Application Of Technological Theories in Developing University-Based Entrepreneurial Ecosystem

SAMUEL TEMITOPE OGBARA[1], SAMUEL MAYOWA ALADE[2]
[1] *Department of Entrepreneurial Studies, Nnamdi Azikiwe University, Awka, Nigeria*
[2] *Department of Computer Science, Nnamdi Azikiwe University, Awka, Nigeria*

Abstract- ***Decades of tremendous technological and sociological panacea being deployed by universities for the footing of an enabling entrepreneurial ecosystem have not assuaged the issues of poor technological perception to the establishment of an entrepreneurial ecosystem centered at universities. This article conceptually demonstrates how the entrepreneurial ecosystem is attitudinally prevented from entering the domain of technological adaptation due to its unfavorable positioning in the valley of technological adoption. Therefore, using Feenberg's technological theories as its main lens, this article objectively presents a conceptual explanation of the mesh mechanism surrounding the complexities of students' entrepreneurial perception of the role of ICT. To improve the development of a technologically oriented system for enhancing entrepreneurship, the authors suggest potential solutions to conceptually attenuate poor technopreneurial perception within the university-based entrepreneurial ecosystem through qualitatively developed substantive theory. This is done in response to a contingent struggle in the Nigerian entrepreneurial context.***

Indexed Terms- ***Entrepreneurship, Entrepreneurial ecosystem, Technological, University-based entrepreneurial ecosystem.***

I. INTRODUCTION

In the fields of business practice, policy, and research, the concept of entrepreneurial ecosystems has gained enormous traction during the last ten years. Accordingly, García-Lillo et al. (2023) opined that half of the ten most cited papers in entrepreneurship during the preceding five years have discussed entrepreneurial ecosystems. of the ten articles on entrepreneurship that received the most citations during the preceding five years. The idea that there is a particular arrangement of actors and factors within a region or country that promotes entrepreneurship and acts as an engine of economic growth was quickly embraced by governments and non-governmental organizations such as the United Nations (UNCTAD, 2010), the World Economic Forum (WEF, 2014), the OECD, the European Commission (European Commission, 2014) (Mason and Brown, 2015), the Kauffman Foundation (Strangler and Bell-Masterson., 2015), the World Bank (Mulas et al., 2015), and commercial organizations like Startup Genome.

Scholars, decision-makers, industry professionals, and research forums have all recently become more interested in entrepreneurial ecosystems (Alvedalen and Boschma, 2017; O'Connor et al., 2018; Spigel, 2017; Spigel and Harrison, 2018; Spilling 1996; Stam, and Welter, 2021). In support of this claim, Ratten, (2020a) noted that research on entrepreneurial ecosystems has grown significantly since 2010 and is currently ranked as one of the most well-liked subfields in the management domain. The capacity of entrepreneurial ecosystems research to characterize the locational and collaborative aspects of entrepreneurship may be the reason for its recent growth. Still, the entrepreneurial ecosystem is a vague idea, undefined, underdeveloped, and lacks a widely accepted definition to an extent that that needs more research (Ratten, 2020a; Cho et al., 2021).

Research and development (R&D) is now driven by policy rather than rigorous academic research guiding policy, owing to the excitement surrounding policy (Stam, 2015; Ratten, 2020b). However, the majority of studies on entrepreneurial ecosystems have been theoretical in nature, focusing on a single theory (Ratten, 2020b). In academic literature, the term "entrepreneurial ecosystems" is mostly used in a metaphorical sense. This is even though many theories attempt to explain firm performance through

ecosystem approaches, but are confused with other business concepts, such as business ecosystems (Adner, 2017; Moore, 1993) and innovation ecosystems (Adner and Kapoor, 2010; Autio and Thomas, 2014). Furthermore, the concept's relationships to other theories of innovation, entrepreneurship, and (regional) economic development can be utilized to give the field a theoretical foundation (Alvedalen & Boschma, 2017; O'Connor et al, 2018, Stam, 2015; Moore, 1993; Scaringella, and Radziwon, 2018). As a result, more investigation is needed to determine whether new theories on entrepreneurial ecosystems are necessary in different parts of the world (Ratten, 2020b).

Although they have come to differing conclusions, researchers have explored the complex relationship between university characteristics and U-BEE (Rothaermel et al., 2007; Åstebro et al., 2012; Smith, and Bagchi-Sen, 2012; Isenberg 2014). In redefining the institutional ecosystem, McCalla (2004) proposed a plethora of pedagogical possibilities of an ecological approach that argues for the mediation of pedagogic models, ultimately effective at improving students' technological quests in U-BEE.

In the contemporary university ambiance, some argue that institutional characteristics should not be the only yardstick to ascertain entrepreneurial possibilities or that the focal lens of entrepreneurial studies should not only revolve around the circumference of unique characteristics of entrepreneurs (Isenberg, 2014). However, there has been some empirical proofs validating technological possibilities as annexed to institutions and opportunities, marshaled for the enhancing of U-BEE development (Shane and Venkataraman, 2000; Shane, 2003), thus maintaining, as far as possible, the positive intersection of institutional characteristics and technological inclination among undergraduates in U-BEE.

Thus, the following inquiries are addressed in this paper using Feenberg theory as a lens: (i) [Privateer, 1999) posed the question of whether graduates' pervasive technological conundrum would advance or impede technological promise knowing that one of the main obstacles preventing U-BEE from concentrating on transitioning from the technological adoption threshold to adaptation has been attitude (Norris et al., 2013); (ii) Is it possible to prove empirically that U-BEE is skillfully navigating the constantly shifting digital landscape in the context of Moore's law? (iii) Does U-BEE effectively maximize the potentials proposed by (Mlitwa, 2005; Ekundayo, 2013) that are inherent in Finberg's technological theory? Jenner (2013) asserted vehemently that most U-BEEs lack a strong technological foundation. (Mlitwa, 2005) acknowledges alongside other critical thinkers, the risk of technological "praise-singing" that ignores significant U-BEE accomplishments. It is necessary to provide an explanation, or at the very least an explication of Finberg's technological framework, which could provide some ideas for empirical research since innovations are typically the domain of a small number of U-BEE and are typically devoid of technological or entrepreneurial challenge.

II. ORIGIN AND DEFINITIONS OF ENTREPRENEURIAL ECOSYSTEM

The emergence of the entrepreneurial ecosystem dates back to the 1920s, when Marshall studied the factors that emulated enterprises in certain regions known as industrial districts. Consequently, several works have built on the idea of Marshall's idea of industrial district such as the national systems of innovations (Malmberg and Maskell, 2002). Nonetheless, the entrepreneurial ecosystem has made advances over the existing approaches in the sense that it has shifted from being the focus of inquiry to economic development that is geared towards production (Isenberg, 2016).

The entrepreneurial ecosystem, however, lacks a generally acknowledged definition in the research domain, despite its acceptance and significance among scholars and practitioners (Alvedalen and Boschima, 2017; Stam and Spigel, 2016). The reason for this could be that "ecosystems are defined in different ways, at different scales, and with different research designs and data" (Malecki, 2018) or that it emerged from distinct origins (ontological and epistemological)

According to the ontological viewpoint, the entrepreneurial ecosystem is seen in terms of newly developing communities and specific entrepreneurial groups that emerge in various nations, regions, or cities and are focused on specific technologies, industries, or societal issues (Roundy et al., 2018). As

a result, the perspective's literature is distinguished by its examination of ecosystems via the prism of accepted theories, such as institutional and evolutionary (Stephens et al., 2019) and evolutionary theories, to mention the most common (Colombelli et al., 2019). On the other hand, the epistemological perspective focuses on the emergence of new value as an emergent characteristic of economic systems: the degree to which localized factors and actors generate new value (Arthur, 2013) According to Katz and Gartner (1988), this emergence could involve new businesses, products, or industries (Garnsey et al., 2010; Yamamura and Lassalle, 2020).

Entrepreneurial ecosystem is a term that is described by several scholars according to their intuition and domain of application. Cohen (2006) defined an entrepreneurial ecosystem as a connected set of actors in a geographical community dedicated to sustainable development through the help and assistance of new sustainable enterprises or initiatives. According to Mujahid et al. (2019) and Shwetzer et al. (2019), authors defined entrepreneurial ecosystem as collection of organized set of actors, organization and factors that enables the creation or formation of supportive or stimulating environment for an enterprise.

Entrepreneurial ecosystem is composed of two words; entrepreneurial and ecosystem. The first part, entrepreneurial, refers to situations in which new goods, services, raw materials, and organizational methods can be introduced and sold at a higher price than their cost of production (Purbasari, 2020a). The second part, ecosystem, is a word that originated from biology. It describes the interaction of living organisms and their environment. Succinctly put, Steffensen et al. (2007) defined ecosystem concept from biology point of view as the natural environment and its elements, including living organisms (biotic factors) in an area as well as the physical environment (abiotic factors), which function together as a single unit. Therefore, applying this biological phenomenon to business research, an entrepreneurial ecosystem comprises of the surroundings, entrepreneurs (i.e., actors), and their businesses as living organisms. However, one of the most widely accepted definitions of the concept of entrepreneurial ecosystem was proposed by Mason and Brown in 2014. This authors defined entrepreneurial ecosystem as an intricate web of interconnected entrepreneurial actors, both current and prospective; entrepreneurial organizations (banks, venture capitalists, business angels, firms); universities; public sector agencies; financial bodies; and entrepreneurial processes (numbers of high growth firms, degrees of "blockbuster entrepreneurship," number of serial entrepreneurs, degree of sellout mentality within firms, and levels of entrepreneurial ambition) that come together, both formally and informally, to link, mediate, and regulate the performance within the local entrepreneurial environment.

III. EXPLICATING U-BEE USING FEENBERG'S TECHNOLOGICAL THEORY

There is a growing body of scholarly literature that ascertains a positive relationship between technological perception and entrepreneurial adoption (Steffensen et al., 2007), which invariably influences U-BEE. (Czerniewicz et al., 2005) confirm the notional divisions that exist among entrepreneurial actors, academics, and policymakers regarding the position and use of technology in U-BEE. The authors, having had decades of teaching experience in conjunction with the studious perusal of the works of (Feenberg, 1991; Feenberg, 2004; Feenberg, 2006) as regards technological theories, notice a transitive relationship between entrepreneur's technological orientation and entrepreneurial action. The bulk of what has been outlined in the theoretical deliberations of Feenberg on technology has an intrinsic influence on entrepreneurial perception in developing U-BEE.

The explication of this theory in the light of present entrepreneurial realities, results in a futuristic substantive framework that could be researched empirically to dispel possible technological illusions inherent in entrepreneurial activities. Decades ago, the Marxist's formula for the anticipation and realization of the inevitable is advancement in technology. This axiomatic declaration that advancement in technology shoulders every other advancement, past or present, is one of the premises upon which this chapter is grounded, though the author conceptually disagrees with this notion concerning the development of U-BEE in developing countries.

Therefore, if entrepreneurial actors are thus divided, we need not wonder if some countries in the developing nations retain some good measure of technological illusions amid numerous technological inventions and innovations. The overarching contribution of Feenberg's theory is the assertion and demonstration of the prerogative and proximity of entrepreneurs' perception over their technological adaption curve. Therefore, the use of Feenberg's four perceptive pegs concertedly collaborates with the explication of the entrepreneur's technological perception of U-BEE development and has lent cadence to the establishment of the argument in this research, drilling down to the necessity of a technologically inclined entrepreneurial management system, developed substantively for the evaluation and prediction of entrepreneurial readiness index with institutional heuristics.

Feenberg's technological theory explains the U-BEE perception prevalent in the Nigerian entrepreneurial context. Feenberg (2006) studied Kuhn (1962) anthropological deliberations in relation to technology to establish a framework for the analysis of technological perception. In his views, technological users are:

i. Neutral and Autonomous (Determinist)
ii. Neutral and Human Controlled (Instrumentalist)
iii. Autonomous and value -Laden (Substantivist)
iv. Human controlled and value -Laden (Critical perspective

Table 1. Andrew Feenberg (2006) Technological Theory

TECHNOLOGICAL ROLE:	*Autonomous*	*Humanly Controlled*
Neutral (Complete separation of means and ends)	Determinism (e.g., modernization theory)	Instrumentalism (Liberal faith in progress)
Value-laden (means form a way of life that includes ends)	Substantivism (Means and ends linked in systems)	Critical Theory (Choice of alternative means-ends systems)

A. Determinism (neutral + autonomous)

Table 1 shows the intersection of neutral and autonomous results in what Feenberg terms Determinism. In U-BEE, entrepreneurs who espouse determinism believe that technological activities are not humanly controlled, rather, they believe that it has some immanent laws which must be perceptibly or imperceptibly adhered to, with a subsuming tendency of their being. Some students entertain the innate idea that technological possibilities reside outside the purview of the University-based Entrepreneurial Ecosystem (U-BEE). Determinists, according to Feenberg (2006) believe in the triumph of technological activities over values and life itself, and, are willing to sacrifice, if possible, values for advancement. Entrepreneurs under this category tend to be unduly task-oriented and with little or no regard for human feelings.

The usual argument is that technological achievement is a dynamo that empowers universal development, but the undermining effects or the seeming downside of it are less considered (Achimugu et al., 2010) while entrepreneurial determinists assert that technology is encoded in genes and with little or no training, this assertion lacks empirical support.

The result of adapting to the sole innate influence of technology creates an atmosphere of pessimism with little or no U-BEE progress. Feenberg (2006) confirms that technological determinists intrinsically peddle around the notion of a technocratic expression of our humanity without historic precedence, the same could be said about technological determinists. Uncritical constructivists often side with determinists to affirm inherent transcendency and the possibilities of evolution without a technical actor.

Martin Heidegger, the famed substantivist theorist recognized the illusion inherent in transcendence by linking the feedback loops to a human actor. Some of the famous determinists effervescently plead for the significance of technology as regards entrepreneurial

progress (Achimugu et al., 2010; Ani, 2010; Leach et al., 2010). There is a need for further study as regards entrepreneur's technological orientation.

B. Concise critique of determinism relative to U-BEE development

One of the major effects of determinism on U-BEE is to develop entrepreneurs and graduate entrepreneur who solely determines entrepreneurial success imbibing the notion of overt-technological reliance, as the root of existence and sustenance, cardinally undermining human intelligence and capability. Another common calamity of this view is that the employability rating of determinist and total usefulness is questionable as well as doubtful (Feenberg, 2006). Espousals of this view could recourse to utopist's idealism, thus hindering the process of U-BEE development.

C. Substantivism (Value-laden + Autonomous)

From Table 1, the intersection of Value-laden and Autonomous results in what Feenberg terms substantivism. Substantivists entrepreneurs accept that technological activities are not humanly controlled, rather, they are value-laden and autonomous (Mlitwa, 2007) This view attaches a substantive value to technological activities and the vivid capability of technological autonomy is often seen as threatening and malevolent [Feenberg, 2006], Therefore, beyond the subsuming of lifestyle, it prompts a formal subscription to an entirely different way of life, religiously requisite of both perceptible and imperceptible consent.

The authors, in their intercontinental experiences, notice that entrepreneurial substantivists are growing beyond a healthy proportion. As such, there exist technological propensities in modern societies with little or no clear interpretation of societal values. The majority espouse this view being pecuniary motivated and others have a deep imperialistic agenda, from the authors' observation. Huxley delved deeply into the labyrinth of substantivism in his famed book, Brave New World, he asserts that technology, as well as entrepreneurship, could overwrite humanity, or perhaps reduce man to a hub in the machinery wheel of universal progress (Huxley, 1932).

McLuhah (1996) foresees that people as well as students would be wary of this overt utopism, the idea of a dystopic realization of true existence with a complete cancellation of our individuality, thus making humanity an organ in a cosmic organism. There is a clear need to review some of the tenets of entrepreneurial substantivists today concerning the development of UBEE.

D. Concise critique of substantivism relative to U-BEE development

Ungirded utopism remains one of the major effects of Substantivism on U-BEE. Entrepreneurial substantivists would perhaps back out when the technological road becomes tough. Entrepreneurs of such persuasions easily flag and waver in their path to becoming entrepreneurs and file in as employees in the face of entrepreneurial adversity. If this issue is not addressed, if students substantively waver in the face of cardinally inevitable challenges, the likes of Mark Zuckerberg and other youthful billionaires could fizzle out of the globe.

Essentially, modernists believe such entrepreneurs, if ever they arrive at the platform of entrepreneurial leadership, would be overtly laissez-faire in their intervention and would cause the decline of U-BEE development. Critics of Substantivism have had to state that the underpinning cause of this view is intrinsic or unconfessed technophobia. [58] explained that the technophobia issue is psychologically enmeshed into the genomes of such entrepreneurs, and there is a need of a psychological panacea for adjustment.

Despite the incessant weakness inherent in this viewpoint, developing nations attach some significance to technological ignorance as one of the bliss of existence, thereby, nipping the bud of U-BEE development in the research location, therefore, necessitating the need for massive awareness about the inherent value in technology for the transformation of entrepreneurial ideas into economic values.

E. Instrumentalism (Neutral + humanly controlled)

This view represents the idea of modernists today. Entrepreneurs hold this view and believe that technological activity is neither substantive nor deterministic. Leaning and Watson (2006) emphasize

that it is merely a tool, substantially subservient to human purposes. The authors further posited that instrumentalists deny the socio-technical concerns of technology, thereby assuming a neutral stance, arguably connoting advancement in empirical research. Entrepreneurs who espouse this view consider technology as a neutral tool that is not value-laden and could be manipulated and subjected by humans to promote entrepreneurial aims in U-BEE. However, Feenberg (2006) observes that this position is intrinsically subjective and the development and deployment of technology without passing the criteria of due democratization could affect economic goals, and, in line with Feenberg's (2006) argument, the author hereby raises concern that before the deployment of any developed technology, entrepreneurs who are instrumentalists should cardinally examine the entrepreneurial motives of U-BEE prior deployment.

Meanwhile, certain technologies do not consider the U-BEE context and would hinder rather than help the U-BEE developmental plan, especially in developing countries, where entrepreneurial phenomena have no clear boundaries and causal depth. Moreover, entrepreneurs who are instrumentalists believe that technology is not self-capable of entrepreneurialism but the mode of usage, which is solely and fully at the disposal of the entrepreneur, however, the tendency to ignore the socio-technical consequences of technology is high. Despite the caution and proclivity to ignore the socio-technical implications of technology by entrepreneurs who are instrumentalists, this view has immense scholarly advocates in Nigeria (Ajayi, 2008; Okewale and Adetimirin, 2023).

F. Concise critique of instrumentalism relative to U-BEE development

Feenberg (2006)] caution is worth consideration by instrumentalists, and the debate about the socio-technical effects of technology have cardinally affected both developed and developing nations. The effects of instrumentalism on the ambience of U-BEE, could help or hinder the development of U-BEE. While instrumentalists opine those profound entrepreneurial possibilities lies in the ambit of technologies, yet the practicality of this has been difficult in several U-BEE ambience, especially in the research location, who seems to be overtly technocentric. Therefore, technological adoption is not directly proportional to U-BEE development nor proportional to advancement in entrepreneurial productivity, though remains an integral element of its constitution.

G. Critical Theory (value-laden+ humanly controlled)

Critical theorists hold a milder posture that technological activity is value-laden yet could be humanly controlled (Feenberg, 2006). Critical theorists simultaneously opine with substantivists and determinists about the substantive nature of technological mechanism (Mlitwa, 2007). Entrepreneurs who hold this view fare better because of the constant subjection of their entrepreneurial activities to democratization processes.

Although substantivism has shown the disastrous results of overt technocratizing, critical theory nevertheless sees technology as offering more freedom (Feenberg, 2006). Entrepreneurial leaders in U-BEE need to ensure a better democratization process for enhanced technopreneurial perception and entrepreneurs who operate under a democratically controlled ambience could arguably change the world.

Critical theorists opine that technologies as well as entrepreneurial activities pose no challenge to universal healthiness though the world is yet to arrive at an equitable democratization process of plausible entrepreneurial endeavors for the facilitation of U-BEE in most developing nations (Leaning and Watson, 2006). The author further indicates that some of the actors within U-BEE are both threatened by change and conversely not impressed by it, however, Critical theorists never overrule the possibilities and potentials of technocentric capabilities for economic transformation.

The cardinal contribution of this view is the acceptance of the possibility of democratization of the technological process in favour of U-BEE development. Feenberg (2006) and other critical theorists share similar opinions, they unanimously alluded to history and discovered that economy as well as technological endeavor are subject to democratic control. Therefore, the inherent autonomous power in technology as argued by substantivists is currently

questionable, therefore, the instituting of a proper democratic forum would be a plausible solution.

Critical theorists, contrary to the expostulation of Heidegger, recourse to the old saying that 'Heaven help those who help themselves', which implies that technological activities are within the purview of our human control, and through democratic intervention, we can attenuate this issue (Feenberg, 2006).

H. Concise critique of critical theory relative to U-BEE development

Critical theory posits a conservative view, it is a plausible threshold whereby entrepreneurs could navigate entrepreneurial terrain without much ado. It incites positively the need for caution and courtesy. The adverse effect of this view on U-BEE development is that the needed democratic platform, that is, the appropriate institution for effective control and censure of weird technological development, may not surface sooner (Feenberg, 2006). And, it could lead to another perspective. Entrepreneurs in this domain may tend to assume another position in the face of a poor platform.

IV. IMPLICATION OF FEENBERG'S THEORY IN NIGERIA

The following is a list of the study's implications in the study environment: (i) the concept of entrepreneurship is introduced and explored, from a theoretical and historical perspective, as well as its various evolutionary stages concerning the development of an entrepreneurial ecosystem centered around universities. The study clarifies that the broad misinterpretation of the theoretical premise underlying the historical scope of entrepreneurship has significantly established the phenomenon's complexity and breadth although the Triadic approaches comprising economic, psychological, and sociological approaches that are often used to explain the essence of entrepreneurship have produced little in the study environment. Therefore, understanding the major milestones and contributions inherent in the theoretical journey of entrepreneurship both historically and chronologically helps to redefine and retrace them. Understanding these milestones improves the research process in the field, and the researcher has given due attention to this conceptualization concerning developing university-based entrepreneurial ecosystems. The thorough study of the entrepreneurial approach has proven to be the harbinger of economic productivity, employment creation, and improvement of living standards.

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