Article Review: Studying Innovation Ecosystems Using Ecology Theory

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Introduction

"Studying innovation ecosystems using ecology theory" is a scientific article published in 2016 by Duncan R. Shaw of the Nottingham University Business School in the United Kingdom and Tim Allen of the University of Wisconsin in the United States. The authors study the innovation ecosystems from the ecology point of view. They propose a set of perspectives for studying the innovation ecosystems based on similarities between business systems and natural systems. The paper describes the innovation ecosystems as pathways of interconnected business models, which convey informational resources, material supplies and value. The article suggests novel methods of studying business models' interactions and ecosystem management. The authors study the natural and business ecosystems and talk about similarities between them from variety of perspectives. However, the decision to illustrate their thesis using a case study of a single smartphone healthcare application limits the analytic and theoretical value of the study.

Summary

Duncan R. Shaw and Tim Allen imply that innovation and digital ecosystems require more research because the ecological terms are not yet coherent or well defined. They turn to the science of ecology and use natural ecosystems as an analogy for the processes that go inside business systems. Ecology studies how organisms interact with the physical environment and each other, as well as the recycling processes that take place in the ecosystem ("What is Ecology," 2016). The paper illustrates and details how nutrients take part in natural recycling processes. Authors argue that business systems are similar to these processes because they amount to complex connections that carry information, money and other resources. The paper illustrates this thesis using a case study of "Quealth," a smartphone healthcare application provided be the "roadtohealth" group. Ecosystems are

harder to manage than innovation ecosystems because natural processes are external to human activity. However, Shaw and Allen believe that study of this application and how it uses information related to its customers to produce services, combined with ideas from studies of complex ecological systems, can help in developing a unifying theory of innovation ecosystems.

The article uses terminology that can be difficult to understand by a general reader. However, the study aims to provide means for managers to change the business models of the start-up organizations, markets or customer segments, as well as multi-national organizations, cities and economies, while maintaining the firm's desired ecosystem. Authors took a concept of "umwelt," which is an ecosystem pathways idea from biology, and applied it to firms by conducting theoretical research. They also performed a single case study of a smartphone healthcare application for over a two-and-a-half-year period. The study took place in the form of semi-structured interviews and conversations with Quealth management and staff, as well as meetings with representatives of roadtohealth group, and members of other companies. The obtained data is examined based on Klein and Myers' hermeneutic analysis principles by studying the whole system from its parts and different interrelationships. (Klein & Myers, 1999). The authors then apply the natural ecosystem organizing perspectives on the case study.

Analysis and Evaluation

Duncan R. Shaw is a lecturer at Nottingham University Business School who also got a Master of Business Administration degree at Manchester Business School. He specializes in strategic aspects of business-to-business interactions, as well as management of complex commerce environments ("Nottingham University," n.d.). Tim Allen is a botanist and a former professor at the University of Wisconsin in the United States. Allen is considered one of the most controversial academics in the establishment, as well as one of the top experts in

the hierarchy theory and systems theory (Tempus, 2010). His course “Plants and Man” is an acclaimed work on biological systems and great introductory for botany majors. Duncan and Allen also have published many scientific articles in their respective fields. In conclusion, both authors have enough credibility and knowledge in their respective fields to be considered trustworthy sources.

The article conveys information by using appropriate methods of writing and specialized terminology. Due to the nature of the study, authors use principles that appliable in both business interactions and ecology sciences. However, most of the terms used in the paper are from ecology science. The paper details the characteristics of the natural ecosystem organizing perspectives, which are the ecosystem, the organism, the population, the community, the landscape and the biome perspective. They are described and applied to the innovation ecosystems.

For example, the authors find the population principle present in both natural and innovation ecosystem. In a natural ecosystem, this principle is defined by spatial contiguity that gives insight into the carrying capacity and fluctuations. In innovation system, the same principle defines by co-location of copied business models, which gives insight about the fluctuations and size of the market. The article makes particularly good points when the authors draw parallels between the ecosystem perspective and a business model. The researchers describe the nutrients’ cycle from the beginning when a leaf falls to the ground. The leaf passes through worm’s digestive system, after which the waste is absorbed by fungi, which then is assimilated by tree roots. This process of recycling resources is a central attribute of ecosystems. In the business, organizations reuse resource outputs and informational resources from different firms (“About TerraCycle,” n.d.), as well as customers and the accompanying customer data left from the previous customer interactions. The authors describe how different firms reuse customers by providing complimentary follow-on

services and products. The pathways of innovation systems are presented as “customer journeys,” which is a term derived from Jakob von Uexküll’s idea of an umwelt – a “self-world” of an entity. This term represents a combination of the senses that a being has and what it can do to change its self-world. Humans, animals and even machines have their “self-worlds,” as well as their perspective on life (“Each IoT,” 2016). Just as beetles have a life journey that is limited to a single grain, customers have their set of journeys, limited by a site’s web page or time spent looking for a product before deciding to make a purchase.

The organism perspective compares natural organisms to organizations that have business models, which are comparable to the genetic code. Duncan and Allen argue that firms also have self-worlds based on their business models, which limits their sense of the world. The organizations’ umwelt limits their understanding of the customer’s needs. The authors describe similarities between the systems from the community perspective. They present a good comparison of birds, who choose available locations to search for food according to their awareness of the surroundings, just as customers, who go shopping on their way from home to work according to their knowledge of the available stores on this pathway. Biome and landscape perspectives are analogous. They have profound differences in ecology, because in nature biome characteristics are only partly based on the location. However, when applied for the innovation systems and businesses, some of which are Internet-based, biome classification becomes excessive.

The article contains data tables and illustrations. The illustrations effectively represent the information presented in the main body of the paper. The tables help to represent a list of conducted interviews more systematically. The figures that show the customer data cycle and nutrients’ cycle are particularly useful. The similarity in their presentations shows how natural systems parallel innovative systems, which helps to illustrate the authors’ point of view.

Scholarly sources are used most of the time in the text. However, some sources of the information cited are questionable. For example, the authors site the product description section of the Google Play to explain the benefits of the Quealth application. Health applications have to be scientifically backed up by research to succeed (The Medical Futurist, 2019). Therefore, it is essential to elaborate further on Quealth's medical validation in the article.

The authors have chosen to study only one digital health application. Their method is to conduct series of interviews and conversations to understand how an innovation system grows around the start-up. The decision to have a single case study reduces the possibility of generalization and limits the analytic value of the research due to the specificities of the subject. Even though single case studies can have their advantages, they also have a set of limitations. Nonetheless, these studies often lead to the issues of their external validity and generalizability, which means they are often biased (Willis, 2014). When deciding if this type of study applies to health care applications, it is necessary to look at the digital health field.

The digital health is a complex market. It consists of wellness-oriented applications for health management, as well as wearable accessories that track various types of medical data. Since 2014 the medical tech start-ups are on the rise, while the market became saturated. By 2016 equity funding to digital health companies was $6.1 billion (CBInsights, 2017). The number of digital health applications keeps growing every year. By the end of 2017 there were more than 310 thousand smartphone applications for health management (Yukhymenko, 2018). There are also many problems that organizations face when they start working in digital health. More than 90 percent of healthcare applications fail within five years of inception. More than 61 percent of the companies in this field must shift from business-to-consumer to business-to-business model to survive (Yukhymenko, 2018). The study would be more useful if conducted on multiple applications, especially considering the

abundance of healthcare start-ups and the high rate of their failing. This paper would have been more analytical and valuable if the authors picked a few of the failed medical start-ups and some the digital applications that succeeded. If authors would research these applications in a more complex study, the causes for their failure or success, as well as the reasons companies have to change their business model, then new knowledge about the ecosystems that grow around these businesses can be gained.

Conclusion

The article provides new angles for studying innovative ecosystems based on the ecology theory. Authors apply the ecosystem perspectives and the concept of "self-world" to companies. The paper looks at business models, the ways organizations interact with their customers, as well as other businesses, from an ecology point of view. This research suggests novel ways to study business models and how they complement each other. However, given the abundance of health care applications and gadgets on the market, the decision to study only one smartphone application limits the value of the research. The study is going to be more useful if it analyzes multiple applications and medical tech start-ups. It is insightful to understand the umwelt of both successful and failed digital health start-ups, as well as reasons most companies in healthcare change their business models. Therefore, this area of study requires more thorough research.

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