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DIGITAL TRANSFORMATION AND GLOBAL INEQUALITY

Abstract: *Developing Countries will continue being Developing Countries for a long time, if they are unable to conceive and design new products with their own technology in their own companies. Technological Development based companies are necessary and technical universities can contribute to these activities if a good technological policy, complementary to the research policy, is implemented by their governments. Scientific researchers and engineers must work together to develop new products able to enrich the economy of their own countries. Achieving Innovation is very difficult, or even impossible, without Technological Development, even if a country does a lot of scientific research; it is imperative for Developing Countries, to achieve economic value from scientific knowledge to improve its own living standard. Presently, we are on the threshold of the 4th Industrial Revolution, where digitalization is essential. However, the value created in wealthy countries that design products will tend to increase therefore, the worth of labour in production processes will tend to decrease. Thus, digitalization and the 4th industrial revolution will tend to widen the gap between developed and Developing Countries. If nothing it's done to counter these trends, Digital Transformation will make poor countries poorer and rich countries richer. The already enormous gap in inequality will worsen.*

Keywords: *Digital transformation; Inequality; Innovation; Product development*

1. Introduction

In today's globalized economy, firms are facing ever-increasing market challenges (Ardito et al., 2015). Hence, new ideas must be constantly sought to develop new products, new methods of reducing costs and improving, in particular, the quality of products and services (Araújo et al., 2019; Bravi et al., 2019; Costa et al., 2019; Sá et al., 2019; Santos et al., 2019b). Thus, according to several authors, innovation has different concepts, although, Porter (1998), argued that

innovation is mainly responsible for creating and maintaining competitive advantages for companies. Innovation also ensures the continuity and sustainability of a company (Silva et al., 2020; Azevedo et al., 2020; Bravi et al., 2020), with the help of Lean tools (Cordeiro et al., 2020; Gonçalves et al., 2019). An innovation could be an implementation of a new product or process (good or service) or its significantly improved version of a new marketing or organizational method in business practices, workplace organization or external relations (OCDE,

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1997). A common feature of innovation is that it must have been implemented to be marketed and must have success. According to some authors (Kaufmann and Tödtling, 2001; Santos et al., 2019c; Marinho et al., 2020), if innovation is successful by introducing more advanced innovations, it will improve the competitive position of the company in the market in which it operates. For Bateman and Snell (1998), it represents one of the principal sources of advantage, along with competitiveness in costs, quality and response time. Some authors, such as Mandado (2016), Santos et al., (2019c), Félix et al. (2019b), argued that innovation is an added value to the competitive level of companies, making a difference in the survival of organizations in environments of increasing change and in the struggle for the same objectives. Being aware of this reality, companies are betting more and more on the certification of their organizational processes, thus allowing them to monitor, measure and evaluate the functioning of that process, and, thereby improving continuously (Barbosa et al., 2018; Bravi et al., 2017; Santos et al., 2014; Félix et al., 2019a; Doiro, et al., 2019), even though there are risks (Ferreira et al., 2019). As such, any company that intends to continue operating in an increasingly competitive world must have, as its principal objective, the continuous improvement of organizational, strategic, marketing and production levels (Ribeiro et al., 2017; Carvalho et al., 2019; Ribeiro et al., 2019; Rodrigues et al., 2019; Zgodavova et al., 2020) heading towards sustainability (Santos et al., 2011; Talapatra et al., 2019; Santos et al., 2018b). According to Tidd et al. (2003), companies that are efficient in the practice of innovating and improving their processes, their products and/or their services achieve better results than those of their competitors. These companies can obtain a larger market share, growth and profitability. This is the best way to create value, such as practised by Japan in the post-World War II and later by South Korea.

2. The Gains Achieved Through Technology

The industrial revolution and the consequent boost supported on technology has provided wealth creation and for an increase in the real income per person in England between 1825-1875, according to Figure 1 (Clark, 2007). We can consider these gains as the miracle of technology.

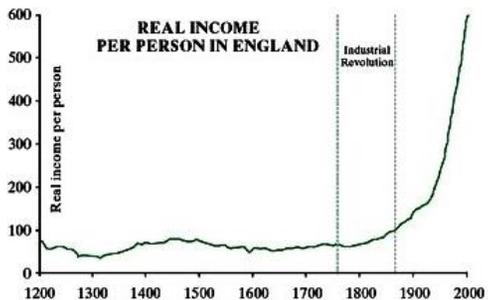


Figure 1. Real income per person in England, 1260-2000 (Clark, 2007)

Some countries, particularly France, Germany, Italy and the United States of America, embraced the Technological Development process that began with the Industrial Revolution in England. Japan started later, around the 1950's in the post-World War II. Around 1976 Canada joined the group. Currently, they form the G7, that is, the group of the wealthiest countries in the world; due to their economies being based on Technological Development and mainly since they conceive /design new products that they sell through brands, supported on their technology. As there is cheaper labour in poorer countries, which do not develop their products and do not have their own technology, production and intensive activities are dislocated, taking advantage of the little gains underDeveloped Countries are attracted to. This creates jobs, brings some wealth and helps eliminate extreme poverty. This idea is in line with the thinking of McCloskeya (2013, p. 1706) when he states that “modern economic growth before and after 1800 was an “Ice Hockey Stick.” The

history of the world for tens of millennia before 1800 was, roughly, a flat handle of never changing real income per head for the average human. Then around 1800 the world reached the business end of the Hockey Stick and all our joy. Now, the rising blade of the Hockey Stick is apparent even in China and India. The share of the world's population living on less than an appalling \$1.25 a day in constant prices fell from 1981 to 2008 from 53% to 22%." As such, we can say that, since the sixteenth century, and perhaps before, the wealth of regions and nations depends on new ideas and new products that energize these places and facilitates their economic growth. If innovation is one of the keys to prosperity, then, how does this happens precisely – How does a region breaks with convention and introduces new products in the market? - Pertinent questions that should be addressed (Feldman & Florida, 1994). Schwab (2017) stats that “the lesson of the first industrial revolution remains valid today: the extent to which society adopts technological innovation is the main determinant of progress.” Therefore, with the development of Technology and the consequent creation of jobs and wealth, a substantial decline in poverty took place in the world from the 18th Century onwards. Hence, and according to Figure 2, a decrease of extreme poverty of the world's population can be considered the miracle of Technology.

According to Kaplinsky (2011), innovation and technological change play an important role in poverty reduction through their contribution to growth, their use of factors of production, their environmental spillovers, the social relations associated with production and the characteristics of the products which they produce.

Evidence shows two sets of countries, those that are wealthy – linked to Developed Countries, and others that have poorer Technological Development, and therefore deficits concerning their standard of life.

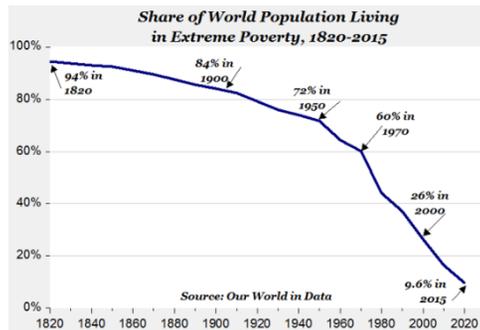


Figure 2. Share of world population living in extreme poverty, 1820-2015. Source: Our World in data, 2018.

Thus, it can be asked: nowadays, where does the great inequality in the world comes from? According to Acemoglu & Robinson (2013, p.69) “the great inequality in the world today, which emerged in the nineteenth century, was caused by the unequal diffusion of industrial Technologies and industrial production. It was not caused by differences in agricultural performance.” Hence, also according to Acemoglu & Robinson (2013, p. 71), “Sustained economic growth is usually accompanied by technological advances that allow people (manpower), the land and the existing capital (buildings, machinery, etc..) to be more productive.” For those countries which conceive/design/project/develop new products, sustained economic growth and poverty reduction are sure. But what happens to most people in Developing Countries, who only produce products that rich countries conceive, design and develop?

3. Product Development and Wealth Creation

It is known that product development it's inherently linked to an intertwined relationship between market demand and available Technologies (Dougherty, 1992; Basalla, 2011). If the developed product has success in the market, it is a potential source of competitive advantage for a firm and, it can be said that innovation occurred. With intensified competition, firms increasingly

compete based on sophisticated research and development (R&D) cooperation network (Roijsackers & Hagedoorn, 2006) applying dispersed knowledge from around the world (Chesbrough, 2003), often from Developing Countries which they do not know how to take advantage of it. Knowledge utilization is an essential predictor of the benefits of developing very high and moderately innovative products (Zhang et al., 2009). Multinational companies gain an advantage through their globally distributed networks and their ability to assimilate, generate, and integrate knowledge worldwide (Bartlett & Ghoshal, 1989). They have their headquarters in the country of origin, usually in Developed Countries, namely G7 countries, where products are conceived/designed/ engineered. Production usually takes place in Developing Countries, where there is cheap labour. According to Blake (2016), in any competitive firm, organizational performance is linked to financial outcomes. Financial performance is the primary way managers show that they are creating value. Full benefits of knowledge management come from the super-additive worth of resource combinations and quality outcomes (Hsu & Shen, 2005; Jimenez et al., 2019; Santos et al., 2019d; Mazzucato, 2018). The disparities in regional innovation are often illustrated in both scientific research and politics by a single innovation indicator or a composite index (Hauser et al., 2018).

4. Innovation in Developed and in Developing Countries

Without any doubt the most commonly words being used by the economist Schumpeter in “Business Cycles” (Schumpeter, 1939) are successful and success. There are also the words novelty and Innovation to indicate that a product is new, but the economist Schumpeter was the first to use the word Innovation instead of novelty to call a new product being successful when it arrives to the market after a development, manufacturing and marketing process.

Nevertheless, in many Developing Countries it is said that a new product is an Innovation regardless of whether or not its success on the market.

Patents are a key measure of innovation. Governments, academia and industry use them to inform policy decisions, track trends, and gather technological and commercial intelligence. However, while straight counting of granted patents is useful, it only provides part of a much bigger and more important innovation picture. For a patented invention to be valuable, it must be good quality, have wide market potential and lay foundations for further developments and refinements. Accordingly, we not only counted the volume of inventions, but measured patent quality, globalization, and impact. (Derwent, 2019).

Developing Countries need to improve their organization of engineering education. Education cannot be just for some people. The more people have access to higher education levels, the greater the likelihood that the country will be or become rich. We can undoubtedly state that “engineering is the fundamental, indispensable profession in the creation of wealth” (Aires, 2019). Hence, it is imperative that the engineers who finish their courses are apt to design new products (Santos et al., 2019a), as in Northern or G7 countries for instance. This made the number of engineers in the 20th century much less in the south than in the North resulting in the lack of a sufficient number of companies developing new products in general and especially new machines to improve automatic manufacturing (Santos & Mandado 2016).

5. The Creation of Wealth by Nations

According Barca et al., 2012, who knows what to do where and when? Underdevelopment traps that limit and inhibit the growth potential of regions or perpetuate social exclusion are the result of a failure of

local elites to act and can only be tackled by new knowledge and ideas: the purpose of development policy is to promote them

through the interaction of those local groups and the external elites involved in the policy.

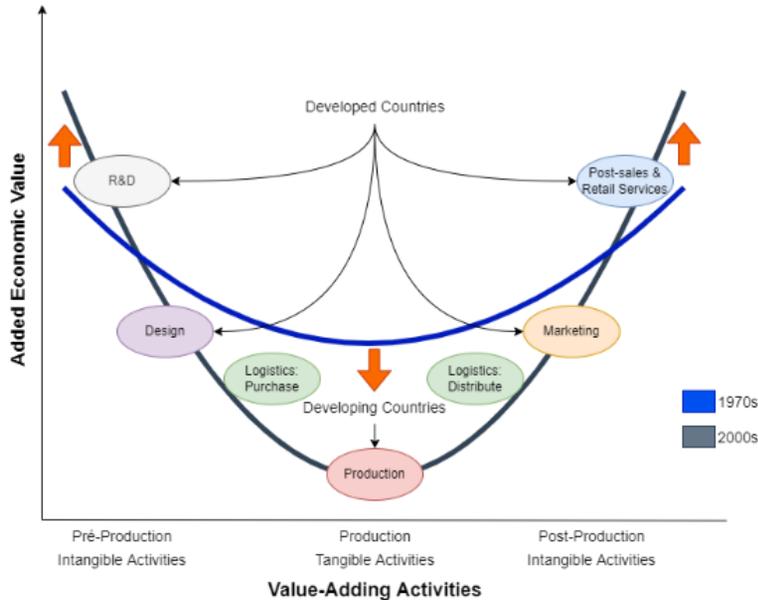


Figure 3. Distribution of value added per manufacturing activity, change in time

Source: The European House – Ambrosetti re-elaboration on Bruegel and OECD, 2014; Fernandez-Stark et al., 2011.

However, according to The European House - Ambrosetti (2014), in the last times, it can be seen two fundamental elements in the production of goods and the consequent creation of wealth. First, it is the progressive migration of high value added activities from the production phase to pre- and post-production phases (Figure 3). The second element is the growing importance of Global Value Chains (GVCs) where companies, usually multinationals with headquarters based in G7 countries, want to capture bigger shares of value added and experience the highest productivity gains will have to preside them. Hence, according to the first element, the decline of manufacturing is often related to the growth of services, as if the two elements of economy were in competition, what is not true. Thus, it can be seen through Figure 3 that what adds value and brings wealth to nations is R&D (Research and

Development), the design of new products, the sale of these products, namely, through brands and the respective post service -sale. This is normally done by Developed Countries, namely the G7 countries.

The production of goods conceived/ designed, namely, by the G7 countries is made, namely, in Developing Countries, where manpower is plentiful and cheap, as for example, first in southern European countries, and nowadays in Southeast Asia, namely, in India and China. Also according to The European House - Ambrosetti (2014), we can see through figure 3 that goods production added less value in the year 2000 than in 1970. And certainly in the year 2020 it adds even less. Developing Countries do and will do the part of production that adds less and less value. Hence, production workers in Developing Countries are becoming impoverished, they have been without salary increases for many

years. The few rich, became richer and the many poor, became poorer is what happened and this will be the trend if nothing is changed. This phenomenon is clearly illustrated by the “smiley” curve (figure 3). Smile curve is a tool to explain the entire value chain behind a product (Yülek, 2018). It includes the stages through which a product has gone before reaching the consumer: idea, development (R&D), design, production, branding and, marketing and finally, logistics and distribution. It can be thought of the total returns received by each of those value chain factors from the ultimate consumer payments for the product. Mathematically, the integral of the curve represents the cumulative payments to the five factors over the life of the product. Empirical studies on the smile curve concept generally support the theoretical suggestion that upstream and downstream value chain activities; i.e., R&D, design, retailing, branding (Shin et al., 2012; Rungi & Del Prete, 2018; Aggarwal, 2017).

At present, we are on the threshold of the 4th Industrial Revolution, where digitalization is essential. However, the value created in wealthy nations that design products will tend to increase and the value of labour in production processes will tend to decrease. Thus, digitalization and the 4th industrial revolution will tend to widen the gap between developed and Developing Countries. Hence, Digital Transformation will make poor countries poorer and rich countries richer. The already huge gap in inequality will worsen. According to Landes (1998), some researchers on economic development, specialists in Third World backwardness, seek to explain retardation by the unwillingness of rich nations to invest in the poor. The statements do not stand up throughout history or present reasonable logic. Businessmen have always been “in it for the money” and will make it and take it where they can in order to get wealthier. They have always sought to minimize risk and maximize profit.

After all this, it can be asked: how did the rich nations really become rich? Ha-Joon Chang

(Chang, 2002) examines the great pressure on Developing Countries from the developed world to adopt certain ‘good policies’ and ‘good institutions,’ seen today as necessary for economic development. His conclusions are compelling and disturbing: that Developed Countries are attempting to ‘kick away the ladder’ with which they have climbed to the top, thereby preventing Developing Countries from adopting policies and institutions that they themselves have used.

6. Why Income Inequality Is Rising?

Why income inequality is rising? This is a very topical issue. Recent empirical evidence by Piketty (2014) has uncovered the secular tendency of inequality to grow in many countries. Such research has challenged the traditional view of inequality by Kuznets (1955) and has revolutionized the understanding of income and wealth inequality (Perera-Tallo, 2017).

We can add that the inequality problem focuses on design engineering and technology development. Thus, engineering in Developing Countries is more about production processes than product design and this creates little added value. Developing country entrepreneurs do not read papers. Most of the time because they don’t have time, they have to deliver for yesterday, the orders that Developed Countries have ordered from them.

In Developing Countries, engineering and innovation are more evident in production processes rather than in product design. It is certain that production creates jobs and this is good for Developing Countries. But the largest share of value created is for the economies that project/design and develop new products. This is one of the main reasons why the economies of poor or Developing Countries are almost always in crisis. Many companies in Developing Countries, are run by people with low literacy. It is necessary to

implement a technological policy by the government. Entrepreneurs of Developing Countries, mainly, make orders from Developed Countries for the previous day and do not have time to innovate. They do not read papers, and as such, do not take full advantage of the new ideas being published (Santos et al., 2019c).

Craving for more profits, Europe delocalized production, namely to South-East Asia, that produced cheaper. So, Europe and G7 Countries had many profits. Then, some countries in Europe contracted researchers in South-East Asia with much lower salaries than those in their own countries. The countries from Asia learned to design new products, and as they already knew how to produce them, they delivered to the Europeans the products made without needing the help of Europe. In this way, Europeans began to use many products, designed and made in South-East Asia. Then, unemployment rose in the countries of southern Europe and settled the crisis. All this thinking contributes to the decline of Europe and for other countries to emerge economically. They are the results of globalization where a few thrive, namely, multinationals companies (Kempf, 2013).

Another factor that increases inequality between developed and Developing Countries is the poor use of knowledge generated in the Developing Countries by themselves. Thus according to Antonelli and Gehringer (2017), increasing levels of income inequality have recently attracted much attention. The literature has concentrated on the hypothesis that increasing levels of income inequality are the cause of slow growth and social unbalances. Their paper contributed to explore an alternative hypothesis, according to which increasing levels of income inequality are the consequence, rather than the cause, of slow growth and more specifically of the slowing pace of technological change. Due to the powerful effects of creative destruction, the rate of technological change engenders a reduction in wealth and rent inequalities that

are highly skewed and, consequently, limits income inequality. These authors calculated the unit cost of knowledge and total factor productivity growth in Organization for Economic Co-operation and Development (OECD) countries 1999–2010. The unit cost of knowledge was calculated as a share of R&D expenditure in millions of constant (2005) PPP (purchasing power parity) dollars over the number of patent applications at the World Intellectual Property Organization. The data of Figure 4 were taken from these authors.

Thus, on the one hand, we can verify that there are many countries where the unit cost of knowledge is very expensive, as in Belgium or Portugal. On the other hand, there are other countries where unit cost of knowledge is very cheap, as for instance, in Korea and Japan. This means that Japan and South Korea invest a high sum in R&D, but they know how to make a good profit in order to enrich the economy of their countries, namely, with technological development and patents registration.

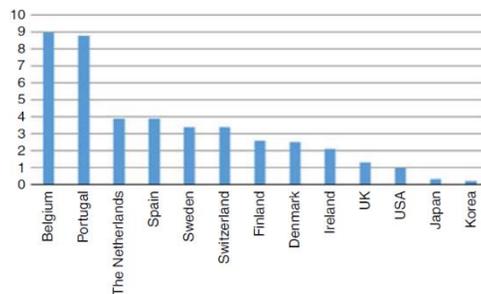


Figure 4. Unit cost of knowledge (Santos et al., 2019c, adapted from Antonelli and Gehringer, 2017).

It is known that a good indicator of the return on R&D investment is patent registration. This, in most cases, makes new products appear in the market. So, it is how product innovation is done. Hence, according to Mandado (2008), “engineers are not scientists, and even if there may be engineers working at the frontier with science, most engineers should look at the market and

always think about the usefulness of what they do. Otherwise it does not fulfill the mission that the profession of engineer requires.” Hence, knowledge itself has a little value, because what creates value is how you use that knowledge in a practical way. According to Dan Brown (Brown, 2009), “knowledge is a tool, and like all tools, its impact is in the hands of those who use it.” So, does a question impose itself? what is the reason for the economic fragility of Developing Countries? The words of Pedro Duque, former astronaut, serving as Minister of Science, Innovation and Universities of Spain from June 2018, during an interview to a magazine (Duque, 2012) can be observed as follows: “the power to exit out of crisis is to improve the economic outlook. These, can be improved by developing technology that leads to an increase in exports that gives the country greater competitiveness. If companies do not create/design good and saleable products for the world market, it is impossible to get out of the crisis.” These are sacred words of Pedro Duque. He lives in another dimension and he views the planet Earth from very far above. He has the ability to see the problems of so many countries, which is unfortunately not seen by their own politicians. According to Mia Couto, a Mozambican writer, “the greatest misfortune of a poor country is that instead of producing wealth, it produces rich men.” Oxfam report shows that the gap between rich and poor people has worsened as never before: the number of multimillionaires who have as much money as half the world’s population has come down sharply – in 2016, there were 61, in 2017, there were 43 and in 2018, there were 26 (Site 1 – Oxfam, 2018). The Developing Countries cannot continue to look at the statistics and see that they have made great progress in producing knowledge translated into the publication of scientific papers, and at the same time to verify that in the area of patent registration and the application of new knowledge and new techniques in enterprises, they are still far behind the more Developed Countries.

Hence, it is necessary to create a technological policy, to do technological development and to register patents. Developing Countries need to know how to apply their own knowledge. For them, it is imperative to transform good ideas into new products to enrich their own economy. For that they must register patents. If they cannot, they will never get out of the crisis. According to Etzkowitz (2017): “we do not write articles, we go to patents.” This is the right path to development.

In the area of communication, Unesco has long recognized the problem of Digital Divide (the widening gap between the developing and the Developed Countries, because of the impact of digital communication platforms) as a central issue in the search for the balance of forces between countries (Amant & Olaniran, 2011).

By the end of the 20th century, in his pivotal work *Being Digital*, Nicholas Negroponte admitted the possibility of digital communication technologies contributing to the shortening of that gap. His argument was that, since digital technologies are cheaper and therefore more accessible, they would leverage the position of the less Developed Countries. However, after 25 years on Negroponte’s book, several experts recognize that global access to digital platforms has not materialized (Landers, 2017). On the contrary, these authors say, digital communication is widening the gap not only between countries, but also between people within each country, creating a class of ‘inforich’ and a class of ‘infopoor’ people.

The solution, says Mark Deuze (Deuze, 2013), may involve redefining media content production processes to the new digital strategies. He argues that there is an urgent need for a new class of journalists, advertisers and marketing specialists to take advantage of the new media scenario. Deuze (2013), says that this is even more important in the Developing Countries, where information is a precious asset, for the development of new structures of economic production.

If Developing Countries do not know how to use knowledge to their advantage, inequality will increase, because when they try to climb the ladder to reach the top, Developed Countries will push it back and Developing Countries will fall (Chang, 2002).

7. Needs of Developing Countries

Another reason that delays the development of many countries is the emigration of young graduates. For example, in Portugal, according to Cerdeira et al. (2015), especially since 2008, thousands of graduates have emigrated. In 2010, OECD countries numbered more than 145,000; in 2015, it was around 200,000. According to the same authors, using OECD data, the investment made by Portugal for the education of 145,000 emigrants is estimated at 9 billion euros and is offered at zero cost to the countries that host them. Still, according to Cerdeira et al. (2015), returning to a statement by Maurice Dobb in the 1970s, “underDeveloped Countries are the backyards of Developed Countries.” More than 40 years later, this statement remains in essence, it has only changed in its contours and in the raw material that the Developed Countries will “reap” from others: the knowledge and the skills that young graduates hold.

Most of the work in Developing Countries is Produce (P), Check (V) and Export (E) goods. According to Figure 5, it is a cycle for them. But if Developing Countries wish to transform themselves into Developed Countries, they have to join the 2Ds, that is, to make design and technological development of products. This is a sustainable path to create value (Santos et al., 2015; Chung, 2007; Yulek, 2018; Santos, 2018; Bravi et al., 2018; Santos et al., 2018a).

Developing Countries are mostly, fantastic countries to live in, but the economies of these countries, like, for example, European Southern Countries, are based on the production of goods and services wherein

tourism is very strong. This is good, but insufficient to live well. This brings little added value to work and it enriches the economy, but in a weak way. Developing Countries, namely European Southern Countries must change their economic paradigm and become countries where new products are conceived/developed, that is, where a complete cycle 2DPCE – D (Design), D (development), P (Production), C (Check), E (Export) is applied (fig.5) (Santos, 2018).

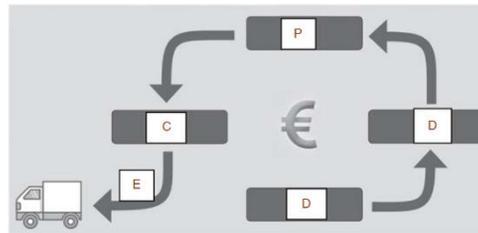


Figure 5. The 2DPCE cycle – design, develop, produce, check and export (Santos et al., 2019c).

Some companies in Developing Countries, already do it very well (Santos, 2015), but it is little for the needs of Developing Countries. More companies in Developing Countries should design and develop new products that are accepted by the market. This is the way forward for innovation to happen not only in product innovation but also in the production processes of the products. Putting this into practice requires education, more education and even more education (Santos et al., 2019a). This is the solid path toward a developed economy, run by Japan after the Second World War and later by South Korea.

South Korea is a good example to follow and this country did not allow that Developed Countries to take the ladder away from him, in order to climb to the top (Chang, 2002) when South Korea was looking for development. Hence, South Korea dynamically changed its product range between the years 1960 and 2000 (Table 1) from lower value-added, primary goods to higher value-added industrial goods with high level design, technological and branding

content. This is the path to follow. Some authors, such as, Felipe et al. (2012), Chang (2000), Yulek, 2018, Chung (2007), among others, reports good results for South Korea and suggest that changing structure of the economy (from low-productivity activities into high-productivity activities), the types of products exported, namely those with high added value, being sure that diversification of the economy play an important role in Developing Countries rising from low to high income.

South Korea employed various industrial policies including product-level industrial targeting ('picking' a few 'winners' such as electronics, transportation equipment –cars and ships), an export-orientation-cum-import-substitution, development-based public procurement policies (Santos, 2015;

Pack & Nelson, 1999; Amsden, 1994; Yülek, 2018; Birdsall & Page, 1993; Kim et al., 2009) coupled with enhanced state-capacity (Yülek, 2020). The policies also involved supporting the formation of 'advanced companies,' world class private companies (chaebols) that were to compete globally with incumbents.

South Korea's developmental policies and trajectory mimics that of Japan after the 1868 (the Meiji Restoration period) and the also after the Second World War. In those periods, Japanese global image of export products was upgraded from 'cheap Japanese products' to 'high quality' and branded products. Japan's experience also had featured the supporting the formation of advanced firms (zaibatsus) and was imitated by South Korea's in forming the chaebols.

Table 1. The change in South Korea's production pattern: Top 10 exports over time (Yulek, 2018)

1960	1970	1980	1990	2000
Iron Ore	Textiles	Textiles	Electronics	Semiconductors
Tungsten Ore	Plywood	Electronics	Textiles	Computers
Raw Silk	Wigs	Iron and Steel	Footwear	Automobiles
Anthracite	Iron Ore	Products	Iron and Steel	Petrochemical
Cuttlefish	Electronics	Footwear	Products	Products
Live Fish	Fruits and	Ships	Ships	Ships
Natural	Vegetables	Synthetic Fibres	Automobiles	Wireless
Graphite	Footwear	Metal Products	Chemicals	Telecommunication
Plywood	Tobacco	Plywood	General Machines	Equipment
Rice	Iron and Steel	Fish	Plastic Products	Iron and Steel
Bristles	Products	Electrical Goods	Containers	Products
	Metal Products			Textile Products
				Textile Fabrics
				Electronics Home
				Appliances

In an imagined dialogue between the developed and wealthy countries in the north and the Developing Countries in the south, the countries in the north say to those in the south: you can innovate in your production processes, but with our products. As innovation in production processes adds less and less value, what Developed Countries really say to Developing Countries of the south is: you must do austerity and live with less. And according to Chang's philosophy

(Chang, 2000) Developing Countries have to climb the ladder of development and fight to hang on up there.

8. The Missing Wealth of Nations

In the last few decades we have seen an increasingly unequal distribution of income and wealth, where bankers play an addicted game. They install themselves at the top and rob what they want (Black, 2005). But banks

must be regulated because if they are too big to fail and they know it, they will take excessive risks in an addicted type of game: if they win they keep the profits; if they lose, taxpayers pay the bill (Stiglitz, 2015).

According Alstadsæter et al. (2018), measuring the wealth of rich households is getting increasingly hard in a globalized world. Since the 1980s, a large offshore wealth management industry has developed in Switzerland, Hong Kong, the Bahamas, and similar offshore financial centers. Banks located in these countries cater to wealthy individuals from around the world. They provide a variety of financial services to these individuals, many of which are legal and legitimate, but most of which make wealth harder to observe in traditional economic datasets, such as national accounts and tax records. Zucman (2013) estimates that 8% of the world’s household financial wealth—the equivalent of 10% of world GDP—is held offshore. There is evidence that global offshore wealth has increased considerably over the last four decades, as a growing number of offshore centers have entered the market for cross-border wealth management, and information technology and financial innovation have made it simpler to move funds overseas.

We obtain country-by-country estimates of offshore wealth by adding up the wealth held in Switzerland and in the other tax havens. The results are reported in Figure 6, where it can be shown the ratio of offshore wealth to GDP (Gross Domestic Product) for all countries with more than \$200 billion in GDP in 2007 (Alstadsæter et al., 2018).

The fruits of the labour of many millions of people has been collected by very few, namely those at the top. The money that was supposed to be distributed from the top to the bottom, evaporated in the pleasant climate of the Cayman Islands (Stiglitz, 2015).

Hence, digitization will aggravate this problem, because to make big money transfers, all they need to do is just a click and

have a good friend in the right place, with whom they can share the cake.

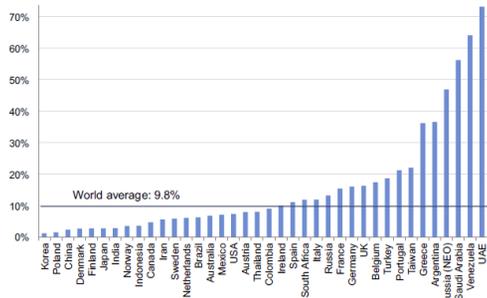


Figure 6. Offshore wealth, % of GDP (Alstadsæter et al., 2018).

9. Conclusion

The main economic problem in Developing Countries, is the lack of high value added products designed and produced by engineers from these countries, capable of enriching their country’s economy and can create value to enable the increase in minimum wage.

Developing Countries will continue being Developing Countries for a long time, if they are not able to conceive and design new products with their own technology in their own companies. Start-up and spin-off companies based on Technological Developments are necessary and technical universities can contribute to these activities if a good technological policy, complementary to the research policy, is implemented by their governments.

Innovation plays a fundamental part in under-development economies since distribution or manufacture does not surpass the development of new products and create little added value. Scientific researchers and engineers must work together to develop new products able to enrich their own economy. Product quality can be the same, but the economic result is much better for countries designing, developing and improving their own products.

It is imperative for Developing Countries, to achieve economic value from scientific

knowledge to improve their living standard. To overcome the crisis in of some Developing Countries it is necessary for Technological Development to happen. Scientific researchers and engineers must work together to develop new products. Achieving Innovation is very difficult, or even impossible, without Technological Development, even if a country does a lot of scientific research. For Developing

Countries, it will be very difficult to become real Developed Countries, if they continue being seen as places where multinational companies of richer countries manufacture their products, taking advantage of low wages and then deposit the big profits in offshore.

If nothing is done, digitization will widen the already huge gap in inequality in the world.

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