# FINAL PUBLISHABLE SUMMARY REPORT

# Results

This Marie Curie project entitled “*Digital Data Generation and Streaming in the Big Data area: Exploiting the New Value Creation Opportunities in the 2020 Digital Enterprise*” had the aim of investigating the business value of Big Data for firms. This is a research topic on the rise since Big Data have become an increasingly important component for firms across advanced economies. Overall, this project enriched the Information Systems (IS) and strategic literature. According to the project objectives, it came up with five main results. First, based on primary and secondary research, the project developed two taxonomies related to the Big Data capabilities and Big Data impacts. Second, a survey was used to collect the data and investigate the benefits, costs and risks of Big Data solutions among 200 French medium and large companies, by surveying Information Technology (IT) managers. The analysis revealed that the first three strategic benefits that companies with Big Data technologies recognize from them are the development of better products or services, an enhancement of employees productivity and an alignment between IT and business strategy. The first three operational benefits are the improvement of data management, improvement in data accuracy and an improvement of the useable data formats. Finally, the first three tactical benefits are the improvement of the skill level for employees, of organizational structure and processes, and of expanding the organizational capabilities of the company. Concerning the costs, they are related to security issues, as the networking security, to the overheads and to engineers that have to install the technological solutions, whereas the risks are related to the security and privacy issues, and to the lack of an IS infrastructure support.

Third, the conceptualization, operationalization and measurement of the DDSs (Digital Data Streams) readiness index of companies, which identifies the dimension to take into account when the readiness of companies in choosing Big Data, and in this specific case DDSs, is evaluated. Specifically, DDSs refer to a specific aspect of Big Data relating to the continuous flows of digitally encoded data, available in real time. The DDS readiness index, composed by four dimensions (mindset, skillset, toolset and dataset), is a multiple-item scale that, by integrating the structural and the psychological views, enables companies to gain an in-depth understanding of their readiness to exploit DDS opportunities.

Fourth, based on the resource-based view and on the dynamic capability literature, the studies conducted during the project added knowledge to the Information Systems and strategic literature. Results demonstrated that the development of capabilities based on the exploitation of Big Data play a key role in enhancing the business value of a company, and that environmental and organizational features moderate this relationship.For a deeper understanding please read: Raguseo, E., and Vitari, C. (2016) Digital data, dynamic capability and financial performance: an empirical investigation in the era of Big Data. Systèmes d’Information et Management, ISSN: 1260-4984 (In press).

Fifth, based on the evidence that the Internet and Big Data are revolutionizing and introducing changes in many value chains the present project investigated this topic by focusing on one of the industries more involved in the digital transformation of its business, the hospitality industry, since new actors (online intermediaries) play new roles in this industry by making relevant changes. A particular focus was made on the role played by online infomediaries, as travel-related content websites, where online reviews of customers are made available, and Online Travel Agencies (OTAs), where customers can buy online rooms and propose new intermediation models between hotels and travellers, on the value creation and value appropriation mechanisms of hotels. They are recognized as two distinct processes by the strategic management literature which emphasizes the important distinction between the two. Specifically, “value creation” refers to the amount of value that is realized by a target user or buyer. However, firms that create new value may lose or in some cases have to share the value created with other stakeholders as competitors or customers. Based on this consideration, the strategic management literature has introduced also the concept of “value appropriation” that refers to “who can gets what” being related to the ability to get part of the value created in form of profit, highlighting the realization of exchange value by economic actors. The study used panel data from 2004 to 2014 on a sample of 240 Italian hotels and 212 French hotels, including financial data of hotels, data on user-generated reviews of TripAdvisor, and data on their presence on OTAs. Results show that both intermediaries play a key role in the change of the way hotels create and appropriate value from being present online and therefore from their online visibility. Fixed effects regression models show that online visibility on TripAdvisor has a positive effect on hotel revenue growth that is outweighed by a negative effect on gross profit margins for Italian hotels, while positive for French hotels probably because they have more appropriate capabilities for exploiting the advantages of being on TripAdvisor. Results also show that the effect on the net profitability is positive. However, hotels with higher star rating, localized outside popular destinations and that do not belong to a hotel chain were found to get more benefits from online visibility on their profitability. Furthermore, results demonstrated that the variables which count more on revenue creation are the multiplicity of OTAs over which hotels are listed and the valence (i.e., the score) of user-generated reviews on TripAdvisor, namely a variable that has a central role in determining their market reputation. However, we found that when it comes to the impact of online visibility on profitability, the multiplicity of OTAs over which hotels are listed counts more than the valence of reviews. This means that hotels that are able to generate and appropriate more economic value through their online visibility are those able to achieve a positioning in the value chain with strong bargaining powers toward distributors, due to a superior ability in defining an appropriate value proposition for specific customer segments. Probably the higher bargaining power towards distributors may also mitigate the risk related to their market reputation over TripAdvisor. For a deeper understanding please read the two following publications: Neirotti, P., Raguseo, E. and Paolucci, E. (2016) Are customers’ reviews creating value in the hospitality industry? Exploring the moderating effects of market positioning, International Journal of Information Management, 36(6), pp. 1133-1143, DOI: 10.1016/j.ijinfomgt.2016.02.010; Raguseo, E., and Vitari, C. (2016) The Effect of Brand on the Impact of e-WOM on Hotels’ Financial Performance. International Journal of Electronic Commerce, 21(2).

# Conclusions

Based on the growing availability of Big Data and demand for Big Data technologies, this Marie Curie project enabled to investigate the potentialities of Big Data at firm and at industry level, and the related business value for companies. Despite the expected impacts of Big Data and their organizational outcomes, there has been only limited research focusing on investigating the adoption and usage of Big Data in firms and in the value chains. At the firm level, the project enabled to figure out the conditions under which companies are able to exploit Big Data, that acquiring complementary skills is not the only difficulty to successful Big Data usage, but that effective Big Data use may require changes to existing mindset, dataset and toolset. Companies, that invest in the development of capabilities based on the exploitation of Big Data, experience business value by achieving better financial performance. However, there are contextual factors that may moderate this impact. At the industry level, the project explored some Big Data related trends characterizing the on-going transformation of the hospitality industry, focusing the attention on the generation and allocation of economic value to hotels created by new actors active, as distribution channels and as providers of online review content. Specifically, results allow to understand how value can be created by new distributors that have progressively supplanted the role of traditional bricks-and-mortar travel agencies and by Internet-based players that act as quality guarantor and support hotel’s formation of their market reputation (i.e., meta-search web sites such as TripAdvisor). Overall, this project theoretically contributes to the large debate on whether and how technology-based initiatives sustain competitive advantage. Indeed, among the possible technologies that can sustain a competitive advantage, the advent of Big Data opened up substantial debate around technologies used for generating, processing, and streaming Big Data.

# Socio-economic impact of the project

## Policy makers implications

In terms of policy making implications, the government should help companies in maximizing the benefits from Big Data by guaranteeing that the workforce can support the growing demand for data scientists and related professionals able to handle the Big Data technologies. This is important for both the large, who have already started in investigating in Big Data solutions, and small companies. Especially the small companies may learn to leverage on Big Data solutions for gaining a competitive advantage and reaping the same value of the larger companies. Other initiatives should be taken in order to improve technologies that support privacy and security, aspects that companies perceives as risky related to Big Data, as incentivizing research on privacy and security for developing techniques of data analysis and mining. Furthermore, since the sectors that belong to the same value chain, but also sectors that traditionally belonged to different value chain, today start to collaborate (for example the assurance sector and companies that sell device for the health monitoring), policy makers should encourage polices that incentivize the flow of data between different stakeholders and different steps of the value chain.

## Managerial implications

This project provides several advices for managers that are going to choose or that have already chosen to invest in Big Data solutions. The developed DDS readiness index is a useful instrument for understanding whether organizations are ready to exploit DDSs. The DDS readiness index can potentially be applied in all types of organizations that enable benchmarking practices at the industry level. Specifically, the DDS readiness index can guide managers in exploiting DDS potential. It allows the identification of where corrective actions could be taken. Moreover, the DDS readiness index suggests that managers should properly consider the complementary resources needed for Big Data exploitation. The availability of the appropriate IT tools to integrate and process DDSs in current workflows is clearly not sufficient. Firms must evaluate the quality of both internal and external DDSs and develop the necessary mindset, skillset, toolset and dataset to envision and pursue new DDS-enabled competitive strategies. Managers should also realize that capabilities based on the exploitation of Big Data can be very beneficial if their firm competes in a highly unstable industry, with frequent changes in customer preferences or the rapid arrival of new products and technologies. Managers that act in the hospitality industry should reinforce the economic value that the online community might create for a hotel by enriching the information extracted by the community itself. Hotel managers should also be aware that the economic value brought by online visibility can be more easily appropriated when firms play a competitive game based on horizontal differentiation and focalization. Furthermore, hotels should look for multiple partners (each with different market segmentation) for selling their services on the Internet, since this fact enhances their bargaining power and allows them to access multiple market segments. In so doing, hotels can progressively establish a more balanced relationship with OTAs and develop capability required to remain competitive without being subject to OTAs’ rules.