distributed online to the businesses from the Municipal Markets (approximately 552 entrepreneurs will receive the survey during September 2020). In-depth interviews and two focus groups will complement the diagnosis research to complete the insights. The results from this second phase should be available in November.

In the following phase, the data and digital data that was previously gathered from the participating businesses through the questionnaires, in- depth interviews and focus groups, in combination with data that is readily available from different sources (such as client interactions, transactions, social media marketing, reviews, e-commerce information, but also sensors in the premises, etc.) will be transformed into useful information on which SMEs can base marketing or strategic decisions. The City of Madrid will be developing a data-sharing platform on which the data and especially the data analysis capabilities will be available to the participating businesses. Based on real time data, SMEs will be able to make smarter and faster

decisions that will ultimately turn into business opportunities and value. There is furthermore a proposal of adding more sensors to the market premises, which would allow for more accurate and more updated data. This last phase is still in a conceptual stage and will be defined once the previous phase has provided the quality data that is needed to define the platform.

Cross-referencing data, using openly available data such as demographic data, census data or economic data available through the interface with the local administration will allow for more accurate planning and forecasting. Blending all the above mentioned with data that is available from social media platforms on which SMEs may operate, such as Facebook, Twitter or Instagram as examples, can also be useful to review existing marketing strategies and launch meaningful marketing campaigns.

In addition to this, the City Council will also be providing further training. This will include workshops and seminars that will allow SMEs to digitally educate employees and executives in terms of data collection, data management, data storage and data analysis. This will also help businesses understand and identify opportunities, by analysing not only the own business data but also the general data that is available through the platform. Overall, SMEs will obtain the knowhow to analyse customer purchasing patterns using the available data, allowing for demand forecasts or identifying potential market opportunities for new or existing products, based on data analytics.

Benefits for the stakeholders

The process and results of this initiative benefit all the stakeholders, including consumers. Digitalization offers an excellent opportunity for state-of-the-art technology to be implemented. The adoption of new work methodologies based on the knowledge and expertise of the business, and supported by the advantages offered by technology, allows to innovate and improve the efficiency of processes and operations.

For the City Council, some of the many benefits are to gain insights, connecting SMEs and the local administration, alongside providing the appropriate resources for SMEs and generate long-term employment. Gaining insight through Big Data will provide real time information on current topics, which will contribute to the development of Smart Cities. It will furthermore lead to improved decision making in terms of policy initiatives. After all, a thriving economy allows a City to become prosperous, companies that do well pay more taxes, which in turn benefits the general public.

SMEs also highly benefit from this initiative through the creation of synergies between SMEs, SMEs and associations and SMEs and the Public administration. Gathering knowledge of the market and accessing new opportunities will be possible thanks to digitalization. Gaining more direct access to support programs, financing, expert advice, and finally improving management and marketing through the use of Big Data. SMEs have the opportunity to reap the benefits from gathering, extracting and analysing Big Data.

Finally, the benefits for the citizens are the possibility of accessing more local and quality offerings, also and especially through digital channels. Receiving a more personalized service will allow customers to gain the trust of the SMEs. But not only personalization achieves a higher trust level, the City Council as driver of this initiative inspires confidence and guarantees viability and functionality of the platform, its safety, especially in the area of data security and

protection for all stakeholders. Interactions among all key players will enable better decision making and stimulate innovations delivering social and economic value.

Finally, adopting the proposed innovative initiative implies that Smart Cities will be in line with two of the seventeen Sustainable Development Goals (SDGs) that the United Nations adopted in 2015 for the 2030 agenda. These being the 11th goal: Sustainable cities and communities and the 12th goal: Responsible consumption and production.

Conclusions and managerial implications

This study will provide novel support for a cooperation among different stakeholders based on a Smart Cities approach. By providing equal access to Big Data for municipal SMEs, the level of digitalization amongst SMEs within the Smart City increases. It will contribute to the knowledge of SME digitalization and the resources needed.

The pilot proposed for the City of Madrid is based on establishing a connection between Big Data gathered from a variety of sources, Artificial Intelligence, Blockchain and Marketing. It allows to further develop and foster the objective of Madrid becoming a truly Smart City.

Some barriers that prohibit SMEs from increasing their level of digitalization are the lack of access to financial resources for SMEs, the lack of digital skills within the SME, the bureaucratic environment, including legal limitations and regulations or the need to provide cybersecurity are just some that have been identified. The project presented in this paper addresses these barriers and provides a possible solution that will not only allow SMEs to gain competitive advantage in a digital environment, but it will also allow to reactivate the local economy.

A second novel finding of this study is that Big Data allows to obtain real time insights and creates value to all the above-mentioned stakeholders. SMEs will benefit and will spread their product and services offer and innovate or modify them. It will help them to reach a wider customer base (Assante et al., 2016). We should not forget that SME´s management teams need to get support and training to obtain the necessary digitalization skills (Sousa & Rocha, 2019).

Knowing the reality of SMEs in Spain, in specific Madrid, it is fundamental to exploit the potential these businesses contain. Nonetheless, it is a difficult task based on the heterogeneity of the business landscape. For now, the findings of this study will be limited to the Municipal Markets, and in a next stage to the Hotel- and Restauration Sector. The platform has the potential to be up scaled to include more businesses and sectors.

Overall, we can conclude that SMEs are the basic pillar of growth of the Spanish economy, both from a quantitative as well as qualitative point of view. There are many challenges to be faced. Aiming for improved productivity, gaining competitiveness through better levels of digitalization, the meaningful use of Big Data for improved decision-making will lead to better economic results and ultimately growth. And, as the Secretary-General of the Organization for Economic Co-Operation and Development (OECD), Angel Gurría, claimed in November 2019, “There will be no sustainable digital transformation without our SMEs” (OECD, 2019a).