
Guest editorial: Data-driven orientation and open innovation: the role of resilience in the (co-) development of social changes

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1. Introduction

In contemporary interconnected world, the availability of large amount of data across organizations' activities, operations, strategies and decision-making redefines dramatically the dynamics of economic, political and social systems. Private companies and public and non-profit institutions can collect data from multiple and heterogeneous sources, sometimes without any kind of investment, and can transform raw data into information and valuable knowledge promptly. In this way, the ability to undertake effective decisions quickly (Loebbecke and Picot, 2015) and to easily gather information on business performances, processes, reputation and users' tastes and behaviour can be enhanced with little effort.

The use of analytics for the collection and analysis of huge data sets (the so-called Big data, Laney, 2001; Diebold, 2012) can potentially increase business decision-making, redesign the strategies for information and knowledge management and boost the value generated across the entire value chain (Lee *et al.*, 2014).

Over the last ten years, literature emphasize the need to support data analysis with the adoption of a new culture grounded on data as strategic levers that can enhance the creation of new ways of capturing, sharing and creating value and that can encourage continuous improvement. *Data-driven decision-making* (LaValle *et al.*, 2011; McAfee *et al.*, 2012) has been introduced to stress the necessity for this new orientation that considers data collection as a driving force to revise business strategies and allow the complex transformation of data into information, knowledge and, potentially, value (Troisi *et al.*, 2020).

The adoption of an integrated set of smart technologies for data analysis can contribute to facilitating real-time communication, engaging actors in decision-making but and enabling the constant redefinition of the connections between users and technology to improve systems' well-being and gain, over time, innovation and resilience. Thus, the investigation of how new technologies for data analysis can increase citizen's collaboration and distributed decision making can help private and public managers understand how to challenge social and economic crisis such as COVID-19 pandemic and to pursue continuous growth by developing a resilient attitude that can develop a constant search for improvement and the incessant redefinition of technological ecosystem to address the changing contextual needs.

In spite of the proposition of different frameworks designed to analyze how organizations can create innovation the digital era, it is imperative that research explores the way in which the data flows that surround communities' lives can be optimized to develop resilience. There is the necessity for a clear understanding of how the possibilities offered from information and communication technologies (ICTs), smart technologies, analytics and Internet of Things can be transformed into advantages and innovation opportunities to avoid the risk of turning them into threats (Provost and Fawcett, 2013; Wamba *et al.*, 2015).

In today's uncertain context, in which the global crisis remodel economic and social systems and the relationships between them, scientific research should investigate the



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different kinds of technologies, processes, people (human component, entrepreneurial attitude) and resources (employees' and citizens' digital competencies and willingness to use technology) that can act as key enablers for the identification of innovation opportunities, and, thus, the development of a resilient attitude in organizations considered as embedded systems.

2. The debate on data-driven decision-making: from innovation to resilience

Contemporary organizations that aim at exploiting the opportunities offered from Big data should reframe their processes through new technologies and analytics not only to gain competitive advantage but also to implement flexible governance and foster diffused decision-making (Visvizi *et al.*, 2018; Polese *et al.*, 2021).

In the last developments introduced in management research, new collaborative and open models are understood strategically according to a network view that considers the relationships with a broad set of stakeholders (from for-profit companies to users, non-profit and public institutions) as critical factors enabling well-being and innovation (Visvizi and Lytras, 2019a).

For this reason, open innovation (OI) (Chesbrough, 2003) is conceptualized to describe the way in which emergent models of innovation can enable the development of innovative insights thanks to the knowledge exchanged through a complex set of relationships enhanced by smart technologies.

Smart organizations based on OI models can be reread as smart communities, as technology-mediated networks that through the collaboration between people (Abbate *et al.*, 2019) and the sharing of a set of norms, rules and values (Barile *et al.*, 2017; Vargo *et al.*, 2020) can improve well-being in different areas, from economy to environment and social inclusion (Appio *et al.*, 2019; Kashef *et al.*, 2021). The ability of communities to challenge environmental complexity through their constant evolution can help rereading the concept of resilience as the complex result of system's adaptation, maintenance, change and disruption (Vargo *et al.*, 2015). The investigation of the main resilient features (restructuring, adaptation, transformation) of smart communities can contribute to detect the transition from the emergence of innovation to the development of social changes.

Therefore, the goal of the current Special Issue is to advance new theoretical and empirical contributions that analyze how contemporary resilient data-driven organizations and communities can integrate technologies with human component (Bang *et al.*, 2021) to reframe innovation emergence and foster the attainment of societal transformation. In this way, by using a collaborative approach, research can explore how organizations can develop innovation solutions to address relevant social issues thanks to the constant reshaping of culture and knowledge and to co-learning processes that can address the evolving community needs.

The exploration of the different ways to reframe organizational processes and policies thanks to human's interactions mediated through technology can help the identification of how social, economic and health challenges (in COVID era but also in case of future crises) can be met through continuous transformation.

3. Content of the special issue

To explore the possibilities offered from data-driven orientation, there is the need to shed light on the different areas of application of Big data and on the opportunities offered to private and public organizations for the redefinition of processes, value chain, business models, decision-making and policy-making.

This Special Issue aims at exploring all the facets of the strategic role of data as a key enabler of innovation opportunities and resilience. To attain this goal, the implications of data-driven orientation for management, government and society need to be explored.

The papers included in this Special Issue can be grouped into two areas: papers dealing with topics related to policy-making, governance and public management of Big data and open data, including citizens engagement and accountability; and papers that adopt a managerial standpoint to understand how Big data can redefine value co-creation, knowledge co-creation and innovation development to attain resilience.

3.1 Big data impact on policy-making, governance and citizenship

The first group of contributions investigates the use of technologies and data-driven orientation in public sector and, in particular, in policy-making dynamics (Maione *et al.*, 2022), in community's perception (Loia *et al.*, 2022) and citizens' behaviour (Marino and D'Arco, 2022).

Big data revolution affects not only companies and public institutions but redesign also the role and communities that can collaborate effectively around a distributed ecosystem of information that can encourage diffused decision-making. Data can help public decision-makers to undertake more efficient and effective measures and can play a key role in the different phases needed to build public decisions (from data collection to the extraction of information, to the final) and in the political dynamics (Styrin *et al.*, 2017). In this scenario, the so-called open data (Auer *et al.*, 2007; Kitchin, 2014) can have a significant impact on governance and open and diffused decision-making for the resolution of global emergencies. The advent of COVID-19 and the implementation of new smart architectures to comply with the limitations posed by the pandemic (smart working, distance learning, etc.) emphasize the importance of opening, sharing and using data. The use of data to simplify communities' and business life in COVID era reveals how open data can increase the effectiveness of public policies and the participation of citizens (Lourenço *et al.*, 2017).

Hence, Maione *et al.* (2022) explore the issue of open government data in the period of COVID-19. The study aims at detecting the patterns of open data in time of crisis and at revealing the policy and managerial implications of the development of open data for accountability. The empirical research is performed through a content analysis of online portals of the 20 Italian regional governments. The findings reveal that in Italian government open data cannot address the accountability concerns in the COVID era and identify the difficulties that can prevent government from a proper utilization of open data.

Data analysis and technology implementation cannot be conceived only as a means for competitiveness in economic and public life but should be integrated also in community's life to enhance well-being. The paper written by Loia *et al.* (2022) seeks to investigate the collective perception regarding the decommissioning of offshore platforms. Through a sentiment analysis, the key positive and negative dimensions in community's perception of offshore platforms are identified. Based on these dimensions, a resilient perspective for the future of the offshore platforms is proposed. The investigation of the criticalities in community's perception of government policies can suggest managers how to raise citizen's awareness about the decisions undertaken and the potentialities of offshore platforms' reconversions.

Lastly, the paper proposed by Marino and D'Arco (2022) explores the role of technology in environmental citizenship behaviour, that is, the responsibility of citizens in a given community to preserve the surrounding environment. The empirical research, based on a multi-group analysis, assesses the moderating effect of the use of sustainability applications on environmental citizenship behaviour. Through the identification of the predictors of

environmental citizenship behaviour, the research provides policy-makers with some recommendations to transform society and the culture of a community through the adoption of technology. Hence, the studies included in the first group introduce some relevant theoretical and practical advancements on the possibilities offered from Big data analytics for the redefinition of open government, community's perception and awareness on social and economic issues, citizenship behaviours.

3.2 Data-driven orientation: redefining value co-creation, knowledge co-creation and innovation

The second group of contributions explores how data-driven orientation can help companies redefine their strategies through the adoption of a new smart culture that can redesign organizational structure, processes and resources management by improving value co-creation (Botti *et al.*, 2022), promoting the constant creation of new knowledge (Hysa and Themeli, 2022) and encouraging continuous improvement and the co-development of innovation and resilience (Ciasullo *et al.*, 2022).

Only through a culture grounded on data as a strategic asset and on a technological infrastructure based on multiple touchpoints set of analytics and tools in line with the strategic objectives of firms, data-driven approach can help companies increase know-how, extract information and knowledge from raw data by proposing innovative solutions and engaging users in the development of innovative ideas. In this way, the promotion of a proactive attitude based on a constant tension to innovation can lead to the continuous renewal of value and foster the emergence of innovation over time (Troisi *et al.*, 2021). This flexible mind-set can develop in companies a resilient attitude that helps them not only overcome crisis but also to be prepared for future crises.

The paper written by Botti *et al.* (2022) explores the changes introduced in managerial attitude towards technologies after the advent of COVID-19. Through a longitudinal study on the use of ICTs platforms by Italian restaurant managers, the study shows that technology is not considered anymore as a means to promote the service (as in the pre-COVID era) but as a strategic lever for continuous improvement and service innovation. By revealing a shift in manager's perception, the research detects the possible "strategic" utilisation of technological platforms to manage the relationship with consumers, enhance value co-creation, develop innovation and foster resilient behaviours.

The paper written by Hysa and Themeli (2022) aims at exploring how inter-organizational Co-working Spaces can affect resilience. Through semi-structured interviews and naturalistic observation, the study shows that co-working spaces contribute to lowering complexity while driving resilience, OI and knowledge co-creation. In this way, the key enabling factors that can help companies develop resilience are identified by addressing a gap in extant research related to the classification of the drivers of resilience.

The last contribution, proposed by Ciasullo *et al.* (2022), investigates the impact of co-innovation and of the possession of data analytics capabilities on the emergence of organizational resilience. The empirical research, based on mediated regression analysis, confirms the impact of BDA capability (Gupta and George, 2016) and co-innovation on the development of entrepreneurial opportunities and resilience. Revealing the micro-foundations of the resilience building capacity of SMEs, the paper provides some relevant implications on the role of co-innovation as an antecedent of resilience and on the different enablers that can help companies recognize business opportunities in COVID era.

Thus, the studies included in the second group offer future research theoretical and practical developments by clarifying the enabling dimensions of resilience (value co-creation, knowledge co-creation, innovation) that can contribute to build strategic resilience

4. Concluding reflections

This Special Issue explores the key opportunities and criticalities offered from the use of Big data analytics in business life through the analysis of the different facets (economic, political and social) and of the key enabling dimensions (citizens' engagement, diffused policy-making, value co-creation, knowledge co-creation, co-innovation) of an effective adoption of data-driven orientation.

The papers included in this special issue highlight the possibilities deriving from a proper implementation of Big data architectures and data-driven approach in business models, strategies, processes, knowledge management and innovation processes. Through quantitative (regression analysis, structural equation modelling, sentiment analysis) and qualitative (semi-structured interviews and observation) research, the above-mentioned studies enrich the research agenda on Big data by providing significant insights on the key enabling dimensions that can lead from the adoption of data-driven orientation to resilience. Moreover, the analysis of the role of technology in facilitating the "forced" technological evolution posed by COVID-19 can suggest private and public companies some strategies to overcome the pandemic through a resilient attitude.

The advancement of empirical results and theoretical frameworks that assess the main steps, objectives and implications related to the strategic use of smart technologies in open organizations and communities can reveal the impact and implications of new technologies on social, economic, political and environmental spheres (Visvizi and Lytras, 2019b).

The analysis of how governance in open organizations can start from the establishment of a set of common values to perform an efficient use of ICTs can show the multiple benefits that a data-driven innovation-oriented mind-set can create throughout the entire community at an economic, relational, educational and societal level. Moreover, the exploration of communities' ability to evolve in line with the changing stakeholder's needs can shed light on the resilience as a key attitude to perform continuous transformation and attain social changes.

The studies included in the Special Issue reveal the main strategic drivers and tools required to reframe OI models through data-driven orientation to enhance the constant adaptation of businesses and institutions to the complex and unstable context of global crisis. Moreover, the key implications of data-driven approach on distributed and collaborative decision-making are analyzed to show public managers how governance mechanisms can be harmonized through the combination of technology (process), dynamic capabilities and human competencies (people) for the attainment of sustainable growth (Visvizi et al., 2021).

Form a managerial standpoint, the conceptualization of resilience and of its main enablers can help managers identify the strategic levers to reframe knowledge management processes and value co-creation strategies to foster the development of innovation constantly, to advance continuous innovation and transformation to meet not only economic challenges but also societal challenges.

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