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Public Sector Support for Innovations

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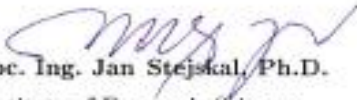
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AUTHOR'S DECLARATION

I hereby declare:

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ABSTRACT

This research was about public sector support for innovations. To establish the critical role of the public sector in the innovative changes taking place currently around the world. The role of the public sector in supporting innovation not only within, but also most importantly in the private sector was investigated on the basis of the three fundamental functions of the public sector as postulated by Rajeswari (1998, p.1). To extensively investigate this phenomenon, the research approached the subject matter through analytic research approach. Highlighting the different ways, the public sector supports innovations within and in the private sector. Using the Schumpeter's theory on dimensions of innovation as the principal theoretical underpinning for the research.

The significance of public sector support for innovation was investigated first from the happenings with the supranational body, the EU. Identifying the role of finances in determining the importance of policy. Then the EU policies on innovation and its scope were examined. Highlighting the financial commitments of the EU to each of its policy programme. The research then conducted a comparative analysis of two of the countries within the EU as a sample of the entire population of individual EU member states to evaluate how their public sector is supporting innovations within and also in the private sector. The Czech Republic and the German Democratic Republic were purposively chosen because of their near opposite standing in terms of economic status and political standing within the EU. The Czech Republic representing the small member states and Germany, the big EU states.

Using mainly secondary research data, the research concludes that the EU takes the participation of the public sector supporting innovation seriously. It also concludes that while the Czech Republic and Germany have different experiences in terms of their relationship with public sector support for innovations. And their approaches also been different. The two focal sample states and the EU have two central agreements that are common to all. First, the irreplaceability of the public sector as a catalyst for innovations in any nations. Two, the central role of shared data, cooperation and coordination amongst all entities involved in the pursuit of innovations.

KEY WORDS

Public sector, Private sector, Innovations, Research and Development, and Technology.

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LIST OF THE ABBREVIATIONS

OECD	Organisation for Economic Co-operation and Development
EU	European Union
EC	European Commission
GPS	Global Positioning System
RAE	Royal Academy of Engineering
JEUPISTE	EU-Japan Centre for Industrial Cooperation
UN-ESWA	United Nations - Economic and Social Commission for Western Asia
SME	Small and Medium Enterprises
UNESCO	United Nations Educational, Scientific and Cultural Organization
EPRS	European Parliamentary Research Service
HCESC	House of Commons European Scrutiny Committee
STIG	Science, Technology, Innovation and Growth
CORDIS	Community Research and Development Information Services
NRDIP	National Research, Development and Innovation Policy
UVCR	Urad Vlady Ceske Republiky
RDI	Research, Development and Innovations
R&D	Research and Development
VVI	Sekce Mistopredsedy Vlady Pro Vedu, Vyzkum a Inovace
ERA	European Research Area
BMBF	Germany Federal Ministry of Education and Research
BMWA	Germany Federal Ministry of Economic and Labour
TFR	Total Fertility Rate
CEE	Central and Eastern Europe

INTRODUCTION

The public sector of any economy are basically the institutions of public enterprise that performs specific functions which the private sector of the economy does not provide. The public sector is indispensable in any country irrespective of the economic system. The public sector's significance in the support of innovation can be identified on the basis of three critical functions that it performs. First, "the promotion of economic activities from which social returns are far higher than direct private return of profit. Second, nurturing activities whose immediate direct returns are low. Third, as means of capital formation at the public level" (Rajeswari, 1998, p.1).

This research thesis seeks to investigate and identifies the different ways in which the public sector supports innovation. Identifying the role of the public sector in the development of innovation throughout Europe using the Czech Republic and Germany's public sector support for innovation as the representative country's for the entire European continent. The research thesis was divided into four parts. The first part was the introductory section which provides the theoretical background for this research on public sector innovation. The second part provided the financing aspect of public sector innovation.

The third part was focused on a comparison of public sector support for innovation across Europe using the Czech Republic and Germany as the focal countries. The fourth part focused primarily on drawing valid and reliable conclusions on public support for innovation across Europe as whole. While pinpointing the difference approaches that the focal countries attempted to explore in ensuring public sector support for innovations irrespective of the size of a country's economy or its economic standing amongst the committee of nations.

Summary of Chapters

This study is organized into five main chapters. The chapter one is predominately literature review, where various research done on the topic is broadly reviewed and synthesized. Chapter two is about the methodology utilized in the study. The chapter three is about the scope of view of EU on innovation policy and financial perspective. Chapter four deals comparison of public sector support for innovation in the selected EU member states. Chapter five outlines the comparative analysis of both the Czech Republic and the

Germany public support for innovation. Lastly, conclusion and recommendation are outlined in chapter six.

Chapter 1

Innovation: The Theoretical Background

1.1 Definition of Innovation

There is perhaps no other word that has become a commonplace within the lexicon of the contemporary world more than the word, innovation. Innovation has been and is still been deployed across different aspects of human endeavours. From businesses to the public sector, irrespective of the products and services been offered or the services of the public sector be provided. Innovation has become a by-word for qualitative products and excellence in services provision across the world. Few however have a deep understanding of what innovation is and the role of innovation in daily lives irrespective of the sector whether public enterprises or private businesses. What then is innovation? What is the motivation behind the current fascination with this word and what it means for the world? There are different opinions and arguments as to what the answers to what innovation is.

In order to establish a robust and comprehensive explanation of the term, it is critical to look at it on a wholesome basis, that is, a combination of its composite meaning without separating it into its component parts of private and public sector. In the light of this, innovation is simply “the successful exploitation of new ideas” (Bessant and Tidd, 2007, p.12). The exploitation of new ideas has been the catalyst for the majority of advancement in human endeavour. From the industrial revolution to the current age of Internet of Things (IoT). This can be identified in the fact that while the primary idea of the internet is the sharing of information. The successful exploitation of the then new idea has led to the development of innovative technologies that ranges from driverless cars to remote controlled off location coffeemakers.

While the successful exploitation of new ideas remains the fundamentals of innovation, there is more to the term than just the exploitation of new ideas. Freeman (1982) explained the complexities of innovation more comprehensively, declaring that:

“[...] Industrial [or public sector] innovation includes the technical, design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product [or service] or the first commercial use of a new (or improved) process or equipment [...]” (cited in Bessant and Tidd, 2007, p.12).

The explanation above by Freeman took the meaning of innovation beyond the basics of successful exploitation of new ideas. It showed the other aspect of innovation that included the application of knowledge to improve the performance of already existing ideas. So, innovation cannot be limited to the successful exploitation of new ideas alone. Its scope extends to the improvement of already existing ideas that can be improved for better performance. Another understanding of innovation that Freeman provided above was the fact that innovation encompasses every aspect of human lives.

That is, innovation can be identified in industrials, services as well as public sectors. This is a critical factor because the general understanding of innovation is always tied to technological development. However, innovation goes beyond outstanding technological accomplishments. Although, technology remains the core of the whole idea. This connection between technological improvements and other sectors can be seen in the application of new technologies in the improvement of services both in the private and public sectors. A good example is the fact that a decade ago, it would be outlandish for anyone to suggest that documents can be transferred through mobile telephones. Today, however, not only has innovative technological advancement made that a reality, innovation has moved beyond that to using mobile telephones to transfer pictures, videos as well as voice simultaneously.

This improvement of technological capability of the primarily voice communication tool to a mini computer system was one of the most visible aspects of innovation. How then do all these affect the public sector of any given economy? The answer to this question can be found in the fact that, while the public sector was never always at the forefront of technological innovative ideas. It is part of society and in some cases the catalyst for the innovative ideas that has now become common place. The level and impact of public sector in the development of new innovative ideas or the successful exploitation of an already existing idea is dependent on its level of support for innovation. The level of public sector support, or lack of support and how they are exploited fully in the next chapters two and three of this research thesis. Another wrongly held notion about what innovation is, was the idea that every innovative idea are commercially viable ideas. This was not the case, innovation can be seen in both the commercially viable technological developments around the world, as well as in some non-commercially viable developments in society.

As Rothwell and Gardiner (1985) explained:

“Innovation does not necessarily imply the commercialization of only a major advance in the technological state of the art (a radical idea) but it includes the utilization of even small-scale changes in technological know-how (an improvement or incremental innovation)” (cited in Bessant and Tidd, 2007, p.12).

The fact that innovative ideas are not always commercially viable was one of the fact that not only necessitated but made the need for public sector support inevitable. It is an established fact that businesses invest in products that are commercially viable. This viability factor is of significant importance to businesses because without such viability, there is no way the business will be able to make return on the resources they invested in developing such innovative product.

The public sector on the other hand is not profit driven, this differences between the goals of the private sector and the public sector is the first requirement for the need for public support for innovation. This linkage between the private sector and the public sector is a well-treaded research path. One of the arguments in support of the relationship between the private and public sectors in the creation of innovations for the betterment of society was based its symbiotic nature. This symbiotic relationship argument is based on the idea that innovation is not purely the result of activity within firms, but that it also includes the inputs from external factors such as location, external knowledge sources and the local ‘milieu’ (Shafer and Frenkel, 1998; Rodriguez-Pose, 1999; Gordon and McCann, 2000, 2005; Freel and Harrison, 2006; Czarnitzki and Hottenrott, 2009 as cited in Lee and Rodriguez-Pose, 2013, p.1744).

Having established above the general meaning of innovation, it is essential to break the meaning of the concept down into two broad sectors as it concerns this research thesis. These two broad sectors of innovation are the private sector innovation as represented by creation of innovative products and services by for profit organizations. The second sector of innovation are those that concerns the services provided by the public sector, that is government from the national to the local government levels. It is important to differentiate these two areas of innovation because of the differences in their objectives. And how despite this objective difference, they must cooperate to achieve the two seemingly unconnected objectives for the both parties. The first innovation objective differences between the private sector and the public sector is that, while the private sector drive for

innovation is driven by the desire for profit. The public sector innovation is mainly motivated by the desire to provide better services for the benefits of the society. The profitability of such innovation is irrelevant to the public sector. What is relevant is the ability to make life easier and more comfortable for the citizenry.

As Rammer (2006, p.107) explained,

“ innovation in firms [private sector] refers to activities that are intended to gain an (at least temporary) absolute competitive advantage over competitors by either achieving a monopoly position in the product [or services] market (i.e. offering products that are clearly distinguished from other products in that market by quality characteristics) or by achieving marginal costs of production for certain product that are clearly below those of competitors and thus result in a price advantage”.

The private sector innovation explanation above provided not just a clear distinction between private and public sector innovations, but also established a critical fact that is commonly overlooked. The fact that innovation within the private sector is not limited to physical products or intangible services. It also provided the often-neglected fact that innovation extends also to the processes involved in producing a physical product or intangible services. The private sector innovation can also involve innovate processes that enables industries and organizations to reduce the marginal cost of production of goods and services, thus providing the firm with the price competitive advantage.

This means that the inability of an organization to develop innovative products or services does not shut it out of the advantages and benefits of innovation, if it is able to develop an innovative process for producing as already existing innovative product or service. Private sector innovation therefore provided opportunities for organizations to participate in creating innovations through more than one means. However, there are differences in the level of competitive advantage that these two phases of innovation can guarantee. The development of innovation through the creation of completely non-existing products or services guarantees longer period of competitive advantage. While organizations that develop a more effective innovate processes for producing and already existing goods and services suffers from shorter period of competitive advantage (Rammer, 2006 p.107).

There is no universally agreed definition or description of what constitute public sector innovation. However, there are several descriptions and explanations for public sector innovation and irrespective of which of the explanation that is adopted. There is a clear difference between what constitute a public sector innovation and its private sector counterpart. Osborne and Brown (2004) described public sector innovation “in the form of new knowledge, a new organization and/or new management or processual skills-that represent discontinuity with the past” (as cited in Bekkers & Tummers, 2016 p. 62). The first clear indication of the differences between private sector innovation and the public sector innovation is the differences in items of innovations. While the private sector is focused on using the competitive advantage that an innovation guarantees over its competitors. The public sector is not concerned with such competitive advantage, but rather more concerned about better service delivery to the general public.

The OECD (2012, p.181) provided an explanation of what public sector innovation is and how it relates to the private sector, observing that:

“Public-sector innovation involves significant improvements in the services that government has a responsibility to provide, including those delivered by third parties. It covers both the content of these services and the instruments used to deliver them. OECD countries pursue various type types of innovation in public service delivery. Many of these approaches create services that are more user-focused, are better defined and better target user demand. Innovation can alter both the supply of services, by improving their characteristics, and demand for services, by introducing new ways to articulate demand for and procure them”.

The above description of public sector innovation provided the relationship between the public and private sectors in terms of innovation as it relates to this research thesis. The OECD’s description of public sector innovation as the improvement in services that government has a responsibility to provide, including to third parties is significant. The significance of the OECD’s description established the fact that public sector innovation has a responsibility to provide services to third parties. The private sector of the economy of any given state are part of the third party that the OECD’s description mentioned above. This is significant because the amount of the public sector support available to the private sector is a determinant of the level of innovation available within the society.

This means that where the level of public support for innovation is high, a high level of innovation is naturally expected in such environment, and where there is a low support from the public sector for innovation, there will be low level innovation. As the OECD description of public sector innovation stated, public sector innovation has the ability to alter both the supply of services by improving their characteristics and demand for services by introducing new ways for articulating demand for and procure them. The impact of public sector demand for innovation as it concerns third parties of which the private sector is a part can go beyond the altering of supply or articulation of demands of services to include the development of new physical products.

The various ways in which the public sector's support for innovation goes beyond the improvement in its impact on services provision and demand are numerous. A classic example is through the regulation of innovation. This issue is further explored later in the third chapter of this research thesis. The question then arises as to what type of support does the public sector provides to the private sector that will determine the level of innovation or its impacts? The OECD's definition above established the fact that the types of public sector innovation supports differs amongst its members. This research thesis seeks to identify these differences in public sector support for innovation, using the case of the Czech Republic and Germany as the focal countries whose public sector support for innovation will be compared.

Public sector support for innovation is critical for the development of an innovative friendly society for many reasons. Some of these reasons ranges from enacting the appropriate regulations that ensure not just fair dealings amongst competing organizations but ensuring that innovations are not harmful to the society they serve. Another significant reason is the availability of essential information. Information availability and sharing is critical for the development of a knowledge society that stimulates innovations. The public sector stands as the pivotal provider of the necessary information that forms the basis for innovations in many cases. As the OECD (2015 p.33) explained:

“Innovation does not just mean doing new things, but new things which are appropriate for the organization in question and the community that it serves. To achieve this, organisations need access to accurate, good quality, useable information, about their performance, their past experiences, their partners and users that they serve”.

Some of the basic information that determines the type and level of innovations that takes place in society is influenced by the availability of such basic information as the population of a society. No organization will invest a substantial portion of the limited resources at its disposal to support the research and development of a given innovation when there is no market for the end product. The availability of the accurate population figures that are provided by the public sector enables organisations to determine whether it is economically viable for them to invest their resources in such environment or not. Since they are profit driven organizations, investing enormously in developing a product that the society's market population cannot support means bankruptcy. This where such basic information as population size can become critical and only the public sector conducts census and make available the accurate population figures in any given society. With this foundational understanding of the meaning of innovation and its deep embedment in every aspect of society, it is important to look at role, function and development of innovation.

1.2 Role, Function and Development of Innovation

The role and function of innovation in the socioeconomic development of any modern society cannot be overemphasized. Innovation plays the role and function as the unique centre in the pulling together of all the different aspects of societal resources to create a symbiotic relationship that benefits the entire society. As Freeman (1995) observed:

“National and regional systems [public sector] of innovation remains an essential domain of economic analysis. Their importance derives from the networks of relationships which are necessary for any firm [private sector] to innovate. Whilst external international connections are certainly of growing importance, the influence of the national education system, industrial relations, technical and scientific institutions, government policies, cultural traditions and many other national institutions is fundamental” (as cited in Castaldi & Dosi, 2010 p.66).

While there are no established standard recipes for successful economic development in any society, yet there are identifiable fundamental policy ingredients and process derived from the past, which are valid for exploiting a better future (Dosi et al., 1994; Cimoli et al., 2006 as cited in Castaldi & Dosi, 2010 p.66).

Some of these identifiable standard recipes that have worked in the past and can be used to set in motion the desired development agenda of the future includes: Firstly, the type of policies set by the state with the aim of increasing the opportunities for scientific and technological innovation (Lazonick, 2007 as cited in Castaldi & Dosi, 2010 p.66). Innovation played the role and functioned as the catalyst that stimulates the direction of the type of governmental policies that encourages the increment of qualified engineers, and scientists by encouraging students to study more of the sciences. The desire of the government to increase the number of engineers and scientists in order to encourage scientific researches that may lead to the development of new innovation.

The government policies that are designed to increase the numbers of engineers and scientists is the first of the many relationships that innovation foster between the state and the private sector. This is because the increment in the number of citizens with the technical knowledge to engage in research and development ensure that the private sector have a rich pool of future skilled workforce that will lead to the creation of new innovative products. While the private sector benefits from this governmental policy, the government also benefits through the increase in its competitiveness because of the number of innovations available within its borders. This is what Porter (1990) referred to as the competitive advantage of nations. Porter (1990) argues that:

“National prosperity is created, not inherited. It does not grow out of a country’s natural endowment, its labour pool, its interest rates, or its currency’s value...A nation’s competitiveness depends on the capacity of its industry [private sector] to innovate and upgrade”.

As seen in the argument of Porter above (Figure 1), the prosperity of a nation is dependent only on its labour pool, but the ability of its industry to innovate and upgrade. However, any nation’s industrial base ability to innovate and upgrade is dependent on its ability to access skilled labour (as part of the factor conditions) that will carry out the necessary research that always result in the innovation that creates the prosperity desired. Innovation therefore, plays the role of motivating the government to create educational policies that encourages the development of a labour pool with the appropriate knowledge that industries can select from.

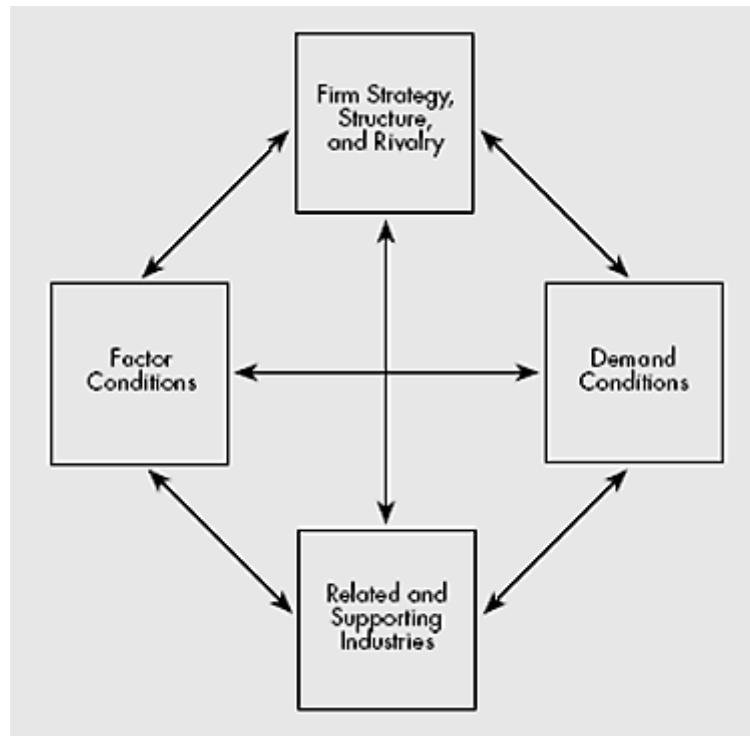


Figure 1: Determinants of National Competitive Advantages (Porter, 1990).

When this skilled labour pool is combined with the other necessary requirements (see Figure 1 above), the industries are able then to innovate and upgrade creating the competitive advantage for the nation that leads to development and prosperity. Secondly, innovation also functions as a catalyst for fostering governmental policies that encourages sophisticated technology learning and penalizing rent-seeking behaviours even under regimes of partial protection of the domestic market (Castaldi & Dosi, 2010 p.67). This reinforces the earlier assertions about the role of innovation in promoting science-based education that creates the needed workforce for developing new ways of doing thing or reinvention of the already existing ways for better performance.

In this instance, governmental policies are used to incentivise the private sector such a way that they are steered towards developing export-oriented products. The government can do this in different ways depending on what it wants to achieve. As Castaldi and Dosi, (2010 p.67) explained, “in general, targeted support, measures, for instance affecting the ownership structure of firms or targeting ‘national champions’, are effective tools for boosting technological activities at the firm level”. Innovation therefore, in this instance, functioned as the main motivation for these types of governmental actions which helped in increasing the society’s knowledge base and therefore increased competitive advantage.

Thirdly, innovation can also function as the main determinant of how information is distributed and its interaction across economic actors are affected (Castaldi & Dosi, 2010 p.67). Information distribution amongst economic actors are critical requirement of the knowledge economies, this means the distribution of information provided another means through which government can influence the growth of innovation within society because of its impact on the efficiency of knowledge integration. As Han (2007, p.7) postulated:

“[The] efficiency of knowledge integration also depends on the communication efficiency required for integration...For example, integration between development phases requires exchange of engineering drawings, parts description, bills of materials, and machine tool configurations between design engineers, manufacturer engineers, and manufacturer analysis”.

Han (2007) argument above was focused on information distribution within a single entity, when this complexity is extrapolated to a societal level distribution of information that may involve hundreds, if not thousands of independent institutions. It is only then that the significance of the distribution of information in the development of innovation can be fully understood. The desire of the government and the direction it wishes to steer the innovation of its industries can be manipulated through the distribution of information and how that information is used. Innovation therefore functioned in this scenario as the determinant of which industry gets the required information to pursue its R&D activities.

If the government is interested in developing products that are export oriented, then those industries gets access to the critical information then those focused in domestic products. Fourthly, there are no doubt that the effective ingredient for productivity growth have been high rate of physical and intangible investment and the progressive integration of all these different inputs creates economic development (Castaldi & Dosi, 2010 p.67). One of the most influential power that the state exerts over the private sector, is the ability to determine which industry gets the funding support required by most industries to carryout needed research activities. As in the other cases mentioned above, the direction that the state wishes to drive the innovative trend determines which of the industries vying for public funding will get the fund. Not only do research and development activities always in need of long term funding, but also there are no guarantee of any returns. Innovation therefore plays the role of determining which industry gets the necessary support and which does not, depending on the development direction of the state.

Finally, in terms of international specialization, according to Castaldi and Dosi, (2010 p.67), “success stories have shown a commodity composition of production and trade increasingly centred on technologies and products featuring high innovative opportunities and high-income elasticities”. Steven Jobs (n.d), was quoted as having declared that, “innovation distinguishes between a leader and a follower” (as cited in Gillam, 2012 p.101). This famous quote aptly described the unlimited ability of innovation on all segment of society, from the individual, industry to the nation states and their place in the world. Steven Jobs argument was simply that any organization, industry or nation state that wishes to be successful must incorporate active innovation strategies to achieve its objective.

Innovation’s role and function therefore in public sector must also follow similar pattern. The only notable difference between the public sector’s innovation drive and that of the private sector is that while the private pursues competitiveness to increase profitability, the public sector pursues innovative competitiveness to serve the general society better, that is, both individuals and the industrial base. The role and function of innovation as its concern the public sector therefore is not focused on profitability but ensuring better service to society. These better services also include ensuring that individuals within the society have access to employment. Employment while some may be guaranteed by the public sector, the majority of employment opportunities for citizens emanates from the private sector.

This is another junction where public sector innovation and public sector support for innovation in the private sector becomes a critical symbiotic relationship. Innovation grants the private sector competitive advantage over others; this competitive advantage means the affected organization’s produces more than its competitors to meet demands in the market. The increment in production because of demands requires the organization to employ more workers, thus enabling the public sector to meet its own objective of ensuring that the citizens have access to adequate employment. This why it is in the public sector’s interest to support innovation in the private sector. As Storper (1997) postulated that public sector competitiveness can be define as, “the ability of an economy to attract and maintain firms with stable or rising market shares in an activity while maintaining or increasing standards of living for those who participate in it” (as cited in Essen, Asik-Dizdar, & Maden, 2015 p.116).

The ability of the state to attract more firms with the competitive advantages to have a stable or rising market share in its activities is dependent on the ability of the state to provide the type of environment that ensure the firms been able to maintain their competitive advantage. Innovation role in ensuring the maintenance competitive advantage is dependent on the availability of the necessary support from the public sector. What then are the innovation process that ensures the competitiveness of the private sector that the public sector is willing to support? This critical question was answered in the next sector by looking at the process of innovation that encourages the critical symbiotic relationship between the public and private sectors.

1.3 Innovation Process

To understand the innovation process, it is essential to look at innovation in its broader sense. As Drucker (n.d) argued:

“Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced. Entrepreneurs need to search purposefully for the sources of innovation, the changes and their symptoms that indicate opportunities for successful innovation. And they need to know and to apply the principles of successful innovation” (as cited in Sarkar, 2007 p.4).

Different aspects of this definition of innovation underscores why innovation is a process. Firstly, Drucker declared that innovation is a tool that can be used as a means of exploiting opportunities. To use a tool effectively for the purpose of exploiting available opportunities, it is necessary to learn how to, meaning a process of learning is required. Secondly, it can be learned, and practiced. If it can be learned through a process of knowledge assimilation, then the process that must be applied must be a process that will ensure that it is learned properly to ensure that the learner can derive the highest level of benefit from the acquired knowledge. Finally, Drucker emphasized the most significant point of learning and acquiring any knowledge. The ability to apply the acquired knowledge in such a way that it can lead to successful exploitations of opportunities. The effectiveness of the innovation process determines the success or failures of the process. This means that there can be processes that are flawed that even when properly learned and implemented will end in failures.

The innovation process therefore must not just be the acquiring of any process, but the right process that will lead to successful exploitation of the resources available. While it is important to identify the appropriate innovation process in any situation, equally essential is the understanding of the types of innovations that the appropriate innovation process is applicable. At this junction, the work and contribution of the Austrian economist Joseph A. Schumpeter to the understanding of the concept of innovation is indispensable. Schumpeter (1936) proposed five dimensions of innovation:

- i. The introduction of new products.
- ii. The introduction of new methods of production.
- iii. The opening of new markets.
- iv. The development of new sources of supply for raw materials or other inputs.
- v. The creation of new market structures in an industry (cited in Zizlavsky, 2013 p.2).

Baregheh et al. (2009) argued that, “innovation is the process by which organizations [public/private sector] successfully transform new ideas into improved products, services or processes, in order to advance, compete and differentiate themselves in their market place” (as cited in Loosemore, 2014 p.24). The processes that Baregheh et al. are talking about above is the different internal activities that occurs within organisations or the public sector that led to the eventual emergence of new innovative products, services or processes. As Sundbo (2003, p.98) explained “the internal social process by which an innovation is developed and implemented is called the innovation process”.

In the light of the above, what then is the internal social processes involved in the implementation of each of the five types of innovations postulated by Schumpeter? The processes involved in the introduction of new products/services are complex and a fundamental reflection of the interwoven nature of the internal relationship within organizations and institutions. The transformation of new or existing ideas into innovative products/services or processes are a factor of the effectiveness of organizations in managing this complex multilayer relationship. Given the above arguments, *the introduction of new innovative products/services* are never an accidental development, but deliberately planned sets of activities that are described as a formalized set of innovation policies, referred to as ‘*product innovation charters*’ (PIC) (Bart & Pujari, 2007 as cited in Breuer & Ludeke-Freund, 2016 p.98).

According to Bart and Pujari (2007), product innovation charters are simply forms of vision and mission statements, that is, the visions and missions for the new product. The vision refers to the needs and concerns of employees, customers, shareholders, and the public, while the mission is one clear goal, purpose, new product vision, values, and the distinctive competences of the company to be leveraged in creating the new product” (cited in Breuer & Ludeke-Freund, 2016 p.98). The *introduction of new methods of production (process innovation)* is the second dimension of innovation according to Schumpeter’s postulations. Loosemore (2014, p.24) described this type of innovation as, “changes in the way that goods and services are produced which includes the introduction of new procurement methods and the production technologies”.

While the majority of focus of the world has always been on the introduction of innovative products such as the Apple Computer introduction of the world famous ‘iPhone’ which the world’s first talking mobile telephone. The process innovation behind the manufacturing such innovative product has received limited attention. Despite the fact that innovative products or services without equally innovative process of manufacturing it may make it unviable. As Lager (2011, p.11) argued “innovation activities are not confined to product development; a substantial proportion of corporate R&D must usually be devoted to process development, application development, applied research, technical support, etc. “. The Schumpeter’s third dimension of innovation is the *opening of new markets*. Loosemore (2014, p.24), described the opening of new markets as the “changes in the architecture of firms, management structures, roles and responsibilities, corporate governance, financial systems, remuneration systems, industrial relations reforms, supply chain reforms etc.”.

It is this overhauling of the original organization’s structures that encourages the type of new thinking that led to the development of new ideas that creates new innovate products. This same principle is applicable in the management of organizations. And the roles and responsibilities of individuals within organisations. An example is the outdated practice of promoting employees on the basis of their longevity within organizations rather than on the basis of their contributions to the effectiveness of the organisation. This type of employee promotion and management encourages indolence instead of industrious new thinking that creates a robust environment for innovation.

The change of the remuneration and promotion system to that which recognizes productivity over longevity creates opportunities for employees to make significant contributions that help the organisation improve its products/services to the consumers. One of the ways in which this change environment help organisations is in developing and creating new innovative products and services that enables the organizations to competitive in new markets. The creation of new products/services means the development of new industrial relations, such as developing new supply chains that enable the organization to meet the new raw materials needs or the provision of new services beyond the limitations of the past. This dimension of innovation is almost always common among business organizations across the world. An example is the transformation of Nokia of Finland from been a paper mill company to a mobile telephone giant (Brunn & Leinbach, 2000 p.131).

The Schumpeter's fourth innovation dimension is the *development of new sources of supply for raw materials or other inputs*. The significance of this dimension of innovation can be identified from the popular saying attributed to Henry Ford of Ford Motors, "no firm can be self-sufficient" (Ford, n.d. as cited in Fleisher & Bensoussan, 2015 p.495). The development of new sources for raw materials or other inputs have significant impact on the competitive advantage that an organization may exercise over its competitors. Shafaeddin (2014, p.53) argued this point by stressing that, "the value chain exposes the sources of cost advantage, differentiation and competitive scope. Firms create, or improve, their competitive advantage through innovation...in any activity in the value chain". This simply means that for the ability of organizations to reduce their cost in any guise will grant them a competitive edge over their competitors.

Shafaeddin (2014, p.53) further explained that there are two major competitive advantages that an effective development of new sources of supply for raw materials or other inputs have on organizations. "First is the lower-order advantage originating from factor cost advantage, which is the low labour cost domain of static comparative advantage...Second is higher-order advantage related to proprietary process technology, product differentiation and product attributes which are more durable". The dynamic nature of innovation means that this competitive advantage is subject to constant change to ensure that the advantage is maintained through continuous search for better than currently available sources of supply. The identification and development of new sources of supply for raw materials or other inputs is not enough, if only one of the two major advantages identified above is available.

In order for organisations to derive the best advantages that their discovery supply, the two types of advantages must be present at the same time. Simply put, an organization in possession of both ‘low-cost’ and ‘high-order’ advantages are in a better competitive position (Shafaeddin, 2014 p.53). The Schumpeter’s fifth and final innovation type is the *creation of new market structures in an industry*. Zook and Rigby (2002, p.84) described this dimension of innovation from the perspective of how organizations use new markets to evaluate the level of competitive advantages or differentiation their products/services are able to achieve. The authors argued that this dimension of innovation provided organizations four distinct advantages. One, it provides organizations *opportunities by the importing of new ideas which is good way to multiply the building blocks of innovation*.

One of the outstanding examples of the benefits that organisations derives from the opportunities provided by importing new ideas to act has the building blocks for innovative products and services is the story of Tetra Pak. According to Zook and Rigby (2002, p.84), Tetra Pak a world leader in packaging found a company with expertise in sterilizing hospital equipment to help it figure out how to sterilize the food inside its packages. This importation of the ideas of an external organisation in sterilizing foods inside its packages changed the packaging industry forever. As Zook and Rigby (2002, p.84) explained further:

“The breakthrough product that resulted from this collaboration, Tetra Recart, makes it possible for Tetra Pak customers to sterilize paperboard containers filled with pet foods, soups, sauces, fruits, and vegetable. The packages are lightweight, and their rectangular shape – easy to hold and pour – increases the number of packages that can be displayed on a shelf by as much as 50%”.

Tetra Pak did not allow its market position and leadership in the food packaging industry stop it from taking advantage of opportunities available through the use of external ideas in improving its products capabilities. This is how organisations uses the opportunities of market structures in an industry to innovate its products and services. The successful outcome from this importation of new ideas goes far beyond the businesses of Tetra Pak to include more efficient use of display spaces in retail outlets. Two, it provided organizations with the *opportunities to export their new ideas in a way that enable them to raise cash and keep talent*.

Morris, Kuratko and Covin (2011, p.110), postulated that:

“A company’s innovative ideas, such as its proprietary technology, can have market value that is exploitable through its sale to outside customers. Additionally, by selling internally developed but unexploited innovative ideas to outside parties, firms can avoid discouraging the people who generated those ideas”.

This type of action by organisation is critical in its efforts to remain innovative because the innovative ideas that are not exploited but sold out to other organisations that will use them for developing new innovative products enables the exporting organisations to generate much needed resources that can be reinvested into creating more innovative ideas. This way of exploiting innovative ideas also enables organisations involved to retain the skilled and talented employees that generates the innovative ideas in the first place. The employees see their ideas been fully exploited which give them job satisfaction. It also enables to continue to pursue other researches through the available resources generated from the sales of their initial innovative ideas leading to more innovative ideas generation.

Three, the exporting of new ideas gives companies *a way to measure an innovation’s real value and to ascertain whether further investment is warranted*. Irrespective of how innovative an idea may be thought of by its developers. The true worth of any innovative ideas is always in its performance in the market place. As Morris, Kuratko and Covin (2011, p.110) observed, the opportunity “to sell internally developed innovative ideas to external markets can be the litmus tests for the true value of those ideas (which are often undervalued or overvalued when viewed through purely internal lenses)”.

The performance of these innovative ideas in external markets enables the originating organisation to open up new markets for their future ideas and build a brand name for excellence. Finally, the authors argued that this innovation dimension enables *organizations exporting and importing ideas to clarify what they do best, that it, their core competency*. This is one of the critical aspect of any innovative idea. The ability of organisations to compete effectively in the market place is dependent on the competitive advantages they are able to extract from their innovative ideas. If this is so, then how the organisation know if their ideas are innovative enough to grant them the much-needed competitive advantage over their competitors?

Morris, Kuratko and Covin (2011, p.110) once again, provided an apt answer for this important question, when they argued that: *“Collaborative efforts, the purchase of innovations or inputs to innovations from other, and offers to sell the firm’s innovations or inputs to innovations to other can reveal where a firm’s real bases for competitive advantage lie and, accordingly, how it should define its business”*. An organisation’s understanding of its core competency goes a long way in helping to cut cost, cut waste and focus more of what really matter to its continual competitiveness and profitability. Kumar and Meenaakshi (2011, p.312) explained this when they argued that:

“A sustainable core competency lets the company produce something at a lower cost or higher quality than other companies in the open market can. When a company tries to weigh its capabilities relative to competitors, it discovers that it is strong in some areas which it should pursue whereas it should withdraw from the rest as other have more capabilities in them”.

Once the exporting and importing of ideas has enabled an organisation to clarify and establish its core competency. The next action is to focus squarely on these identified core competencies. This is how organizations uses the exporting and importing ideas to clarify what they do best and focusing all their resources on those areas where they performed best. This also enable organisations to improve their capabilities in these identified core competencies and used it to their advantage by continuously innovating in those areas.

1.4 Innovation in the Public Sector

In the last three to five decades the role and function of the public sector has experienced dramatic changes. These dramatic changes have completely changed the way in which the public sees the role of the public sector in society. As Torfing (2016, p.27) explained:

“It is no longer enough for public administration and public governance to be legal, rational, efficient, planned, and coordinated. Instead...public organisations should be subject to constant and deliberate changes that optimize their operation and functioning vis-à-vis the political objectives and performance targets set by elected politicians and the social and political demands advanced by citizens in their capacity as “users,” “customers,” or “stakeholders.”

The definition of the new role and function of the public sector above shows the dramatic change from what use to be an agency of government established by law to provide certain services. To agencies whose role demands that they must meet the increasingly dynamic needs of citizens.

In the light of the above, the researcher has in previous sections of this research thesis explained the interconnectivity of the public and the private sectors in their respective roles and functions. However, in this section, the focus was more on how innovation that started mainly in the private sector has crept into the public sector due to the aforementioned demands of a changing society. One of the first observation that even a casual observer will notice about the new definition of the role of the public sector was the definition of the users of its services. Citizens have transformed from mere users to “customers,” and “stakeholders”. These are description that are usually assigned to actors in the private sector. The graduation of “users” of public sector services to becoming “customers” and “stakeholder” meant the way they are served has also changed.

It no longer enough for public sector agencies to make certain services available, but rather they must strive to serve the citizens as users, but as customers and stakeholders, thus changing the way services are provided. While the change in the description of the consumers of public sector services may appear ordinary. It has however changed the role and function of the public sector completely. Public sector now serving customers and stakeholders must change to serve the valuable purpose of breaking policy logjams and political stalemate, permitting a knowledge-based renewal of outdated organisational procedures and practices, and meeting the changing and unfulfilled needs of citizens, private sector organisations, and other beneficiaries of its services (Torfing, 2016 p.28). In order for innovation to occur in public sector, there are certain phases that the concerned public sector agency must undergo.

This is referred to as the public sector innovation circle. While there is no disagreement on the presence of innovation circle in public innovation. There is divergent opinion among scholars as to the number of circle. Hartley (2015, p. 86) described the entirety of the public sector innovation cycle in three phases, that is, the invention phase, the implementation phase and the diffusion phase. These three phases represent a simplified public sector innovation circle from the process perspective. However, Hartley (2015, p.86) was quick to point out that these three phases was an oversimplification and overgeneralization from the private sector literature on innovation. Eggers and Singh (2009) described the public sector innovation circle in a more comprehensive way. Identifying five phases that includes, first, *defining problem and challenges phase*, second, *generating new and creative ideas phase*.

Third, *selecting the most promising ideas phase*, fourth, *implementing the new solution in practice phase*. And fifth, *diffusing new ideas and practices phase* (as cited in Torfing, 2016 p.32-35). For the purposes of this research thesis, this more comprehensive approach to the innovation circle phases in public sector innovation was adopted. What then, are these five phases of the innovation circle and do they relate to the subject matter of this research thesis?

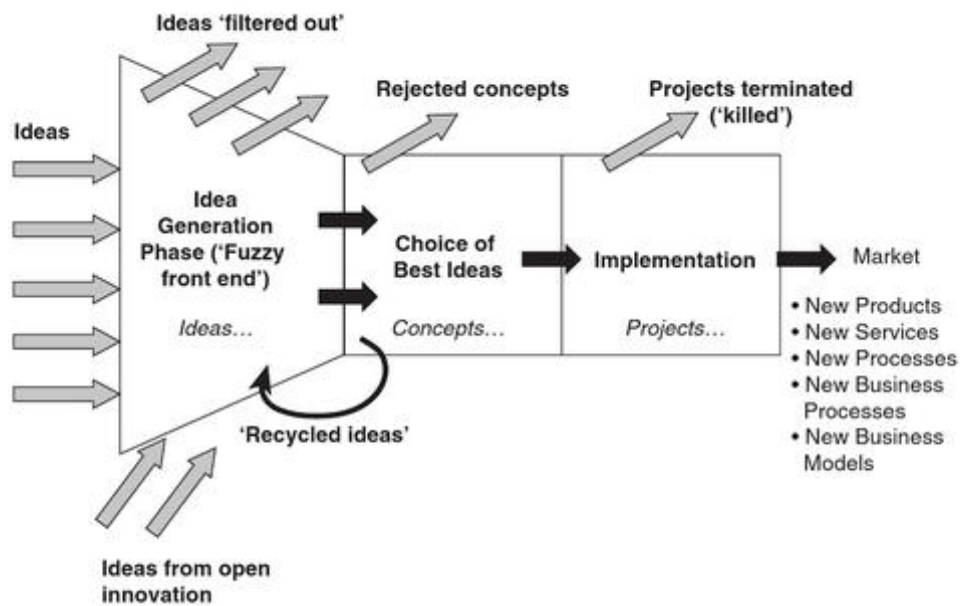


Figure 2: *The Typical Phases of An Innovation: 'The Development Funnel'* (Goffin & Mitchell, 2016 p.17).

Defining Problem and Challenges in Public Sector Innovation

According to Torfing (2016, p.32), “to start crafting innovative solutions, the problems, challenges, and opportunities must be properly understood and defined. This step involves devising a thorough description of the problem at hand, outlining the significance, scope, conditions, and causes”. This phase simply involves the identification of the issue that requires attention, say, the delays in application for certain public records. This problem here is simply the difficulties involve when citizens require the theoretical documents and are unable to access it in reasonable time. The challenge is how will this delay be resolved? In a situation as stated above, the concerned public sector agency, understand and agreed that there is a problem with timely access to the said documents. The identification of the problem and the recognition of the challenges that may be involved in resolving the problem forms the first phase of the development of an innovative solution to the problem. The identified problem simply acts as the catalyst for seeking a permanent innovative resolution (ideas in figure 2 above).

Generating New and Creative Ideas in Public Sector Innovation

This phase of the innovation circle is where the first point where the disruptive nature of innovation is always experienced. Despite all the fanfare associated with innovation, it has never always been a smooth operation. Generating new ideas that will enable the identified problem in the system to solve may also involve testing new ideas that tend to be disturbing and disruptive and are likely to make the social and political actors involved in innovation processes uncomfortable (Torfing, 2016 p.33). In the public sector, the fostering of new and creative ideas to solve any identified problem usually occurs only after the political and social actors are dissatisfied with the current situation.

The political actors, that are in charge of the public sectors activates all the necessary actions that will enable the generation of new and creative ideas to remedy the problem. The creative ideas could be as basic as employing more staff to reduce the delays. Or as complex as developing new computer systems that enable citizens to apply online without physically going to the public sector agency. This juggling of ideas whether basic or complex eventually results in the generation of a large pool of innovative and creative ideas from where one or more are chosen for development (ideas generation in figure 2 above).

Selecting the Most Promising Ideas in Public Sector Innovation

This is the phase where the actors select a limited number out of many generated during the preceding phase. Since it is practically impossible to develop all the generated big bold ideas during the ideas generation phase. The discarded ideas are represented as the ‘ideas filtered out’ within the ideas generation phase (see figure 2 above). While the few selected ideas are moved to the next stage for possible development and implementation (choice of best ideas in figure 2 above).

Implementing New Solutions in Public Sector Innovation

According to Sorensen and Torfing (2015, p.153), implementation of new solutions generated from amongst the best ideas selected in the previous phase “is promoted when the relevant actors [the political actors being the politicians that controls the management of public sector agencies and the social actors, that is, the citizens that requires the services provided by the public sector] coordinate their actions and have joint ownership of the new solution”.

It is when they achieve this coordination of actions that the real value of the new innovative ideas being implemented can be appreciated or rejected. Sorensen and Torfing (2015, p.153), went further by adding that this can only be possible when there is an exchange and pooling of resources in the implementation phase which helps to avoid overlaps and create synergies that eventually broaden participation which in turn will help in reducing implementation resistance (see implementation in figure 2 above).

Diffusing New Ideas and Practices in Public Sector Innovation

The diffusing of new ideas and practices is the final phase in the innovation circle. Proctor (2007, p.59) described this phase of the innovation circle as “the tendency of new products, practices, or ideas to spread among people. Usually, when new products or ideas come about, they are initially only adopted by a small group of people; later, many innovations spread to other people”. This stage of the innovation circle is represented by market in figure two above. The market in respect of public sector services involves the testing of the new innovative ideas in service provision. An example of this phase of innovation in public sector is the implementation of the use of smart card for the disbursement of social benefits welfare payment in the Czech Republic by the Ministry of Labour and Social Affairs (MoLSA) (Hybl, 2004 p.196).

This electronic smart card scheme has never been done before in the Czech Republic and the introduction marked the market phase (figure 2 above). The outcome of the pilot scheme determines the future of the programme. If the programme was accepted and become popular, it would be migrated to other aspect of the public sector services provision in the Czech Republic, thus making it an established innovative change in the provision of social services. However, if the scheme was unpopular, faced stiff opposition or becomes expensive and not cost effective. The product will be terminated (see figure 2 above). Torfing (2016 p.34) described this phase of innovation circle in public sector more aptly as involving the:

“highlighting the gains obtained by first movers, establishing contacts with potential followers [those who support the scheme], overcoming standard objections [those who opposed the scheme] such as “we do not need any changes” and “it is not invented here,” and adapting innovative ideas and concepts to new and different circumstance”.

Simply put, the success or failure of innovation, creative innovative ideas in the public sector are dependent on the acceptance or rejection of such innovations by the general public. Unlike in the private sector where innovative ideas and products' successes are dependent on their performance in the market place. At this junction, it is essential to understand the types of innovations common in the public sector. Osborne (1998) postulated that innovation in the public sector can be grouped into a four-fold typology, that is:

- i. Total - Innovations that are new to the innovating public sector agency.
- ii. Expansionary - Innovations offering an existing service to a new group.
- iii. Evolutionary - Innovation offering new services to existing groups.
- iv. Developmental - Innovations improving existing services to existing groups (as cited in Borins, 2014 p.29).

While Osborne's postulation covered almost every aspect of established public sector innovation in broad manner, others like Windrum (2008) provided a more simplified but concise list. According to Windrum (2008 as cited in Georgousopoulos, 2013 p.315), the six types of public sector innovation are: *Service innovation*, that is, new or altered service features and design. This is the innovation within public sector that involves the altering of already existing services such as the introduction of the smart card payment scheme for Czech welfare payments. This is an already existing service offered by the Czech government to its citizens. It was however, innovated through the introduction of smart card payment systems. Service innovation in public sector could also be the introduction of a completely new service that was never offered within the public sector in the past. An example of this type of completely new innovation in services is the recent introduction of the EET system within the Czech Republic for certain group of business entities.

Service Delivery Innovation, that is, new or altered ways of delivering services or interacting with citizens. The introduction of the internet to public sector service delivery is a great example of how the public sector innovated its service delivery system. This can be seen from the eradication of paper application for certain services to the ability of citizens to electronically pay for certain public services such as the online public transport systems reservation and payments. This type of service delivery completely changed the ways in which the public sector interacts with the citizens of any given state that introduced such services.

Administrative/organisational Innovation, that is, “new or altered organisational methods in the public sector practices, workplace organisation or external relations, increasing public sector’s performance by reducing administrative/transactional costs, improving workplace satisfaction etc.” (Windrum, 2008 as cited in Georgousopoulos, 2013 p.315). This type of innovation remains one of the most visible of the innovative transformation that has occurred because of the adaptation of internet to public sector service provision.

Conceptual Innovation, that is, “the development of new world views that challenges assumptions that underpin existing service products, processes and organizational forms” (Windrum 2008 as cited in Georgousopoulos, 2013 p.315).

This is the type of public sector innovation that departs completely from what was assumed as the norm to change the way things are done. Such as introducing new forms of governance which may include the recruitment of experts to reorganise the administration of public institutions. This type of innovation lead to the creation of interactive policy making and engaging governance that work to create horizontal networks (Alberti & Bertucci, 2006, as cited Lewandowski, 2016 p.53). *Policy Innovation*, that is, the change of thought or behavioural intentions associated with a policy/new or altered missions, objectives, strategies and rationales (Windrum 2008 as cited in Georgousopoulos, 2013 p.315). Przeworski (2001) argues that this type of public sector innovation only happens when a successful policy innovation is introduced, aside from this occurrence. What is normally present within the public sector is simply ‘policy regimes’ which is just the dynamism of policies as part of the political cycle (as cited in Shiratori, 2014 p.387).

Systemic Innovation, this implies that the public sector should be able to develop a long-term, goal oriented and systemic perspective on how to mobilize public resources and external private resources such as knowledge collaboration with universities or research institutions, people and funds in order to look for ‘new combinations’, thereby creating fruitful conditions for innovation (Drucker, 1985 as cited in Bekkers, Edelenbos & Steijn, 2011 p.20). This is the type of systemic innovative thinking in the public sector that resulted in the creation of public-private partnership in developing mutually beneficial innovative products and services.

Chapter 2

RESEARCH METHODOLOGY

Innovation has become central to the growth and development of all nations. This explains why the backbone of every developed country and their success is dependent on innovation, which is fuelled by public support for innovation and development through R&D. Individuals, families, societies, organizations and all areas of human life have become reliant on innovation such as in the area of technology, medicine, space science and others. In order to achieve innovation break through, integrative national policies are required to achieve success. That is to say, the fundamental principle for every policy is to develop a framework for implementation and improvement of innovation. Policies normally consider two major things; the beneficiary of the policy and funding of the policy. The ability to satisfy the two criteria proves that the policy to be implemented is viable and beneficial hence receives the public sector support and financing.

Evidence from studies show that the European Union as a body have a driving goal and a blue print that engineers and accelerate public support for innovation and development through R&D for its member states. Since 1984-2013, a progressive innovative framework has been designed to influence creativity and innovation in Europe. In addition to that, future projections of frameworks have been designed in the Horizon Research Programme to be completed in 2020. Series of policies towards achieving innovation and technological breakthrough have been designed, implemented and amended over the years by the two nations selected for the study (Czech Republic & Germany).

2.1 Research Aim

The aim of this thesis research is to investigate the role and impact of public sector support for innovations.

Based on the aim, the specific objectives are to;

1. Examine policies on Public Sector Support for Innovations in the EU as a body.
2. Assess the extent of Public Sector Support for Innovations in the selected countries (Czech Republic & Germany).
3. Compare the integrative approaches use in the implementation of innovation and R&D.

4. Investigate how the Public Sector Support for Innovations is used to finance policies.

2.2 Research Questions

The following research questions aided the analysis of the selected countries helping achieve the aim of the thesis.

1. How significant is public sector support for innovations?
2. What is the significance of the relationship between governance and Public Sector Support for Innovations in both Germany and the Czech republic?
3. what is the impact of Public Sector Support for Innovations on socio-economic development of Germany and the Czech Republic?

2.3 Research Method, Approach and Strategy

To conduct a valid and reliable research, it is essential to have a clear and well thought through research method. This is important because the entirety of the reliability and validity of the research is dependent on a solid well researched dissertation that was founded on the appropriate approach and strategy. As Achari (2014, p.19) explained, “Research methods may be understood as all those methods/techniques that are used for conduction of research”.

Research Approach – Inductive Approach

Of the two approaches available to this type of research dissertation, the inductive approach was the most relevant and appropriate for the type and nature of research. As Jakubec and Astle (2017, p.28) observed, inductive research approach starts with specific observation and measures, begins to detect patterns and regularities, formulate some tentative hypothesis that can be explored, and finally develop some general conclusions. The appropriateness of the inductive research approach can be identified in the fact that the success of the German’s innovative economy represents the observed phenomenon. This observed phenomenon was then investigated to discover the patterns and regularities, that is, public sector support for innovations.

Then using the outcome of the investigation of these observed phenomena and its inherent patterns, comparing them with what was observed as regularities and patterns in the Czech Republic. The outcomes of the comparison of these two independent observations and

regularities enabled the research to develop a generalized conclusion as to the effect of public sector support for innovations. Another critical importance of the inductive research approach that makes it the best fit for this type of research dissertation was its open-ended nature. This enables the research findings and conclusions to be solely based on the interpretation of the available research data, hence increasing its validity and reliability (Figure 4. P.32).

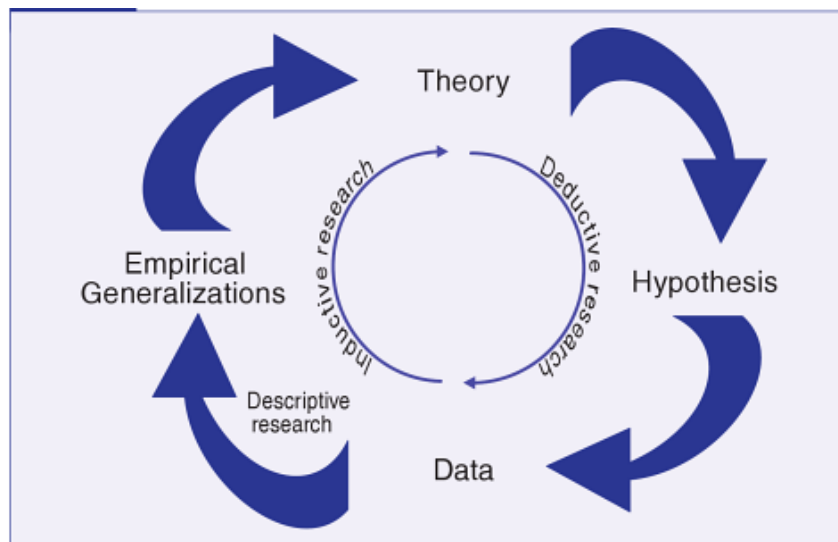


Figure 3: Inductive and deductive research strategies (Nestor & Schutt, 2014, p.32).

Research Strategy – Qualitative Research Strategy

One of the many motivations for application of the honeycomb of research methodology was the connectivity and continuity it provides from the start to the end of the dissertation research. That is, the research philosophy of interpretivism connects to the choice of inductive research approach. In the same vein, the choice of research strategy applied to this dissertation was informed by the dissertation’s philosophy and approach, hence decision to qualitative research strategy. As Smith (2017, p.47) explained, the purpose of this type of research strategy was to identify, evaluate and interpret all available research data relevant to the dissertation. Qualitative research strategy provides the most robust means of collecting the appropriate research data that was not only appropriate but fit perfectly into the entire structure of the research dissertation.

Qualitative research strategy enables researchers to make sense of the world and experiences they have of the world around them (Merriam, 2009 as cited in Guest, Namey and Mitchell, 2013 p.2). The qualitative research strategy applied therefore enabled the

research dissertation to investigate and evaluate the impact of public sector support for innovations. Furthermore, to buttress the significance of the qualitative research strategy to this research dissertation. It is important to look at the three essential characteristics of the qualitative research strategy and its impacts on this dissertation. As Carlone, Caudle and Check (2013, p.viii) argued, qualitative research strategy is inductive, open-ended and most importantly relied mainly on textual or visual rather than numerical data to achieve its main goal of understanding rather than generalizing across settings.

This research thesis was conducted on mainly and primarily on the basis of publicly available textual materials. In addition, as the thesis did not intend to provide a generalized finding that could be applied across all settings, that is, limited only to the observed and researched occurrence in two nation states. The qualitative research strategy can be definitely argued as the most appropriate for this type of research. The public sector support for innovations as observed in the Czech Republic and Germany was not intended to be generalized across all nation states of the EU. Finally, the research thesis strives to draw open-ended conclusions that allows for other inputs and interpretations.

Research Design – Comparative Research Design

According to Heppner et al., (2016, p.119), “research design is the tool that researchers use to frame a study and involves developing a plan or procedure to conduct that investigation”. As was the case in the preceding aspects of the methods and methodology of this research dissertation. There are several established research designs that could be applied to any research study. Wilson (2013, p. 17) provided a list of possible research designs which was by no means an exhaustive list. This ranges from case study research design, cross-sectional research design, to comparative research design. The research strategic approach has already been explored in great details above. The significance of the appropriate choice of research design was that it must be compatible with the already selected research strategy.

In order to ensure this seamless connection between the research strategy and design. It is critical that the choice of research design amongst the several available must be one that work effectively with the already chosen design. The determination of the research dissertation to meet the above required coupled with the desire for a reliable and valid research conclusion. The comparative research design was selected for the dissertation. As

Heppner et al., (2016, p.121) argued, “Qualitative research relies upon a naturalistic and interpretive approach in order to understand the research question of interest”. To understand influences of public sector support for innovations in the Czech Republic and Germany, it was essential that the research dissertation approach the phenomenon is critical three steps process.

First, investigates each of the focal nations states public sector support for innovations individually. This enables the research to have a comprehensive understanding of the issue innovations and the how that each focal nation supports it within their own context. Second, evaluated the outcome of each of the two investigations independent of each other. This was important to ensure reliability and validity of the investigations. Finally, compare the two independently investigated and evaluated public sector support for innovations with each other. The aforementioned three steps explained the reliance, appropriateness and significance of the application of the comparative research design. Having established the rationale for the research dissertation’s philosophy, approach, strategy and design. The next focus was on the data sources and analysis.

2.4 Sources of Data Collection

According to Klenke (2016, p.10), one of the hallmark of qualitative research was the fact that research data are mainly derived from the perspective of the participant. The author went further explaining that qualitative research dissertations are descriptive, incorporating expressive language which reflects the voices of the participant, which was the focal countries in this particular case. As this dissertation research involves the investigation and exploration of two nation states that cannot be surveyed, interviewed and observed as a living entity (Figure 2 above). As it was impossible to apply the commonly applicable qualitative research data sourcing options. In the light of the above, the research dissertation sourced the required information for the execution of this research through the only available option, that is, secondary research data sources (Figure 5, below). The secondary research applied in this dissertation research was sourced through the process of literature review. Webster and Watson (2002) described literature review as a process of creating “a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed” (as cited in Booth, Sutton and Papaioannou, 2016 p.17). Hence, its adoption for the research as illustrated below.

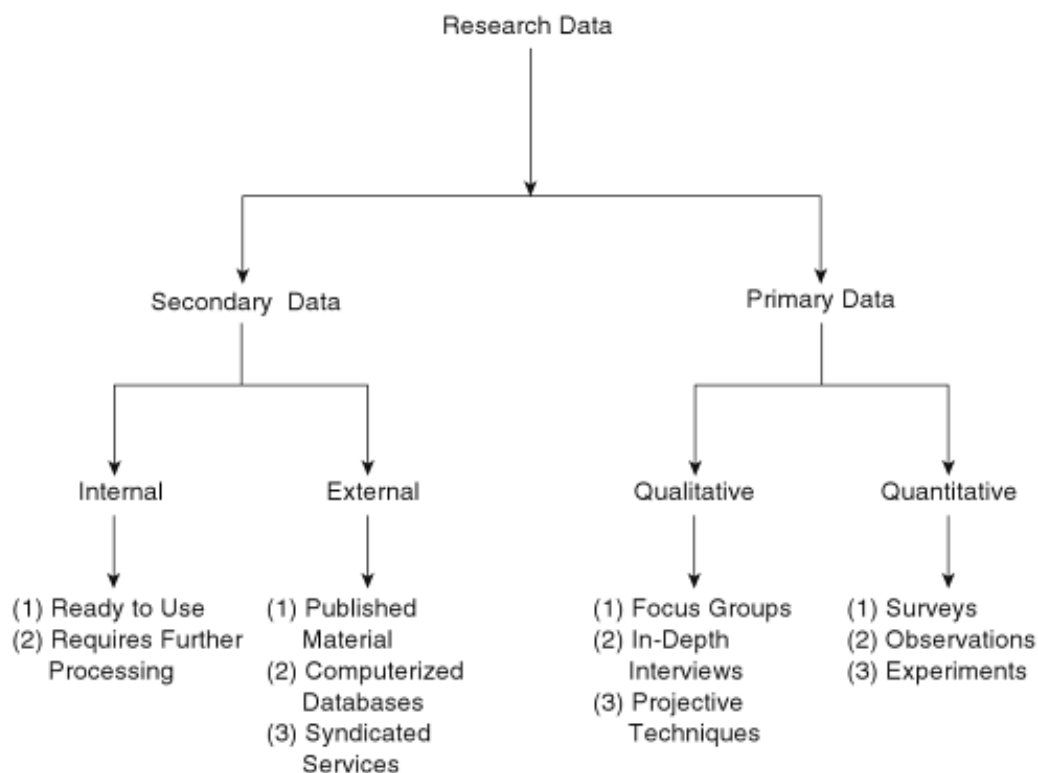


Figure 4: Types and sources of Qualitative research information (Malhotra et al. 2006 as cited in Polonsky and Wallert, 2011, p.130).

Secondary Data Collection

At the basic level, secondary research data are simply data that are already available and originally produced for a different reason. According to Collins (2010, p.120), “secondary research involves using information that other people have gathered through primary research...neither collected directly by the user nor specifically for the user”. This was the type of research data that the whole dissertation research was based. As figure 6 below indicated, there are seemingly limitless sources for this type of research data. Ranging from official government statistics, to textbooks, academic journals and even mass media sources. Due to the nature and volume of the available secondary data resources, there was a need to apply a befitting sampling technique. Qualitative research sampling tends to be ‘purposive’ rather than random (Kuzel, 1992; Morse, 1989 as cited in Miles & Huberman, 1994, p.27).

Johnson and Christensen (2012, p.231) explained the appropriateness of purposive sampling technique for this research dissertation further by arguing that the sampling technique enabled the research to determine the characteristics of the sample. This was a critical point as the research was faced with the choice selecting the relevant information that will enabled the research dissertation objectives to be met. As Patton (1990) declared,

“the logic and power of purposeful sampling lies in selecting information-rich cases for study in-depth” (as cited in Lodico, Spaulding and Voegtler, 2010 p.134). Simply put, the dissertation selected purposive sampling technique to enable the obtaining of the secondary research data that provided the richest, most detailed and relevant information. And the details provided by the secondary research data enabled the answering of the research question completing the fifth step of the honeycomb of research model.

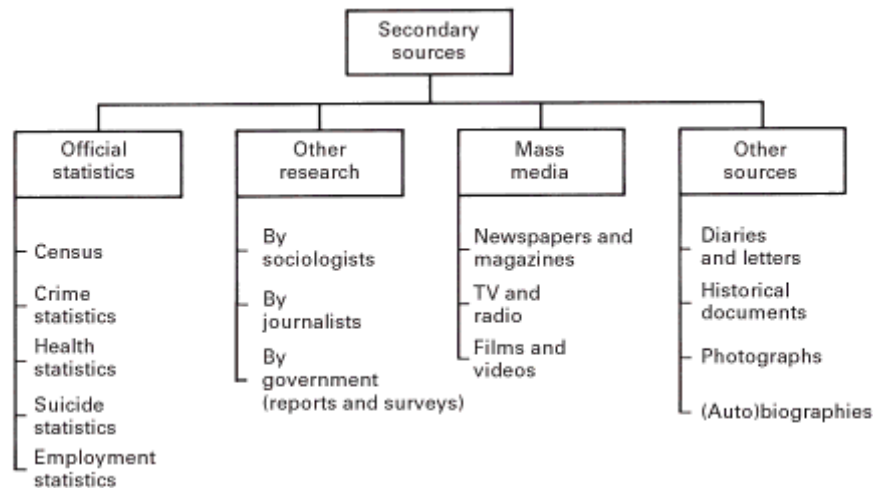


Figure 5: Simplified sources secondary research data (Browne, 2005,p.418)

2.5 Research Data Analytical Method – Content Analysis

According to Krippendorff (2013, p.24) described content analysis as “a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the context of their use”. The appropriateness of content analysis method was rooted its characteristics. Some of these characteristics includes but not limited to the following: One, texts have no objective, that is, whatever interpretation that anyone makes of a written text is based one’s own independent analysis and interpretations (Krippendorff, 2013, p.24).

All the qualitative research data acquired during the course of the research were selected on the basis of their relevance in a purposive sampling manner. However, the original meaning the original research may have assigned to the text was not a determinant of what eventually becomes of them when applied to this research dissertation. Two, there are no single universal meaning assigned or attached to collection of texts. Again, the interpretation of the reader is the determinant factor on what type of meaning was assigned to the interpreted texts. Simply put, content analysis allowed the researcher to interpret on the basis of the environment and context of its application. And finally, meanings (contents) speaks to something other than the given texts (Krippendorff, 2013, p.24).

Irrespective of the research analytical interpretation of the text, the central principles of reliability, validity and replicability was always present.

2.6 Significance of the Study

The study will unearth Public Sector Support for Innovation policies from developed countries like Germany and Czech Republic and draw the comparative assessment. Through the EU Public Sector Support for Innovations will be used as a standard measure and practices to develop and implement other policies in the selected regions.

The study will also contribute to existing literature by adding the perspective from the selected countries. Aside that, the knowledge of the researcher will be enhanced regarding developed countries like Germany and Czech Republic Public Sector Support for Innovations. This will help the researcher to contribute meaningfully to policy on Public Sector Support for Innovations. Future Students and other researchers will have the opportunity to use the current study as a guide for further studies.

Chapter 3

European Scope of View on Innovation: Policy & Financial Perspectives

The basis for the introduction of any main reason for any policy irrespective of the scope is always to provide a framework for improvement. The introduction of policies however is never enough to ensure the outcome that the planners hoped for. To ensure the possibility of a policy framework resulting in a planned outcome. The planners usually ensure they have the answers to two critical questions, that is, who does the policy benefits? And, how is the policy going to be financed? The answers that the planners of any policy get from their research into these two critical questions will determine the success or failure of the policy. For instance, if the beneficiaries of the policy been proposed are limited to a small number of the population. It is obvious that the public sector that was designed by nature to provide benefits to majority of the population will automatically shy away from such policy. This is because the finances that the public sector will devote to such policy is derived from the taxation of the majority of the populace. On the other hand, if the answer to the first question indicates that majority of the population will benefit from the introduction of the policy been planned, then the public sector support for such policy can be easily justified.

This bring the research to the second critical question, that is, how will the policy be financed? Financing is a critical part of the development and implementation of any policy. Having established this fact, public sector financing of any policy is subjected to strict guidelines and monitoring to ensure there are no abuses. One of the justifications for expending public limited resources on policy programmes. In this second chapter of this research project, the focus is on these two critical questions and the answer that ensure that policy make it out of the drafting stage to full implementation. The research in this section looked at the answers to these two critical questions as it concerns the EU and its support for innovation. Firstly, the research focused on the beneficiaries of public support for innovation. Describing what public support for innovation is comprised of. Identifying the beneficiaries through the traditional public administration, the new management, and collaborative governance perspectives. Secondly, the research in this section also focused on providing the answers to the second critical question of public sector support for innovation, which is, financing. The research answered this fundamental question through

the exploration of the EU's seven framework programmes on innovation. These provided the policies framework and the financial structure that ensured their successes.

3.1 Beneficiaries of Public Sector Support for Innovation

The fact that innovation and the public sector support for it has played and is still playing a crucial role as a developmental catalyst was an established fact. As Farr, Sin and Tesluk (2003, p.599) attested, "the role of public sector [support for] innovation is decisive as catalyst and accelerator of social and economic development". They went further arguing that public sector support for creativity, innovation and competitiveness has created better, more efficient and cost-effective ways of managing public operations, and helped market function more efficiently in a competitive environment. These assertions raise the question about who and what are the beneficiaries of this public sector for innovation in specific terms. The beneficiaries of public sector support for innovation can be categorised into three broad groups: The State (public sector), the industries (private sector), and the society as a whole (citizenry). As Eichenberger (2003, p.314) explained, economic growth and human welfare are spurred by innovations. While this is obvious with respect to economic innovations, political innovations are perhaps even more important". It is not surprising that the author considered the political innovations are the most important innovation within the trio of innovations mentioned.

This is because the political innovations, that is, the State, controls and determines are far the other beneficiaries of innovation will experience the benefits that innovations provide or not. Eichenberger (2003, p.314) emphasised the significance of the government and its attitudes towards innovations by declaring that the government "determine the capability to innovate of the economy as well as the effectiveness of government, which is decisive determinant of competitiveness, be it at the local, regional or national level". Since it is clear from the explanations above that the role of government or put more directly, the State is that of the pivotal fulcrum that determines the level of penetration of innovative ideas, products and services. It is therefore pertinent to discuss the beneficiaries of innovation first from the perspectives of the State. The researcher looked at the beneficiaries of innovations in terms of the States contributions to the existence of these innovation beneficiaries on the basis of three public sector theories. First, the Traditional Public Administration (TPA), second, the New Public Management (NPM) and finally, the Collaborative Governance also known as Public Value Management (PVM).

3.1.1 Beneficiaries of Innovation: Traditional Public Administration

The traditional public administration has been hailed as perhaps the most flexible and adaptive approach to public sector administration. Famer (2010, p.20), described it as perspective that is regarded as established or mainstream in ways of thinking, of believing, of assuming, of interpreting, and doing. While also at the same time seen as been inclusive of the ways of not thinking, not believing, not assuming, not interpreting, and not doing. This description painted an apt picture of what the traditional public administration perspective represents. This perspective of public sector administration is known to enable the management of both human and material resources in such a way that it enables the explosion of innovative ideas. Although the name may appear conservative in meaning, in reality, the traditional public sector administration was at the heart of the greatest innovative achieve of the last century.

Hartley and Torfing (2013, p. 238), explained that innovation has been occurring under “traditional public administration” (government primarily by government, based on political direction and bureaucratic administration) for some considerable time. This further emphasises three important points about traditional public administration. One, the fact that despite its conservative name, traditional public administration was compatible with innovative changes. Two, its long history with innovation before innovation became a mainstream issue. Three, the centrality of the controllers of government, that is, the political leadership as well as their bureaucratic counterparts in determining the flow of innovative development in any society.

Muzzacato (2013) buttress this point by pointing to the fact that “the invention of the Internet, which has revolutionized economics, politics and society, but also extends this to a wide range of technologies, including GPS, bio-engineering and pharmaceuticals” (as cited in Hartley & Torfing, 2013 p. 238). The examples of the direct impact of the invention of the Internet provided here is a fraction of the areas of societal life that has been changed forever on the basis of this single invention. While the invention of the Internet has erroneously been attributed to the private sector by some because of the limitless use of the medium that the private sector has taken advantage of. The invention was actually the brainchild of the public sector effective provision of the resources and the directions required for explorations in new, uncharted territories in sciences and development that the private sector could not afford to fund.

Hartley and Torfing (2013, p. 238), were more direct in their attributions of the effectiveness of the traditional public administration in creating the right environment, providing the appropriate resources and directions for innovation. They declared:

“Innovation occurs under “traditional public administration” (government primarily by government, based on political direction and bureaucratic administration). In these contexts, national and local politicians are likely to set the tone and direction and allocate the resources for innovation, through radical, often large-scale and sometimes transformative policy reforms, with public servants responsible for finding ways to implement the proposed innovations”

If just the example of the invention of the Internet is taken out of the many examples available. The beneficiaries of the invention of the Internet championed by traditional public administration cannot be listed in the true sense of the word. This is because the Internet has affected every segment of the society. The Internet has changed the way in which society communicates providing more avenue to reach each other. In business, the Internet has created new and otherwise unimaginable ventures from the Googles of this world to enabling the limitedness of the boundaries that otherwise nominal equipment such as the mobile telephone can reach today. Not mentioning the creation of virtual marketplace such as Amazon were the world can basically buy and sell anything and everything from the comfort of their homes to buyers in the remotest parts of the world completely unreachable in the past.

It is therefore an effort in futility to even try to list the beneficiaries of the innovation of the Internet in specific terms. However, in broad terms, the researcher can comfortably state that the innovation of the Internet has affected the creation of new ways of doing things in both the public and private sectors of the economy of any given society across the world. These has in turn led to the creation of otherwise none existent employment opportunities that has led to the improvement in the quality of the living standards of millions of people across the world. The beneficiaries of this innovation can then be classified as ranging from the public sector the initiator of the invention. To the private sector, the sector that taken advantage provided by the innovation. And by extension, the individuals across the world whose livelihood are connected to the existence of the innovation of the Internet. So, generally speaking, the beneficiaries of the traditional public administration of the innovation of the Internet has been the entire spectrum of the society.

3.1.2 Beneficiaries of Innovation: New Public Management

Another model of public administration that has impacted innovation in no little ways is the New Public Management theory and thereby increased the numbers of beneficiaries of innovation. This theory was based the simple premise that public sector innovation is seldom the result of individual efforts of singular actors, but rather requires the collaboration between a host of public and private actors, which includes politicians, civil servants, experts, private firms, user groups, interest organizations and community-based associations (Csikszentmihalyi, 1996; Borins, 2001 as cited in Torfling, p.305). Pollitt and Bouckaert (2004) argued that the whole idea of the collaboration between these different segments of society that created the theory of New Public management was not borne out of the goodwill of the public sector but was driven by the neoliberalist criticism of the public sector for been too big, too inefficient and too expensive (as cited in Torfling, p.302). As result of the sustained criticism of the public sector, the New Public Management model was developed to foster an entrepreneurial spirit that will reinvigorate the public sector and stimulate innovation (Osborne & Gaebler, 1992 as cited in Torfling, p.302).

The model has led to the effective collaboration between the public sector as represented by the State and many other segments of society. One of such collaborative corporation between the public and other segment of society to generative innovative solutions that benefit many can be seen in the creation of knowledge economies. Innovation is a product of knowledge economy, knowledge economy itself is a creation of concerted effort. Knowledge based economies are not happenstance, but as a result of deliberate actions taken by the State to ensure their existence. The connection between the State (i.e public sector), knowledge (i.e university), and Industry (i.e innovation) was explained by the “Triple Helix thesis” (Figure 3 below). The Triple Helix thesis states that university can play an enhanced role in innovation in increasing knowledge-based societies” (Lundvall, 1988, 1992; Nelson, 1993 as cited in Etzkowitz & Leydesdorff, 2000, p.109). The public sector as the regulator in any economy has the singular power to determine the direction of the flow of resources and thus influences the propensity of any institution within its control to pursue the required research that creates innovative knowledge that end up creating innovative products and services. The public sector stimulates the development of innovative knowledge through the effective resourcing of universities and research institutions.

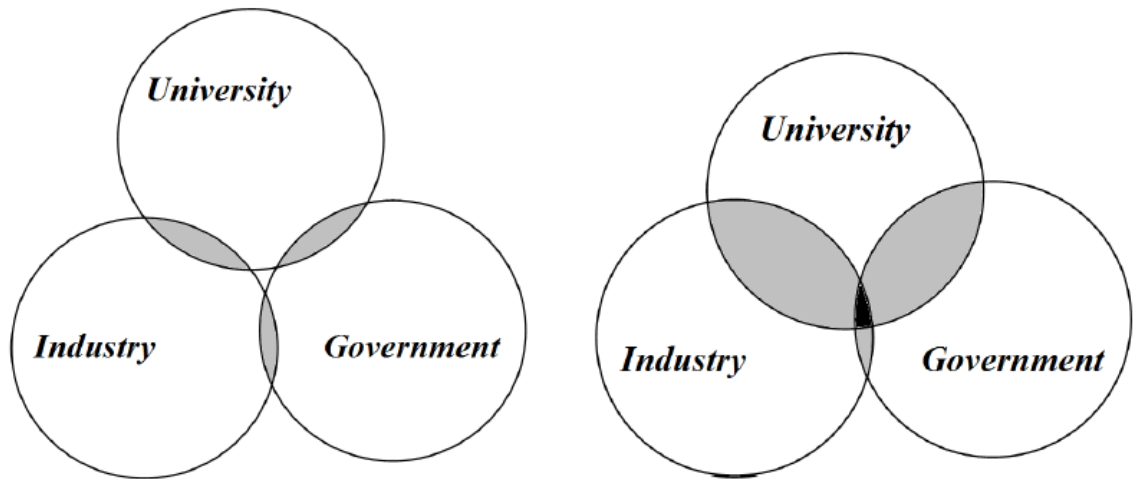


Figure 6: The Triple Helix Model of University-Industry-Government Relations (Etzkowitz and Leydesdorff, 2000 p.111).

This is not because the private sector does not fund its own researches, but mainly due to the limited resources that the private sector is able to muster and invest in research activities. The RAE (2015, p.13) buttress the position of the public sector as the creator of innovation when they explained that “the public sector has a key role to play in enticing private sector investment and encouraging innovation in priority or high-potential areas, through direct investment, smarter procurement and creating an enabling environment”. The question that naturally arises then, is how does the public sector investments entice the private sector to invest in priority or high-potential areas that benefits the society?

The answer to this essential question can be found in the deployment of the Triple Helix model. Etzkowitz and Leydesdorff (2000, p.109) explained the Triple Helix as an analytical model that adds to the description of the variety of institutional arrangements and policy models an explanation of their dynamics. While the effectiveness of the dynamics between these three institutions that would enable benefits that can be derived from innovation in any given society can be varied, depending on the intensity and depth of the relationship (Figure 3). What has been established as been stable was that using the Triple Helix model can motivate the public private sector dynamics in such a way that it creates innovative breakthroughs. On the basis of these agencies, it can be surmised that the beneficiaries of innovation are, the society at large and when broken down into its component parts, that is, the State (public sector), the industrial sector (private sector) and the general public (which is inclusive of the academia) (Figure 7). The entirety of the society that runs a knowledge-based economy are beneficiaries of the innovations generated by the New Public Management through the ‘Triple Helix model’.

3.1.3 Beneficiaries of Innovation: The Collaborative Governance

The collaborative governance model presents an interesting perspective to approaching the support of the public sector for innovation and innovative ideas. The appropriate way of understanding the enormous contributions of collaborative governance to the promotion of the support of the public sector for innovation is to see innovation as the constructive management of differences in order to find joint solutions to shared problems (Robers & King, 1996; Gray, 1989 as cited in Krogh & Torfling, 2015 p.94). With this perspective of what innovation is in mind, it is important to look at what governance is, at its basic form. Hamdok (2003) provided an apt description of governance declaring it as a “framework’ for interaction in which the actors involved exercise their rights, meet their obligations and articulate their interest” (as cited in Afful-Koomson & Asubonteng, 2013 p.80).

This definition of governance exposes the interactivity and collaborative nature of the concept. Identifying the fact that there are several components to the function of governance, and the requirement for collaboration between these different component parts. Dwivedi (2002) was even more specific about the nature of governance declaring it as “a system of values, policies, and institutions by which a society manages its economic, political, and social affairs through interaction within and among the state [public sector], civil society and private sector” (as cited in Afful-Koomson & Asubonteng, 2013 p.80). Once again, this definition reinforces the fact that governance does not happen in a vacuum, neither is it a solitary concept that can be managed without the input of other stakeholders.

These descriptions of innovation as a tool to for searching for and finding solutions to shared problems. As well as, the collaborative nature of good governance establishes the fact that collaborative governance is perhaps the most appropriate public sector management approach to innovation. Agger, Damgaard, Krogh, and Sorensen. (2015, p12) in their authoritative book on collaborative governance and public innovation in Northern Europe provided four significant impacts of this concept of public sector management and how their benefits. They argued for this concept on the basis of four prepositions: “1) Collaborative public innovation transforms mind-sets, role perceptions and work forms; 2) Design matters for the success and failure of collaborative innovation processes; 3) Leadership is important for promoting collaborative innovation; and 4) Collaborative public innovation is relevant at all levels of governance”.

On the basis of the postulations of Agger et al. (2015, p.6) argued that collaborative governance “approach to public innovation is based on the assumption that collaboration between relevant and affected actors from different organizations, sectors and levels of governance can contribute to the formulation, implementation and diffusion of new, innovative public policies and services.” Unlike in the other models of public sector innovations, the collaborative governance provided the most localized form of cooperation between the public sector and the society that it serves. This is because under collaborative governance innovation, the cooperation between the different segment of society are not limited to high end or major project alone, it is also reputed to encourage cooperation at the street level for something as ordinary as how effectively some local services are managed.

As Gash (2016, p.457) observed, the key ingredient for any endeavour to create a network of partners that are represented by diverse interests are able to achieve anything of significance requires an environment in which institutional, geographic, cultural, political or substantive pluralism thrives. This singular observation identifies the far-reaching width of the beneficiaries of collaborative governance. The model analyses problems through a multiple lens and the results that are generated through these multipronged approaches, also generated benefits and beneficiaries that are wider in range of institutions, organizations, as well as, public and private stakeholders across every facet of the society.

As others have observed as well postulating that “in this sense then, collaborative governance produces substantive benefits that are truly more than the sum of its parts. By gathering together, a range of skills and expertise, collaborative can leverage each individual organization’s talents and contributions to produce “synergies” that prompt innovative and equitable solutions to vexing problems” (Booher 2004; Fish et al. 2010; Emerson et al. 2012; Brown 2002; Gerlak & White 2012 as cited in Gash, 2016 p.464). This argument further establishes the ability of public sector support for collaborative governance to create some symbolic relationships that benefits every segment of the different stakeholders. The benefits of collaborative governance go beyond its immediate impacts on its many stakeholders, but it also provided something extra that other models of public sector innovation management do not readily provide. And that is, its ability to assist in lessening the negative impacts of frequent failures that are part and parcel of any innovative venture. This is the one pivotal characteristic of the collaborative governance model made it the most effective at community and grassroots innovation level.

More succinctly put, by pooling talents, collaborative governance also pools risk, providing a more cost-effective and more stabilizing response to increasing economic, political and social uncertainty. Thus, making negative impact of failures less damaging (Booher 2004; Fish et al. 2010; Davies and White 2012 as cited in in Gash, 2016 p.464). Lasker et al. (2001) reinforces this view of collaborative governance when they declared that, “when organized and structured correctly...produces a number of civic and redistributive benefits that have implications far beyond its policy-specific substantive outcomes” (as cited in in Gash, 2016 p.464). The advantages of collaborative governance and its benefits to the society is enormous in many aspects of the stages of innovation.

Bevir (2009, p.48) provided some postulations that best exemplifies the far-reaching beneficiaries of collaborative governance. First, collaborative governance accelerates the policy-making process, and this is because of the involvement of many actors from the beginning ensures broad support for the project once an agreement is reached on the direction to take. This broader the number of actors involved in the project, the broader the beneficiaries of the outcome of the project. Second, the author argues that “the involvement of diverse actors leads to a more thorough exploration of any proposed policy: there is less chance that an aspect or consequence of policy will be overlooked or ignored” (Bevir, 2009 p.48). This argument underscores the fact that the large number of actor’s involvement meant there is a limited chance of any actor’s interest been neglected. This means everyone’s interest is included in the eventual outcome meaning broader beneficiaries more than are usually the case in situations where collaborative governance model was not applied.

Third, the author went further on the widening of the beneficiaries of collaborative governance arguing, it “brings new skills, expertise, and perspectives into the policy-making process: it expands the range of people involved, and it might thus lead to more innovative policies” (Bevir, 2009 p.48). The fact of collaborative governance’s principle advantage been its use of wider range of people and institutions is no longer in doubt, however, it is impossible to estimate or place an emphatic limit to the opportunities that this type of approach to innovation can generate. Neither can the beneficiaries that will emerge from the innovations that emerges from the collaboration of diverse peoples, institutions and organisations be accurately estimated. Each of the contributing actors in collaborative innovation has its own ever-expanding network of beneficiaries.

Fourth, “collaborative governance can increase the legitimacy of public policies. It opens up the policy-making process, thereby increasing transparency, accountability, and trust” (Bevir, 2009 p.48). The significance of this argument in increasing the numbers of the beneficiaries of the outcome of collaborative governance cannot be overemphasized in a polarised political environment. Public sector policies that enables the development of innovative outcomes are subject to the continuous support of the political actors involved in the process. This is because of the fact that political leadership by their nature are transient. The longer a government in power enjoys the continuous support and trust of the electorate that put them in charge, the longer the time they have to ensure the completion of their innovative agendas.

However, no matter how effective their innovative policies may be, once the political leadership loses the trust and support of their electorate. Their removal from office is only a matter of time and any new incoming government are usually motivated by their own agendas which are most likely different from the government they are replacing. Thus, the effectiveness of the collaborative governance model may not only determine the longevity of the governmental policies, but also their number of those that will eventually become beneficiaries of their innovative policies. Finally, Bevir (2009, p.48) argues that collaborative governance widens the public participation in the policy-making process that has the spin-off of benefitting the entire society. Collaborative governance has at its core the development of innovative policies, however, innovative policies by themselves are not enough to ensure the development of innovative projects or creation of the appropriate knowledge environment without the appropriate budgetary framework.

The apportionment and the management of the appropriate budgetary framework for any project irrespective of whether it is an innovative project or not is vital to the existence and performance of such project. In collaborative governance, “citizens come to view the state not as an external imposition watching over them, monitoring them, and regulating them, but as an active partner in making a better society” (Bevir, 2009 p.48). This understanding of the role of the state as partners in development is critical. Critical because of the power and influence of the state in providing the budgetary framework for innovative ventures. Hence, the importance of understanding the budgetary and policy management for innovation not only within the two focal states of this research, but first from the perspective of the intracontinental body, the EU.

3.2 The European Union (EU) Budget for Innovation

As mentioned in the preceding section, the budget of any institution or state provide a clear path to understanding what such institution or state considered as its priority. It is therefore not a departure from the norm if the budget of the EU is used as a means of evaluating its commitment to supporting innovation or not. Hierl and Palinkas (2009, p.281) explained that, “the EU allocates money from its own budget to R&D, innovation and knowledge development in accordance with self-decided targets”. These self-decided targets are the indicators of what the EU considered as its priority in terms of innovation. The level of budgetary provisions made for supporting innovation and the knowledge economy therefore is valid determinant of the EU support or lack of thereof for innovation. The decisions on how these resources are allocated is never a decision not taken lightly because of the premium that the EU places on innovation and knowledge development as this research will indicate.

Hierl and Palinkas (2009, p.281) further explained that these innovations supporting budgetary decisions are carefully laid out on six yearly “Framework Programmes”. In exploring the budgetary commitment of the EU and by extension its support to innovation and innovative researches, the researcher used the ‘Framework programme’ as the factual foundation to establish the EU’s budgetary support for innovation. Before the different framework programmes and their budgetary impact on innovation in Europe is examined and explained, it is essential to have a brief understanding of what exactly the ‘framework programme’ is about. JEUPISTE (n.d.) described the framework programme as an idea to support research and innovation on a European scale on the basis of a European institutions agreement to dedicate financial resources to the instrument of innovation development.

The explanation above shows the high-level significance of supporting innovation development for the EU. The significance of the issue is so high on the priority of the EU that it not only committed specific policies to it but went further to back the policies up with a carefully laid out financial resources commitment to ensure its coming to reality. The policy aspect of the EU commitment will be examined in the next section of the research. For now, the research focuses on the budgetary commitment of the EU to the policy on supporting innovation development through the examination of the financial commitment to the policy by highlighting the historical financial commitment to the framework programme starting from the first to the current one.

3.2.1 The First Framework Programme Budget: 1984 – 1987

The first framework programme's objective was focused on defining and implementing an overall development research and demonstration strategy for innovation at the Community level. This first framework was designed to cover three years from 1984 to 1987 with a total dedicated budget of €3.75 billion that was split into 7 scientific and technical areas:

i). 47.2% for the improvement of the management of energy resources; ii). 28.2% for the promotion of industrial competitiveness; iii). 10.3% for the improvement of living and working conditions; iv). 3.5% for the promotion of agricultural competitiveness; v). 2.1% for the improvement of raw materials management; vi). 4.0% for stepping up of development aid; and vii). 2.3% for improving the effectiveness of EU's scientific and technical potential (JEUPISTE, n.d.) (Figure 8).

From the scale of the amount committed to the programme from the onset, it is clear that the development of the knowledge economy in general and innovation in particular is important to the EU. No wonder therefore that the community decided to commit such a hefty amount to a new programme from the get go. One of the argument in support for the development of an EU wide innovation supportive programme was based on the fact that individual members of the community may never be able to commit the large financial resources that such a programme requires. As Cipriani (2007, p.28) explained that “the main objectives of the proposed action cannot be sufficiently achieved by the member states and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community”.

While the fundamental facts that the main motivation behind the EU budget for innovation as expressed in this first framework programme was to be able to muscle enough resources for the achievement of a Communitywide innovation development. The decisions concerning the budget are also a collective decision. Hierl and Palinkas (2009, p.281) observed this fact stating that, “at EU level, the financial budget for R&D support is decided and coordinated by the European Commission, the European Parliament and the Council of (national) Ministers. This collective approach to the decisions concerning the designing and allocation of the resources for innovation and knowledge economy development ensure the focusing of efforts and resources towards the same goals. The collective nature of the decisions is also reflected in the way the resources are allocated to specific areas that the EU targeted for innovative development.

3.2.2 The Second Framework Programme Budget: 1987 – 1991

The success and failures of the first framework programme were taken into consideration in the drafting of the second framework programme. The first indication of this argument can be identified in the increase in the amount budgeted for the programme between 1987 and 1991. The total budget for this second framework programme was €5.4 billion (JEUPISTE, n.d.). The second framework programme was more streamlined in its objectives and the number of areas that was funded for this programme indicated as such. For this programme the EU budgeted for four cardinal areas: a). Developing a large market, information and communication society with 42.2% of the budget. b). the increasing challenges with energy was squarely addressed with 21% of the budgeted amount. c).

The modernization of the all-important industrial sector with a budgeted share of 15.7% and finally, improving the quality of life and the improvement of the European S&T cooperation with 5.3% of the budget (JEUPISTE, n.d; Brebner & Hogan, 1991 p.224). Apart from the obvious lopsided amount dedicated to the two critical issues that concerns knowledge economy and information and communication technology. This second framework budget division clearly indicated the increasing significance of the role that innovation will play in the Europe economy of the future (Figure 8).

Framework Programme	Period	Budget € million
FP1	1984 - 1989	3,750
FP2	1987 - 1991	5,396
FP3	1990 - 1994	6,600
FP4	1994 - 1998	13,215
FP5	1998 - 2002	14,960
FP6	2002 - 2006	17,883
FP7	2007 - 2013	50,521

Table 1: EU Framework Programme for Research and Technology Development, 1984 – 2013 (Adapted from Artis & Nixon, 2007 as cited in Kaar & Muller, 2011 p.25).

3.2.3 The Third Framework Programme Budget: 1990 – 1994

The third framework programme did not depart from the now becoming familiar path that the two previous frameworks had taken, that is, strengthening the development of innovation through funding of research. The total budget for this framework was €6.6 billion with the main objective of continuing the strengthening of the scientific and technological basis of the European industry (JEUPISTE, n.d) (Figure 8). The third framework like the first two frameworks of the EU was designed to finance collaboration among research units located in different parts of Europe and as such they help in the transfer of great amount of knowledge across different parts of the European continent (Varga & Sebestyen, 2016 p.1).

The third framework programme budget as it concerns innovation was distributed as follows: Advance Communications (RACE) 8%, Telematics 6%, Esprit 23%, Industrial and material technologies 15%, Environment 9%, Life sciences and technologies 13%, Energy 14%, Human capital and mobility 9% and Others 3% (UN-ECWA 2001, p.30). Irrespective of the location or level of sophistication of innovation in any given environment, the market remains the cantered on the application of specialized knowledge, and the skills that are developed.

While the goods and services only serve as a vehicle for transferring knowledge and skills to satisfy higher order needs (Randall et al. 2010; Vargo & Lusch, 2014 cited in Heuninckx, 2016 p.106). The third framework programme was designed simply to buttress the efforts towards creating a knowledge economy that will serve the needs of the emerging innovative market not only within the EU, but across the world as well. The objectives as well as the amount of resources committed to these objectives clearly indicated these laudable objectives. Apart from all this obvious point, the fact that the budgeted amount for this programme almost doubles the amount committed the preceding framework is also an indicator of the significance of its objectives.

3.2.4 The Fourth Framework Programme Budget: 1994 – 1998

As observed with the preceding framework programme's budget, the EU did not only increase the amount of resources committed to the fourth framework programme substantially as to almost double it. It actually doubled the budget from recent programme's €6.6 billion to €13.2 billion for the current fourth framework programme (Figure 8). In the fourth framework programme, the EU departed from the norm in one significant area in comparison to the previous programmes. The enabling legislative decision for the fourth framework demanded an establishment of a means of evaluating the impact of the framework programmes (Georghiou, 1995 p.182). So, apart from the obvious increases in each and all the segments of the framework as observed in the past increases.

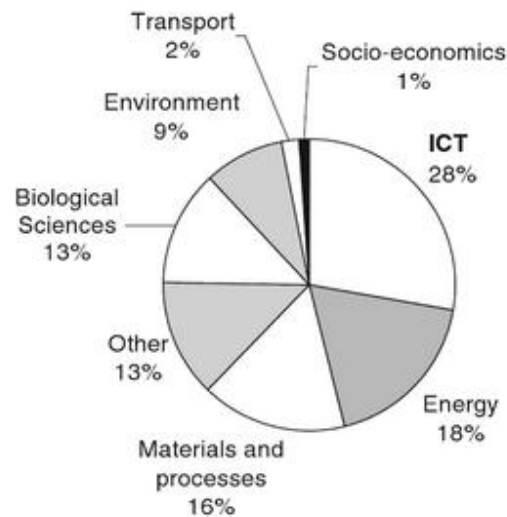


Figure 7: Funding of specific programme in FP4 (EC as cited in Stajano, 2009 p.179).

According to Georghiou (1995, p.182), the fourth framework prescribed four new elements, that is, firstly, continuous monitoring of both specific programmes and the framework programme on an annual basis by the Commission, aided by outside experts; secondly, a mid-term review of the state of implementation by the Commission; thirdly, a 5-year assessment of both specific programmes and the framework programme by outside experts during 1996-7 to inform the basis for the next Framework Programme; and finally, evaluation of specific programmes by outside experts after 1998. Without any doubt, the fourth framework programme apart from the remarkable increase in its budget (figure 9). The Commission wanted to evaluate the positive outcomes of the huge investments been made. This is of course in keeping with the values of any effective budgetary system. The ability to evaluate the effectiveness or failures of the committed financial resources to any programme. Making this the appropriate stage to make these evaluations.

3.2.5 The Fifth Framework Programme Budget: 1998 – 2002

According to McSweeney and Hsia (2000, p.45), the fifth framework programme was adopted on December 22nd, 1998. The framework defines the activities of the European Community in the field of research, technological and development and demonstration for the period between 1998 and 2002. The authors argued that the new framework differs from all its earlier predecessors in that it was designed purposefully to respond to major socio-economic challenges facing the EU (McSweeney & Hsia, 2000 p.45). In financial terms, the EU increased its funding for the fifth framework programme as was usually the case.

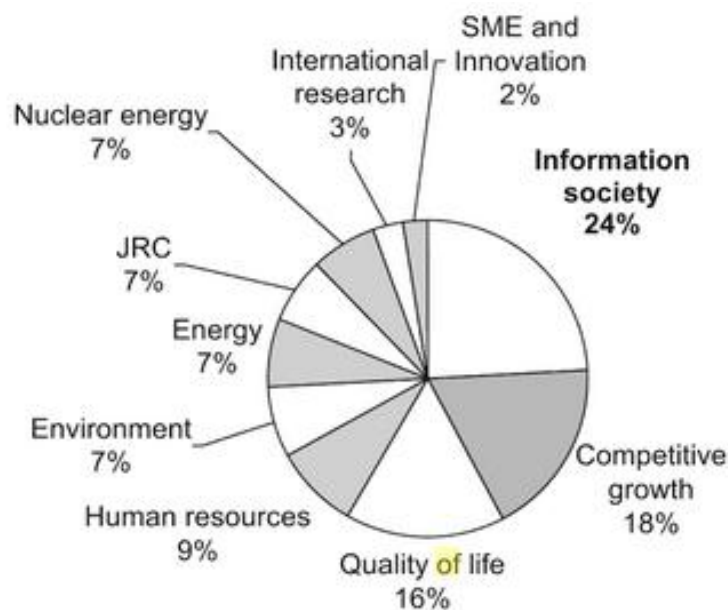


Figure 8: Funding of specific programme in FP5 (EC as cited in Stajano, 2009 p.180).

The budget for the fifth programme was just under €15 billion (Figure 8), dedicated to meeting the objectives of the Community as it concerns seven programmes (Table 1). This budgeted figure represented a 3% increase in real terms in comparison to the most recent preceding framework programme (Darmer & Kuyper, 2000 p.273). Bontoux (2002, p.1) identified both the four thematic and the three horizontal programmes as been designed to solve problems in the under listed strategic areas. The thematic programmes include the ‘Quality of life and management of living resources’, to which 16% was dedicated. Followed by the ‘User-friendly information society’ which enjoyed 24% of the budget. Third was the ‘Competitive and sustainable growth’ which was provided with 18% of the budget. And finally, the remaining 14% of the budget was dedicated to the ‘Energy, environment and sustainable development’. The thematic programme enjoyed a collective total of 72% of the budget.

While the remaining 28% was divided among the remaining horizontal programmes with *confirming the international role of the Community research* getting 3%. The *promotion of innovation and encouragement of SME participation* benefitted from 2% of the budget and the *improving human potential and the socio-economic knowledge base* got 9%. However, apart from these two categories of programmes, that is, the thematic and horizontal programmes. The fifth framework also made provisions for two other programmes. These are ‘*joint research centre*’ and the ‘*nuclear fission and nuclear fusion*’ programmes which got 7% each (Darmer & Kuypers, 2000 p.274). Once again, the Community indicated its commitment to innovation and improvement through its budgetary allocations.

3.2.6 The Sixth Framework Programme Budget: 2002 – 2006

According to Wolfmeyer (2005, p.45), the sixth framework programme features a much stronger focus on mechanisms aimed at supporting the innovation process than any of its predecessors. The question then arise as to which innovation processes this new framework supports. The answer to this essential question was already something that has been established as a reoccurring focus on innovation support in all its entirety. Moller (2008, p.214) explained that, “the sixth framework programme covering the five-year period from 2002-2006 had total appropriations of €17.5 billion”. Again, this represented an increased from the previous programme’s total expenditure of €15 billion which represented 3.9% of the overall EU budget for that period. Others have given even a higher figure of €17.9 billion (figure 4), irrespective of which of the figures above one was the correct one. The fact remains that the EU increased yet again its expenditure and support for the improvement of the innovation processes. Moller (2008, p.214) confirmed this argument on the basis of the main objectives of the sixth framework has been focused on Information and Communication Technology, biotechnology, nanotechnology, and energy (Figure 10).

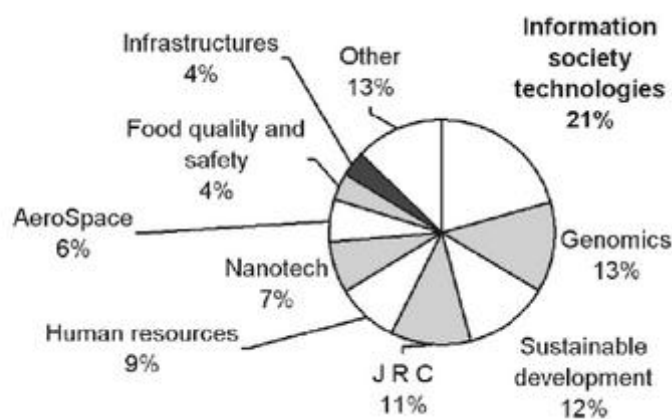


Figure 9: Funding of specific programme in FP6 (EC as cited in Stajano, 2009 p.180).

According to Wolfmeyer (2005, p.45), the sixth framework was actually structured in two main areas which answers the two key priorities of the Community. The author went further explaining the first priority as “Integrating and Strengthening the European Research Area (ERA), which was concerned with integrated research at EU level in seven fields of science and technology. While the second priority area was christened, “Structuring the European Research Area” encompassing four activities, that is, research and innovation; human resources and mobility; research infrastructures; science and technology.

3.2.7 The Seventh Framework Programme Budget: 2007 – 2013

According to Boccia, Keskimaki and Ricciardi (2014, p.286), the seventh was allocated €53billion for research and technology development. This amount represented a departure from the increment to the research and development budgets as observed in the past. This framework budget represents an over 100% increase over that of the preceding programme. Two major facts that could be deduced from this huge increment in the allocated resources to the seventh framework programme are: First, the Community’s evaluation of the preceding programmes shows the limitations of the allocated resources in the face of ever increasing competition from the United States and the increasing influence of China. The second deduction been that the value that the Community has received from the previous framework investments.

The increase in the value of the outcome of the previous investments and the need to strengthen position of the EU in the increasing competition from other parts of the world for a knowledge-based economy. There is not better evidence of the increasing importance of investment in research and development and innovation than the fact that while the highest share of the total EU budget ever dedicated to the same area was 3%. The seventh framework programme by comparison received 20% of the Community’s total budget. Boccia, Keskimaki and Ricciardi (2014, p.286), however argued that the massive increase could be traced to the general aim of the programme which was basically to support research that makes Europe more competitive in economic terms, which was broadened to include health services research. Shawish and Salama (2013, p.95), also argued that, this framework bundles together all research related EI initiatives under a common roof, which played a crucial role in reaching the goals of growth, competitiveness and employment along with a new Competitive and Innovation Framework Programme (CIP).

All the arguments and postulations about the seventh framework programme and its role in the future of innovation and knowledge-based economy boils down to the centrality of the objectives of the programme. Shawish and Salama (2013, p.95), described these objectives as, Cooperation, Ideas, People and Capacities and that for each of these objectives there is a specific programme corresponding to the main areas of the EU research policy. Therefore, irrespective of anyone's perspective, the final conclusion that was always arrived at, was that the Community has grasped the significant role of innovation in future economy.

3.2.8 The Horizon 2020 Research Programme Budget: 2014 - 2020

In this section of the research, the focus has been on the seven-framework programme itemizing the progressive nature of the Community's budgetary allocation to research and development. After the end of the seventh framework programme, the EU launched a new programme with a much bigger programme with a budgetary allocation that none of the preceding programme ever enjoyed (Figure 4). Hollanders and Kanerva (2015, p.247), affirmed this observation explaining that, "the funding levels of the EU's successive framework programmes for research and development have grown consistently from €4billion for the first one from 1984 to 1988 to €53billion for the seventh...and nearly €80billion for [its latest programme] Horizon 2020".

If this budgetary allocation appears extraordinary, it is because it is so, and it is therefore not surprising that the Horizon 202 programme has been declared as the 'biggest EU research programme ever'. More importantly, the bulk of the estimated €80billion programme will be for the promotion of excellent science (32%) and addressing societal challenges (39%) (Hollanders & Kanerva, 2015 p.247). The Horizon 2020 programme expressed the EU's desire to focus on strengthening its knowledge-based economy. According to Reillon (2015, p.4), majority of the implementation of the budgeted programme would be carried out by other bodies (up to 75%), these included the Commission executive agencies, public partnerships between the EU and Member States, public-private partnership with industry one of which is the European Institute of Innovation and Technology (EIT). The Horizon 2020 programme was designed as the eighth framework programme for research and innovation, crafted to support research and innovation activities. Reillon (2015, p.4) described the programme as having three main pillars, that is, Excellent Science, Industrial Leadership, and Societal Challenges.

3.3 The European Union (EU) Policies for Innovation

The EU policy on innovation since its foundation as seen above has always been about improving the level of innovative development, not just at the member states level but more focused on at the regional level. This is not surprising since every state irrespective of their level of innovative development are made up of regions. Furthermore more, if there is anything that are common amongst all members of the Community, it is the need for regional development. Artis and Nixon (2007, p.177) explained that one of the main EU innovation policy was the ‘Single European Act’, amongst many other of course. They described this innovation policy as one that designed to reform the structure of funding and regional policy on innovation in such a way that it ensures that the least developed areas of the Community benefits from the policy as they are held in a position of priority (Figure 8).

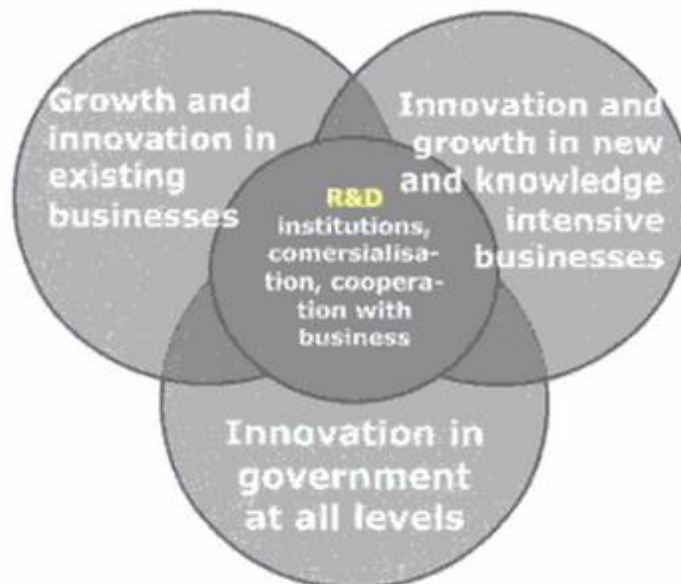


Figure 10: Strategic target areas for the public sector Innovation (Adapted: Knudsen & Davis, 2006 p.598).

EC (2000) described its innovation policy a set of actions intended to raise the quantity and efficiency of innovation activities. This is expected in turn to enable innovative activities that creates, and lead to the adoption of new products, processes, or services (as cited in Rodriguez & Montalvo, 2007 p.467). The focus of this section of the research therefore was on what Aghion et al. (2006) described as a framework of Science, Technology, Innovation and growth systems (STIG) (cited in Kaderabkova & Radosevic, 2011 p.3).

The entirety of the examined framework programmes whose budgetary allocations were the subject of the preceding section where the bedrock of the EU innovation policy.

The EU innovation policy therefore is embedded in the seven frameworks and the currently running horizon 2020. To have an in-depth understanding and appreciation of the EU innovation policy, a return to the framework programmes is therefore a necessity. Without the fear of self-repetition, it is essential to therefore look at the objectives of each of the frameworks to itemise what the EU innovation encompasses as it concerns STIG. Kumar and Siddharthan (1997, p.25) observed that, “the European framework programmes have brought together European industries, universities and research centres in joint initiatives in the form of transnational projects since 1984”. This foundational collaboration between the different stakeholders on the European continent enables the public sector to contribute effectively to the innovations already taking place within the private sector by providing a policy structure to the whole venture.

This collaboration enabled the EU to stir focus towards programmes that ensures the development of the policy to encourage STIG across different sectors and disciplines within the community. As mentioned above, from the start, the EU innovation policy were focused on the principle of STIG. The *first framework programmes* were set up to herald the shift towards a legally solid grounded integrated EU research policy focusing on the competitiveness of the European industry and the quality of life of its citizens (Muldur et al., 2006 p.95). The competitiveness theme was one that will eventually become a stable of the EU innovation policy through time. And it is not surprising that this was so, given the increasing role that competitiveness has and is still playing in the survival or failure of any given economy irrespective of their location in a globalized knowledge economy (Figure 8).

According to Muldur et al., (2006, p.96), the *second framework programme* was generally designed to strengthen the European research industry to face the increasing and fierce Japanese competition. The strong competition was however not only from the Japanese, but also the increasing strength of China couple with the European natural competitor, the USA. And the Community did not develop a competitive policy to ward off only the current competitions but prepared itself form the competitors of the future. The Community’s principal focus under this innovation policy was in information and telecommunication technology. Cortada (2012, p.221) argued that under the *third*

framework programme, the innovative policy focus was shifted to multimedia, miniaturization, and mobile technologies among others.

This shift in direction can be identified in the fact that during the duration this framework programme, not only where the objectives drastically reduced. As Morris, Boehm and Geller (1991, p.200) explained, the main sectors that were covered were, information and telecommunications technologies, industrial and materials technologies, energy, human capital and mobility. The *fourth framework programme* main policy drive was to take advantage of the opportunities in IT industry by supporting the competitiveness of the industry at large. Dekker, Smit and Zuidervaart (1994, p.xii), explained that while in the past the push has been more on the side of technology. Under the new policy on innovation as captured in the fourth framework on innovation, the new focus was on making the technology user friendly.

This means unlike in the preceding EU policy places more emphasis on the technologies developed themselves. The new policy seeks to emphasize the user friendliness of the developed technology thus creating a demand pull by the end-users. Dekker, Smit and Zuidervaart (1994, p.xii), went further stressing that under this new EU innovation policy, the users will play an important and not just marginal role. One of the characteristic of the EU innovation policy was the way in which the Community has been able to create a continuum between the preceding policy and the succeeding policy frameworks. The *fifth framework programme* policy that ran between 1999 and 2002 adhered to this tradition. According to Bontoux (2002, p.4), the fifth framework programme ensured ongoing research efforts in the medium to long term specific programme such as the ‘quality of life and management of living resources’ and ‘energy, environment and sustainable development.

According to its own research services information services, CORDIS (n.d), the EU’s innovation policy objectives as established by the fifth framework programme was conceived to help solve problems and respond to major socio-economic challenges that the Community was faced with. This outline shows the Community’s use of its innovation policy to deal with society’s pressing challenges. CORDIS (n.d), explained further that the EU focuses on a number of objectives and areas combining technological, industrial, economic, social and cultural aspects. Simply put, the EU used its innovation policy to deal with concrete problems through multi-disciplinary approaches involving all the interested

parties (CORDIS, n.d). The fifth framework programme policy basically continue the tradition of the Community in using innovation to solve society's problems.

According to Wolfmeyer (2005, p.45) explained that the main objectives of the EU's innovation policy as it was enshrined in the *sixth framework programme* was to concentrate Europe's efforts on fewer priorities. These fewer priorities however included the move towards the progressive integration of activities of all relevant participants working at different levels. The author also identified the promotion of research activities designed to have a lasting "structuring" impact to support activities which will eventually strengthen Europe's general scientific and technological basis. For any careful observer, the objectives of the whole EU innovation policy irrespective of which of the frameworks or the period of operation one focuses on, has always been to develop a robust economic and social system fully prepared for the knowledge economy of the future.

Wolfmeyer (2005, p.45) concurred to this argument when they declared that, the "objectives [of the sixth framework programme] stem from the recognition that research and development in specific scientific areas is insufficient to establish a true European culture of innovation, and to answer the problems Europe faces as a result lingering behind the USA and Asia. The *seventh framework programme* was the last of the framework programmes that were designed by the EU to map the innovation policy of the entire Community from 1984. While the seventh framework programme represent the end of the era for the framework programmes, it however does not represent the end of the Community's innovation policy. The final framework programme was designed to perform basically the same functions that all the preceding frameworks had been tasked to perform as well.

The EU's final monitoring report on the effectiveness or otherwise of the seventh framework programme in 2015 explained that the overriding aim and objective of the framework was to contribute to the Community in becoming the world's leading research area. In order to achieve this laudable objective, the EC grouped their policy plan into four categories, that is, "cooperation", "ideas", "people", and "capacities". EC (2015, p.4), explained that, "for each type of objective, there is a specific programme that corresponds to one of the main areas of EU research policy. This means that the Community's objectives on its innovation policy were not just an abstract identification of certain categories of ideas, but that there were actual programmes attached to each of these

objectives (Figure 9, Appendices 1). The Community thus have specific programmes that enables it to evaluate the effectiveness of the innovation policy objectives.

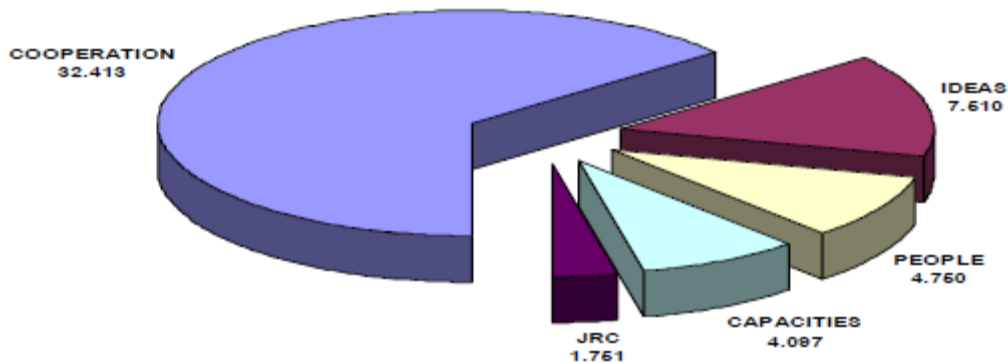


Figure 11: FP7 budget breakdown in € million (EC, 2015 p.5).

The most recent and current innovation policy of the EU was labelled *Horizon 2020*. The programme is the largest programme ever introduced or planned by the EU. EC (2015, p.3) described the Horizon 2020 as a strategy focused on developing a strong knowledge-based economy in Europe through investment, particularly in research and innovation (R&I). This new strategy is completely focused on R&I and its funding reveals as much (Figure 14). The Horizon 2020 strategy, also known as the EU 2020 strategy for smart, sustainable, and inclusive growth places research and innovation at the heart of EU policies, and introduces an Innovation Union flagship initiative (EC, 2015 p.3).

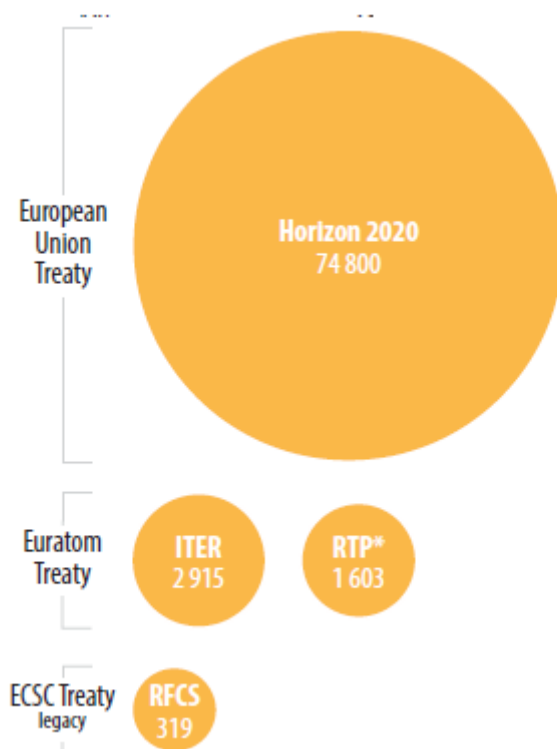


Figure 12: Programme fully dedicated to supporting R&I activities (Horizon 2020, 2015 p.3).

As mentioned in the beginning of this section of the research, the one of the unstated objectives of the whole EU innovation policy was to establish a form of regional innovation strategy that will give rise to a Communitywide knowledge economy. According to the EC (2015, p.3), the Innovation Union flagship initiative aims at strengthening research and innovation systems throughout Europe. This is aimed at establishing the European Research Area, develop strategy research agendas on key challenges and enhance joint research programming between member States. While the Innovation Union initiative is still at its earliest stages of implementation. The current Horizon 2020 is up and running. The current programme covers all research fields and fully dedicated to funding R&I activities including sectoral R&I programmes (nuclear energy, coal and steel as well as space (Figure 15).

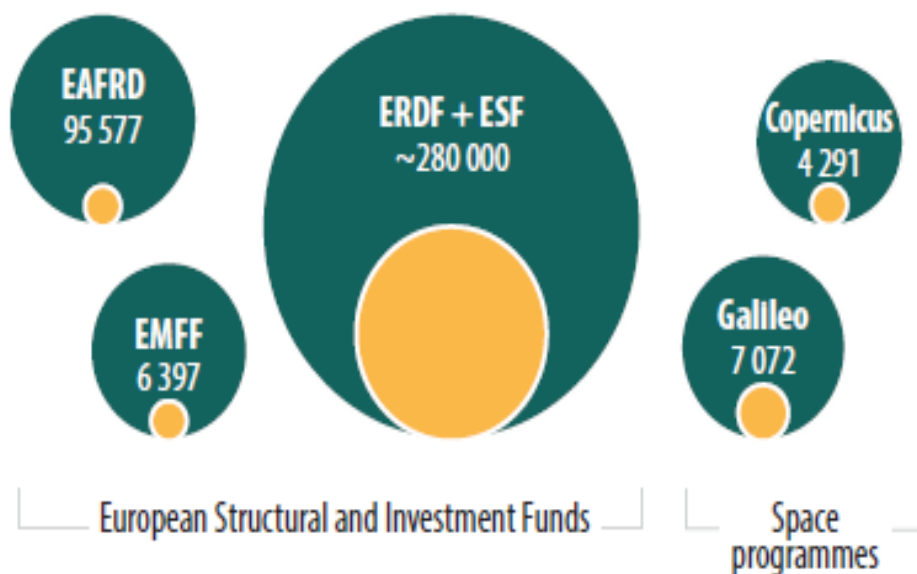


Figure 13: Programmes including funds for R&I activities (Horizon 2020, 2015 p.3).

EC (2015, p.3) explained that one of the focus areas of the Horizon 2020 programme also included the European Structural and Investment Funds. The significance of this funds is that they are implemented at regional level. These programmes are complemented by five other EU programmes not related to the funding of R&I activities, but connected to them (EC, 2015, p.3) (Figure 12). This chapter has been dedicated to exploring the EU innovation policy as a whole, in the next chapter the focus was on two focal States.



Figure 14: Programmes connected to R&I activities (Horizon 2020, 2015 p.3).

Chapter 4

Comparison of Public Sector Support for Innovation in Europe

In this section of the research, the focus is on two of the 28 EU countries, that is, Czech Republic and Germany. As already established through the detail exploration of the EU innovation policies in the preceding chapter. It is important to focus on two-member states of the EU to have a more specific identification of the public sector support for innovation. These two neighbouring states were selected for the fact that they are a representative sample of the entirety of the EU member states. The Czech Republic represented the small member states in terms of both population and size of its economy. The Czech Republic represent the majority of the member states of the EU, which bears similarities in their economic and political map. Germany on the other hand, represents the minority of the EU member states, in that, it has the biggest economy amongst all the member states. Representing the big EU member states such as France, and The United Kingdom.

The aim is to compare the ways in which the small states within the EU approach and effects their support for public sector innovations as represented by the Czech Republic. With the ways in which the more resourceful states within the EU approach public sector support for innovations, as represented by the biggest economic power on the continent and one of the most innovative states in the world. The detailed exploration of each of these focal member states provides a basis for which to evaluate how the public sector in small and big states supports innovation. The comparison of the two approaches of the selected countries also enables the research to identify the things that work and the things that do not work well. This knowledge will enable the researcher to analyse and arrive at not just a valid conclusion about public support for innovation, but also provide reliable recommendations that if applied will ensure a more effective innovation support in the future. The understanding of these different approaches and how to improve them where lapses exist will be critical to the level of state competitiveness in the future. As Pavelkova, Bednar, Bialic-Davendra, Bruskova, Knapkova and Zahradnik (2016, p.132) observed, while the competitive environment in the Czech Republic is characterised by relatively low demand in the private sector for innovation. Its public sector is noted as not exhibiting any low rate in terms of its expenditure on R&D. Germany on the other hand is known to operate completely reversed approach to innovation.

4.1 Czech Republic Institutional Framework for Innovation

The Czech Republic's framework for public sector innovation are outlined in a rolling programme called the national policy programme. The research exploration of the public sector support for innovation in the Czech Republic is based on the National Research, Development and Innovation Policy 2009 – 2015. This policy programme was approved by the Czech Republic government through the Government Resolution No. 729, which supersedes the previous programme that ran from 2004-2015 (VVI, 2015). It is important to state here that while the National Research, Development and Innovation Policy is a clear and precise outline of the government's programme. This outlined institutional framework was managed by 22 different public bodies that includes ministries, central offices of state and public administration (ERKC, 2016). The most significant amongst these 22 bodies are the Ministry of Education, Youth and Sport (MSMT), the Academy of Sciences of the Czech Republic (AV CR), The Ministry of Industry and Trade (MPO) and the Czech Science Foundation (GA CR) (ERKC, 2016). Using these four key institutions as the focal representative institutions in explaining the institutional framework for public support for innovation in the Czech Republic which is of course more complex as the figure below indicates:

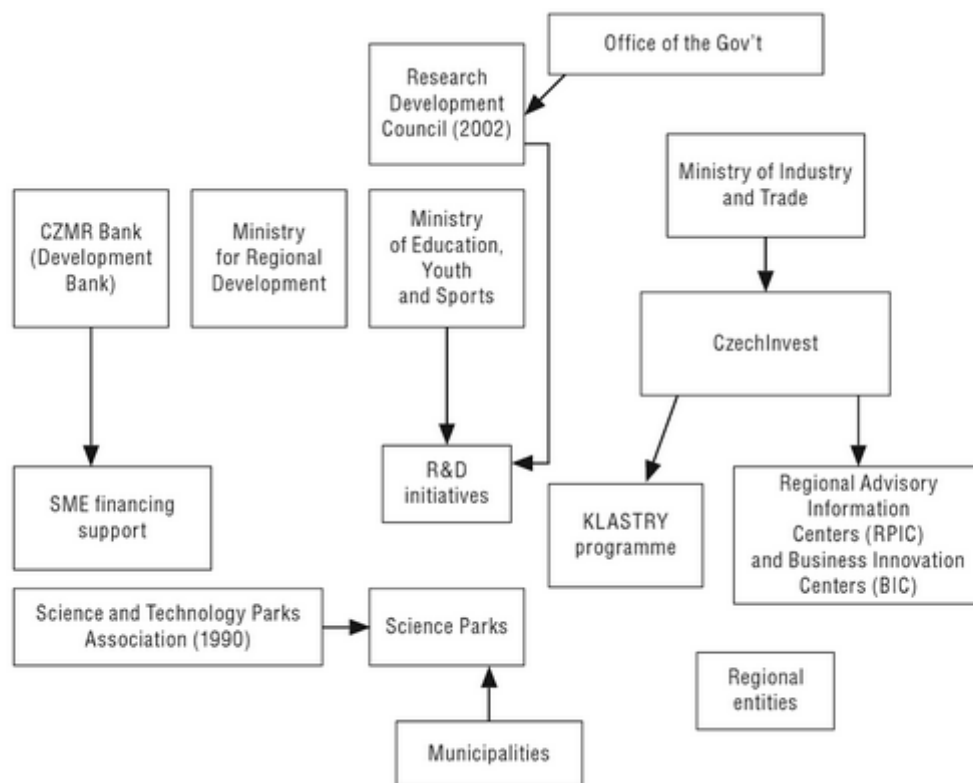


Figure 15: Czech Republic Organizational Chart (OECD, 2007 p.158).

The Ministry of Education, Youth and Sport (MSMT)

As the OECD (2014, p.25) explained, the ministry of education, youth and sport represent the main body responsible for education at the national level. This responsibility extends to include the development of education strategies and priorities. As already established in this dissertation, one of the means of directing and motivating innovative development is the coordinated public administration and funding (OECD, 2014 p.25). The ministry of education, youth and sports was able to exert this influence on the direction of the innovative development of the country through structural institutions that includes the regional assembly, regional council and regional authority. The Ministry of Education, Youth and Sports exert innovation in all these public agencies that are under its control. This influence extortions can be either positively or negatively. Positively, the ministry can use its control of these agencies to nudge the public sector in one direction or discourage the development of another area that the ministry does not want innovative resources focused on. Some of this strategic action can be exerted by action as simple as the location of sport medicine laboratory. The ministry is the most powerful of the institutions that influence innovation activities with the Czech Republic, as is the case across the world as they have oversight powers over universities.

The Academy of Sciences of the Czech Republic (AV CR)

The Czech Academy of Sciences was established by an Act of Czech Parliament as a successor to the original Czechoslovakia Academy of Sciences (Act No. 283/1992 Coll). The AVCR is a non-university research agency that has in its payroll over 8,000 employees (AVCR, 2017). The academy's mission was primarily "to conduct basic research in a broad spectrum of natural, technical and social sciences and the humanities" (AVCR, 2017). With a staff strength of over 8,000 employees, majority of whom are researchers, one can conclude without contradictions that the academy's mission was designed to contribute and support innovation and innovative development in the Czech Republic. The evaluation of these army of researchers is directly linked to their research funding. This means that where the government observed that the academy's researches are not producing the kind of innovative result that are desire. The government can defund, such research and direct such spare funds towards research areas where there is more quantifiable results. As Stockelova (2016, p.291) observed, "the institutional funding of research organizations is dependent on their annual research performance". Academy of sciences also acts as links to corporate actors in the private sector.

Corporate actors like the Confederation of Industry of the Czech Republic and the Association of Innovative Entrepreneurship Czech Republic to mention, but a few. Stockelova (2016, p.291) explained that corporate actors such as these were able to use their influence in the Governmental Research and Development Council in defining public research value and legitimacy. These are the complexity of the workings of the institutions and agencies both in the public and private sectors influences the innovation policies of the Academy of Sciences of the Czech Republic. According to AVCR (2017), “the supreme self-governing body of the Academy of Sciences is the Academy Assembly two-thirds of which is composed of representatives of all Academy institutes, the remaining third being representatives of universities, state administration, business circles, and other notables personalities”. These complexities of the role of the Academy of Sciences of the Czech Republic as a melting pot for the different interest groups in both the public and private sector. The result of this cooperation between different sectors and operators of in the research and innovation institutions is a standardized research methodology that is binding on all participants. The role of the Academy of Sciences of the Czech Republic in this manner cannot be overemphasized. It is not surprising then that the Academy is rated second only to the Ministry of Education, Youths and Sports.

The Ministry of Industry and Trade (MPO)

The Ministry of Industry and Trade of the Czech Republic is an agency of government that plays a pivotal in the public sector support for innovation. One of the visible areas of the role of the Ministry of Trade and Trade is the control and coordination of the Science and Technology parks. These technology parks provide a foundation for greater cooperation between firms and the public sector on innovation (OECD, 2007 p.161). According to the OECD (2007, p.161), the Science and Technology park programme supported a network of about 25 science and technology park. These parks acted as incubator and platform for cooperation between universities, research centres and businesses. As already been clearly established earlier in this dissertation, innovation is only relevant if they are usable and more importantly if they can be made commercially successful. The Ministry ensure this by providing up to 65% of the investment costs which goes a long way in encouraging not only investments in innovative creations but granting the investors a certain level of assurance that if the investment fails, they do not lose the entirety of their investment capital.

The Czech Science Foundation (GA CR)

The Czech Science Foundation which is also known as the Grant Agency of the Czech Republic hence the acronym GACR. The agency was established in 1993 as an independent public organization that facilitates and promotes research within the country as well as bilateral and multilateral research agreements (GA CR, 2015). The significance of the role of the foundation in the institutional framework support for innovation in the Czech Republic can only be appreciated by looking at the basic aims of the agency. The first aim of the foundation was to *provide financial support in respect of research projects*. This aim clearly indicates one of the fundamentals of the foundation, that is, provide the required scarce resources for researchers that eventually lead to creation of innovative products and services. Another aim of the foundation is *to promote and enhance international scientific cooperation in basic research*, as all innovative product and service start from basic research, it is not surprising then that the foundation will seek to support basic research not just within the Czech Republic, but also internationally. The support of researchers and innovators in creating an environment that is conducive for them to work more effectively. Hence the aim *to create and develop a high-quality research environment that encourages the improvement of scientific career opportunities*.

Aside from these three critical aims that were highlighted above, there are also other aims that speaks directly to the role of the foundation in supporting and creating innovative advancements. One of the aims of the foundation that speaks to this area of the foundation work is the aim to *promote research through provision of funding on the basis of peer review evaluation of submitted proposals, science policy expertise and global cooperation*. This aim enabled the foundation to encourage quality and innovativeness b funding research that are based on peer reviewed and standards that are at a level that can be competitive within the country and internationally. This type of action ensures that resources are directed solely to researchers and researches that fall only within these high standards. Finally, the foundation was also able to support innovation through their investments in *raising the public understanding of science to enhance the esteem and social status of scientific research in the country*. This aim in particular enable the foundation to encourage young people to take to sciences and thus create a rich pool of future scientist. At this point, it is important to examine the Czech Republic's strategic framework for public sector support for innovation.

4.2 The Czech Republic Strategic Framework for Innovation

The strategic framework for public sector support for innovation was set out in the outlined aims of the NRDIP which established the strategic management of RDI centrally, based on evaluation of the impact of the National RDI Policy and the systematic analysis of activities in this area (VV, 2015 p.16). As mentioned earlier all the main programmes supporting public sector innovation was implemented by different ministries and agency as established above. These aforementioned mentioned programmes are managed and implemented by different ministries and agencies. This first aim of the NRDIP was designed to address this type of situation where different institutions implement different policies and programmes. The problem with the former arrangement was that the innovation programmes could be investing scarce resources pursuing parallel objectives which may create a situation where the institutions that should be working together are competing against each other instead of complimenting each other. The government as the regulator needs to ensure that public resources are utilized in more efficient and effective ways, hence the introduction of this objective. As VV (2015, p.16) explained, in order to implement the RDI strategic management and make the system of State support for RDI more efficient, a coordinating body has to be set up to ensure the coordination of public support for RDI.

The Czech Republic government strives to achieve this laudable aim through four coordinated approaches. First, by establishing a single coordinating body at the central level of State administration to be responsible for RDI. This first step creates a giant movement towards ensuring efficiency and the removal of waste within the system. Second, by launching the Czech Technology centre, the government took the second necessary step to ensure coordination. As VVI (2015, p.16) explained, “an important part of an effective system of state aid for RDI is an effective implementation structure”. Third, through the promotion, implementation and updating of the national budget to reflect its RDI ambitions. As already enumerated in the previous exploration of the EU support for innovation. The budgetary commitment of the State is always a clear indication of the seriousness attached to any policy. Finally, by strengthening the role of the management of universities and other research organizations. The faithfulness of the government of the Czech Republic in implementing these principles will be the determining factor as to whether this first aim of the NRDIP is achieved or not (VV, 2015 p.16). The State has established its seriousness in this regard.

4.3 Czech Republic Financial Framework for Innovation

According to Czech Invest (2018), the financial framework for innovation in Czech Republic is divided among a large number of providers (Figure 17). While each and every one of these fund providers for innovation are important and critical. For the purposes of this dissertation, the analysis is limited to the three main providers as identified by the Czech Investment Agency (Czech Invest). Based in the above explanation, the focus for the financial framework for the public support for innovation therefore will be limited to the big three, analysing them on the basis of the type of funding they provide for innovation. The Czech Republic financial framework for public sector innovation were divided on the basis of *institutional funding*, *project funding* and *structural funds*.

The Main Framework for Institutional Funding

As already explained in preceding sections, the Ministry of Education, Youth and Sport (MSMT) is the central administrative office for research and development. Central amongst the various administrative functions of MSMT includes institutional funding for research and development (Czech Invest, 2018). The government provides funding for innovations through the MSMT and other ministries to universities, state research organizations and institutions (Figure 17). Through these ministries and institutions, the funding for innovation in the Czech Republic flows to the researchers that need the funds.

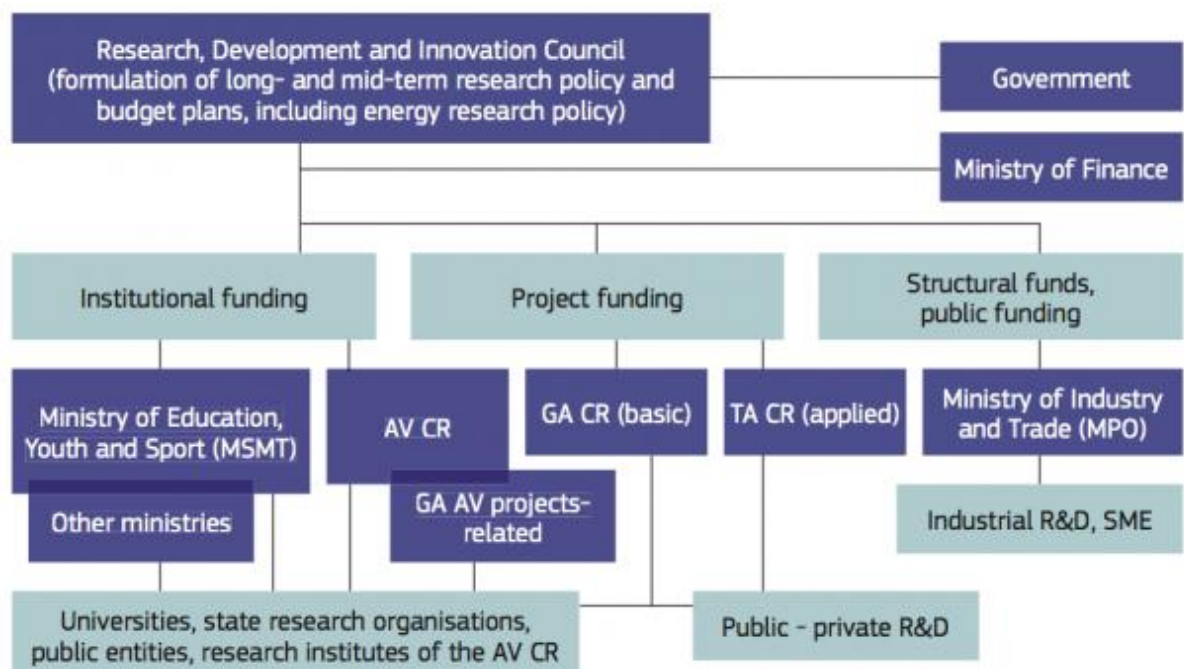


Figure 16: Czech Republic Research Funding Structure (OECD, 2007 p.158).

The Main Framework for Project Funding

Project funding for research and innovation in the Czech Republic filtrates to researchers through two main avenues determined by the type of research involved. The Czech Science Foundation (GA CR) provides the funding for researchers and innovators involved in basic research. The GACR funding are provided to researchers that meets the eligibility criteria as set out in § 18 of the Act No 130/2002 on Support of Research and Development (GA CR, 2015) (Figure 17). These grants are designed to help researchers pursue specific researches in specific scientific areas. According the GACR (2015) these areas chosen in accordance with the agency's status which focuses on technical sciences; physical sciences; medical and biological sciences; social sciences and humanities as well as, agricultural and biological-environmental sciences. On other avenue through which researchers can access funding was through the applied research option. One of the key agencies that provides funding for applied research in the Czech Republic is the Technical Agency of the Czech Republic (TACR) (Figure 17). One of the objectives of the TACR enshrined in its enabling law in Act No. 130/2002 was the preparation and realization of its own programmes of applied research, experimental development and innovation (TACR, 2018).

The Main Framework for Structural and Public Funding

The final avenue for funding for innovations was through the Ministry of Industry and Trade (MPO). The fact that the government has a dedicated ministry that focuses on the funding of research and development is clear indication of the government desire to ensure the development of innovative goods and services. The government desire is not bore out of generosity out of benevolence or availability of unlimited resources, but because of the return that is expected on the investment. A fact clearly emphasized in the government own 2007 comparative analysis of Czech research report which observed that, "Science makes knowledge from money, innovation makes money from knowledge" (Government, 2008 as cited in Young, 2014, p.21). The clear understanding of the government that providing the critically required funding for research and innovation. Through the MPO the government was able to provide the required funding for industrial research and innovation, as well as for Small and Medium Enterprises (SMEs) which are the backbone of highly industries nations (Figure 17). The effectiveness of these three aforementioned avenues as a source of funding for researchers determines the strengths and failures of the Czech Republic financial framework for innovation.

4.4 Czech Republic Framework for Public Sector Innovation: An Evaluation

The effectiveness of the different frameworks that has been used to approach public for innovation in the Czech Republic can only be evaluated within the context of the rise of the innovation economy in the EU. The measurement of the effectiveness of these frameworks within the context of the innovation economy can only be on the specific indices of what was described as driving forces of contemporary competitiveness and development (Komninos, 2008 p.23). Using the EU parameters as a basis for the measurement for the effectiveness of the Czech Republic's frameworks for public sector support for innovation. According to Komninos (2008, p.23), "it becomes clear that the regions of Europe are moving towards a new model of development, which draws its dynamism from technological innovation and the capability to convert R&D into products and services". On the basis this assertion, if the regional innovative capability is a proof of the effectiveness of the Czech Republic innovative strategies, then there is still a long way to go. Another parameter been established was the idea of regions of excellence, this simply implies that regions in a nation state that has been able to develop its education, research, innovation, digital infrastructure, and competitiveness (Komninos, 2008 p.23). The idea of regional centre of excellence as it pertains to the Czech Republic can be identified in the innovation clusters such as Brno. The level of the achievement of regional clusters of innovation excellence like Brno will determine the level of the effectiveness of the Czech Republic strategic framework for innovative excellence.

The final parameter that can also be applied to the evaluation of effectiveness of Czech Republic innovation strategies is the concept of core of excellence. Komninos, (2008 p.23) described core of excellence as "a multidimensional regional system of innovation, which brings together and connects capabilities and skills within industry clusters, institutional mechanisms of innovation, and digital spaces and e-services enabling the global reach of knowledge, technologies, and markets". The argument for and against the successes of the Czech Republic framework in support of public sector innovation therefore can be judge on how they perform in respect of the three parameters above. While there is no case that can be made against the fact that there has been growth in each and all of these parameters within the Czech Republic economy. The level of effectiveness therefore will be how much these achievements and growth compares to the other countries with the EU

and the world at large. As this research is limited in scope, the comparison therefore was limited to the country's immediate neighbour.

4.5 Germany's Institutional Framework for Innovation

As mentioned in the introductory section of this chapter of the research, the aim also includes comparing two EU member States using them as the representative sample for the entire EU community. Having explored the Czech Republic public sector support for innovations, it is now the turn of the second focal country. The German economy is recognized as the biggest economy not only within the EU member States, but also across the length and breadth of continental Europe. One of the major contributing factor to this economic success of the country was and is still its leadership in innovation and knowledge economy. In this section of the research, the focus is on exploring the country's approach to public sector support for innovation that created the current success story. The OECD (2017, p.153) observed that, in Germany, the Open Government team in the German Federal Ministry of the Interior focuses on linking existing projects and initiatives in federal, state and local government. This means the government realises the importance of information sharing by the public section and the private sector as a prerequisite for innovation. By this point alone, the German government and public sector indicated its interest in supporting innovative development that ensured and continues to ensure the competitiveness of the country's economy.

The OECD (2017, p.153) supported this argument by declaring that the German government intention is to make it as easy as possible for citizens to access government data as part of its agenda to increase transparency, participation and cooperation between government and its citizens. Ebner and Taube (2010, p.187), explained that one of the earliest indicators of the German's public sector support for innovation occurred in the 1990s. When the government recognized the special role of business start-ups in promising new industries. This recognition led to initiatives such as the '*BioRegio*' contest, aimed at the formation of innovative networks in biotechnology among public and private sector in the entire 17 regions of the country. Based on just this simple initiative, it is no surprise then that Germany currently is the leading nation in the entire EU and one of the leaders in the whole world (Heidenreich, 2005; Annesley, 2004 cited in Ebner & Taube, 2010 p.187). According to Weyer and Schneider (2012, p.177), "in 2006, the German government published a national High-Tech Strategy (HTS) aiming at a better coordination of its research and innovation policy, and to increase its financial support to research and

development in high-tech sector”. It was not as if this was the German first public sector attempt at supporting innovation within the country’s economy.

As Schrepf (2016, p.10) observed, “Research and technology policy in Germany goes back to the 1960s. However, the High-Tech-Strategy (HTS 2010), published in 2006 (Bundesministerium für Bildung und Forschung 2012a) was first national framework for developing a shared concept and vision”. The German’s government’s designing of the HTS indicated their focus on using innovation as a constant catalyst that powers their economic prowess. Schrepf (2016, p.10), buttressed this argument by postulating that the strategy is aimed at creating an innovation friendly economic environment, and the activities proposed on concentrated pooling of innovative power of innovation to improve the conditions for SMEs. The German framework for public sector support for innovation as enshrined in the HTS was not a case of a completely new policy programme. The HTS policy was simply an upgrade of the German long-term policy of public sector support for innovation. Weyer and Schneider (2012, p.177) emphasized that the HTS was simply an integrated programme in which a complex combination of existing and planned activities was presented as a new and coherent programme. This research cannot in practical terms be able to fully explore every aspect of the German HTS approach to innovation. This is because of the complexity of the institutional HTS framework (figure 18).

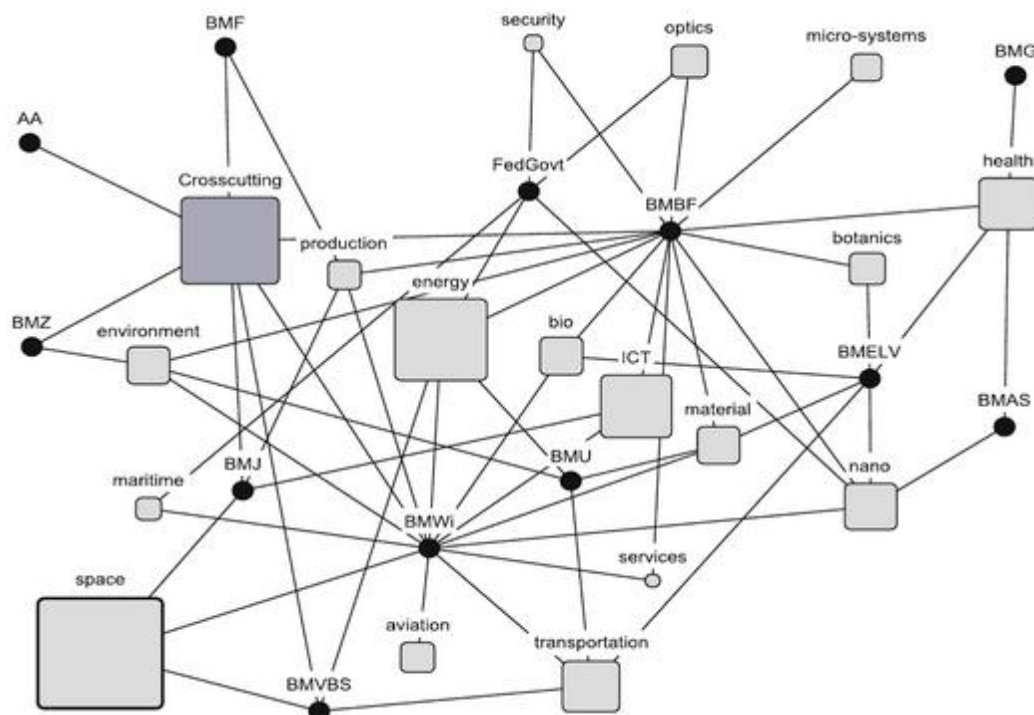


Figure 17: Participation of Governmental Actors in Sectoral Innovations (Weyer & Schneider, 2012 p.180).

4.6 Germany's Strategic Framework for Innovation

This exploration of the German's framework strategy for public sector innovation was based on this all-encompassing HTS strategy. This strategy was adopted as the platform for exploring Germany's approach because its ultimate goal was to accelerate the development, market access and the diffusion of innovation within the State's economy (Weyer and Schneider, 2012 p.180). According to Lohr (2012, p.129), "the high-tech strategy is a mission-orientated approach designed to establish Germany as a pioneer in science- and technology –based solutions". Germany is historically known as an innovation hub and this is proven over and over again in the current position as the largest economy on the continent of Europe. The majority of the German economic success is based on its competitive advantage in technology and innovation. There is no part of the world currently where German leadership in technology and innovation are not present. From global brands in automobiles such as the Mercedes Benz cars, BMW to telecommunication giants such as Siemens. The ingenuity of the German innovation competitive edge is well established. It is not surprising then that the government is invested on not only ensuring that the country continue to maintain their prime position. The German public sector support for innovation highlights the country's determination to ensure that this trend is continued.

Schrempf (2016, p.11) explained that the German government's publication of the HTS 2020 augmented and refined the strategy that focuses on early interaction between potential users and developers of new technology. This strategy does not just look at cooperation within its borders, but also on a global basis. Schrempf (2016, p.11) argued that Germany's strategy also aimed to facilitate mutual learning and supporting the introduction of new technologies. So, while the government continue to invest in the local innovation start-ups, majority of which are SMEs. The government also incorporated its international connections into innovative cooperation that ensure that the country is abreast of developments. An example of international cooperation that the German government uses in keeping pace with global trends in innovation is the European Partnerships. EC (2012) described the EP as an initiative to deal with the 'grand challenges', which allows all stakeholders involved to reach a critical mass. Focusing on coordination of research efforts and help develop norms (cited in Schrempf, 2016 p.11). The Germany government

cooperated with the EU agenda on five cardinal points which includes, climate energy, health nutrition, mobility, security, and communication (Figure 15).

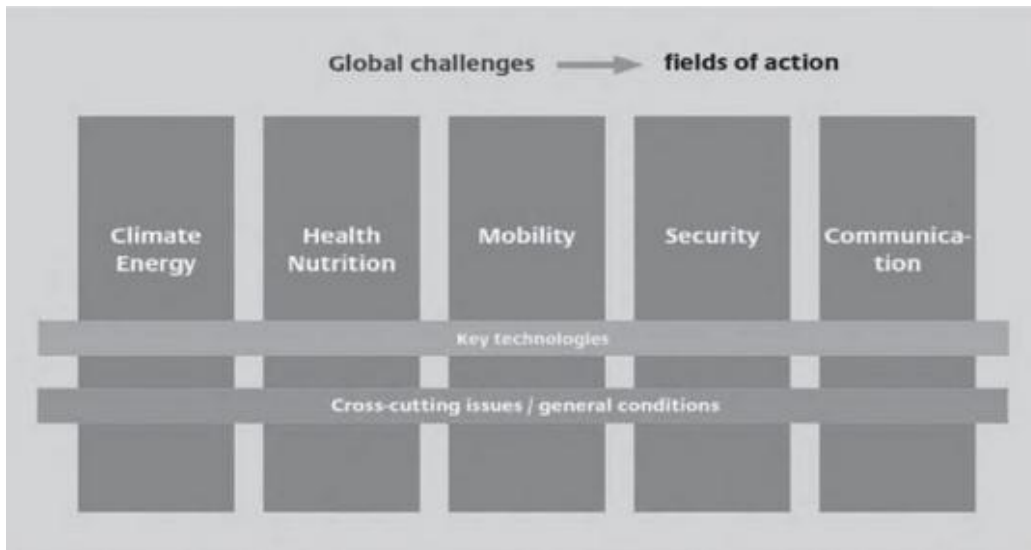


Figure 18: Global Challenges and Fields of Action of the HTs 2020. (Schrempf, 2016 p.12).

This creates opportunities for Germany's public and private sectors to learn new developments from others, while been able to leverage its strengths in areas such as communication where it is already a global leader. Thus, enabling German's public and private sectors keep abreast of global innovative trends. Keeping abreast of global innovation trends does not depend solely on the effectiveness of strategies, but also on the efficiency the other supportive frameworks such as the institutional, as well as, the financial. Before the focus of this research shifts to the financial framework of the German financial support for innovation. It is important to highlight one of the uniquely German innovation strategic framework successes, that is, its focus on traditional industries such as chemicals, autos, and appliances.

While this traditional focus may appear as basically the mainstay for many technologically developed countries, the fact of the matter is that, in terms of innovation, the focus has shifted decisively towards new areas of innovation. This includes robotics, artificial intelligence and communications. According to Wessner (2013, p.35) while the German strategy was often criticized as low-growth by many economists. The fact remains that the country's medium-sized businesses (*Mittelstand*) which are mainly family owned, but they are exemplarily successful in creating high quality products, thus establishing niche markets. This family owned small and medium scale industry plays a critical role in supporting major manufacturing firms by developing the supplies and skills that enable

these major industries to enjoy continuity. How then do these firms access funding for their R&D activities?

4.7 Germany's Financial Framework for Innovation

In terms of funding for innovative R&D, Germany remains one of the most robustly funded research environments in the entire OECD. As Wessner (2013, p.36) argued, "Germany's innovation strategy is well-funded, multifaceted, and, by some measures, quite successful". The successful outcome of the German investment in R&D is evidenced by the country's position amongst the committee of innovative and technologically developed nations. Like the framework for funding that was observed in the Czech Republic, the German government external funding in support of R&D through a network of universities, research institutes. And other similar agencies that acts as middlemen between the government and the end users of this resources for innovation. Wessner (2013, p.35) pinpointed that the German financial framework for innovation centres around a network of 60 research institutes providing effective R&D support for both SMEs and large companies. This research networks have a combined yearly budget of about \$2.4 billion which is a pool of funds that are sourced from all tiers of the German government, that is, both at the federal and states levels. The gravity of importance R&D in general and innovation in particular to the overall plans of the German government can be clearly identified in the way the funding framework was protected from any governmental cuts to spending. Despite the significant impact of the recent recession on almost every sector of the economy and the subsequent cuts to public sector spending.

The German government both at the state and federal level protected the budget for R&D. As Wessner (2013, p.65) observed, during recent recession, the German state and federal governments plans to raise spending levels for R&D to 10 percent of the national GDP by 2015, with a targeted 7 percent for education, and 3 percent for research. This commitment not only shows the government's understanding of innovation and government for it as the mainstay of the knowledge economy of the future, but as the critical link then will enable the country transit into that future seamlessly. Another angle of highlighting the significance of the German public sector framework support for financial innovation is by comparing it with the major players around the world. The combined public and private sector funding outlays for the world top economic power, the United States in 2010 was \$415 billion, followed by China with \$149 billion and Japan \$148 billion. Germany was the fourth on the list with \$83 billion (Wessner, 2013 p.35). Germany's feat was made

more significant because unlike the US where the department of defence consumes about 90% of the available R&D fund, Germany was focused on commercial innovations.

4.8 Germany's Framework for Public Sector Innovation: An Evaluation

As already enumerated in preceding pages of this section of the dissertation, the German strategic, institutional and financial frameworks rests on the tripartite cooperation of the federal government, the state government and the private sector. OECD (2017, p.140) argued that the key strength of German's approach and support for innovation rests on the country's dual training system that enables the development of highly trained workforce. This German's approach enables the country to not only develop the selective highly skilled workforce that the country requires for its innovative strategies for a knowledge economy of the future. In the light of the above, the success and effectiveness of Germany's public sector support for innovation can be evaluated using the any model that takes into consideration the historical and futuristic perspectives. One of the models that enables this type of evaluation was described as the 'shell model'. According to Kulmann (2003 p.131) There are three shells, dealing with the individual research performance, the second shell relates to the programmes and the final shell, institutions. On the basis of the above, the individual research performance in Germany are evaluated on the basis of peer reviews. These procedures are common use in German research system and they are used to evaluate the projects on basic and long-term basis. This critical role is performed by the German Research Association (DFG). The successes of this first shell of evaluation can be deduced from the increasing amount of resources been committed to the sector.

The DFG scope includes all higher education institutions in the country which nets the second largest share of the research expenditure with a budget of €8.1 billion (Kulmann, 2003 p.133). The second shell deals with programmes that are specifically geared toward ensuring the country's industry remain competitive through increasing innovation from the medium-sized firms. According Kulmann (2003 p.132), the evaluation of this sector reveals its value as it was and remains the most heavily funded research aspect of the whole German research drive. With an investment of €33.6 billion, the country's continuous dominance of the technologically advanced products and services in the EU and one of the strongest contenders in the world. Kulmann (2003 p.131) explained that the final shell, institutions are continuous evaluated for their effectiveness by the Science Council declaring, "German evaluation practices in the area of judging the performance of

research and research institutions can be characterised as both strong and fragmented at the same time”. This clearly indicates that despite the effectiveness of the German innovation and evaluation, there is still an opportunity for improvement.

Chapter 5

Comparative Analysis: Czech Republic and Germany's Public Sector Support for Innovations

A comparative analytical research such as this research cannot be completed without a clear and detailed comparative analysis of the frame of reference of the research. In keeping with the desire for a valid and reliable research finding. The research conducted a comparative analysis of the three critical frames of reference for this research, that is, the comparative analysis of the institutional, strategic and financial indicators of the two focal countries. A simplistic look at the size of the economies of the Czech Republic and Germany provides any casual observer an indication of the clear differences between the two nations. However, what a casual observer of the two economies and nations may not be able to deduce from their casual observation was the causal factors behind the deduced differences. This chapter of the research dissertation provides the causal factors for the differences between the two economies and nations using any of the aforementioned indicators as it pertains to innovations.

5.1 Comparative Analysis of the Institutional Indicators for Innovations

The comparison of the Czech Republic and Germany institutional indicator was viewed within the framework of the EU. The EU provided the standard for what could be considered the gold standard across the continent for institutional support for innovation. The EU provided its institutional support for innovation through the establishment of several frameworks within which the community pursues the enshrining of institutionalization of public sector support for innovation. The Czech Republic institutional frameworks are established in four critical institutions that ranges from the cabinet level institutions such as the Ministry of Industry and Trade (MPO) to inter-ministerial agencies such as the Academy of Science of the Czech Republic (AV CR). The complexity of the institutional support for innovations can be seen from the Czech Republic Research Institutional Chart (Figure 16, P.60). While the entirety of the Czech Republic's institutional structure are not more than five critical institutions. Germany's institutional support for innovation can be deduced from the complexity of the country's innovation supporting institutions. The German's institutional structure not only triple that of the Czech Republic, it is perhaps, the most complex innovation institutions in the whole

EU. The first indication of the incomparable difference between German's and the Czech Republic's innovative institutions is complexity of its structure (Figure 18, P.69).

It is therefore easy to deduce from the differences in complexity of the institutional structures of the two focal countries that which places more premiums on public sector innovations. This deduction emanates from the fact that the more the institutions that are saddled with different responsibilities, the more the areas of public sector innovations that are covered. As the dissertation has indication through the application of the triple helix theory of interconnectivity between government (public sector), university and industry (private sector) in public support for innovations. As the size of the institutions devoted to innovation indicates the significance that the government of the state attaches to innovations. While it is undeniable that the German government invested a lot more than the Czech Republic in its innovative institutions, however it is also important to state here that, Germany dwarfs the Czech Republic in geographical size, population and economic standing. It was no surprise that that the institutions dedicated to innovation should dwarf that of the Czech Republic. While there was no doubt that institutions indicate the level of seriousness that any government attaches to public sector innovation. However, the next indicator clearly determines whether the size and number of institutions of German's support for public sector also translates to actual influence on public sector.

5.2 Comparative Analysis of the Strategic Indicators for Innovations

Inasmuch as institutional structure and framework behind a country's innovative pursuit is critical. The size and effectiveness of the institutional structure was reliant on the effectiveness of the strategy behind the structure. Using the EU strategic approach to support for institutional innovations as a standard. The EU established clear strategic approach to innovation support through the publication of the previous six framework programmes and the current Horizon 2020 programme. The strategies established in these EU programmes are directed at ensuring the institutions enabled the achievement of three critical innovative objectives of; innovation and growth in new and knowledge intensive businesses, growth and innovation in existing businesses and innovation in government at all levels. The EU applies this innovation objectives through its established institutions and it was carried out on a clearly outlined 4 yearly bases. The Czech Republic's strategic approach to public sector innovation was outlined in the National Research, Development and Innovation Programme (NRDIP). This national strategy not only provides a focused approach to public sector support for innovations. It actually provided a unified and

centralised approach for public sector innovations. Unlike what was the case with institutional support and indicators for public sector innovation support.

The Czech Republic strategic indicators are limited to four coordinated approaches, that is, establishment of a single strategic coordinating body; the establishment of a Czech Technology Centre; the promotion, implementation and updating of the national budget to reflect its RDI ambitions. Finally, the Czech Republic strategic approach also paid attention to the strengthening of the role of management of universities and other research institutions as a critical part of the public support for innovation. These strategic approaches clearly indicated that the country sees the significance of not just institutional support for innovations as been critical, but also of the appropriate strategies to support the institutions. The German's strategic approach to public sector innovation establishes the sophistication of the country and its relative expertise on the issue of innovations. Unlike the Czech Republic approach where there was an outline of four critical strategic aims. The German strategic indicators provide a simple but more sophisticated indication of the depth of the experience that the country has on the subject. The German's strategic approach is simply to accelerate the development of innovative products, ensuring a quick market access for the innovative products and services and most importantly the diffusion of innovation within the country's economy.

There was only one critical difference between the three different strategic innovative approaches that the EU, the Czech Republic and the German's approach revealed. That difference can be identified in the simple phrase, "diffusion of innovation within the German economy". The German's diffusion of innovation within its economy was simply the quick integration of innovative products and services. This strategic approach ensures that when an innovative product or services is developed within any tiers of the country's institutions, the innovation is integrated as quickly as possible throughout the entirety of the German economy irrespective of the sources of innovation. The effectiveness of this simple and direct strategic approach on the part of the German's support for innovations is the desire of the German government, institutions and strategists at achieving greater innovative products and service. It is therefore undebatable given that the country's position as the economic giant in the EU. While the significant role currently played by innovations in determining the competitiveness of today's economy is clear. The fact that the competitiveness of the German's economy was not only based on its current innovative competitiveness, but also its relentless investment and pursuit of the innovative products

and services of the future. The effectiveness of institutional and strategic indicators is dependent on the robustness of the funding available to ensure their success.

5.3 Comparative Analysis of the Financial Indicators for Innovations

The EU as a financial indicator standard for the entire countries in the EU clearly indicated that Community places high premiums on innovation and knowledge economy. A clear indication of the significance of innovation in any nation state, international organization or institutions is always how much it commits to RDI. The EU has clearly indicated that innovation is a critical and essential aspect of all its plans and developmental goal. This is indicated by budgetary commitments to its strategic framework programmes and the incremental nature of the framework to budgetary commitments. The initial innovation framework programme between 1984 and 1989 enjoyed a budget of €4billion, but by the fourth innovation framework programme, the budget has increased significantly to €13billion and as at the close of the framework programmes in 2013 that budget has jumped to an astonishing €51billion. While these figures clearly established without any doubt the commitment of the EU to Research, Development and Innovations, the current Horizon2020 programmes enjoys a budgetary support of approximately €80billion. Having established the EU's long-term commitment and support for innovations. How does the two focal countries fare in this regard? (Table 1 above).

There are no readily available figures for the funding for public support for innovations. However, the commitment of the Czech Republic for public sector innovation cannot be over emphasized. The thesis reveals that there are three main avenues for innovation funding within the country. The first been the availability of funding for institutional innovations which are accessible through institutional funding such as the Ministry of Education, Youth and Sport as well as other ministries. Secondly, funding is also available for specific projects which are obtainable through the Czech Republic Academy of Sciences (AV CR), and the Czech Science Foundation (GA CR) among others. The third avenue for innovations funding within the Czech Republic is the structural funds and public funding. These sources of funding are channelled through the Ministry of Industry and Trade (MPO) which makes funding available for industry level research and development researchers as well as Small and Medium Scale Enterprises (SMEs) (Figure 17, p.65). Despite the lack of specific figures that are committed to these different avenues of funding within the country. It is clearly indicated the commitment of the country to

public sector innovation on the basis of the fact that it covers the entirety of the country's economic sector. From the public sector such as universities, state research institutions and research institutes to the private sector through industrial R&D and SME (Figure 17, p.65). There is arguably no other member of the EU with a better innovation funding compared to the level of funding available to the German innovation framework, both in the public and private sectors. This may not be unexpected given the fact that the country runs the biggest economy on the continent. Having said that, the country's innovation funding was described as well funded, multifaceted and by all indications quite successful. When the German's funding commitment to innovation is compared with that of the Czech Republic without considering the figure for figure comparison, but just on the funding structure alone. The entirety of the Czech Republic innovation funding structure consists of less than 10 funding institutions and agencies. On the German side, there are well over 60 research funding networks that provides effective funding for SMEs, large companies and other institutions with a combined yearly budget of approximately \$2.4billion. Aside from these funding institutions, the states and federal government in Germany has a protected spending levels for innovations that is equal to 10 percent of the country's GDP. The aforementioned indicated the German's government irrefutable commitment to innovations, not just at the federal level, but also at the states level.

When the comparison of the German's government commitment to innovation is evaluated and compared on the basis of the actual figure commitments. The result will indicate a clearly incomparable level of commitment between the Czech Republic and the Germany. It would be unfair to actually compare the German government commitment directly with that of the Czech Republic given the large gap between the sizes of their respective economies. But it is critical to provide a perspective for level of commitment of the German governments to innovations. A good way of doing this is to compare the country's level of commitment to two biggest economies in the world, that is, that of the United States and China. In the year 2010, the United States' private and public sectors has a combined research budgetary commitment of an estimated \$415billion, and as expected followed by China at a distant with a budget of \$149billion. The German's government commitment was \$83billion during the same period making the country the fourth in the list of the world top five R&D funding in the world and the first in Europe. While there is no reason discovered throughout the research to doubt the commitment of the Czech Republic government to innovation. However, the level of that commitment cannot be

compared in any way to that of the German government. This finding was however not due to lack of appreciation of the significance of the role of innovations to the knowledge economy of the future, but mainly as a result of the size of its economy.

Conclusions and Recommendation

During the conduct of this research, several ideas and principles surfaced concerning the public-sector support for innovations. One critical reoccurring principles that remains constant throughout the research irrespective of the perspective through which the issue was viewed was the principle of information sharing. The research discovered that the ability to share information amongst different organizations and institutions ensures that these benefiting organizations and institutions are able to learn from each other and that ensure a more efficient management of limited resources. The research can conclusively argue then that the most important and significant way that the public sector supports innovations is the platform that it provides for the sharing of information which enable the achievement of the twin objectives of efficiency of the management of limited resources and the generality of the innovations that emerged from this shared information for the benefits of the entire public. To arrive at this conclusion, the research investigated the subject matter on the basis of the set-out objectives.

The purpose of this research as stated in the introductory section was to identify the different ways in which the public sector supports innovation. To explore this exciting, but also intimidating objectives. The research viewed public sector support for innovation from the perspectives that is; promotion of economic activities from which social returns are far higher than direct private return of profit. In other words, the public sector must focus on ensuring the benefits of innovations are not just to ensure the financial prosperity of a few, but rather the general benefit of the public must outweigh the individual. However, this argument should not be taken to mean that the private sector does not deserve right to benefit financially from their investments in R&D that generates innovations. What the author was arguing was that the public sector must always be concerned with ensuring the general public benefit of any innovation first and foremost before considering financial benefits to individuals. While the public sector may not be able to stop the private sector from benefiting from the returns on their investments. As regulators in free market economies, it has the statutory rights to ensure real earned financial benefits was not abused. More so, the public sector stands in a critical position of nurturing activities whose immediate direct returns are sometimes low. However, the public sector has the ability to ensure a flourishing environment for innovation in any economy by supporting ventures that may demand high capital while returns on the investments are not guaranteed. Due to this high risk associated with such innovation investment, the private sector may shy away

from engaging in them. The research identifies that fact that the public sector plays an important role in such situations. Not only because in many instances, it provides the resources that may be lacking in the private sector for such risky investments. Better still, all that may just be required of the public sector is to stand as guarantor for the huge capital investments in risky R&Ds, while all the resources required are put in place by the private sector. In cases such as the one above, the public sector stands ready to provide the financial backup for the private sector investors. So that if the project did not turnout successful as hoped, the public sector will back up the private sector to ensure they continue to function as a business and not go bankrupt. A good example of this scenario, although the causes are different, is the infamous bank bailout during the recent financial crisis. While the bailout may not be popular among the public, the action was right in ensuring the entire financial sector did not collapse during that crisis. Finally, that the public sector supports innovation as a means of capital formation at the public level. As explained in the preceding paragraph, the public sector can and has often act as the main foundation for financial formation for innovation activities in the public sector. Few of the innovations that public sector has played a significant role in ensuring the continuity of financial resources for its emergency includes, but not limited to the Internet and the Navigation Systems that are now part and parcel of everyday living.

The research discovered that the R&D that led to the creation of the Internet was sustained by public sector funding. The Navigation System was first developed within the public sector department with the highest funding in the majority of the developed countries, that is, the military. The development of the Navigational System within the public sector did not stop it from becoming a global private sector driven success that it has become. These three fundamentals of the functions of an effective public sector highlights the significance of public sector support for innovations, irrespective of where the innovation activities originate. The research was conducted on three main focal points to ensure the exploration of the issues of public sector support for innovations comprehensively;

Firstly, the research identified the meaning of innovations by defining the word and concept of innovations. The research discovered that innovation does not always result in commercial success but could be just improvements in the way things are done. The research however established that the public sector and private sectors have different

objectives concerning innovations. The public sector seeks to support of the development of innovations that benefits the majority of the people.

With no regard to whether the innovation is commercially viable or not. The private sector on the other hand, seeks to maximise the revenue and profits that can be derived from any innovation that it has invested time and resources. Aside from this profit motive, the private sector also seeks to gain competitive advantage over its competitors that will serve not just its immediate need for return on investments and profit. It also seeks to ensure that the competitive advantage the created the revenue and profits over and above its competitors are maintained for as long as possible. While the private sector is busy looking at its own sustainability in terms of competitiveness and profitability. The public sector seeks to ensure that an enduring environment that encourages and inspires other innovations are created within the state. In the same section, the fact that public sector creates the environment that ensures innovation was well established. An example of this innovation creating environment was public sector's objectives of increasing the number of skilled labour within the state that creates innovations. The private sector on the other hand can seeks and secure skilled labours far beyond its present location of centre of operations. The research observed that as parallel as these differences may appear to a casual observer.

The differences are eliminated through cooperation and collaboration that generate mutual benefits for both sides. The research used the Schumpeter dimensions of innovations to highlight the differences and similarities between the public and private sector innovations objectives. Schumpeter explanations of the innovations dimensions established the fact that working collaboratively ensures benefits for both sides of the issues. Collaborative efforts and innovations are perhaps the best ways in which the research established the importance of public sector support for innovations. This is because it enables both sides to bring forth their best abilities. This collaboration ensures that the differences in their objectives and aims are reduced or completely eliminated to ensure that only what is worthy are strengthened. This often referred to as 'sustainable core competency', which is simply the opportunity that collaboration grants the public and private sectors to reinforce their strong points while reducing their commitments in ineffective and inefficient areas.

Secondly, the research focused on the European scope of view on innovations. Pinpointing the relevance of finances as the indicator of the policies that are priority. The way finances are utilized is one of the most scrutinized aspect of public sector activities. As a result of

this, the public sector must justify how the tax payers' funds are spent. One of the ways of justifying the spending of tax payers' funds is to identify the beneficiaries of the expenditures as majority of the public.

This section of the research first identified the beneficiaries of public sector support for innovation, before highlighting how the state used the public fund to steer innovation in the direction that benefits the majority of the people. The research identified some of the beneficiaries of public support for innovations. These includes the traditional public administration, the new public management, and the collaborative governance. These highlighted beneficiaries of public support for innovations in the public sector is relevant and important because of the fact that there is no part of the public that is not impacted by the activities of any of these identified beneficiaries in the public sector. Having identified the public sector beneficiaries of public sector support for innovation, the research moved to look at the EI budget for innovation. As mentioned earlier, one of the indicators of relevance of any policy or policies is the amount of resources committed to it. In line with that argument, the research explored the commitment of the EU to innovation on a continental level. The EU showed its commitment and support for innovation through its financial commitment to a set of programmes designed to focus the community's support in a definitive way. This programme is the Framework Programmes. There are eighth of these programmes with the current one named differently. The EU devoted a percentage of its resources to these programmes starting in 1987 and has not ceased doing so till date.

Another indicator of the community's commitment to public sector support for innovation was the fact that, from the initial programme in 1987, the year on year budget has never been cut, but rather increased significantly. For emphasis sake, the EU committed €3,750 to the initial FP1, by the time of the FP7, the budget has jumped to €50,521. This is not even mentioning the current Horizon 2020 programme whose budget surpassed the last FP7 programme significantly (See Table 1 above). The EU's commitment to public sector support for innovations has been clearly established by its financial commitment to the innovations programmes. The research having established this fact, moved on to sample two states within the community as a focal point for individuals states.

Thirdly, the research focused on two states to evaluate how their public sectors supports innovations. The Czech Republic was chosen as the first focal state and Germany as the second. These two-member states of the EU were not selected randomly, but rather

purposely because of certain characteristics. First, the Czech Republic is one of the small states of the community. While Germany is one of the biggest states within the community. They are not just different in terms of their size, but also in their economic stature within the EU.

Germany is the undisputed largest economy within the EU, while Czech Republic although not the smallest, was nowhere close to Germany in terms of economic prowess in the EU. Now, there are still many differences between the two states, however, the Czech Republic is no pushover in terms of innovative products. Germany can boast of globally recognized brands such as Mercedes Benz, BMW and Volkswagen. The Czech Republic can also compete and does so effectively with brands such as Skoda and CEZ. Not to mention, Bata shoes and Averse antivirus company. Despite all the similarities identified above, there is no doubt that the differences between these two nation states extends beyond their global brands. It included the two states perspectives and how they approach public sector support for innovation. The research conducted a comparison analysis of the two as a means of identifying the common practices within EU member states. Starting with the Czech Republic, the research discovered that the country approached public support for innovations through the state initial operations of an uncoordinated approach to the issue of innovations. The operational word here is, initial, because the country has moved from such practice when there are different ministries and institutions dealing with public sector support for innovation.

Having different ministries and institutions operating different aspect of a country's innovation policies is nothing new. What is new however is the lack of coordination between these different institutions and ministries in the past. The research highlighting three innovation policies as an example of the lack of coordination of the past. These are the BETA programme of 2012 to 2016; the Defence Applied Research, Experimental Development and Innovation of 2011 to 2017. The last of the three was the programme for Security Research for the Needs of the State of 2010 to 2015. To the credit of the Czech Republic, there has been drastic changes in its approach to public sector support for innovation. This change was registered in the National Research, Development and Innovation Policy of 2009 to 2017. This public sector support for innovations was established in law through an Act of parliament which shows the seriousness of the state. The research discovered that this new approach to supporting innovation in the Czech Republic mirrors that of the EU. The EU has seven Frameworks Programmes and the

currently running Horizon 2020 programme concerning innovations in the entire community. The Czech Republic has the NRDIP programme with nine objectives that are similar to that of the EU.

After evaluating the Czech Republic's approach to public sector support for innovation, the research then moved on to explore the German's approach as the comparison other half. The research exploration of the German's approach to public sector support for innovation is different from that of the Czech Republic. First off, it was unfair to compare the Czech Republic with Germany in terms of public sector support for innovation. The research made this observation, not as a denigration of the excellent works of the Czech state in this respect, but because of the differences in their history in terms of innovations. Having made that point clear, the German state has a long history in respect to public sector support for innovations. One of the more recent actions of the German state that has ensure their continuous competitiveness in this regard was their Open Government style. The German Federal Ministry of interior ensuring the linking of different projects in different levels of government from the local, state to the federal. This exchange of information is critical in innovations development as has already been established. Leaving that aside, what are the specific ways in which the German state approach public sector support for innovations?

The answer to this critical question resides in the German government established National High-Tech Strategy (HTS) in 2006 with the singular aim of providing better coordination of its research and innovation policy and increase its financial commitment to RD&I. As mentioned earlier, the German Democratic Republic is no stranger to effective policy on innovations. The fact of the German state relationship with innovation policy dated as far back as the 1960s. The focus of this research was however on the German's state current relationship with public sector innovation support. In the light of this, the research identified four cardinal points of the German's HTS programme for public sector support for innovation. Firstly, to keep Germany's innovation at par with global innovative trends. Secondly, to provide the required funding for innovations in both the public and private sectors. Thirdly, to reform the education system in such a way as to tackle the approaching demographic change and challenges. And finally, to improve the link between industry and science. It is worthy of note that while the EU has an elaborate public sector support for innovation policy enclosed in the seven FPs plus the Horizon 2020 programme. The Czechs in the eight innovations objectives. The German state kept it simple to four critical

objectives and programmes. However, the public sector support for innovations was not only recognized as crucial by all, but continuously addressed by both governments, although the focus varied on the basis of resources and expertise available.

Recommendations

Irrespective of the amount of resources and expertise committed to public sector support for innovation in the two focal countries or even the EU as a whole. The issue of innovation will remain a constant issue that will continue to demand attention given the dynamic nature of the current knowledge economy. Having established this critical fact, the research recommends as follows:

1. It is recommended that Firstly, while resources are limited and will continue so in the foreseeable future, the government of Czech Republic must pay more attention to securing more funding for RD&I from private sector more than currently available in the country.
2. The German government on the other hand has succeeded in ensuring this obstacle is addressed, but more is still required. Secondly, improving cooperation between key stakeholders within each state is and will remain critical. Once again, while the German state appears to have mastered the management of this critical relationship. There is still room for improvement simply because the dynamism of the knowledge economy demands constant improvements. The Czech Republic on its part, has a long way to go and must use the successes already recorded as a motivation for improvement in this regard.
3. Although the size and might of the German's economy played a key role in its seemingly incontestable success story. The key to that success was its use of the small and medium scales enterprises (SMEs) as a catalyst for growth in the knowledge economy. The Czech Republic need to take a page from this example and use it effectively to its advantage in remaining competitive in the EU economy of the future.

In addition to the above recommendations, within the context of Czech Republic, national policy programmes that support innovation based on its National Research, Development and Innovation Policy 2009-2015, has been faced with major challenges such as ministries investing resources in parallel objectives as a form of competing each other as oppose to working together. In order to avoid the promotion of parallel agenda, the government needs to establish the single coordinating body at the State administration to control affairs. This practice will lead to efficiency thereby reducing waste in their system.

Lastly, the study recommends that, the European Union being the bigger umbrella under which all other EU countries operate should develop a comprehensive template that will serve as the blue print for all member countries to follow in integrating the innovation policies and the public support for innovation and development through R&D. this will ensure that there is fair growth among the countries in terms of innovativeness and technological advancement. There is the need t also develop collaborative learning among the member countries to promote frameworks.

Reference

- [1] Academy of Sciences of the Czech Republic (CAS), 2017. *Mission of the Czech Academy of Sciences (CAS)*, viewed 20 January 2018, from <http://www.avcr.cz/en/about-us/mission-of-the-cas/>
- [2] Achari, P.D. 2014, *Research Methodology: A Guide to Ongoing Research Scholars in Management*, Horizon Books, New Delhi, India.
- [3] Afful-Koomson, T. & Asubonteng, K.O. 2013, *Collaborative Governance in Extractive Industries in Africa*, United Nations University Institute for Natural Resources in Africa, Ghana.
- [4] Agger, A., Damgaard, B., Krogh, A.H., & Sorensen, E. 2015, 'Introduction', in A. Agger, B. Damgaard, A.H. Krogh & E. Sorensen (eds.), *Collaborative Governance and Public Innovation in Northern Europe*, Bentham Science Publishers Limited, Sharjah, U.A.E.
- [5] Appendices 1: Structure of FP7 – Specific Programmes and Thematic Areas (EC, 2015).
- [6] Bekkers, V., & Tummers, L. 2016, 'An Innovation Perspective', in S. Van de Walle, & S. Groeneveld (eds.), *Theory and Practice of Public Sector Reform*, Routledge, London, UK.
- [7] Bessant, J. & Tidd, J. 2007, *Innovation and Entrepreneurship*. John Wiley & Sons, West Sussex, UK.
- [8] Bevir, M. 2009, *Key Concepts in Governance*, SAGE Publications Limited, London, UK.
- [9] Boccia, S., Keskimaki, I. & Ricciardi, W. 2014, 'Public Health Research', in B. Rechel & M. McKee (eds.), *Facets of Public Health in Europe*, Open University Press, Berkshire, England.
- [10] Bontoux, L. 2002, 'The European Strategy on Endocrine Disruptors: Progress to Date and EU/US Cooperation', in L. Chyczewski, J. Niklinski, & E. Pluygers (eds.), *Endocrine Disruptors and Carcinogenic Risk Assessment*, IOS Press, Berlin, Germany.
- [11] Borins, S.F. 2014, *The Persistence of Innovation in Government*, Brookings Institution Press, Washington, D.C.
- [12] Brebner, M. & Hogan, J. 1991, 'Investment Incentives', in J. Hogan, (ed.), *The European Marketplace*, The Macmillan Press Limited, London, UK.

- [13] Breuer, H. & Ludeke-Freund, F. 2016, *Values-Based Innovation Management: Innovation by What we Care About*. Palgrave, London, UK.
- [14] Browne, K. 2005, *An Introduction to Sociology, 3rd ed.* Cambridge: Polity Press.
- [15] Brunn, S.D. & Leinbach, T.R. 2000, 'Nokia as a Regional Information Technology Fountainhead', in J.O. Wheeler, Y. Aoyama, & B. Warf (eds.), *Cities in the Telecommunications Age: The Fracturing of Geographies*, Routledge, London, UK.
- [16] Carlone, D., Caudle, S.L., & Check, J.W. 2013, 'Preface', in J.A. Maxwell, (2013), *Qualitative Research Design: An Interactive Approach*, SAGE Publications Limited, London, UK.
- [17] Castaldi, C. & Dosi, G. 2010, 'ICT and Productivity Growth in Europe: An Update and Comparison with the US', in M. Cimoli, A.A. Hofman, & N. Mulder (eds.), *Innovation and Economic Development: The Impact of Information and Communication Technologies in Latin America*, Edward Elgar, Cheltenham, UK.
- [18] Cipriani, G. 2007, *Rethinking the EU Budget: Three Unavoidable Reforms*, Centre for European Policy Studies, Brussels, Belgium.
- [19] Collins, H. 2010, *Creative Research: The Theory and Practice of Research for the Creative Industries*, AVA Publishing SA, Lausanne, Switzerland.
- [20] Community Research and Development Information Services (CORDIS) n.d, *Fifth Framework Programme*, viewed 30 March 2017, <http://cordis.europa.eu/fp5/>
- [21] Cortada, J.W. 2012. *The Digital Flood: The Diffusion of Information Technology across the U.S., Europe, and Asia*, Oxford University Press, Oxford, UK.
- [22] Czech Investment Agency (Czech Invest), 2018. *Funding Bodies*, viewed 14 February 2018, <http://www.czech-research.com/rd-funding/national-funds/funding-bodies/>
- [23] Czech Science Foundation (GA CR), 2015. *Basic Information about Czech Sciences Foundation (GA CR)*, viewed 13 February 2018, <https://gacr.cz/en/about-gacr>
- [24] Darmer, M. & Kuyper, L. (eds). 2000, *Industry and the European Union: Analysing Policies for Business*, Edward Elgar, Cheltenham, UK.
- [25] Dekker, L., Smit, W., & Zuidervaart, J.C. eds, 1994, *Massively Parallel Processing Applications and Development*, Elsevier Science B.V., Amsterdam, The Netherlands.

- [26] Ebner, A. & Taube, F. 2010, 'Dynamics and Challenges of Innovation in Germany', in A. Lopez-Claros (ed.), *The Innovation for Development Report 2009-2010: Strengthening Innovation for the Prosperity of Nations*. Palgrave Macmillan, London, UK.
- [27] Eichenberger, R. 2003, 'Economic Innovations Depend on Political Innovations: On Deregulating the Political Process', in J. Brocker, D. Dohse, & R. Soltwede (eds.), *Innovation Clusters and Interregional Competition*, Springer, Heidelberg, Germany.
- [28] Esen, A., Asik-Dizdar, O., & Maden, C. 2015, 'Social Innovation as Driver of Regional Competitiveness: A Conceptual Framework', in L.M.C. Farinha, J.J. Ferreira, H.L. Smith & S. Bagchi-Sen (eds.), *Handbook of Research on Global Competitive Advantage through Innovation and Entrepreneurship*, Information Science Reference, Hershey, PA.
- [29] EU-Japan Centre for Industrial Cooperation (JEUPISTE), n.d. *Historical Timeline of the Framework Programme*, viewed 27 March 2017, <http://www.jeupiste.eu/horizon-2020-and-around/historical-timeline-framework-programme>
- [30] EU-Japan Centre for Industrial Cooperation (JEUPISTE), n.d. *Historical Timeline of the Framework Programme*, viewed 27 March 2017, <http://www.jeupiste.eu/horizon-2020-and-around/historical-timeline-framework-programme>
- [31] European Commission (EC) (2015), *Seventh FP7 Monitoring Report: Monitoring Report 2013*, Publications Office of the European Union, Luxembourg.
- [32] Farmer, D.J. 2010, *Public Administration in Perspective: Theory and Practice through Multiple Lenses*, London, England.
- [33] Farr, J.L., Sin, H-P., & Tesluk, P.E. 2003, 'Knowledge Management Processes and Work Group Innovation', in L.V. Shavinina (ed.), *the International Handbook on Innovation*, Elsevier Science Ltd, Oxford, UK.
- [34] Fleisher, C.S. & Bensoussan, B.E. 2015, *Business and Competitive Analysis: Effective Application of New and Classic Methods*, 2nd ed. Pearson Education, Inc., New Jersey, NJ.
- [35] Gash, A. 2016, 'Collaborative Governance', in C. Ansell & J. Torfing (eds.), *Handbook on the Theories of Governance*, Edward Elgar Publishing, Cheltenham, UK.

- [36] Georghiou, L. 1995, 'Assessing the Framework Programmes: A Meta-evaluation', *SAGE Publications*, Vol. 1 (2), pp.171-188.
- [37] Georgousopoulos, C. 2013, 'Applying Open Innovation Strategies to eGovernment for Better Public Services', in J.R. Gil-Garcia (ed.), *E-Government Success Factors and Measures: Theories, Concepts, and Methodologies*, IGI Global, Hershey, PA.
- [38] Gillam, S. 2012, *Steve Jobs: Apple Icon*. ABDO Publishing Company, North Mankato, Minnesota.
- [39] Goffin, K. & Mitchell, R. 2016, *Innovation Management: Effective Strategy and Implementation*, 3rd ed. Palgrave, London, UK.
- [40] Guest, G., Namey, E.E., & Mitchell, M.L. 2013, *Collecting Qualitative Data: A Field Manual for Applied Research*, SAGE Publications Limited, London, UK.
- [41] Han, S. 2007, 'Essays on Information Technology and Innovation Processes: Exploring the Effects of IT Investments on R&D Effectiveness and, Understanding the Drivers of Migration to Services by IT Product Vendors' PhD Thesis, Rensselaer Polytechnic Institute.
- [42] Hartley, J. 2015, 'The Creation of Public Sector Value through Step-Change Innovation in Public Organisations', in J.M. Bryson, B.C. Crosby & L. Bloomberg (eds.), *Public Value and Public Administration*, Georgetown University Press, Washington, DC.
- [43] Heppner, P.P., Wampold, B.E., Owen, J., Thompson, M.N. & Wang, K.T. 2016, *Research Design in Counselling*, 4th edn. Cengage Learning, Boston, MA.
- [44] Herrera, G.L. 2006, *Technology and International Transformation: The Railroad, the Atom Bomb, and the Politics of Technological Change*, State University of New York Press, Albany, New York.
- [45] Heuninckx, B. 2016, 'Collaborative Defence Procurement: How to Make It Work,' in K. Burgess & P. Antill (eds.), *Emerging Strategies in Defense Acquisitions and Military Procurement*, IGI Global, Hershey, PA.
- [46] Hierl, J. & Palinkas, P. 2009, 'Energy Technology Policy in Europe,' in P.J.J. Welfens, ^ J.T. Addison (eds.), *Innovation, Employment and Growth Policy Issues in the EU and the US*, Springer, Berlin, Germany.
- [47] Hollanders, H. & Kanerva, M. 2015, 'European Union', in the United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France.
- [48] House of Commons European Scrutiny Committee, 2012. *Fifty-second Report of Session 2010-12*, House of Common Publication, London, UK.

- [49] Hybl, J. 2004, 'The Czech Social Security Smart Card', in Paulus, S., Pohlmann, N., & Reimer, H. (eds.), *Securing Electronic Business Processes: Highlights of the Information Security Solutions Europe 2003 Conference*, GWV Fachverlage GmbH, Wiesbaden, Germany.
- [50] Jakubec, S.L. & Astle, B.J. 2017, *Research Literacy for Health and Community Practice*, Canadian Scholars, Ontario, CA.
- [51] Johnson, B. & Christensen, L. 2012, *Educational Research: Quantities, Qualities, and Mixed Approaches*, 4th edn. SAGE Publications Limited, London, UK.
- [52] Kaar, M. & Muller, J. 2011, *The Impact of Participation in Publicly Funded R&D Projects on Firm Competitiveness: Benefits and Barriers to the Use of National and EU Funding Programmes on the Example of Swiss SMEs in the Field of Renewable Energy*, Diplomica, Verlag GmbH, Hamburg, Germany.
- [53] Kaderabkova, A. & Radosevic, S. (2011), 'Innovation Policy in Multi-tier Europe: Introduction', in A. Kaderabkova & S. Radosevic (eds.), *Challenges for European Innovation Policy: Cohesion and Excellence from a Schumpeterian Perspective*, Edward Elgar, Cheltenham, UK.
- [54] Klenke, K. 2016, *Qualitative Research in the Study of Leadership*, 2nd edn. Emerald Group Publishing Limited, Bingley, UK.
- [55] Knudsen, T. & Davies, K. 2006, 'R&D Innovation in the Public Sector – A National Agenda for Renewal', in P. Cunningham & M. Cunningham (eds.), *Exploiting the Knowledge Economy: Issues, Applications and Case Studies*, International Information Management Corporation Ltd (IIMC), Dublin, Ireland.
- [56] Komninos, N. 2008, *Intelligent Cities and Globalisation of Innovation Networks*, Routledge, London, the UK.
- [57] Krippendorff, K. 2013, *Content Analysis: An Introduction to its Methodology*, 3rd edn. SAGE Publications Limited, London, UK.
- [58] Krogh, H.A. & Torfling, J. 2015, 'Leading Collaborative Innovation: Developing Innovative Solution to Wicked Gang Problems', in A. Agger, B. Damgaard, A.H. Krogh & E. Sorensen (eds.), *Collaborative Governance and Public Innovation in Northern Europe*, Bentham Science Publishers Limited, Sharjah, U.A.E.
- [59] Kuhlmann S. 2003, 'Evaluation of Research and Innovation Policies: A Discussion of Trends with Examples from Germany', *Int. J. Technology Management*, Vol. 26, Nos. 2/3/4/, pp.131-149.

- [60] Kumar, A., & Meenakshi, N. 2011, *Marketing Management*, 2nd ed. Vikas Publishing House Pvt Ltd, New Delhi, India.
- [61] Kumar, N. & Siddharthan, N.S. (1997), *Technology, Market Structure and Internationalization: Issues and Policies for Developing Countries*, The United Nations University Press/Routledge, London, UK.
- [62] Lager, T, 2011, *Managing Process Innovation: From Idea Generation to Implementation*. Imperial College Press, London, UK.
- [63] Lee, N. & Rodriguez-Pose, A. 2013, 'Original Innovation, Learnt Innovation and Cities: Evidence from UK SMEs', *Urban Studies Journal*, Vol. 50 (9), pp.1742-1759.
- [64] Lewandowski, M. 2016, 'Public Organisation and Business Model Innovation: The Role of Public Service Design', in Lewandowski, M., & Kozuch, B. (eds.), *Public Sector Entrepreneurship and the Integration of Innovative Business Models*, IGI Global, Hershey, PA.
- [65] Lodico, M.G., Spaulding, D.T., & Voegtle, K.H. 2010, *Methods in Educational Research: From Theory to Practice*, 2nd edn. John Wiley & Sons, Inc., San Francisco, CA.
- [66] Lohr, F. 2012, 'The "Morgenstadt" Concept', in C.W. Wessner (Rapporteur), *Meeting Global Challenges: U.S.-German Innovation Policy*, Washington, D.C: National Academy of Sciences.
- [67] Loosemore, M. 2014, *Innovation, Strategy and Risk in Construction: Turning Serendipity into Capability*. Routledge, London, UK.
- [68] McSweeney, B. & Hsia, M. 2000, 'Marie Curie Industry Host Fellowships: Industrial Research Training under the European Community's Fifth Framework Programme', *Industry and Higher Education*, Vol. 14 (1), pp.45-50.
- [69] Miles, M.B. & Huberman, A.M. 1994, *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd edn. SAGE Publications Limited, London, UK.
- [70] Moller, J.O. 2008, *European Integration: Sharing of Experiences*, Institute of Southeast Asian Studies, Panjang, Singapore.
- [71] Morris, B., Boehm, K., & Geller, M. 1991, *The European Community 1991/2, 3rd Ed*, the Macmillan Press Limited, London, UK.
- [72] Morris, M.H., Kuratko, D.F., & Covin, J.G. 2011, *Corporate Entrepreneurship and Innovation: Entrepreneurial Development within Organisations*, 3rd ed. South-Western Cengage Learning, Mason, OH.

- [73] Muldur, U., Corvers, F., Delanghe, H., Dratwa, J., Heimberger, D., Sloan, B., & Vanslebrouck, S. (2006), *A New Deal for an Effective European Research Policy: The Design and Impacts of the 7th Framework Programme*, Springer, The Netherlands.
- [74] Nestor, P.G., & Schutt, R.K. 2014, *Research Methods in Psychology: Investigating Human Behaviour, 2nd ed.* London: SAGE Publications Limited.
- [75] OECD 2006, *Government R&D Funding and Company Behaviour: Measuring Behavioural Additionality*, OECD Publishing, Paris, France.
- [76] OECD 2007, *Reviews of Regional Innovation: Competitive Regional Clusters*, OECD Publishing, Paris, France.
- [77] OECD 2010, *OECD Economic Surveys: Germany*, OECD Publishing, Paris, France.
- [78] OECD 2012, *OECD Science, Technology and Industry Outlook 2012*, OECD Publishing, Paris, France, viewed 23 January 2017, <https://www.oecd.org/sti/outlook/e-outlook/stipolicyprofiles/competencestoinnovate/public-sectorinnovation.htm>
- [79] OECD 2014, *Employment and Skills Strategies in the Czech Republic, OECD Reviews on Local Job Creation*, OECD Publishing, Paris, France.
- [80] OECD 2015, *The Innovation Imperative in the Public Sector: Setting an Agenda for Action*, OECD Publishing, Paris, France.
- [81] OECD 2016, *Dare to Share: Germany's Experience Promoting Equal Partnership in Families*, OECD Publishing, Paris, France.
- [82] OECD 2016, *Education in Latvia: Reviews of National Policies for Education*, OECD Publishing, Paris, France.
- [83] OECD 2017, *Fostering Innovation in the Public Sector*, OECD Publishing, Paris, France. <http://dx.doi.org/10.1787/978926470879-en>.
- [84] OECD 2017, *OECD Reviews of Innovation Policy: Costa Rica 2017*, OECD Publishing, Paris, France.
- [85] OECD 2017, *Public Procurement for Innovation: Good Practices and Strategies*, OECD Public Governance Review, OECD Publishing, Paris, France. <http://dx.doi.org/10.1787/9789264265820-en>.
- [86] Pavelkova, D., Bednar, P., Bialic-Davendra, M., Bruskova, P., Knapkova, A. & Zahradnik, P. 2016, *Internationalisation of Cluster Organizations: Strategy, Policy and Competitiveness*, Cambridge Scholars Publishing, Newcastle upon Tyne, UK.

- [87] Polonsky, M.J., & Waller, D.S. 2011, *Designing and Managing a Research Project: A Business Student's Guide*, 2nd ed. London: SAGE Publications Ltd.
- [88] Porter, M.E. 1990, 'The Competitive Advantage of Nations', *Harvard Business Review*, viewed 26 January 2017, <https://hbr.org/1990/03/the-competitive-advantage-of-nations>
- [89] Proctor, T. 2007, *Public Sector Marketing*, Pearson Education Limited, Essex, England.
- [90] Rajeswari, G. 1998, *Public Sector Performance of State Road Transport Corporation (A Case Study of Andhra Pradesh)*. A.P.H. Publishing Corporation, New Delhi.
- [91] Rammer, C. 2006, 'Innovation in Firms', in U. Schmoch, C. Rammer, & H. Legler (eds.), *National Systems of Innovation in Comparison: Structure and Performance Indicators for Knowledge Societies*, Springer, Dordrecht, The Netherlands.
- [92] Reillon, V. 2015. *Overview of EU Funds for Research and Innovation*, the European Parliamentary Research Services (EPRS), viewed 23 January 2017, https://ec.europa.eu/research/fp7/index_en.cfm?pg=budget
- [93] Rodriguez, V. & Montalvo, C. 2007. 'Innovation Policies from the European Union: Methods for Classification', *Bulletin of Science, Technology & Society*, Vol 27 (6), pp. 467-481.
- [94] Sarkar, S. 2007, *Innovation, Market Archetypes and Outcome: An Integrated Framework*. Springer, Heidelberg, Germany.
- [95] Schrepf, B. 2016, 'European and National Innovation Agendas', in P. Ahrweiler, N. Gilbert & A. Pyka (eds.), *Joining Complexity Science and Social Simulation for Innovation Policy: Agent-Based Modelling Using the SKIN Platform*, Cambridge Scholars Publishing, Newcastle upon Tyne, UK.
- [96] Shafaeddin, M. 2014, *Competitiveness and Development: Myth and Realities*. Anthem Press, London, UK.
- [97] Shawish, A. & Salama, M. 2013, 'Cloud Computing in Academia, Government, and Industry', in X. Yang & L. Liu (eds.), *Principles, Methodologies, and Service – Oriented Approaches for Cloud Computing*, Business Science Reference, Hershey, PA.
- [98] Shiratori, H. 2014, 'Multilevel Policy Regimes, Political Cleavages and Party Systems: Horizontal and Vertical Transfer of Policies and its Effects', in H. Magara

- (ed.), *Economic Crises and Policy Regimes: The Dynamics of Policy Innovation and Paradigmatic Change*, Edward Elgar, Cheltenham, UK.
- [99] Smith, M.F. 2017, *Research Methods in Sport*, 2nd ed., Learning Matters, London, UK.
- [100] Sorensen, E. & Torfing, J. 2015, 'Enhancing Public Innovation through Collaboration, Leadership and New Public Governance', in A. Nicholls, J. Simon, & M. Gabriel (eds.), *New Frontiers in Social Innovation Research*, Palgrave Macmillan, Basingstoke, England.
- [101] Stajano, A. 2009, *Research, Quality, Competitiveness: European Union Technology Policy for the Knowledge Based Society*, 2nd ed. Springer Science + Business Media, New York.
- [102] Stockelova, T. 2016, 'Science Policy Implications for Policy Knowledge Generated in Academia', in A. Vesely, M. Nekola & E.M. Hejzlarova (eds.), *Policy Analysis in the Czech Republic*, Policy Press, Bristol, the United Kingdom.
- [103] Sundbo, J. 2003, 'Innovation and Strategy Reflexivity: An Evolutionary Approach Applied to Services', in L.V. Shavinina (ed.), *The International Handbook on Innovation*, Elsevier Science Limited, Oxford, UK.
- [104] Takhar-Lail, A., and Ghorbani, A. 2015, *Market Research Methodologies: Multi-Method and Qualitative Approaches*, Business Science Reference, Hershey, PA, USA.
- [105] Technology Agency of the Czech Republic (TA CR), 2018. *Technology Agency of the Czech Republic*, viewed 26 February 2018, <https://www.tacr.cz/index.php/en/about-tacr.html>
- [106] The Royal Academy of Engineering (2015). *Investing in Innovation*. Royal Academy of Engineering, London, UK.
- [107] Tondl, G. 2007, 'Regional Policy', in M. Artis & F. Nixson (eds.), *The Economics of the European Union: Policy and Analysis*, 4th Ed. Oxford University Press, Oxford, UK.
- [108] Torfing, J. 2016, *Collaborative Innovation in the Public Sector*, Georgetown University Press, Washington, DC.
- [109] Torfing, J. 2013, 'Collaborative Innovation in the Public Sector', in S.P. Osborne & L. Brown (eds.), *Handbook of Innovation in Public Services*, Edward Elgar, Cheltenham, UK.

- [110] United Nations ESCWA. 2001, *Review of Science and Technology in ESCWA Member Countries*, Issue No.3, United Nations ESCWA, Beirut, Lebanon.
- [111] Urad Vlady Ceske Republiky (Sekce Mistopredsedy Vlady Pro Vedu, Vyzkum a Inovace), 2015, *The National Research, Development and Innovation Policy of the Czech Republic in 2009 – 2015*, viewed 12 June 2017, <http://www.vyzkum.cz/FrontClanek.aspx?idsekce=1020>
- [112] Varga, A. & Sebestyen, T. 2016, ‘Does EU Framework Program Participation Affect Regional Innovation? The Differentiating Role of Economic Development,’ *International Regional Science Review*, pp. 1-35.
- [113] Wessner, W. C. 2013, ‘The Global Innovation Imperative’, in W.C. Wessner (Rapporteur), *Building the Illinois Innovation Economy: Summary of a Symposium*, The National Academic Press, Washington, D.C.
- [114] Weyer, J. & Schneider, V. 2012, ‘Power Games in Space: The German High-Tech Strategy and European Space Policy’, in J.M. Bauer, A. Lang & V. Schneider (eds.), *Innovation Policy and Governance in High-Tech Industries: The Complexity of Coordination*, Springer, Heidelberg, Germany.
- [115] Wilson, J. 2013, *Essentials of Business Research: A Guide to Doing Your Research Project*, 2nd ed. SAGE Publishing Limited, London, UK.
- [116] Wolfmeyer, P. 2005, ‘CORDIS: Drawing from Experience of European Support for Innovation’, in W.L. Filho & P. S. Gramatikov (eds.), *R&D Priorities in Innovation Policy and Financing in Former Socialist Countries*, IOS Press, Berlin, Germany.
- [117] Young, M. 2014, ‘Coarsely Ground: Development in the Czech System of Research Evaluation’, in J. Brankovic, M. Klemencic, P. Lazetic & P. Zgaga (eds.), *Global Challenges, Local Responses in Higher Education: The Contemporary Issues in National and Comparative Perspective*, Sense Publishers, Boston, U.S.A.
- [118] Zizlavsky, O. 2013, ‘Past, Present and Future of the Innovation Process’, *International Journal of Engineering Business Management*, Vol. 7 (47), pp. 1-8.
- [119] Zook, C. & Rigby, D.K. 2002, ‘Open-Market Innovation’, *Harvard Business Review*, viewed 2 February 2017, <https://hbr.org/2002/10/open-market-innovation>.