

A Review of the Theoretical Context of the Role of Innovation in Economic Development

Maria E. Eggink

Abstract—It is the aim of this paper to place the role of innovation in economic development in its theoretical context through a literature review. The review compares classical economic theory and the neoclassical theories of “equilibrium in the markets” and “perfectly competitive markets” with the Schumpeterian theory. It was found that Schumpeter’s role in contributing towards economic development theories, and by creating awareness of the role of innovation in these theories is of immeasurable importance. His contribution led to a change in economic thinking, although this was only realized much later than when his theories were first published. The neo-Schumpeterian thinking expanded on the Schumpeterian theory by studying innovation within a system of interaction among different role players. Studies on innovation should be founded in the neo-Schumpeterian school of thought in order to accommodate the complexity of the innovation system concept.

Keywords—Economic development, evolutionary economics, innovation, Schumpeter.

I. INTRODUCTION

POVERTY and unemployment that are experienced in many countries of the world are increasing in this current era of global and financial uncertainty. Innovation is seen by many economists as a driver of economic development and is therefore assuming increasing importance. The positive relationship between innovation and economic development was confirmed in a study by Eggink [1]. However, the role of innovation in economic development is perceived differently by the different schools of economic thought.

Although many economists have touched on the concept of innovation, Joseph Alois Schumpeter (8 Feb 1883 – 8 Jan 1950) deserves to be studied in more detail because of his contributions to innovation theory. Schumpeter’s [2] theory on innovation and economic development was not part of mainstream economic thinking at the time that Schumpeter published his theories. However, since the 1980s, interest in the role that innovation plays in development has started to grow. Schumpeter’s theory began to be paid more attention by economists. Freeman [3] wrote about a “Schumpeterian renaissance” in the late twentieth century and he offers proof of the neglect of interest in Schumpeter’s theory in literature before the 1970s-80s.

It is the aim of this paper to place the role of innovation in economic development in its theoretical context through a literature review. A critical review of the economic schools of

thought is conducted to determine what roles innovation and the entrepreneur play in the economic theories and how Schumpeter contributed towards the importance of innovation in economic development theories. The review compares classical economic theory and the neoclassical theories of “equilibrium in the markets” and “perfectly competitive markets” with the Schumpeterian theory. The contribution of the Schumpeterian theory towards the neo-Schumpeterian theories will form an essential component of the discussion.

This paper will contribute to the literature of evolutionary economics and will make a contribution towards realising a change in the mainstream economic conception of the role of innovation in economic development.

II. RESEARCH METHODOLOGY

A literature review is completed to determine the historical and current role of innovation in economic development theories. This review includes a critical discussion on the inclusion of innovation in the development theories and on the role of Schumpeter’s development theory as it affects evolutionary economics.

III. THE MAIN CONTRIBUTORS TO INNOVATION THEORY

The French sociologist, Gabriel Tarde (1843-1904) has been described as the first great theorist of innovation and entrepreneurship [4], [5].

Tarde was the first theorist who used and described the two concepts of invention and innovation, as well as the postulate that innovation comes in waves. Tarde mostly used the concepts of invention and imitation. He believed that first imitators, and not the inventors, played the central role. This agrees with the innovators found in later literature. The major works of Tarde, in which he described the innovation theory, included the trilogy *Les lois de l'imitation* (1890), *Logique Sociale* (1894) and *L'Opposition Universelle* (1897), as well as his subsequent work, *Psychologie Economique* (1902) [5].

Latour and Lépinay [6] stated, “Fifty years before Joseph Schumpeter, eighty years before the development of economics of technical change, Tarde places innovation and the monitoring of inventions at the heart of his doctrine”. Sundbo’s [5] view is that Tarde was first in describing the innovation concepts and that this foundation of the innovation theory lived on with Schumpeter, as Schumpeter became known as “the founder of innovation theory”.

Schumpeter made a crucial contribution to the study of the role of innovation in development. Schumpeter [7] highlighted the importance of innovation when he wrote, “... innovation is the outstanding fact in the economic history of capitalist

M. E. Eggink is with the Tshwane University of Technology, Nelspruit, South Africa (phone: +27 13 745-3546; fax: +27 13 745-3582; e-mail: egginkme@tut.ac.za).

society or in what is purely economic in that history... ”. He stated his intention as being to make the facts of innovation the basis of his model of the process of economic change. As Schumpeter is the founder of innovation theory, it is vital, therefore, to pay some attention to his life and thinking.

Joseph Alois Schumpeter was born in the Austrian province of Moravia. He studied law and economics at the University of Vienna and started his career by practicing law and teaching political economy. He was appointed as professor at the University of Graz (Austria) in 1911, and was an exchange professor at the Columbia University during 1913 and 1914. In 1919, he served as Minister of Finance of the Austrian Republic, after which he pursued his career in the private sector. In 1921, he became president of a private banking house in Vienna (Biedermann Bank), but when the bank failed in 1924, he accepted a professorship at the University of Bonn. In 1932, he was appointed at Harvard University and he remained at Harvard until his death. Schumpeter served as president of the American Economic Association for a period, which was unusual for a foreign-born economist. Amongst Schumpeter's best-known publications are, "The theory of economic development" (1911), "Business cycles" (1939), "Capitalism, socialism and democracy" (1942) and his encyclopaedic "History of economic analysis" (1954) [8]-[10].

According to Becker, Knudsen and Swedberg [11], "The theory of economic development" is Schumpeter's central text regarding evolutionary economics and it is the "founding work in the literature on entrepreneurship and economic evolution".

Schumpeter's contribution to the theory of economic development and the role of innovation therein, is remarkable. The following quotations are just some examples of the recognition Schumpeter received:

"Joseph Schumpeter...was one of the most original social scientists of the twentieth century...Very early he developed an original approach, focusing on the role of innovation in economic and social change" [12].

"More than half a century after his death, Schumpeter still remains an intriguing source of scientific debate on major economic and social issues and methodology, and empirical research on economic dynamics and technical change" [10].

"Over the past thirty years, a number of economists have dedicated themselves to studying technical change or innovation more broadly, its sources, and its economic consequences. In all these branches of economics, as well as among scholars that directly concerned with technical advance Schumpeter is widely cited as an inspiration" [13].

"Schumpeter ... is the exceptional economist who links innovation to the entrepreneur, maintaining that the source of private profits is successful innovation and that innovation brings about economic growth" [14].

Although Schumpeter has, in the literature of the last twenty to thirty years, received the recognition that he deserves, he was not recognized as a leading economist during the time that he developed and published his theories. The classical and neo-classical schools received much more attention and Keynesianism was very popular after World War II when Schumpeter was most active. Van Duijn [15] stated that, since

the 1970's, "... resistance arose against the failure of neo-classical theory to deal with the phenomenon of innovation ...".

Hanusch and Pyka [9] opined that, "... it might appear astonishing that it took until the middle of the 1980s for the economics community to rediscover the ideas of Schumpeter ...". The two reasons that Hanusch and Pyka [9] give for the lack of interest in Schumpeter's theory are, first, the interest in Keynes's theory concerning the removal of macroeconomic imbalances and the potential stabilizing effect on the circular flow. The second reason is that Schumpeter did not present his ideas in the form of mathematical systems. The later development of such systems and subsequent attempts to formalize Schumpeter's theory have substantially increased interest in his work. Nelson [16] adds, as a reason for Schumpeter's theory historically not being part of mainstream economics, the incompatibility of Schumpeter's theory with the basic assumptions of the neoclassical microeconomic theory.

This begs the question, what is it that makes Schumpeter's theory so significant and so different to other schools of thought? In the discussion that follows, Schumpeter's role in the innovation theory will be analyzed, as will the contributions of other notable economists.

IV. THE PLACE OF INNOVATION IN ECONOMIC THEORIES

There are many different views in economic theory of the role of innovation. Some theorists see innovation as one of the key elements, the basis of the theory, while others do not consider innovation as an important factor. In some theories, innovation is seen as an endogenous factor, while other theories describe innovation as exogenous to the economy. In this section, a brief overview of the origin of the innovation concepts as well as the place of innovation in the historical theories will be presented.

A. *Equilibrium versus Disequilibrium*

The most fundamental difference between the neo- and classical theories and the Schumpeterian theory is the debate on an economy that tends towards an equilibrium position *versus* an economy that is continually changing and is in disequilibrium. Although innovation (or technology, as some sources refers to the concept) had long been recognized by some classical economists such as Marx and Adam Smith, the dominant neoclassical theory did not regard innovation or technology as a major category in its models. These models were, rather, based on economic equilibrium [5]. According to Sundbo [5], "The Neoclassical theory is based on an abstract theoretical assumption of general equilibrium in the economy, which would mean that there would normally be no change". The neoclassical theory cannot therefore be used to explain economic growth or development, because growth and development imply change.

Schumpeter's theory questions the traditional view of economic system's tendency towards equilibrium and its ability to explain and predict certain phenomena: "... 'static' analysis is not only unable to predict the consequences of

discontinuous changes in the traditional way of doing things; it can neither explain the occurrence of such productive revolutions nor the phenomena which accompany them. It can only investigate the new equilibrium position after the changes have occurred" [2].

Here, he refers to change that is exogenous to the neoclassical model of the economic system. He believed that this traditional static view of the economic system did not explain development: "Development in our sense is a distinct phenomenon, entirely foreign to what may be observed in the circular flow or in the tendency towards equilibrium. It is spontaneous and discontinuous change in the channels of the flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing. Our theory of development is nothing but a treatment of this phenomenon and the processes incident to it." [2]

Important influences on Schumpeter's theories were Léon Walras and Karl Marx, but these influences do not imply that he agreed with their theories. The influence from Walras on Schumpeter was Walras's emphasis of the interdependence of economic quantities in his theory. Schumpeter strongly disagreed with Marxism, while remaining an admirer of Marx's emphasis on the process of economic change. Marx's theory coincides with Schumpeter's in that they both have that technology is continuously changing and is therefore dynamic. Marx differs mostly from Schumpeter in that Marx "passionately hated capitalism" [8]. Marx, similar to Schumpeter, regarded innovation as the centre of their respective growth theories [3], but while Schumpeter regarded the entrepreneur as the driver of economic development, Marx regarded the accumulation process itself as the source of development [17]. Schumpeter's theory differs from that of Walras in that Walras's theory is based on general equilibrium analysis and so his approach is static [18]. This implies that his theory does not include an explanation of innovation as a component in economic analysis, because innovation is the one component that leads to disturbing an equilibrium situation. Nelson [13] is of the opinion that theories like that of Walras "... might actually interfere with the ability to theorize about innovation and ... might drive concern for innovation to the outlands of the discipline".

Brue [8] summarizes Walras's theory as follows: "Walras's general equilibrium theory presents a framework consisting of the basic price and output interrelationships for the economy as a whole, including both commodities and factors of production. Its purpose is to demonstrate mathematically that all prices and quantities produced can adjust to mutually consistent levels. Its approach is static, because it assumes that certain basic determinants remain unchanged, such as consumer preferences, production functions, forms of competition, and factor supply schedules".

According to Hanusch and Pyka [9], the reaction of Schumpeter in 1908, the same year that Schumpeter met Walras, was as follows: "Economic development and all the important sources of disturbance of equilibrium states lead away from equilibrium without showing any tendency of returning to it".

Schumpeter therefore directly opposed the very basis of Walras's theory. Schumpeter's view on the important role of innovation in disturbing the equilibrium is summarized in Brue [8] as follows: "Without innovation, economic life would reach static equilibrium, and its circular flow would follow essentially the same channels year after year...The entrepreneur, seeking profit through innovation, transforms this static situation into the dynamic process of economic development...The resulting economic development arises from within the economic system itself, rather than being imposed from outside".

The attention that the Keynesian school of thought received contemporaneously with Schumpeter's theory development necessitates a look into the Keynesian theory also. Although Keynes criticized certain aspects of the neoclassical school, the Keynesian school of thought itself arose from the neoclassical school and therefore included static equilibrium economics [8]. Where innovation seems to be the centre of Schumpeter's theory, Keynes treated it as a phenomenon outside of the economic scene. Another major difference between Schumpeter's growth theory and that of Keynes is that Schumpeter focuses mainly on the supply side, whereas Keynes' theory is based on the demand side [10]. Schumpeter [2] stated his position as follows: "It is, however, the producer who as a rule initiates economic change, and consumers are educated by him if necessary; they are, as it were, taught to want new things, or things which differ in some respect or other from those which they have been in the habit of using. Therefore, while it is permissible and even necessary to consider consumers' wants as an independent and indeed the fundamental force in a theory of the circular flow, we must take a different attitude as soon as we analyze *change*."

The role of innovation in development thus can be adequately explained neither by the classical, neoclassical nor by the Keynesian schools of thought, due to the static basis of their analysis, as well as the neglect of innovation in their theories. It is the Schumpeterian theory, with its explanation of the role of innovation in disturbing the equilibrium situation that is fundamental to the explanation of economic development.

B. Innovation as an Exogenous or Endogenous Factor

In the theories of the classical economists, such as those of Adam Smith and Karl Marx, technological change and economic development formed an essential part. However, during the late nineteenth and early twentieth centuries, technological change and economic development were neglected by the neoclassical theorists. Neoclassical theories dominated that era [19] and the interest in development theories only started blooming again after 1945 [8]. In some of these development theories, innovation (or technical change) was neglected or totally omitted. Even in those development theories where innovation is included, it is treated as an exogenous factor. According to Hanusch and Pyka, [9], "Neoclassical thinking focuses on the optimal allocation of resources and the adaptations following exogenous shocks, such as demographic change, changing preferences etc".

The revived interest in technological change and economic development was initiated during the 1950's, *inter alia*, by the Nobel Prize winner, Robert Solow (b.1924). Solow received this prestigious prize in 1987 for the neoclassical theory of growth [14]. Solow treated technological change as an exogenous factor, and implied that growth that could not be explained by the variables endogenous to the model must be a result of exogenous technical change [12]. The variables that Solow treated as endogenous to growth were capital and labor. Solow used capital, labor and technological change as the variables in the production function. Brue [8] summarized Solow's findings of the relationship among these variables as, "He found that increases in labor and capital inputs explain less than half of economic growth. The residual...results from technological progress".

Yet Solow, [20] called technological change "neutral" and defined "neutral" stating, "Shifts in the production function are defined as neutral if they leave marginal rates of substitution untouched but simply increase or decrease the output attainable from given inputs".

Solow's theory, in short, is founded in the neoclassical view, which states that the economy adjusts internally to achieve stable equilibrium growth. His theory is based on the contribution of capital and labor to growth, with technological changes as an exogenous factor. Although Solow highlighted the importance of technological change in growth, his theory contrasts strongly that of Schumpeter. Romer [21] developed a model to incorporate technological change as an endogenous factor. Romer's model became part of what is referred to as the "New Growth Theory" [22]-[23]. Although Romer played a role in incorporating technological change as an endogenous factor in economic growth theories, Romer's model remains another equilibrium model, one similar to the neoclassical growth models.

It was Schumpeter who developed a development theory with innovation as the major driver, endogenous to the economy and disturbing the equilibrium. He was but little concerned with the effect of the exogenous shocks to the economy, and he focused on the endogenous effect of innovation on the development process. Hanusch and Pyka [9] quoted Schumpeter as saying: "Economic development has to be considered as a process generated within the economic system ...I was deeply convinced...that there must be a source of energy within the economic system which endogenously destroys every equilibrium state which might be reachable".

This "source of energy" Schumpeter refers to is innovation that functions as a catalyst for disturbing equilibrium and generating development. Schumpeter [7] explicitly called innovation an "internal factor of change", explaining: "It [innovation] is an *internal* factor because the turning of existing factors of production to new uses is a purely economic process and, in capitalist society, purely a matter of business behavior. It is a *distinct* internal factor because it is not implied in, nor a mere consequence of, any other".

Schumpeter's view of the endogenous nature of innovation differs from that of the neoclassical economists in terms of the production function. Innovation does not vary the quantities of

the factors of production in order to produce different quantities, as described by neoclassicism; innovation actually causes a completely new production function [7]. This new production function can represent the production of a totally new product, or the change of the inputs or method of production of an existing product, in order to produce something new. The entrepreneur plays an important role in Schumpeter's theory by being the creator of this new production function.

It is now necessary to establish the role of the entrepreneur in the different theories.

C. The Entrepreneur in Economic Thought

Entrepreneurship does not play the same role in all economic development theories. Where some theories place the entrepreneur at the heart of growth and development, others pay no attention to the role of the entrepreneur. Lombard and Vosloo [24] stated, "The policy models for economic growth developed by mainstream economists – i.e. the proponents of 'neoclassical economics' in the tradition of Marshall, Keynes, Samuelson, *et al.* – do not deal explicitly with entrepreneurship as a distinct factor of production or an element in the economic growth process. In fact, explanatory models in mainstream economics (including the Keynesian tradition) hardly deal with economic growth at all".

Vosloo [25] stated even more strongly that, "... entrepreneurship is the real source of all economic and social development. It is an irony that the role of entrepreneurship in the process of economic growth is grossly neglected in mainstream macroeconomic theory".

Adam Smith, in his seminal "The Wealth of Nations", published in 1776, had already mentioned the owner-manager who combined resources, land, labor and capital for the successful functioning of a business. Some theories afterwards built on Smith's ideas and later, during the middle of the nineteenth century, the French word, *entrepreneur*, became popular to describe the owner-manager of a new industrial enterprise. During the development of the neoclassical theories, the owner-manager had not been incorporated as he had been in the classical theories. The neoclassical markets that are described as perfectly competitive and in equilibrium (with Walras, in 1874, and Marshall, in 1890, as the founders of this theory), do not make provision for the entrepreneur or "supplier" who creates products different from all other products or a "supplier" who controls or sets market prices [26]. The neutral role of the "supplier" (entrepreneur) in the neoclassical model is described by Bygrave [26], saying, "... suppliers (owner-managers) must behave as passive, responsive participants as the market sets prices and determines demand. As prices rise, suppliers produce more; as prices fall, they produce less. So, although the perfect market provides a solid foundation for economic predictability, it achieves this sophisticated capability *by eliminating the unpredictable behavior of entrepreneurial owner-managers who thrive on upsetting market activities by introducing innovative products and services*".

Schumpeter [2] criticized Walras and "... many other authors ..." for the neglecting of the entrepreneur in their theories. He caustically noted, "The tendency is for the entrepreneur to make neither profit nor loss in the circular flow – that is, he has no function of a special kind there, he simply does not exist".

In the Schumpeterian theory, the entrepreneur plays a determining role. According to Schumpeter [2], the entrepreneurs are the individuals who carry out innovations. It is, therefore, the entrepreneur who is the agent through which innovation and eventually development takes place. Brue [8] summarized the role of the entrepreneur in Schumpeter's theory when Brue noted, "The entrepreneur, seeking profit through innovation, transforms this static situation into the dynamic process of economic development".

Hébert and Link [27] gave a chronological trace of the theories that studied the entrepreneur as innovator. Schumpeter is singled out by Hébert and Link as dominant in connecting the entrepreneur with innovation. The theories, which link innovation with the entrepreneur, that preceded Schumpeter include Richard Cantillon (1680-1734), Nicholas Baudeau (1730-1792), Jeremy Bentham (1748-1832), J.H. von Thünen (1785-1850), Gustav Schmoller (1838-1917), Werner Sombart (1863-1941) and Max Weber (1864-1920). Hébert and Link's [27] summary of Schumpeter's theory corresponds with that of Brue and they state that, "Schumpeter is generally credited with establishing the entrepreneur as innovator ..." and "Joseph Schumpeter ... set out to develop a theory of economic development in which the entrepreneur plays a central role...Schumpeter's entrepreneur becomes the motive force of economic change. The entrepreneur is a key figure for Schumpeter because, quite simply, he is the *persona causa* of economic development".

The entrepreneur is responsible for what Schumpeter called "creative destruction". This implies that the entrepreneur destroys the existing economic structure in the process of creating new products and production methods. This entrepreneurial innovation, in turn, leads to economic growth and development [8]. Schumpeter [28] supplies some examples of creative destruction: "... the contents of the laborer's budget, say from 1760 to 1940, did not simply grow on unchanging lines but they underwent a process of qualitative change. Similarly, the history of the productive apparatus of a typical farm, from the beginnings of the rationalization of crop rotation, plowing and fattening to the mechanized thing of today – linking up with elevators and railroads – is a history of revolutions. So is the history of the productive apparatus of the iron and steel industry from the charcoal furnace to our own type of furnace, or the history of the apparatus of power production from the overshot water wheel to the modern power plant, or the history transportation from the mail-coach to the airplane. The opening up of new markets, foreign or domestic, and the organizational development from the craft shop and factory to such concerns as U.S. Steel illustrate the same process of industrial mutation...that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one,

incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism."

Schumpeter [2] stated that the "characteristic task" of the entrepreneur "consists precisely in breaking up old, and creating new".

D. Innovation and the Neo-Schumpeterian Theory

A certain group of economists became known as "neo-Schumpeterian", due to their adherence to Schumpeter's thinking, as well as for their opposition to neoclassicism. Heertje [10] stated that, "Neo-Schumpeterians have a tendency to consider themselves as a group or school, sharing common views and opposing in particular, the so-called neoclassical scheme".

Although the term "neo-Schumpeterian" has been used quite often in recent literature, the term has not been defined or described in many publications. The reason for this may be that there is not yet enough agreement or correspondence in the different views of neo-Schumpeterian economists. According to Heertje [10], the neo-Schumpeterian economists, in their criticisms of neoclassical equilibrium, have provided "an impressive set of empirical results", but they have not developed a "consistent alternative theory". The neo-Schumpeterian economists' beliefs are based, *inter alia*, on Schumpeter's theory, but do deviate from it. Metcalfe [29] concluded in his study that Schumpeter pointed "...economic reasoning down an evolutionary path, a path which is only partly trod a hundred years on". According to Freeman [3], "... the ideas of the 'neo-Schumpeterian' evolutionary economists, although departing in some respects from Schumpeter's own ideas, were nevertheless strongly influenced by the Schumpeterian renaissance".

Scerri [30] does not use the term neo-Schumpeterian, but refers to the paradigm shift in economic theory towards evolutionary economics and innovation theory. He agrees that the paradigm shift is based on two main ideas, the first, the increasing importance of innovation in growth and development economics, and the second, that the static analytical framework of neoclassical economics is not suitable for analyzing the economic role of innovation.

Hanusch and Pyka [31], together with all the contributors to their book, attempted to enclose and describe neo-Schumpeterian viewpoints in their publication, "Elgar companion to neo-Schumpeterian economics". Hanusch and Pyka [32] explain that neo-Schumpeterian economics do not only study the economy at the micro- and macro-levels, but focus mostly on the link between the two, that is, at the meso-level. The neo-Schumpeterian view corresponds with that of Schumpeter in that innovation is seen as the major force propelling economic activity. Hanusch and Pyka [32] defined neo-Schumpeterian economics as follows: "Neo-Schumpeterian economics deals with dynamic processes causing qualitative transformation of economies driven by the introduction of innovation in their various and multifaceted forms and the related co-evolutionary processes".

This definition includes, according to Hanusch and Pyka [33], the following three characteristic features of neo-

Schumpeterian economics: “qualitative change, affecting all levels and domains of an economy”, “punctuated equilibria i.e. periods of radical change followed by periods of smooth and regular development”, and “pattern formation: despite the true uncertainty, the process to be observed are not completely erratic but spontaneously structuring.” This definition and features emphasize the fundamental differences with the static neoclassical views of equilibrium.

Hanusch and Pyka [33] further emphasize the importance of innovation and entrepreneurship in neo-Schumpeterian economics and the differences with the neoclassical when they state: “Entrepreneurship and innovation are responsible for economic development by overcoming the limiting constraints, which are considered to be a datum in neoclassical economics. With innovation, also, true uncertainty as an essential characteristic of the future orientation of development processes enters all economic domains, leaving far behind the possibilities of analysis within the neoclassical framework of strict rationality”.

Heertje [10] did not specifically define neo-Schumpeterian economics, but he offered a comprehensive description of this school of thought, writing: “The neo-Schumpeterians confront the equilibrium approach of the neo-classical scheme, based on maximizing behavior of producers, consumers and owners of the factors of production, with an evolutionary framework of the dynamic process as the interaction of internal movements, activities and decisions, and the environment of the firm, both being influenced and shaped by technical change, in particular. In doing so they underline the significance of discontinuous and qualitative changes, the role of restricted knowledge, information and fundamental uncertainty, increasing returns, external effects and decision making. A typical feature also is the emphasis put on the process of diffusion of technology, both in the sense of knowledge and applications and the relationship with institutional changes in society at large.”

One of the points where the neo-Schumpeterian view expands on Schumpeter’s theory is in the idea that innovation takes place in a complex system. According to Carlsson [34], the idea of studying innovation occurring within an economic system is consistent with the view of Schumpeter, referring to Schumpeter’s view on the internal forces that changes economic life. However, Carlsson pointed out (using Freeman as a reference) that Schumpeter neglected the multiple sources of information inputs and the importance of a national system of innovation, due to his focus on the individual entrepreneur. There are, according to Carlsson [34], three things that come out of the systems approach. It is

1. “necessary to specify the components of the system”;
2. “the relationship among various components must be analyzed”; and
3. “the attributes or characteristics of the components need to be specified”.

From the little that could be found in literature describing the neo-Schumpeterian “school of thought”, some idea can be formed of the fundamentals of this group of economists. Studies on innovation should be embedded in the

Schumpeterian view of economics, sharing some views with the neo-Schumpeterian economics. Studies on innovation should therefore be founded, in agreement with Carlsson [34], on the following:

1. Innovation is seen as the most important force behind economic development, being an endogenous, dynamic influence, disturbing the economy from a static, equilibrium state.
2. The interaction among the micro, meso and macro levels are important to understand fully the impact of innovation on the economy.
3. Innovation is a complex process, consisting of interaction among numerous components. A system approach is therefore necessary to study the influence of innovation on development.

V. CONCLUSION

In this paper, an analysis of the role of innovation in economic theories has been undertaken. It has been shown that innovation plays no significant role in the classical theories, and even less in the neoclassical theories. These theories, which emphasize equilibrium in the economy, cannot explain the role of innovation, as the effect of innovation is actually a disturbance of equilibrium. Schumpeter has shown that growth and development can only take place if the economy is constantly disturbed to an out-of-equilibrium phase. In some of the later neoclassical theories, innovation was considered as a factor that causes growth, but was treated as an exogenous factor. The “new growth theories” were developed later, including innovation as an endogenous factor, but these theories were still based on the equilibrium principle. In the Schumpeterian and neo-Schumpeterian theories, innovation is treated as endogenous to the economy.

The entrepreneur, in contrast with neoclassical theories, plays a key role in both the Schumpeterian and neo-Schumpeterian theories. Schumpeter saw the entrepreneur as the one who carries out the innovation and, whether innovation is done by a small or large firm, entrepreneurship is essential for innovation to take place.

Schumpeter had not been acknowledged as a mainstream economist at the time that he developed and first published his theory. It was not until the 1980s that economists started paying attention to his works and to the importance of innovation in development. Becker et al. [11] concluded in their study that it is especially Schumpeter’s work, “The theory of economic development”, that forms “... a central and foundational piece for evolutionary economics”.

The neo-Schumpeterian theory is, as might be expected, based on Schumpeter’s theory. The difference between the Schumpeterian and the neo-Schumpeterian theories is mostly the fact that Schumpeter did not see innovation as taking place in a system. The neo-Schumpeterian thinking expanded on the Schumpeterian theory by studying innovation within a system of interaction among different role players. Studies on innovation should be founded in the neo-Schumpeterian school of thought in order to accommodate the complexity of the innovation system concept. Although evolutionary

economics introduced the innovation system concept, the functioning of such a complex system requires further research.

Schumpeter's role in contributing towards economic development theories and through creating awareness of the role of innovation in these theories is of immeasurable importance. His contribution led to a radical change in economic thinking, even though this only took place much later than when he first published his theories.

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