

# Towards A Functional Definition of Innovation for Malaysian Universities

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## Introduction

The landscape of higher education has been so greatly transformed that public universities are now perceived by the public, corporate and political leaders as key components in a national scientific and technological innovation system. The term “innovation” has been absorbed into the core values of many universities as the “next big thing”, anticipated to lead rapidly to the betterment of society. The current Information Communication Technology (ICT) era has cultivated the tendency to expect fast results, ignoring the fact that knowledge generation is a time consuming process. Hence, universities are pressured by their stakeholders, especially industries and government, as they struggle to meet their high expectations while realising that an obvious gap exists between the role of universities and the expectations of the public. In attempting to close the gap, many universities have revisited their visions, missions and goals and subsequently embedded the new value of innovation into their operation. We see this as the beginning of the innovation transformation in universities. However, without a clear and functional definition of innovation in keeping with the essential character of the university, the impression of it failing to achieve stakeholders’ expectations will persist.

## Definitions of Innovation

Innovation remains one of the most overused, under-defined terms as no one seems to be sure just what the word means. Unfortunately, the literature does not present a comprehensive definition of innovation, nor is there a structured hypothesis stating the principles and methodologies by which the system of innovation operates. Various researchers have posited methodologies for innovation but few have considered innovation as a system with principles that govern its operation. A scrupulous literature search fails to turn up a commonly accepted simple definition of the word innovation.

Rogers (1962, 1965) (in Rogers, 2003) gave an early definition of innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption (p. 11). Most innovations under observation are technological innovations, and he defines technology as “a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome” (p. 12). Rogers (2003) further reduces technology to hardware, or tools, and software, the knowledge needed to use a particular

tool. Technology usually features both hardware and software characteristics.

According to Stokic et al. (2003), innovation is a new product that is introduced to an environment, and only those products or services that have been fully implemented may be termed innovations. For Kusiak (2007), innovation is an iterative process aimed at the creation of new products, processes, knowledge or services through the use of new or existing scientific knowledge. He further stated that product innovation is concerned with the introduction of new goods and services which differ from those currently existing in the marketplace. Echerhmann et al. (2000) go further by describing innovation as more than discovering new ways to create products or processes; innovation is often rooted in the culture itself. This statement clearly goes deeper than the concept of innovation as the mere invention of a new product or process.

Bason (2010), on the other hand, attempted to categorise innovation into four types: process, product, positional, and paradigm. Process innovation focuses on the inner life of the organisation. Product innovation has to do with changes in what is delivered to individuals and entities outside the organisation. Positional innovation is when a product or service is placed in a new context and therefore gains new significance for users, or targets new user groups.

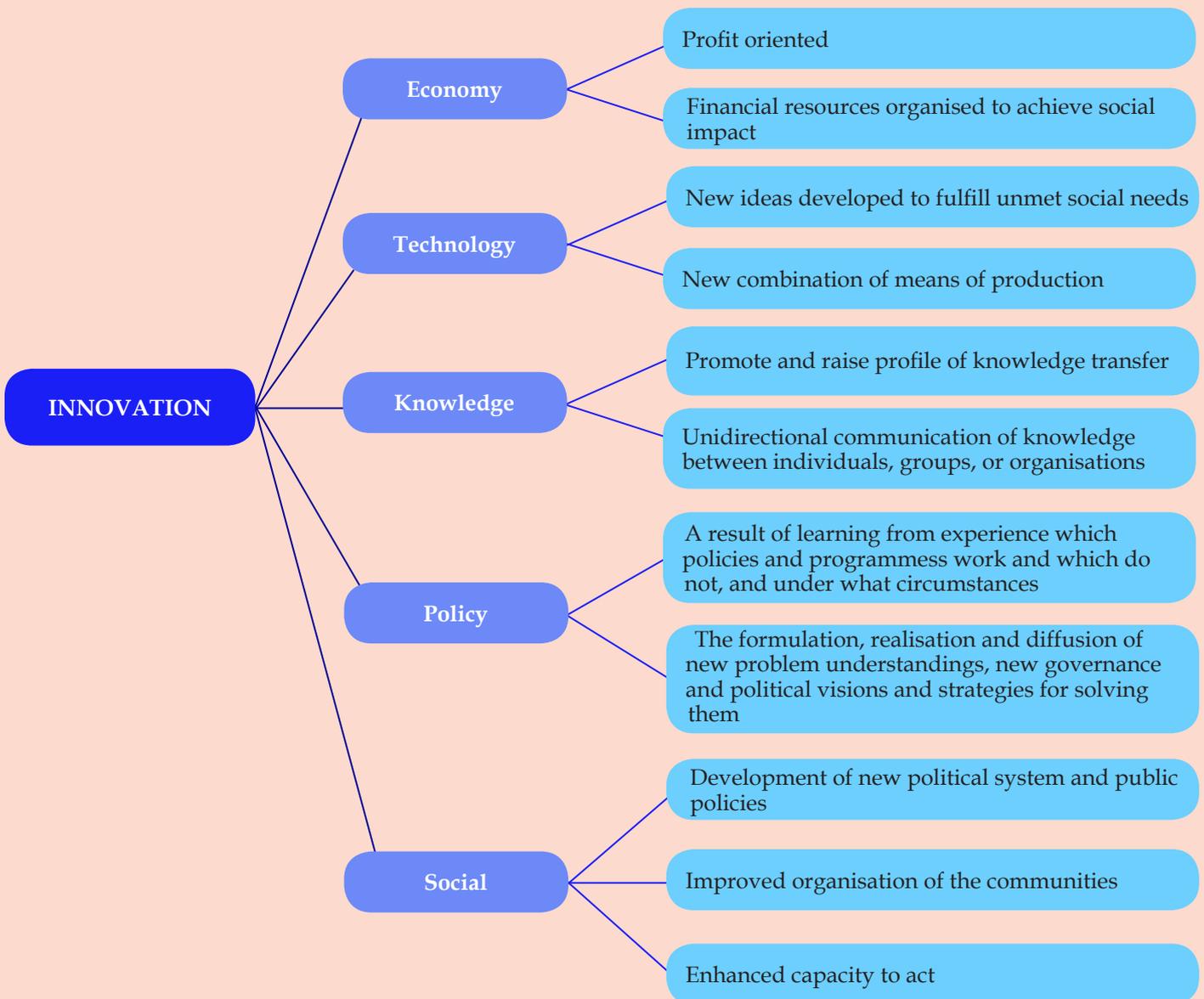
Paradigm innovation is when the organisation’s existing mental model is changed completely. Bason places these four categories of innovation on a compass-like circle, with one P at each of the four cardinal directions. He also categorises innovations on a spectrum of incremental to radical.

Following Bason’s categories on innovation, the literature further describes innovation as taking place in one of two ways. Incremental, or non-disruptive innovation, is seen as the manner in which innovation builds upon previous innovations and ideas. Radical, or disruptive innovation, is the less common manner in which innovation is sparked from completely new ideas. It has been stated that radical innovation constitutes only about 10% of all innovations (Kusiak, 2007). Most often it is the incremental type of innovation that is considered in the literature as it is easily followed.

While several definitions of innovation are offered, there is no single definition of innovation. However, innovation researchers generally agree that innovation involves the formulation, realisation and diffusion

of new creative ideas (Fagerberg, Mowery & Nelson, 2005). Each expert describes innovation slightly differently, and many descriptions of innovation include other concepts that need their own definition. Most definitions have some common elements and the types of innovation are closely linked. Clearly, innovation emerges from a collective process where individuals or groups absorb, assimilate, exchange, and create knowledge (Fischer, 2001; 2006). Hence, the different innovation projects depend on different mechanisms of knowledge management or functions (Cardinal, 2001; Kang & Snell, 2009).

In order to have a comprehensive view of what innovation means, we first defined the different types of innovation based on our literature review. We then summarised the definitions and types of innovation by function. Then we took a deductive approach to classify the definition into various domains which best reflect the meaning, content and function. In other words, we arrived at a definition of innovation based on the type of output or the result of innovation, leading to five main domains or functions of innovation, namely, economic, technological, knowledge, policy and social innovations. A summary of the definitions is presented in Figure 1.



**FIGURE 1** Innovation Domains by Functions

## Economic Innovation

The economy is an indicator of the development and progress of a country. Innovation is a key component in driving the economy of a country. The objective of innovating is to enable businesses to continue to prosper from their activities. For Drucker (1985), innovation is the distinctive mark of entrepreneurial businesses. Innovative entrepreneurs focus on innovation, and innovation is rooted in creating change and endowing existing resources with new wealth. Economic innovation is therefore profit-oriented and knowledge-based. For example, a person who develops and markets a new product is an entrepreneur, whereas the typical corner grocer is not. Likewise, a restaurant franchisee may not be an entrepreneur, while an independent restaurant owner is likely to be one. Entrepreneurs continually search for change, respond to it and exploit it as an opportunity. They therefore view change as the source of opportunity in the marketplace. This means doing something different, which is the realm of innovation, rather than simply excelling at something that is already being done. The latter may be profitable, but falls into the realm of increased productivity through operational improvements rather than true innovation.

**“ ...economic innovation needs two important elements, knowledge and technology, to generate profit while driving sustainable income to a country.”**

Economic innovation is a growing concept that reformulates economic theory which includes knowledge, technology, entrepreneurship, and innovation positioned at the centre of the model rather than acting as independent forces that are largely unaffected by policy. Innovation economics is based on two fundamental tenets: that the central goal of economic policy should be to spur higher productivity through greater innovation, and that markets relying on input resources and price signals alone will not always be as effective in spurring higher productivity, and thereby economic growth (Godin, 2008). For example, in economic innovation, researchers study how entrepreneurs and societies can collaborate to create new forms of production, products, and business models to expand wealth and quality of life. In summary, economic innovation needs two important elements, knowledge and technology, to generate profit while driving sustainable income to a country.

## Technological Innovation

Technological Innovation refers specifically to any introduction of a new technology or design into a given market. Innovations typically surpass old

technological or design standards and therefore offer consumers the opportunity to enhance their capabilities to accomplish tasks or enhance their social status (i.e., by being innovators in the marketplace). Technological Innovation can also refer to improvements and modifications of existing technologies, and creation of new technologies. In fact, technological and design innovations (i.e., introduction of a new product technology or design into a given market) are becoming increasingly important when competing in the global marketplace (Sun & Lee 2013). In essence, technological innovation refers to changes in the functionalities of the product, whereas design innovation refers to changes in the external appearance of the product (Hoegg & Alba, 2011; Rubera & Droge, 2013). Although product innovations typically incorporate both technological and design aspects, they often heavily emphasise one over the other. As such, many new products can be characterised as primarily technological or design innovations.

**“ ...technological innovation refers to changes in the functionalities of the product, whereas design innovation refers to changes in the external appearance of the product”**

Technological innovation is a very important component in enhancing quality of life. Bacon et al. (2008) stated that new ideas (products, services and models) are developed to fulfil unmet societal needs. For example, the evolution of the cell phone to smartphone is one of the important technology communications that evolved through innovation for decades, but the true revolution had only happened since the mid-1990s. In a different context, Apple and Google might be the most frequently mentioned companies that epitomise “innovation”. Coincidentally or not, both of these companies are also known as technology companies dealing with technological innovation. Indeed, the Boston Consulting Group in its most recent innovation survey ranked Apple as the most innovative company in 2012 and Google as the second most innovative (the same as the rankings in the 2010 survey). These two are well-known technology innovators that have long dominated the top ten technology based companies in the world.

## Knowledge Innovation

Knowledge has been recognised to play an important role as an organisational attribute in fostering innovation (Dougherty, 1992). In the knowledge literature, models of innovation detail the type of knowledge processes that facilitate the creation of knowledge (Nonaka, 1994; Galunic & Rodan, 1998). Thus, knowledge innovation has been defined as the creation, evolution, exchange

and application of new ideas into marketable goods and services for the excellence of an enterprise, the vitality of a nation's economy and advancement of society as-a-whole (Lee, 2010; Quintane et al., 2011). Knowledge innovation occurs in the process of the production, transmission and use of the new knowledge.

**“...knowledge transfer involves the interface between scholars and innovators, universities and business, and it involves the transfer and commercialisation of skills and expertise possessed by higher education.”**

The knowledge-based innovation literature examines the knowledge content of an innovation with a focus on three particular areas: the definition of the concept of knowledge in organisations, knowledge creation in the innovation process and mechanisms by which knowledge relates to innovation (Popidiuk & Choo 2006; Quintane et al., 2011). These three focus areas are usually oriented towards explaining the role of knowledge in the process of innovation. The literature argues that an innovation is in essence new knowledge, and therefore it is possible to conceptualise innovation as an outcome from a knowledge-based perspective. In other words, the knowledge that is created during the innovation process and that allows the process to be understood constitutes the essence of the innovation process and it defines the innovation as an outcome. However, not all new knowledge should be termed innovation and specific characteristics should be added to a knowledge-based conceptualisation of innovation as an outcome in order to differentiate between new knowledge, and new knowledge that is an innovation.

Knowledge innovation is also known as Innovation Knowledge Transfer, creating a huge impact on the development of countries, and enhancing the lives of their citizens (Institute of Knowledge Transfer, 2013). The purpose of knowledge transfer is to catalyse and facilitate innovation. Paulin and Suneson (2012) posited that knowledge transfer is the focused, unidirectional communication of knowledge between individuals, groups, or organisations such that the recipient of knowledge has a cognitive understanding, and the ability to apply the knowledge. Innovation through knowledge transfer most importantly promotes and raises the profile of knowledge transfer and innovation, and provides publication opportunities for all those involved in the discipline. In fact, new knowledge must become public and it needs to become an object of critical review and evaluation of members' of one's community. Thus, publication (various types of publication including journals, books, white paper and for different purposes) is the most important aspect of innovation knowledge transfer.

We define knowledge transfer as the means by which expertise, knowledge, skills and capabilities are transferred from the knowledge-base (for example, a university or college, a research centre or a research technology organisation) to those in need of that knowledge (for example a company, social enterprise or not-for-profit organisation as well as the knowledge based community). The purpose of knowledge transfer is to catalyse and facilitate innovation. Hence, knowledge transfer involves the interface between scholars and innovators, universities and business, and it involves the transfer and commercialisation of skills and expertise possessed by higher education.

### **Policy Innovation**

Although the literature has only categorised innovation into four interrelated domains, namely knowledge innovation, technology innovation, economic innovation, and social innovation, policy innovation is also considered a pertinent aspect of innovation. The key object of an innovation policy is to change the behaviour of actors in order to improve innovation capabilities and outcomes. As such, innovation has become an instrument of government policies. Innovation policies are designed and implemented as innovative approaches that are undertaken on political will. It is the government's intention to accelerate the transformation process and sustain economic development. The efficient innovation policy, which goes far beyond the traditional science and technology policy, addresses the overall innovation areas and involves many government departments. Governments all over the world currently face critical problems that call for policy innovation. A new strand of research in public policy and innovation points to collaboration between public authorities and relevant and affected stakeholders as an important driver of policy innovation. Policy innovation can contribute to qualifying the politicians' and the public's understanding of policy problems, and to fostering new creative policy solutions.

**“According to the World Bank, policy innovation is a result of learning from experience which policies and programmes work and which do not, and under what circumstances.”**

Thus, policy innovation is not really a new concept and it should be highlighted to strengthen the policies for the services that are offered in order to be more effective and efficient. According to the World Bank, policy innovation is a result of learning from experience which policies and programmes work and which do not, and under what circumstances. These lessons are especially important as circumstances may change

rapidly, and as new forms of innovation emerge, innovation policies need to reflect developments. Innovation researchers generally agree that innovation involves the formulation, realization and diffusion of new creative ideas (Fagerberg, Mowery & Nelson, 2005).

Taking our departure from this agreement, we use the definition of policy innovation developed by Sorensen and Waldorff (2014) as the formulation, realisation and diffusion of new problem understandings, new governance and political visions and strategies for solving them. Each policy will differ in the construction of the problem definition that calls for political, governance and managerial actions on behalf of the community or nation (Tucker, 1995). The problem definition is crucial for policy innovation because it directs the search for new innovative policy visions and the strategies that are chosen for their realisation and diffusion (Moore, 1995; Borin, 2001).

### Social Innovation

One of the most widespread definitions of social innovation refers to innovative solutions to human needs (Mulgan, 2006, Murray et al., 2010). Generally, the aim of social innovation is to apply innovative tools and resources in addressing societal issues with the aim of improving communities in ways that are more effective, efficient and sustainable than previous approaches. Murray et al. (2010) define social innovation as a new idea (a product, service or model) that simultaneously meets social needs and creates new relationships or collaborations. It represents new responses to pressing social demands, which affect the process of social interactions. It is aimed at improving human well-being. In other words, they are innovations that not only are good for society but also would enhance its capacity to act.

Social innovation can take many forms; it can occur through non-profits' government, the private sector, social enterprises, foundations and philanthropies, or various combinations of those sectors. Many, including the United States federal government, are looking to invest in social innovation. In order to invest wisely, there needs to be a common definition of social innovation, an understanding of a common social innovation process, common indicators to measure the effectiveness and quality of the social innovation – and a tool to measure potential social innovations against the common definition, process, and indicators.

Essentially, social innovations describe the entire process by which new responses to social needs are developed in order to deliver better outcomes. This process comprises four main elements: first, the identification of new/unmet/inadequately met social needs; second, the development of new solutions in response to these social needs, third; evaluation of the

effectiveness of new solutions in meeting social needs, fourth; scaling up of effective social innovation (DG Regional and Urban Policy, 2013). Mumford (2002) explains that social innovation refers to the generation and implementation of a new idea about how people should organise interpersonal activities, or social interactions, to meet one or more common goals. Thus, it can bring about changes in social relations by transforming a framework of action or by proposing new cultural orientations.

**“...social innovations describe the entire process by which new responses to social needs are developed in order to deliver better outcomes.”**

Recently, Manzini (2014) defined social innovation as a process of change emerging from the creative recombination of existing assets (from social capital to historical heritage, from traditional craftsmanship to accessible advanced technology), the aim of which is to achieve socially recognised goals in a new way. He argued that social innovation has always been and will continue to be a normal component of every possible society and that it will be an important type of innovation. According to the literature, social innovation initiatives are multiplying and will become even more common in the near future due to the multiple, growing challenges of the ongoing economic crisis and the much-needed transition towards sustainability (Manzini, 2014; O'Brien et al., 2014; Mulgan, 2012). Besides, as contemporary societies change, the nature of social innovation itself is also changing, resulting in new and hitherto unimaginable possibilities.

### Conclusion

This article has attempted to clarify what is meant by innovation by sharing insights from the literature as well as by taking a few alternate, less direct approaches to understand different types of innovation. The key point is that innovation encompasses more than technological R&D activities. Innovations can be categorised or labelled by type; they can also be addressed by looking at their attributes. Five main domains or types of innovation, i.e., economic, technological, knowledge, policy and social innovations have been briefly explained, but given the distinctions between them and the potential for differences in performance outcomes associated with these innovation types across national cultures, there is an urgent need for policy research in this yet unexplored area. Filling this research gap will provide some answers and recommendations that will be valuable in two ways: firstly, it would extend the theoretical work on how national culture influences types and functions of innovations by universities; and, secondly, it would contribute to the university

innovation strategy literature and policy as well as to the development of a rationale for universities contributing to the effectiveness and impact of investments in innovations.

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