A Guide to Planning and Managing Open Innovative Ecosystems

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Chapter 1

Planning and Managing Open Innovative Ecosystems, Data and Government

Vanessa Ratten and Abu Zafar Shahriar

Abstract

The rise of the digital economy has led to a focus on how to manage big data and business intelligence for entrepreneurial purposes. The aim of this chapter is to discuss how to plan for open innovative ecosystems that harness the potential of new data analytics techniques in order to progress society. This means concentrating on the increasingly complex world of data analytics in order to derive information about potential entrepreneurial opportunities. The role of knowledge management in influencing an open innovation ecosystem predicated on big data and computing acumen is stated. This helps to understand how the future of the global economy relies on an open data policy that encourages the sharing and dissemination of information. Implications for managers are also suggested that emphasize the role of innovation ecosystems, data and government.

Keywords: Data; ecosystem; entrepreneurship; entrepreneurial ecosystem; government; innovation; open innovation; planning

1. Introduction

The concepts of ecosystems, data and government have evolved over the years based on societal trends (Bliemel, Flores, De Klerk, & Miles, 2019). This is influencing how people view the concepts and how they are understood in society. Culture plays a role in this as people will consider data differently depending on their experiences. This has meant some countries where there are more open discussions and a democratic society tend to view data differently compared to more autocratic societies. This has also changed with increased computing platforms being available that enable the open and free sharing of information.

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This is evident in websites like Wikipedia being edited on a daily basis based on new information becoming available. This has increased internationalization as more individuals can communicate and work together on projects. Most of the research on big data has been conducted in the analytics field due to its emphasis on statistics (Olszak, 2016). There is also a lot of research being conducted in the information systems area due to the need to introduce new data analysis methods. However, less research has focused on innovation, data and government from an innovation perspective, which is the reason for this chapter.

There has been a shift in entrepreneurship research from the individual entrepreneur to an ecosystem perspective that acknowledges the cultural and social embeddedness of entrepreneurship (Ferreira, Ratten, & Dana, 2017). This means being aware of how entrepreneurship occurs at multiple levels in society from the individual, firm to societal. An intersectionality approach to entrepreneurship is useful to understand the effects of different identities and contexts. Entrepreneurs self-identify with being a risk taker and innovator, but they can also have other roles in society (Dy & Agwunbi, 2019). This comes from their socio-demographic features such as gender, geographic location and income level. Context also impacts entrepreneurial behavior with some contexts more conducive to entrepreneurship (Shepherd, 2019). Although the concept of entrepreneurship dates back a long time, it is only recently with the internet and technology revolution has an entrepreneurial ecosystem emphasis swept the industry. In order to support entrepreneurship, different levels of analysis are needed that focus on the role of data and government in society. The core attribute of an ecosystem is in the complex interactions that are hard to define due to their intangible nature (Puhakka, 2010). In addition, there is a time effect evident in ecosystems due to the need for connections based on time factors. The government is a crucial ecosystem member that determines the fate of many involved in a functioning entrepreneurial environment (Ferreira, Fernandes, & Ratten, 2017). This is due to the role institutions play in managing business activities and introducing new regulatory systems. One of the key drivers of a good ecosystem is a government structure that is sympathetic to entrepreneurship (Lichtenstein, 2011). This means the role of government needs to be considered as one of the most important factors influencing the entrepreneurial climate.

Entrepreneurship is not an isolated event but occurs based on environmental conditions (Ferreira, Fayolle, Ratten, & Raposo, 2018). This means it is important to understand the role ecosystems play in fostering a good environment for entrepreneurship. Thereby enabling a focus on how interconnected individuals, businesses and government entities intersect to create business ventures. To do this can be a hard task due to the continued and varied interactions occurring in an ecosystem. This means the entrepreneurial processes need to be understood as systemic interactions (Miller & Bound, 2011). In an entrepreneurial ecosystem, there is a wide range of related activities taking place that often occur in a synchronous manner. A sustainable ecosystem develops in a way that facilitates mutual interactions based on common goals (Parente, El Tarabishy, Botti, Vesci, & Feola, 2020). This means there are different activities occurring at the same time that produce a collective outcome.

Ecosystems involve a large number of entities that depend on each other for their survival. This results in both strong and weak ties among the entities that

facilitate mutual goals. Moore (1996, p. 26) defined a business ecosystem as "an economic community supported by a foundation of increasing organisations and individuals in the organisms of the business world." This definition highlights how the effectiveness of an ecosystem will depend on how the entities interact in order to facilitate future gain. Thus, an entrepreneurial ecosystem is a form of ecosystem that focuses on entrepreneurial endeavors. This means stakeholders involved in entrepreneurial projects such as entrepreneurs, research institutions and start-ups work together in a collaborative manner. Certain cities and regions like Silicon Valley in San Francisco have become famous due to their entrepreneurial ecosystem. This has made other places want to replicate their environment in order to obtain the same kind of economic success. In an entrepreneurial ecosystem, there needs to be a variety of entities in existence such as government institutions and trade groups in order to foster entrepreneurship (Pitelis, 2012). This is required as the interconnection of human and social capital enables entrepreneurial ideas to emerge. Governments have tried to create entrepreneurial environments due to the benefits they bring to a region in terms of jobs and growth. This has resulted in science and technology parks created to enable a number of entities to work together in a region (Ratten, 2016). This also enables support systems in terms of venture capital, financing and other support services to be offered. Thereby ensuring that the entities in the region have access to required services they need.

To build an understanding of how to plan and manage ecosystems, this chapter examines the current research on ecosystems. This ensures a full understanding of how ecosystems work and operate based on the input of data and government. Through the discussion provided in this chapter, it is possible to identify the distinct elements and dynamics of entrepreneurial ecosystems. In addition, this chapter provides an agenda for future research based on open innovative ecosystems, thereby suggesting a major contribution to the literature on ecosystems. This is by discussing the importance of ecosystems in society and being able to stress the role digitalization plays in the economy. This means integrating the current literature with new research strands about big data and data analytics. This is important as it focuses on how the digital economy is influencing entrepreneurship. Moreover, the literature on digital business with ecosystems is discussed in order to derive theoretical and practical insights. This can help build phenomenon-driven research on ecosystems, data and government.

In the remainder of this chapter, the role of ecosystems, data and government in society is discussed. This includes focusing on the importance of these topics for both scholars and practitioners. This will help to highlight the relevant issues for analyzing and solving societal problems related to big data and entrepreneurial ecosystems. The last section of this chapter identifies opportunities for future research on ecosystems, data and government that can also provide advice for managers and educators.

2. Knowledge Economy

The knowledge economy has transformed organizations into being repositories of intangible resources (Nonaka & Takeuchi, 1995). In the past, land and material

capital was emphasized, but this has changed with more interest in knowledge and intelligence. Thus, the way firms compete is based on the information and wisdom they have that can differentiate them in the marketplace. Gupta, Iyer, and Aronson (2000, p. 17) state that knowledge management is "a process that helps organizations find, select, organize, disseminate and transfer important information and expertise." This means it is important to manage knowledge as a source of information. Most knowledge is derived from gut feelings and intuition about events (Polanyi, 1958). This makes it important to act on hunches in order to progress in society. Some individuals do this by focusing on insights they have that bring meaning to certain occurrences. Often it is hard to put knowledge into words in order to explain it to others, which makes knowledge a crucial asset individuals have that can determine their success (Polanyi, 1966).

There can be some skepticism around the value of knowledge due to uncertainty about whether it will alter market conditions. Knowledge can be distinguished in terms of information or know-how (Becerra-Fernandez & Subherwal, 2001). Information refers to what something means and can be accrued from experience. Some forms of information are embedded in events or procedures. This means it is important to understand the context from which the information was obtained. Know-how refers to how to do something and is embodied inexperience (Suseno & Ratten, 2007). This means in order for knowledge to be valued, it needs to be shared in a way that gives meaning to those involved. To do this can be a hard task as knowledge involves information that needs to be acted upon in order to provide a benefit to society. Those who value knowledge tend to understand its impact and recognize it as an asset. This means intelligent people can harness the potential of knowledge by acting on it for their own gain. This involves having the ability to continually learn and innovate based on the accumulated knowledge.

Business intelligence is associated with knowledge management and data analytics. This is due to it being an umbrella term to describe a set of concepts that relate to the use of information. In order to improve decision-making processes, businesses are investing in ways to utilize information. This enables the use of fact-based support systems that are characterized by the collection and then analysis of information. In order to evaluate information, there needs to be a set of business functions to transform data into information. This enables advanced analytical tools to be used in order to support the strategic decision-making initiatives in an organization. The use of data analytics is needed in order to systematically organize data so that intelligent decisions can be made. Business intelligence provides a way for firms to leverage information in order to make informed decisions. In order to realize the potential of data, it needs to be analyzed using appropriate tools and technologies. This helps firms to improve their decision-making systems based on the data provided (Watson & Wixom, 2007). To do this requires the gathering of data that can be stored for later usages. Firms can use business intelligence in order to provide analytical processing and predictive analysis. This enables the reporting of data that can lead to performance benefits.

Information technology services have become a large share of overall investments in the economy. There has been an exponential increase in the amount of

data being circulated in society due to the adoption of mobile computing devices. Networked devices such as smartphones have also contributed to this growth due to the way they are connected to the internet. In addition, user-generated content streaming from social media has further fueled this growth. Big data analytics is becoming more important as a way to realize the value in structured and unstructured data. In order to solve societal problems, big data are being hailed as a new innovation that has huge potential. Big data are a significant source of business intelligence due to the way they can capture opinions. This means big data can make a difference to human life and enable businesses to deliver better value.

A decision support system is defined as "a computer-based information system that supports business or organizational decision-making activities that typically result in ranking, sorting or choosing from among alternatives" (Mariani, Baggio, Fuchs, & Hoepken, 2018, p. 4). Cloud-based services are being used to provide business intelligence on demand. This enables data to be accessed on demand and enables a faster way to analyze data. Cloud-based architecture also enables more flexibility in accessing data from any geographic location. Due to advances in computing power and machine intelligence, the use of big data is becoming more popular. Business intelligence can be defined as "a set of conceptus and methods based on fact-based support systems for improving decision making" (Trieu, 2017, p. 111). It is important to utilize business intelligence in order to gather information about government processes regarding entrepreneurship. This can enable a more open innovation ecosystem to develop that utilizes the government and other key stakeholders in the business environment.

More firms are basing their decisions on big data due to the voluminous amounts of data it contains. Despite the importance of big data, there exist digital inequalities in society that might affect their usage. This is due to there being a digital divide in terms of who has the capacity and opportunity to work with big data. In order to manage data, there should be some form of project management in place. A project is defined as "a temporary endeavour undertaken to create a unique product, service or result" (Sanchez, 2015, p. 319). Thus, projects can integrate complex data in a way that benefits both business and government.

Those firms with the financial resources to buy data analytics tools will have a distinct advantage. Computational intelligence can be used to analyze big data as it enables a focus on understanding ideas through computing processes. Fulcher (2008, p. 3) defined computational intelligence as "adaptive mechanisms that enable or facilitate intelligent behaviors in complex and changing environments." Increasingly social media platforms are becoming part of computational intelligence as they generate a large amount of unstructured data that are tied to an individual's daily activities and interests (Ghani, Hamid, Hashem, & Ahmed, 2019). This overwhelming amount of data being generated has led to a surge of interest in big data analytics. This is due to the ability of big data to reveal previously unknown information.

Stakeholders are entities whose support is needed in order for the survival of a business. This means that there are mutual dependencies between stakeholders in order to ensure their success. In order to facilitate successful business development, there needs to be knowledge exchange and collaboration.

Sanchez (2015, p. 320) defines stakeholders as "individuals, groups and organisations that are affected by or can affect a decision or action." There are different types of stakeholders involved in project management including dormant, discretionary, demanding, expectant and dominant (Sunder, 2016). Dormant stakeholders are those who have not been active for a long time period on a project. These stakeholders can be active when the time or need arises. Discretionary stakeholders are those who are not needed to run a project and can come and go as they please. Sometimes, it is useful to have backup stakeholders who can provide input if there is a need for their services. Demanding stakeholders refer to those who require something urgently from the project. These kinds of stakeholders can be quite stressful as they are constantly requiring resources. Expectant stakeholders are those who are waiting to receive some kind of feedback from the project. These stakeholders can be impatient as they might need something before they can do something themselves. Dominant stakeholders are those who have the most influence in a project. When these stakeholders' view is expressed, normally others listen to it in an attentive manner.

Stakeholder buy-in is needed in order to manage projects involving start-ups. Attention needs to be paid to stakeholders who have the greatest influence over the project. This requires ongoing engagement to make sure the project aims are suitable to all the stakeholders and that power relationships are managed. Power can be defined as "the ability or capacity to produce an effect-to get something done that otherwise may not be done" (Sunder, 2016, p. 139). To do this, communication is needed that identifies potential problems before they occur. Active collaboration through the life cycle of a project is needed in order to achieve the best outcomes. To do this, there needs to be coordination among the stakeholders that leads to continued interaction. This is important in ensuring that knowledge about the project is spread to the stakeholders in order to make sure they are involved with discussions. Stakeholders will have different levels of impact on a project depending on their importance. This means it is important that the input of stakeholders is appropriate given their contribution to the project.

3. Data Revolution

There has been a data revolution led by the increased amounts of data being available from the internet and social media. This has meant more information is available on a range of issues that affect the global economy. However, in order for data to be used properly, it needs to be understood in terms of its meaning and potential applications. Analyzing data through computing programs has become a way to translate data into knowledge. This is important as there are vast quantities of data available that can be used in order to find patterns to predict future market trends. Thus, big data can be a game changer and enable more entrepreneurship to take place.

Big data are changing the competitive dynamics of an economy through transforming existing processes. Hazen, Skipper, Boone, and Hill (2018, p. 202) state that big data are "large, complex and longitudinal data sets generated from instruments, sensors, internet transactions and/or other digital sources."

The emphasis in this definition is on the complexity inherent in big data that makes them hard to understand. Data can change over time so big data provide a way to understand temporal effects. This can be useful to see how events are impacting behavior and the relevance for business. Data include information assets that need to be analyzed in the appropriate manner. This enables enhanced insights into occurrences and the ability to plan for the future. This is enabling companies to alter their existing systems as a way to facilitate innovation. The shift in the global economy to real-time data has meant increased competitiveness. In addition, organizations are realizing that they can increase their productivity by putting big data into analytics.

Mishra, Luo, Jiang, Papadopoulos, and Dubey (2017, p. 559) state "big data refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage and analyse." In order to comprehend the concept of big data, it can be helpful to highlight its three main characteristics in terms of variety, velocity and volume. The three Vs have become a common way to describe big data due to the emphasis on how data are captured, stored and analyzed. This helps to understand why big data need to be analyzed through advanced technology services. The difference between big data and normal data sets is in the need for big data to be understood through the statistical analysis. This can be costly and time-consuming due to the amount of data being available. Therefore, new statistical tools are being used to understand data in order so that people can learn more about the information it contains. In the past, it was difficult to analyze data quickly, but with cloud computing and other computing tools, it can be done in an easier manner. This enables data to be analyzed in a way for future gain. Variety refers to the wide range of data available that relate to different topics. This means there are numerous ways to comprehend data that depend on the way it is understood. For business people, it might be important to focus on data related to financial information, whereas other people might be interested in other features such as the timing and content. Velocity refers to how fast the data are being transferred and accumulated in society. Due to increased usage of mobile communications, it can be important to understand how and why data are being used in society. This might refer to data being used to book events or plan for other types of activity. Alternatively, the data might be being used to understand consumer trends. Volume refers to the amount of data being stored. As computing devices have more storage capabilities, it is becoming easier to store data.

Lee (2017) suggests that an additional two Vs should be added to the way big data are conceptualized: variability and value. Variability refers to differences in the flow of data. The rate and exchange of data can vary depending on numerous factors including time of day, season and location. This means the flow of data will fluctuate depending on these environmental effects. Thus, the context from which the data are emerging needs to be considered. This will help explain predictable and unpredictable events. Some data are complex so they can take time to understand in terms of market implications. For this reason, the circumstances surrounding the extraction and use of data should be considered. Value refers to the way data can be used once they have been assessed. Some data are more

valuable than other forms because of their usefulness. This is due to the data initially not being seen as valuable, but once they are analyzed, the value can be more easily understood.

Big data offer new insights into how to manage and store information. There are increased privacy issues surrounding the use of data due to the information it contains. In addition, often individuals are unaware of data about them that cause them some concern. This impacts the way individuals behave and act in society. Cybersecurity is another vexing concern due to the confidential and sensitive information being available. This means there is a debate about how best to use data while protecting the privacy and security rights of individuals. Big data are projected to influence the study of medicine in a way that was not possible before. This is due to innovations such as DNA being made as the result of large-scale coordination of research centers. This means data if used in the right way can have a beneficial effect in predicting events before they occur. The big data era means more attention is being placed on how data can be used in order to derive a benefit. Data should be collected in an appropriate manner in light of recent technological advances in real-time storage of information. This means investments in data searching and analysis need to be made.

The use of data without authorization has become a concern in society due to the large amounts of data being captured on a daily basis. Compared to the past, it is now much easier to store data that can be used at a later point in time. This means a balance between privacy and societal benefits needs to be introduced as a way to balance different concerns. A large amount of data are being generated by Internet of Things devices such as smartphones and home devices. This has changed the way data are used and increased the need for data to be used on multiple devices. In addition, new technological innovations such as wearable devices, remote sensors and fitness apps have changed the way data are stored and analyzed. This has given rise to new usages for data that were previously not considered. The interactivity entered between data provider and receiver has also changed. This has meant new ways of assessing and then utilizing data. Blockchain technology is becoming more popular due to the way data can be stored in an encrypted format. This enables data privacy but still ensures individuality of data in terms of retaining unique characteristics. Blockchain is a way to enhance data security by making data tamper resistant. This ensures data are unique while also protecting privacy rights.

There are many inferences being made from big data in terms of predicting behavior. While some of these inferences are merited, others need further investigation in order to see if they hold true under different circumstances. This means decisions inferred from big data analytics need to be carefully considered given the potential ramifications. Most decisions based on big data are based on quality analysis, but some analysis techniques still have flaws. This means data analysis results should be triangulated from multiple techniques in order to see if the same results emerge. This would give greater credibility to the results ascertained from the data.

There have also been potential harmful effects derived from big data analysis. This includes stereotyping others based on general characteristics rather than