

The Role of Education in Economic Advancement: A Case Study of Silicon Valley

Yuyang Wei *

University of Massachusetts Boston 100 Morrissey Blvd. Boston, MA 02125 USA

* Corresponding author: Yuyang.Wei001@umb.edu

Abstract. Education is an important ingredient in the development of the human capital of any given country since it directly influences the quality of output of the workforce. With an educated workforce, efficiency is enhanced, as well as the level of productivity, due to the capacity of individual workers to be innovative. This paper seeks to analyze the impact of education in a country by analyzing the impact that education has on the level of economic growth, as well as its influence on a workforce's capacity to absorb new technologies. Additionally, the paper also discusses how education is a crucial asset in reducing poverty and inequality in society by increasing sustainable household incomes as well as bringing about positive externalities. The paper shows from the case of Silicon Valley in the United States, education plays a great role in economic advancement of a nation or region. The paper shows that the Silicon Valley largely benefits from the presence of top higher education institutions such as Stanford University, which train a large number of technological innovation talents.

Keywords: Education, Economic, Silicon Valley, Advancement.

1. Introduction

Education refers to the range of skills, capabilities, competencies and any other characteristics in an individual that enhance productivity. Education is a critical element in the human capital of a country as it directly determines the quality of output due to its ability to enhance efficiency of individual workers [1]. In addition, education is a key driver of innovation that enables a country shift from manual processes of production to highly efficient and cost-effective forms of production that generate new value chains in the economy. Consequently, education has a positive impact on the economic growth of a nation through improving the quality of human capital, increasing productivity and increasing the level of personal incomes and earnings [2]. Thus, it is paramount that a nation focuses on improving the quality of its education at all levels in order to guarantee that its human capital is both resourceful and productive, while also being equipped to handle the demands of the current world. This is particularly useful in the human capital being able to deal with the dynamism brought about by fast changes in technological advancements [3]. This growth in technology has made it increasingly apparent that education plays a great role in boosting the level of innovation as well as overall productivity in an economy. One of such case is in the United States where institutions of higher learning are at the forefront of boosting economic growth through research, comprehensive education and partnerships with leading sectors in the economy as in the case of Silicon Valley. The objectives of this paper are therefore to examine how education plays a significant role in economic growth by reducing poverty levels elevating households' incomes, and positively influencing the absorption of new technologies.

2. The Impact of Education and Economic Growth

Education acts as the main avenue for the acquisition of skills and capabilities that equip individuals with the means of adding value to their daily activities and earn a living [4]. Educational opportunities act as avenues to impart learning and facilitate the acquisition of knowledge, skills, behaviors and attitudes that make one resourceful, productive and invaluable to the society [5]. The knowledge, behaviors, skills and attitudes acquired through quality education processes act as engines

for economic and social transformation. This is because they bring about some notable positive impacts on areas such as creativity, innovation and resourcefulness of the human capital. As a result, it is vital for governments to prioritize the adoption of quality education programs at the primary, secondary and tertiary levels in order to enhance the resourcefulness and productivity of the country's human capital. There is also a need to ensure that such education programs also conform to international best practices and standards. A focus on quality higher levels of educational attainment in the country is vital as it enhances the cognitive skills in workers. This is a key determinant in the differences in the levels of productivity of workers across countries rather than educational attainment [3].

In addition, individuals that have attained higher education demonstrate better capabilities in acquiring skills through learning by doing in comparison to their less educated counterparts [3]. As a result, the ability of education to enhance faster pace in human capital accumulation due to higher educational achievement reiterates the need for the authorities to prioritize the ease of access to education beyond the primary and secondary levels. The ability of the educated to demonstrate better capabilities in acquisition of new skills through learning by doing demonstrates the value of education in enhancing the absorptive capacity in the economy for new skills and novel ideas. The higher absorptive capacity is evident through the ability to recognize the value of new external information, and then assimilating and applying it [6].

In a similar perspective, a country with a highly educated, quality and skilled workforce has better capabilities in absorbing the benefits and spillovers emanating from foreign direct investments into the country [3]. Achieving a quality workforce in terms of skills and higher educational attainment is achieved through great investment in research and development, as well as considerable improvements in the wage levels of the educators. Foreign direct investments into a country are invested mainly through technical methods and thus, a nation can only attract these investments if its workforce is of a higher quality [6]. Such capabilities are vital in making a country acquire and absorb technology spillovers from more developed and advanced nations at lower costs as the human capital required to utilize such technologies is available locally [7]. Higher levels of absorptive capacity for skills and technology spillovers from more advanced countries is crucial in making the goods and services from the country more competitive over those of rivals in the regional and international markets. Such competitiveness boosts the levels of a country's GDP due to higher volumes of industrial production to exploit the opportunities available in local and international markets [1].

3. Education for Absorption of New Technologies

As discussed in the previous section, having a workforce that is highly educated, quality and skilled greatly improves its capabilities of utilizing newer and more dynamic technologies. The ability to absorb new technologies and other spillovers from more advanced economies expands the supply and value chains for businesses as they add new varieties of products and services [6]. Eventually, the positive impacts on the economy are evident through higher employment levels and increased consumer spending due to more income-generation opportunities.

Investment in education also has a positive impact on economic growth as it enhances the efficiency and productivity of the labor force and improves the personal earnings and incomes of the individual workers [2]. Educated workers demonstrate higher levels of flexibility in adapting to changes in the job markets thereby guaranteeing the competitiveness of the goods and services produced in an economy in the global market. The competitiveness of the goods and services of a country in the international market is vital in improving the balance of payments [1]. Consequently, positive balance of payments due to the high value of the country's exports over imports has a significant impact on economic growth as it increases the foreign exchange reserves of the country, improves the value of the country's currency over other currencies and boosts the value of the country's international trade [4].

4. Reducing Poverty and Inequality in the Society

Education is a crucial asset in reducing poverty and inequality in society by providing individuals with the knowledge and skills that enhance their employability and ability to progress professionally and earn progressively higher incomes [4]. Consequently, through education, the labor force participation rate in a country increases as more people have on-demand skills and can easily access jobs in the formal and informal sectors of the economy leading to increases in the Gross Domestic Product (GDP) in the country. As a result, the levels of employment in the country increases and more households earn incomes, which raise their disposable incomes [6]. The higher disposable incomes for more households imply increases in the levels of aggregate demand in the economy leading to higher levels of production as the various sectors in the economy strive to satisfy the high demand for goods and services in the economy [5].

Education is also crucial to self-sufficiency as it provides opportunities for enhancement of skills, knowledge and competencies that guarantee career progression and growth. Consequently, the skill improvements lead to higher wages and benefits and are manifested through improvements in the standards of living in a country [4]. The increases in the job opportunities for the learned due to their quality professional skills directly increases the levels of output in the economy due to equity and equality in access to the educational opportunities [7]. The improvements in the living standards due to higher levels of educational attainment are evident due to the increases in per capita income thereby indicating economic growth.

5. Increase in the Level of Households' Sustainable Incomes

Consequently, by guaranteeing more households sustainability in their incomes due to employment opportunities, education reduces poverty and reliance by households on social support programs. The government can then divert the financial resources that would have been spent on social support programs to areas such as infrastructural development [3]. More so, the availability of employment opportunities due to quality education programs enhances social mobility reduces inequality and results in improvements of the social status of individuals [7]. As individuals improve their educational attainment and social mobility, they are able to gradually acquire a higher level of social status. This in turn translates to these individuals having a higher purchasing power, which manifests in their capabilities to demand and be able to afford the purchase of more goods and services. As such, this further drives economic growth as businesses face increased demand for their goods and services, which also expands other industries such as technology and manufacturing.

The investments in quality education are also vital in guaranteeing a highly skilled workforce that promotes innovation across the different sectors of the economy. Innovation is a major driver of economic growth as it guarantees a higher level of output from the same inputs [3]. Due to innovation, the levels of productivity rise as witnessed in industries such as manufacturing where the utilization of innovative processes has led to the phasing out of manual processes in production. The effort results in higher efficiencies and productivity at lower costs thereby guaranteeing value creation and growth of the economy [5]. It implies that education inspires creativity and the new lines of competitive advantages for businesses are crucial in enhancing the value of a country's GDP through increased competitiveness in the exports at the international market [7].

6. Positive Externalities

The value of education in promoting economic growth is also notable through the positive externalities in the economy. For instance, education promotes entrepreneurship as it equips individuals with the needed cognitive skills that enhance the ability to make better evaluations and informed decisions on areas such as risk assessments to reduce the perceived risks of their targeted investments [5]. The increases in the levels of entrepreneurship facilitate economic growth as the entrepreneurs introduce new products and services in the economy thereby increasing variety and

competition [7]. Also, entrepreneurs such as those in the small microenterprise sector act as a source of employment supplementing formal employment, which has a positive impact on the GDP in the economy.

7. Level of Education

Education presents a key cog for the growth and development of any given society, but this depends on the level of quality that the education exhibits. The elevation of the economy of any given country greatly depends on an increase in the acquisition of higher education by the citizens in order to improve their technical know-how [8]. The theory of human capital postulates that the best way for people to elevate their overall level of productivity is by the acquisition of better education as well as getting adequate training to improve on their skills [5]. Essentially, this theory is built on the tenet that acquiring formal education is greatly instrumental in expanding the productive capacity within an economy since people are able to engage in economic activities that are of more value [9]. Through investment in education, the efficiency as well as productivity of the citizens of a country are elevated since their overall cognitive stock level is increased. This way, the economic productivity of a region or nation is greatly improved through improved human capability that is a result of the investment in harnessing people's innate abilities [8]. In this realm of improving human capital in order to boost the economic growth and development of a nation, universities and institutions of higher learning are at the forefront of boosting innovation and elevating the overall productivity of the population [1].

Numerous studies have shown the positive correlation that exists between investments in education and higher learning with improvements in human capital and benefits in the long term for individuals [9]. With increased investments in education, students are equipped with basic skills from a young age and thus, it becomes easier for the knowledge frontier to be reached. This plays a great role particularly for potential innovation in the future since people are taught how to recognize their inherent capacities and talents, thus taking advantage of them and exploiting them to their full potential [10]. More so, through investment in comprehensive research, universities are able to play a significantly important part in the creation of knowledge as well as kickstarting the process of innovation. As such, increasing the level of investment in these institutions as well as ensuring that their admission process is considerably democratic brings about significant benefits in terms of innovation [8]. With the growth in technology, it has become increasingly apparent that education plays a great role in boosting the level of innovation as well as overall productivity in an economy [4]. This is because education plays a greatly important role in helping people in the adoption of technologies which in turn leads to innovation.

One of the instances that can be used to show the interlinkage between education, innovation and productivity is in the United States, particularly in the case of Silicon Valley in California. One of the main aspects that has enabled the United States to rise continuously in terms of being a technological power is the long tradition that it possesses whereby leading universities undertake collaborations with notable companies [9]. Silicon Valley is an innovation cluster whereby leading local universities are on longstanding missions toward spurring economic development. This is achieved through the development of technologies in conjunction with the local industries, but also by working collaboratively on their technological research, thus bringing about comprehensive know-how to these industries [11]. As such, this stimulates new businesses to be created in science parks and also incubators that are all centered in these universities. Essentially, companies that are technology intensive often ensure that their operations are located in Silicon Valley so as to be in close proximity with leading universities, particularly in the fields of engineering and sciences [12]. This in turn helps the research departments in these companies to work in conjunction with the leading scientists who are professors in these institutions and also be able to recruit the brightest and most inspiring students.

One of such cases in the United States in regard to education having a positive impact on innovation and productivity is Stanford University and its influence on Silicon Valley. This is a great advantage for Silicon Valley in that it largely benefits from the presence of top higher education

institutions in close proximity such as Stanford University, which train a large number of technological innovation talents [11]. Silicon Valley is greatly successful in terms of its innovation dynamic and studying it in detail is key in getting to understand how alignment with leading universities played a key role and how it can be emulated. Although the establishment of Silicon Valley and its rise may tend to have some varying narratives that might contradict each other or converge in some instances, one constant is that Stanford University played a key role [12]. Apart from providing the companies in Silicon Valley with a significant portion of their workforce, Stanford University was also crucial in the starting of Silicon Valley from its inception, at a time when most of its successful corporations today were starting as startups [10]. At Stanford University, the development of startups is ingrained in its culture, with majority of its professors, past and present, having been involved in one way or another in creation or development of a startup. Stanford University boasts great success in terms of technology and innovation, with thousands of companies, both within and out of Silicon Valley tracing their roots to the institutions [9]. Some of such companies include Cisco Systems, Alphabet Incorporation, PayPal, HP Incorporation, Yahoo, among many others.

From its foundation, Stanford University has had a commitment to an internal strategy of ensuring that the formation of firms and enterprises is encouraged from the academic knowledge acquired in the institution. This is particularly the case with its school of engineering which acts as the institution's repository for technical knowledge that is already in existence, research into prospective technologies, and adequate training for its students [12]. This is then harnessed towards the advancement of detailed research, which is in turn useful in the formation of startups or development of existing technological know-how. The students at Stanford University are encouraged to think of how they can harness their knowledge into innovative solutions that can be useful in solving different problems in the world [11]. The startups launched by students are greatly supported by the institution in terms of both the technical as well as the financial support needed. Through its Honors Cooperative Program, the university also allows the employees within the companies that are affiliated with Stanford University to enroll and undertake various graduate courses on a part-time basis [10]. This helps these employees constantly sharpen their skills and ensure they remain abreast with technological advancements, which is one of the reasons that most of these companies in Silicon Valley continuously partner with the institution.

More so, Stanford University also maintains a program based on industry liaison, whereby affiliated companies that pledge financial support to the institution every year are given access to the university's resources. These resources include research projects and results, but also the institution's graduate students in various ways such as guest lectures, seminars and also production of periodic reports [12]. In perspective, the curriculum at the university is kept updated with any current trends and developments within the technology industry. This way, the students are kept ready to seamlessly transition from the classroom into the work environment and this lays down the foundation of Stanford University's great importance to Silicon Valley [9]. The role that Stanford University played in fostering the development of Silicon Valley was achieved over an extended period of time and it continues to be evident and functional even today [10]. This interconnection and continuous partnership serve as a learning curve of the model that other regions, and institutions of higher learning in the United States as well as around the world can implement in elevating innovation and productivity of their workforce [11]. This does not necessarily mean that the success of Stanford University and its close working relationship with Silicon Valley can be duplicated elsewhere, mainly due to differences in the culture around innovation in different regions. However, it shows that education possesses the capacity to elevate productivity in human beings and also spur innovation and this should be an aspect that researchers and those involved in education reforms should always take into consideration. There is a great need to ensure that institutions of higher learning are producing the best and most-qualified personnel by ensuring that they are adequately funded in order to foster their research and development.

8. Conclusion

This paper has discussed through extensive research the manner in which education is invaluable to the economy as it improves the quality of human capital and enhances employability for the majority. By guaranteeing new skills and competencies, education increases the levels of productivity in the economy through positive impacts in areas such as innovation, employment and entrepreneurship amongst others. The rise in the popularity of innovation reveals the value of education with most businesses prioritizing budgeting for the training of their employees in the latest skills and competencies to enhance their productivity. Such highly skilled workforces are invaluable as they exploit their tacit knowledge alongside the new skills to develop novel approaches to workplace activities. Due to their informed understanding of workplace processes, they are better placed to improve business processes through novel innovations that offer new lines of competitive advantages for businesses. As a nation increases its investments in education, the learners are cumulatively equipped with the necessary knowledge and skills from a young age and in doing so, it becomes easier for the knowledge frontier to be reached.

As discussed extensively in the paper, there is a need for a country to develop a tradition whereby leading universities partake in collaborations with notable sectors of the economy as well as with leading private entities. This is evident in the case of the United States whereby corporations or startups that are technology intensive often ensure that their operations are located in Silicon Valley. This is to ensure they are in close proximity with leading universities, particularly in the fields of engineering and sciences such as Stanford University. The success of Silicon Valley has spurred massive economic growth in the United States, and this points to the need for education systems to be aligned with the technological needs of today's world in order to spur economic growth. Learning from this case points to the need to ensure that the quality of education provided is relevant and in line with solving market needs. This is an element that should inform educational research as well as reforms aimed at transforming the education of not just the United States but also other nations in different parts of the world, now and in the future.

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