The Entrepreneurial Mind

Lecture 8: Entrepreneurial Mindset and Development

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Lecture Learning Objectives:

At the end of the lecture, you will be able to:

1. Distinguish between fixed and growing mindsets;
2. Explain the evidence in neuroscience about how the growth mindset affects work and school performance;
3. Differentiate behavioral responses from fixed and growth mindsets with regard to failures, obstacles, challenges, criticism and effort;
4. Outline recommended strategies for promoting growth mindset in the classroom and workplace.
5. Identify historical periods associated with entrepreneurial activities and significant technological discoveries;
6. Construct timeline indicating the stages of the evolution of economic life;
7. Relate the development of money and property rights to entrepreneurial development;
8. Distinguish entrepreneurs from business managers;
9. Present arguments in support of or against the issue of modern market-driven economic systems in the context of food security and economic sustainability; and
10. Examine the causes of the persistent global problems of wealth inequality and poverty and provide theoretical and practical solutions to the problems.

Overview

The lecture examines how people think and act, how those thoughts and actions influence their expectations, motivations, and job performance. It will help students to understand the predisposition to a discredited belief that ability or talent is innate (**fixed mindset**), and Improve their opportunities for accomplishing their career goals by developing a growth mindset (Dweck, 2005). This lecture will help students understand the importance of a growth mindset in establishing positive attitudes towards risk-taking, creativity, initiative, empathy, critical thinking, and problem-solving.

Fixed and Growth Mindset

A **mindset** is a pattern of thinking or behavior of one or more individuals or groups of individuals (Argyris, 2004). An individual acquires a **mindset** through interaction with the social, economic and cultural environment. Much of what we understand of

personality comes from mindset that propels or prevents a person from fulfilling his potential (Dweck, 2005). As a learned behavior, it exerts strong motivation or demotivation within an individual or group of individuals to carry on or adopt new attitudes and behaviors. According to Dweck (2005), there are two kinds of people (**growth mentality versus fixed mentality**) that distinguish them according to their attitudes towards failure. A **fixed mindset** sees individuals' abilities as innate traits and sees failure as a lack of basic skills needed. This is clearly not the case. No one at 50 would have the same IQ as when they were 10. If that is the case, something went wrong in his life. The **fixed mentality** is also evident from the innate desire for instant gratification. Research has shown that a person might undertake a business with a large percentage profit on a smaller scale than would undertake a large-scale enterprise to earn a small percentage profit per unit. Yet, a buyer might go to a store to save ₱10 for ₱100 purchase but might not go to a store to save ₱100 for ₱1000 purchase.

Sadly, many still hold on to the belief of innate human talent that becomes a self-fulfilling prophecy unless we even consider them. In contrast, **growth mindset** individuals see themselves capable to gain any ability through hard work and persistence. Dweck (2005), as quoted by Herbert (2007), said individuals with a fixed mindset consider the primary objective in life the titles of their abilities, and not true learning. When they experience setbacks, they take those setbacks as reflections of their innate capacity, becoming defensive and helpless. On the other hand, individuals with a malleable mindset value learning and growth and react to adversity with increased change efforts, strategies and resiliency. A **fixed mindset** undermines a person's ability to cope with challenges or criticism such as loss of a job, live up with the expectations, committing mistakes, and so on. People with fixed mindsets consider challenges tedious and feel easily frustrated. Growth-conscious people see challenges and a way to create opportunities (Yeager & Dweck, 2005). **Growth mindset** people lead a less stressful, and successful life (Dweck, 2005).

Neuroscience Evidence of Growth Mindset

Scientific research of the brain corroborates the growth mindset theory. Neuroscience data show that the brain is malleable, also referred to as "plasticity" of the brain. The brain functions like a muscle, as a person thinks, the brain expands as more neurons interconnect among the brain cells. As the brain expands, and its volume grows, the more a person is able to think deep, Researchers found positive correlates between intelligence and overall brain volume (Pietschnig Pink et al., 2015); brain gray matter volume (Narr, Woods, et al., 2007); brain white matter volume (Gur, Trotsky, et al., 1999), cortical thickness, and neural efficiency (Haier, Siegel, et al., 1988). Research on the neuronal basis of intelligence over the past 30 years will provide more information in the future about how the brain works (Luders, Narr, et al., 2009), Until now, neural studies have shown that intellect is the sum of mental effort; in this sense, the growth mindset holds the key to success in life. While the assumption that brain size is correlated with intelligence is questionable because other animals have a larger brain size and hence smarter than humans. However, most neuroscientists believe that the complexity of cellular and molecular connections or synapses in the brain is a true determinant of

intelligence (Lechtenberg, 2014). While animal brain size is predictive of intelligence, it depends much more efficiently on how parts of the brain communicate with each other and make a more conscious and intelligent person than lower forms of animals.

In education, studies have confirmed that growth mindsets have a positive impact on student performance. Dweck (2010) highlighted how educators can improve student achievement by creating a culture of growth mindset. These include exposing students to neuroscience evidence of brain malleability, promoting the right strategies and advice, seeking help from others when necessary, and changing how students interact with others (Romero, 2015). Other comparative studies also confirmed the importance of creating an environment that is conducive to growth mindset. For example, a study of high school students showed the impact of a fixed and growth mindset in relation to growth on math outcomes. Students with a growing mindset scored better in math over time than students with a fixed mindset (Blackwell, Trzesniewski, & Dweck, 2007). A follow-up study showed that students growth mindsets are likely to succeed in advanced mathematics over time (Romero et al., 2014). Another study examines if attitudes differ from one person to another after experiencing difficulties found that people with a growing mindset learned from people who did better than others. But those with a fixed mindset seemed more interested in feeling better and looked at the tests of those who had done worse (Nussbaum & Dweck, 2008). This finding suggests that people who struggle the most get better results. In addition, research has also found that teachers' previous beliefs about learning and learners have influenced how they engage in mindsets (Kemper & Ela, 2019). The results suggest that many teachers oversimplify the concepts of growth and fixed mindset simply as a dichotomy between positive and negative traits (Kemper & Ela, 2019). In this respect, teachers need additional training and support to successfully implement growth initiatives in their classes. The results confirmed the theory of mindset advanced by Carol Dweck's studies according to which there are elements in an individual personality sensitive to mistakes and setbacks. Consequently, in a force-based education and learning system, students may develop a mindset that prevents them from doing anything about obstacles or challenges. The theory of growth mindset may require significant intervention to reshape student mindset through appropriate training and interactions. The chart below illustrates the main differences between fixed and growth mindset in terms of how people face challenges, obstacles, criticisms, attitudes toward doing extra efforts, and views about the success of others.

Growth Mindset and Intuition

Intuition can be an important business tool. Decision-making consists mostly of two modes, perception and insight (Kahneman, 2011). **Perception** is slow, rational, mindful, thoughtful, and deliberate thinking. This is thinking with real evidence and scientific facts. Growth mindset is important in perception because acquiring scientific knowledge and business information needs persistence and hard work. On the contrary, **intuition** is feeling before thinking. it is instantaneous, unconscious, automatic, and emotional. It is a product of the evolutionary history of decision-making which helps to create expectations, connect inconsistencies and alert a person to potential problems. At any given time, active thoughts and actions vary with active mode. Kahneman (2011)

noted that people use perception rarely as in many situations responses are automatic hoc rationale where "**intuition** comes first and strategic reasoning and intuitive. Therefore, in many situations **reasoning** is post-second" (Haidt, 2012) in an attempt to avoid cognitive dissonance and feel in control of the process that the rational mind comes up with reasons. In such case, intuition is logically sound (Moore, 2015). There is a growing interest in human intuition because of its impact on decision-making. Intuition, also known as heuristics, allows people to make decisions in uncertain situations where science and logic are meaningless. Gigerenzer and Selten (2008) have developed models for bounded rationality that describe how intuition leads to relevant decisions for environment characterized by high degree of uncertainty. Gigerenzer hypothesized that intuition is an adaptive tool that is not identical to the rules of logic and probability, but an adaptive response to the world of uncertainty. Baldacchino and Leonie (2015) conducted a literature review and found a number of areas requiring special attention on the role of intuition in the entrepreneurial process. Intuition research has become increasingly popular over the past two decades in management literature and in the academic community in general (e.g., Akinci and Sadler-Smith, 2012; Osbeck, 1999, 2001). There are two reasons for this: (1) intuition is the least understood aspect of managerial cognition (Hodgkinson and Healey, 2011) and (2) without understanding intuition, it is impossible to develop any meaningful conceptualization of cognition. For example, Chalmers (1998) maintains that intuition is critical to understanding the problem of cognition. He argued that intuition is critical to understanding the cognitive problem and ignoring the problem of intuition would, in turn, deny the problem and the phenomenon of consciousness itself. As Polanyi (1969) further argued that intuition comes about for lack of knowledge or no longer holds true and therefore, intuition reinforces and probably the basis for the expansion of knowledge. Although most people agree that there is such a phenomenon as intuition, involving emotionally charged, rapid, unconscious processes, so far little compelling evidence supports its ability to predict entrepreneurial action.

Growth Mindset, Risk Taking, Creativity and Innovation

Researchers believe that successful entrepreneurs are innovators, profit-seekers, and risk-takers. A **growth mindset** is essential for the development of these abilities while innate abilities or talents are necessary but not sufficient cause for achievement. For example, two American inventors, the Wright brothers built and flew the world's first motor-operated airplane in 1903. The two brothers, Wilbur and Norville, never attended college. However, their life-long fascination with aerodynamics and belief in their abilities had kept their interest alive. While the brothers have been working on different mechanical projects like building bicycles and printing machines, they also persistently followed the research of German aviator Otto Lilienthal. When Lilienthal died in a glider crash, the brothers risked conducting their own experiments with flight. Difficult to understand that time was aerodynamics to fly a plane. As rumor has it that the brothers studied how birds fly and discovered that birds angled their wings for balance, control, and direction while the movement of the tail for take-off and landing. Through innovation from Lilienthal's work, they had successfully built a wing mechanic into the airplane with the foot pedal rudder for turning. Their hard work and perseverance finally succeeded in demonstrating the first controlled power-driven flight in 1903. Many, especially the press,

however, did not appreciate their success. This did not discourage the brothers and set out for Europe in 1908 hoping to gain public acceptance and sell airplanes. Later the brothers found a wider public acceptance in France and made public flights and gave rides to officials, journalists, and statesmen. The brothers became huge celebrities in Europe and began selling their airplanes in 1909. They became wealthy businessmen, filling contracts for airplanes in Europe and the United States.

One significant result of the **growth mindset** is the attitude toward risk. Risk in a decision situation occurs when a decision-maker lacks information. **Growth mindset** individuals take doubts or uncertainties as a challenge to work harder in gathering as much information as possible. Gradually, with more information obtained, the probability of reaching the right decision is higher. Therefore, risk-taking behavior is a factual probability, where business risks are estimable and reducible. For instance, a risk management plan will help determine investment security through insurance diversification dependent on the amount and probability of occurrence. Taking risk is not just a haphazard undertaking but also an opportunistic venture as in creative risk-taking. Hence, risk-taking measures how far one can go toward success. Additionally, a Growth mindset is important in developing creativity since creative work requires a higher level of perseverance, Creativeness needs time to develop and creative success is not so much innate ability or talent but in putting more effort and perseverance into the limited talent a person has. A poll of creativity researchers found that one influencing factor in creative achievement is the perseverance and resilience produced by a growth mindset (Dweck, 2007). As Einstein has said, "It's not that I'm so smart, it's merely that I stay with problems longer." Innovation is another important ability as an outcome of a growth mindset. The innovation introduces new ideas of doing things and does not happen quickly since a new business idea needs time to grow and develop. Schumpeter (1947) defines innovation as a process of creative destruction-the process of developing and introducing new ways of doing things and abandoned the old ones. Through persistence and hard work, risk-taking, accepting failures, and learning from the success of others, success comes to those who will wait.

Entrepreneurial Mindset

There were previous attempts to describe, explain and predict recurrent behavior that set people apart from one another originated in the discipline of personality psychology. Familiar names in this field are Jung and Freud. It was Allport who made a significant contribution to the field with his conceptualization of personality traits in the late 1930s. Allport's 4500 personality traits gradually reduced to five by researchers Costa and Macrae in the late 1970s and early 1980s. The broad traits which include neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness became known as the "Big Five' personality traits or Five-Factor Model (FFM). Since then the Big Five became an academic term used to understand mindset including other sub-disciplines for everyday behavior such as physical health and psychopathology, to name a few. Researchers' focus on personality traits eventually turned to the interpretation of traits and the habit-forming behavior resulting from such traits. Mindset influences the way people understand and respond to the world.

In 2005 Carol Dweck redefined implicit theories as people's 'mindsets'. Since then many definitions of mindset have come to light and they have all influenced the multiple definitions of an entrepreneurial mindset. Based on all these definitions, the synthesized definition of entrepreneurial mindset was proposed. This definition relates to how a person thinks, their state of mind or the lens through which they see the world, and how this influences their propensity for entrepreneurial activities and outcomes.

This state of mind or lens is influenced by multiple factors that include:

1) what people know or do not know (related to their knowledge);
2) what people have done or have not done related to their experience;
3) what people can do or believe they can do related to their level of competency and self-belief; and
4) who they are (related to their personality, values, attitudes, and beliefs).

These dimensions revealed **11 characteristics of an entrepreneurial mindset** (Orbis, 2011). They are;

1) lifelong learning and openness to change;
2) engagement in a complex and uncertain world;
3) creative and innovative approaches to problem-solving:
4) belief and confidence in one's own capacity and competency to be entrepreneurial;
5) desire, motivation and intention to practice entrepreneur-ship and behave entrepreneurially;
6) taking initiative and personal responsibility for actions;
7) pursuit of goal-attainment through personal mastery and value-creation;
8) recognizing opportunities;
9) grit and perseverance in the face of challenges;
10) taking risks that lead to learning, growth, and value; and
11) a belief in one's ability to influence.

Several studies attempted to measure the 11 characteristics of entrepreneurial mindset using scales based on the 10-point Likert Scale survey or other validated scales to measure specific dimensions of the entrepreneurial mindset.

However, the existing instruments failed to individually measure all or even a significant percentage of the entrepreneurial mindset dimensions that have been identified. In addition, there is a need for developing quantitative items to measure these dimensions as the existing instruments have all made use of qualitative or mixed-method approaches. On this account, there is a need to develop a pilot test requiring a more refine instrument for measuring an entrepreneurial mindset.

Entrepreneurial Development

Overview

This lecture traces the development of entrepreneurs since the dawn of history. Since the first light of civilization, the crucial element in economic development is productivity over time brought about by innovation. Schumpeter (1942) defined innovation as the process of "**creative destruction**" the deliberate abandonment of the old methods and replacing them with newly improved methods resulting in an increase in productivity. During the Stone Age, homo habilis -the ancestor of homo sapiens used hunting and gathering tools.

This **primeva**l ability to fashion stone tools marked the earliest Innovation that differentiates **homo sapiens from the primates**.

The second wave of innovation appeared during the **Agricultural Revolution** (10,000 B.C. 5,000 B.C.). People planted crops and domesticated wild animals.

The third wave of innovation came during the **Industrial Revolution** (1750 A.D. - 1830 A.D.). People introduced machines in farms and factories.

The fourth wave happened in a **post-modern** or the **Information Revolution** (1960- present) when people developed computers.

In this lecture, students will learn that innovation does not refer chiefly to the development of technology, but also to the changes in economic organization from simple tribes to complex international political economy, multinational corporations, and global market. These changes have been more important than technological discoveries themselves (North, 1981).

Stone Age (5 million - 10,000 B.C.)

Also known as the **Palaeolithic age**, came with the appearance of **Homo habilis**, the precursor to modern man in Africa approximately crude tools to survive by scavenging from carcasses of creatures wiped out by predators or died of natural causes (Attenborough and Collins, 1990). The earliest stage of entrepreneurship began when early humans developed hunting tools (Binford, 1986). With their tools, they moved to sparsely wooded areas; however, with little physical and intellectual capital to increase productivity they lived in small groups in order to survive (Gavashelishvili and Tarkhnishvili, 2016). Since the amount of food available in the foraging area determines the population, life expectancy was short of only around twenty years. More than half of the children born did not endure long enough to start a family, although some elders might live long into their forties (North, 1981; Livi-Bacci, 1992). The exchange of goods between groups was rare as no organized trading system existed. Historians found it difficult to pinpoint exactly when the barter trade started but believed it started way back in 6000 B.C. (Doughty, 2018) as evident from the barter trade by the Phoenicians in Mesopotamia

tribes. Tribes would barter goods for things like food, animal skins, weapons, and spices that they wanted in return. This marked the earliest form of entrepreneurship responsible for exchange to take place. During the Stone Age, the population growth rate was almost nil around 0007%, doubling in about 100,000 years (Getzen, 1997). As tribes became larger for the local area some families separated and occupied new lands. With better tools for food exploitation and ability to track and barter efficiency increased but not productivity as they have depleted large tracts of land, tree-dwelling animals, and water mammals for food and clothing. Evidently, hunting and gathering for food brought out less than what could have supported an increase in the population using the same measure of resources. By the close of the Stone Age, population limits reached their limits in some fully populated areas. This stimulated the development of domestication of wild animals and plant cultivation to feed the excess population starting the Agricultural Age.

Agricultural Revolution (10,000 B.C. - 5,000 B.C.)

Millennia after millennia, humans have become extremely adept at hunting, and this has led to the extinction of big animals. In most locations, food became so scarce and compelled humans to make a choice: either to continue moving out for food and die or stay permanently in a place by feeding on plants. During many years of adaptation to climate, they have noticed that some plants reproduce naturally by their seeds and others by their roots, stems, and leaves. Eventually, they learned to raise plants by sticking to the natural process with some improved tools along with domestication of wild animals. This ushered in the second wave of entrepreneurial innovation - agriculture. Discovering agriculture was ground breaking. People realized the natural power of the land to support many families that later became cities. Even today, a large part of the world's population still has the effects of the agricultural revolution, Population growth has increased at a rate of 0.0465%, doubling every 1,500 years (Getzen, 1997). The demographic transition caused tremendous growth in population. This is the historical trend of high birth and death rates to low birth and death rates as tribes economically developed (Myrskylä, social and economic Mikko, et al., 2009). But the most significant to social improvement was the increase in productivity (gradual innovation in farming i.e., farm improvements, the building of irrigation canals, the invention of farm implements, and selection of better seeds). Since intensive cultivation of land (plowing, sowing, harrowing. harvesting, irrigation, or drainage) required permanent abode of farmers, there must have been at the early stage some form of usage and property rights (Zückert, 2003). Large productivity increases resulted in a surplus of harvest needing storage systems for times of scarcity or trade them for tools and other necessary things. An early form of money allowed people to trade goods and services through delayed payments and save the surplus for larger purchases in the future (Liuliang Yu and Hong Yu, 2004). The development of property rights along with barter trade and money as a medium of exchange stimulated the growth of early entrepreneurs who started the earliest form of trade and investment. As people became more efficient, they experienced surplus of food and needed protection against looters. An army was organized to protect farmers against the appropriation of productive lands through conquest and slavery. Those who successfully gathered troops in battle gained power.

Through a hierarchy of rules and commands, they controlled most of the wealth of society. However, governance by the military was necessary for protection and food security against stronger bands of tribes. Collective actions allowed farm innovation such as road building, irrigation systems, and storage facilities. This caused a set of regulations that govern collective farm practices that everyone must agree to cooperate or go back to the old ways of hunting and gathering. People must have realized that governance does more good than harm. Eventually, the feudal system became an accepted institution, Growth in population requires larger returns of investment and requires more cooperation among people with an emphasis on the division of labor. The new form of social organization sustained the rapid growth of the population by creating the cultural, political, and economic institutions that make civilization.

As society became more advanced, the quest for more territories expanded and caused widespread conflict and war during ancient times. For instance, ancient Greece expanded between 500 B.C.-146 B.C. (de Blois and van der Spek, 1997), and the ancient Roman Empire ruled for 500 years between 140 B.C.-360 A.D (Kaplan and Jouni Häkli, 2002). Although productivity increased tremendously during the Agricultural Era, but, it was accompanied by a wide disparity of wealth distribution. The population split into two classes of people: **peasants** who worked the land and stayed at the subsistence level, while **rulers** controlled all the wealth. According to anthropologists, wealth disparity began when land becoming more valuable and capital as substitutes for human labor. This caused labor to reduce in value (Cowie and Bowles, 2019). One such substitute was the ox-drawn plows (an early form of capital), a labor-saving technology that ushered early forms of separation of wealth from labor. This separation caused economic disparity and is still prevalent today. During that time, a family who wanted their house moved to another place by legal eviction or seeking greener pasture would require many oxen equivalent to the number of days, weeks, or even months of free labor. So, the family had to remove or leave behind some part of the house to make the transfer possible. David Ricardo (1817) articulated the conflict between labor and landowner. He theorized that the market value of labor determines the value of commodities. As the population increases, labor supply exceeds demand, pulling wages lower toward subsistence level. When the harvest is scarce, prices of goods rise landowners gain as they continue to receive land rent while farmers get less amount of goods since subsistence wages (amount of labor spent) fall below Prices landowners get less than expected since the value of rents fall below.

Conversely, when the harvest is abundant, prices go down, prices while farmers benefit as subsistence wage falls above prices. naturally quality. As a result, it commands a higher rent, while worsening the condition of farmers since prices are higher. Improvement in the utilization of the poorest land for agriculture increases rent, all of its earnings going must go to landowners. As the population Increased holding land fixed, rents increased and the real value of wages fell, economic progress slowed down. Though economic e during the agricultural stage was technologically more efficient, however, uneven distribution of wealth arose when capital had higher value than labor - an early form of capitalism characterized by the conflict between landowners and peasants

Industrial Revolution (1800-1950 A.D.)

First appeared in England at the start of the nineteenth century. In 1733. John Kay invented the "**flying shuttle**," a new mechanized method of weaving cloth (Hills, 1998). That invention created the third wave of innovations applied in the textile industry. Foremost of weaving inventors was Richard Arkwright in 1770-an English inventor and leading entrepreneur who invented Cotton Jenny (Fitton, 1989). His machines were faster in the spinning of yam and rapidly more efficient and centralized machines in the English textile industry. Technological advancement towards mechanization also arose in other industries such as steam power, iron making, and the invention of machine tools. Today, people live in a technologically and industrially advanced 21st century. These advancements would have been completely impossible if not for the industrial revolution which happened from the 18th to 19th centuries. Productivity increased tremor tremendously that caused the average standard of living to increase. Population growth rose to 43 percent and surged to L8 percent in 1950 (Getzen, 1997).

The world population quadrupled from 750 to 2.5 billion and life expectancy rose from 20 to 35 years (Getzen, 1997). The social hierarchies during the Agricultural Era broke up by a tremendous increase in social mobility due to the improvement in wages. A middle-class group of people emerged and actively participated in a monetary economy. This shift in social and economic structure was the driving force of the market-driven growth of the industrial revolution. However, many people remain poor even today and rural struggle to support the growing population is prevalent along with the rapidly growing economy. This is not because of the lack of technology but the lack of equitable property rights, social order. and administrative organization which could allow for technology to be productively applied (Olson, 1996). The increasing wealth disparity remains a threat to the health of the people not of the shortage of knowledge, technology, or money but of the defect of economic organization.

The most direct impact of technological progress on the daily life of most people is unemployment and rising inequality. In the early stage of the industrial revolution, there were already fears of unemployment. The common fear was the introduction of labor-saving mechanization of the cloth industry which would replace labor causing massive unemployment and worsening income inequality. While this could be true initially in some industries, but not in other industries, however, the trend continues even today (Olson, 1996). For instance, at the start of the 20th-century jobs in manufacturing plants and agriculture were disappearing. However, millions of new jobs eventually have been created in new industries. Nonetheless, technology is a real threat particularly to people whose labor skills became obsolete due to the introduction of labor-saving technologies. One historical study presents a different way of looking at the problem. Thomas Picketty (2014) indicated that the rate of return of capital has recently been greater than income from wages. He indicated that the build-up of wealth by the richest percentiles has grown faster than income likely to stay in the 21st century. He theorized that without far more progressive tax rates increasing return of capital would undermine democracy and political instability. He claimed that wealth becomes increasingly concentrated in the hands of a small elite whose marginal propensity to consume (MPC) increases as a class

compared with the MPC of poor classes. Since economic growth depends on savings, there is a greater tendency for the income of the richest to be saved, and these funds are reinvested into the financial system. However, at full employment, an attempt to save more will reduce consumption levels and offer less incentive for firms to increase output capacity. As the economy tends to run at full employment, 'over-saving' will reduce economic growth and increase unemployment.

Another trade-off of technological progress is the application of technology in the production of weapons of mass destruction (WMD). For instance, a study of 170 countries over 45 years showed that an increase in military spending led to slower economic growth; over 20 years a 1% increased military spending decreased country's growth by 9%. Military spending was especially detrimental to the economic growth of wealthier countries (d'Agostino and Dunne et al., 2017). There are, however, arguments in favor of the development of nuclear technology. One may argue that production of WMD created jobs at the same time preserved peace by preventing foreign attacks. On the other hand, smart bombs and cruise missiles have accurate targets for the enemy, hence, lessen the unintended damage to the civilian population and therefore reduce the danger of war. All these suggest that the production of WMD has a trade-off between the dangers of war and the production of consumer goods, health care, and other more urgent needs. Certainly, other alternatives to preserve global peace and economic prosperity are more important than weapons of mass destruction.

Information Age (1950-to the Future)

The very recent historic leap of entrepreneurship came with the rapid shift from the Industrial Revolution to information technology in the 20th century (Zimmerman, 2017; Manuel, 1996). This era characterizes information as a commodity and easily available with computer technology. The labor spent on ICT is much lower than labor-intensive farming and manufacturing. Such an information-driven economy is prevalent in countries that have a large human capital investment in Information and Communication Technology (ICT) such as computerized machinery (robotics), fiber optics, communication satellites, Internet, and other ICT tools that have changed the operations of business and industries. In addition, ICT-based economic systems are prevalent in countries with higher life expectancy, lower dependency ratio, and lower population growth rates. On the other hand, the effect of ICT on economic growth is attributable to the huge reduction of production costs.

The production of goods was through bits or bytes that are easy to produce and readily accessible through the computer across the country and globally. Through ICT product design, subsequent manufacturing processes can be effectively and efficiently made compared to the labor-based and expensive traditional product design and processing. Almost all firms today have computers and internet connections providing consumers with more diversified and customized products, improving product quality, and selling goods and services. Technology brings together the tools that ease the manufacturing and distribution of goods, uses, and exchange of information makes tasks

easier to execute, and solving many of humankind's problems. But for whom are these high-tech products and services?

Research on the effect of information technology on economic growth provides mixed results. Many studies conducted in European countries, Canada, and the United States confirmed the positive effect of ICT on economic growth (Schreyer, 2000).
Another study conducted in 159 diverse countries showed a positive relationship between the growth rate of real GDP per capita in terms of the number of internet users, fixed broadband internet subscribers, and the number of mobile subscriptions per 100 inhabitants (Farhadi, Ismail, et al., 2012). However, the effect of ICT use on economic growth is higher in the high-income groups rather than in lower income groups. This implies that if these countries seek to enhance their economic growth, they need to implement specific policies that facilitate ICT use. However, the argument that ICT is a driving engine of economic growth today across countries is disputable, as there are shreds of evidence that showed the negative effect of ICT on economic growth. For example, introducing a new investment good like computers can impose large change costs on the economy and decrease economic growth (Kiley, 1999). Another study reveals no significant relationship between ICT investment and economic growth for the sample of 43 countries over the period of 1985-1999 (Pohjola, 2002). In another study, no significant positive effects of computer penetration on the economic growth of 84 countries during 1990-1999, although it confirms the positive link between the use of mobile phones and economic growth (Jacobsen, 2003). Apparently, the effect of ICT on economic growth requires further studies that would account for other predictors such as unemployment, income distribution, peace, and security.

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Entrepreneurial Mind, Ferdinand C. Paurom and Frederick U. Ybanez,
Mindshapers Co., Inc.
2021