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## OPEN DATA, OPEN INNOVATION, OPEN INNOVATION ECOSYSTEM

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### ABSTRACT

The open data movement has gained prominence over the last decade among governments, corporations as well as across the scientific and citizenry communities. In particular, the public sector has been among the most ardent in embracing the open data movement. Many government agencies around the world have embarked on open data initiatives in the belief of its transformative potential in enhancing citizen engagement, accountability, transparency, public service delivery and public value creation [1, 2, 3]. For example, in Europe, the EU Public Service Information directive was issued in 2003, and served as a common legislative framework for EU nations to make government agencies data available publicly for re-use [2]. In 2011, the European Commission further expanded the adoption of the open data movement with the launch of the Open Data Strategy for Europe. In the US, the Open Government Directive was issued in 2009 by the Obama Administration [1, 4]. This was followed by the issue of the Digital Government Strategy in 2012, which included the aim to unlock the power of the government data to spur innovation and improve the quality of services for Americans. In Singapore, the government also launched a *data.gov.sg* portal in 2011 to serve as a first-stop portal where publicly accessible government data can be found [3].

In open government data initiatives, government agencies made their data available for public consumption in machine-readable format such that corporations and individuals can access, re-use and re-distribute these data for various purposes [2]. Examples of such datasets include meteorological data, macro-economical statistics, geographical data, community or municipality-based event calendars, and road traffic information [3]. Corporations and individuals are encouraged by government agencies to participate in public value co-creation by developing new insights or e-services through using the open data. The approaches to achieve such public value co-creation includes “meshing up” distributed government data from different government agencies and private corporations, discovering interesting patterns through data analytics, developing value-added e-services, providing feedback to enhance the quality of published government data and even promoting their value-added data products or e-services to other parties [5, 6]. Essentially, the underlying premise for the success of open government data initiatives lies in the presence of value co-creation through the participation of corporations and individuals in using the open data. It calls for government agencies to embrace open innovation in order to reap the envisioned fruition of open government data initiatives.

Open innovation acknowledges that organizational innovation does not always occur within the organization [7]. Instead, innovations are widely distributed and organizations need to supplement their internal innovation processes by transforming previously closed boundaries into semi-permeable ones that enable interaction with external sources of innovation in pursuit of new products, market advantage, and other opportunities. For example, corporations may partner with research institutions possessing complementary resources to co-create and innovate on a better product. In order for organizations to be innovative and productive, it is essential to recruit the participation of parties outside of the traditional organizational boundary. Hence, the success of open government data initiatives is predicated upon open innovation.

Interestingly, recent research development in open data as well as open innovation coalesced upon the concept of ecosystem [3, 10, 11, 12]. The ecological concept is widely adopted in contemporary business strategy research for organizations whose success depends highly on interdependencies with other organizations well outside the traditional value chains that contribute directly to product or service creation [13, 14]. This stream of literature focuses on the need for businesses to be supported by a healthy, diversified ecosystem of actors, playing specialized roles in the value development and delivery process [15].

Research in open data indicates that value co-creation in open government data initiatives is supported by a complex ecosystem of interconnected and interdependent actors as well as information resources [3, 10]. These actors include government agencies that owned the data, various data intermediaries involved in co-creating information products and e-services based on the data, and the consumer of the resultant information products and e-services. The information resources include databases, portals, electronic-exchanges and e-marketplaces where the open data and the resultant information products and e-services may be discovered and utilized. At the same time, research in open innovation also identified that open innovation takes place within an open innovation ecosystem [11, 12]. Organization pursuing open innovation needs to work with other actors in the ecosystem by opening up their innovation processes to other actors and using external resources to enhance its own innovative capacity. Such an ecosystem is termed to be an open innovation ecosystem.

This paper examines the open innovation ecosystem in open government data initiatives to identify the key types of actors, resources as well as typical mechanism and strategies that these actors employed is engaging one another. In so doing, it posits a conceptual framework of the open innovation ecosystem in open government data initiatives.

The research methods include formal content analysis and thematic analysis on various print and online media (e.g., newspaper articles) on the open data initiative by the various government agencies. The content analysis method was adopted for two reasons. Firstly, research on open government data initiatives is still emerging and a more exploratory research approach is justifiable. Secondly, the scale and magnitude of the ecosystem and the nebulous understanding of it also justified the adoption of the content analysis method. Specifically, without knowing the various actors and resources, it is difficult for field work to be conducted. Moreover, given the scale and magnitude of the ecosystem, it is also challenging to adopt other exploratory research methods, such as case study.

In sum, this research aims at expanding the existing open data literature by identifying the major actors in the open innovation ecosystem of open data initiative. Its primary theoretical contribution is the conceptual framework of the open innovation ecosystem in open government data initiatives. The managerial implications for policy makers, corporations and individuals is primarily the appreciation of the dynamics and among the various actors in the eco-systems and strategies that can be adopted to facilitate and generate desired participation and collaboration for value co-creation in open data initiatives.

*Keywords:* e-government, open data, open innovation, open innovation ecosystem.

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