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**COUNTRY'S INNOVATIVE DEVELOPMENT: STUDY OF THE POTENTIAL CAPACITY (CASE OF DEVELOPED COUNTRIES AND NIGERIA)**

Main tendency of correlations between Global Innovation Index and other development indexes of developed countries and Nigeria is defined. The correlation analyses showed that for now Nigeria's economy does not have close relation to innovations, but has definite good potential for that if to compare it with other African countries in studied group. Fig. 9, tabl 15, ref. 18.

Key words: development, innovation, postindustrial economy, development index, innovation index, correlation.

**Problem statement and actuality.** Innovation, particularly technological innovation, is rightly seen as a key to economic and social development for nowadays. But different countries dispose absolutely different results and experience in innovative development. Having understanding of that World Bank introduced a guide "Innovation Policy. A Guide for Developing Countries" [1]. Main idea of the book is that countries which "begin to formulate policies that support innovation, need to learn from the experiences and good policy practices of dynamic economies, especially those from the developing world. Although emulating the success stories and models of other countries is not easy, useful principles and illustrations drawn from the experiences of others can help inform effective approaches to innovation in the difficult institutional and business climates of low- and medium-income countries. ... In the developing world, innovation is generally not something brand new but something new to the society in question, which, if broadly disseminated, brings significant economic, social, or environmental change". That is the reason why each country should have a realistic approach to innovation, basing on realistic potential to develop innovatively.

**Aim of the research.** This article is focused at study related to description of contemporary world and National Nigerian economy in the context of innovations.

**Main findings.** As one can read in [2], "The post-industrial society is largely due to the shift in the kinds of work and the processing of information technology. There is much emphasis on information processing and therefore, sometimes the emerging post-industrial society is also called 'information society'.

Regarding the nature of the emergence of this new society, there has been a debate among sociologists. Bell, Castells, Gordon, Gorz, Porat and Touraine have been the major contributors to this debate. These theorists have developed the construct of information society or the post-industrial society with their own perspective.

Both Bell and Porat argue that information occupations or technologies would in the long run result in the development of post-industrial society. Castells, however, vehemently differs from Bell and Touraine and says that information-based society is more post-industrial than the industrial society which was post-agrarian.

It is important to Castells that the information society is not simply confused with a service society in which the manufacturing sector has all disappeared from view. Like Bell and Touraine, he identifies the dynamics of the coming society in which there is role of knowledge and the use of knowledge and not the predominance of any one particular sector of an economy.

We may refer to any thinker who has shown his concern for the post-industrial society, and emphasizes the prime role of knowledge and information in the

development of this kind of society” [2]. Lets consider characteristics of the post-industrial society which are the resultant of informational mode of development if to follow [2]:

People work with other people to deliver a service. Gone is the industrial society where the workers toiled on machines day in and day out – one shift after the other. Now, there is growth of service sector where there is very little of manual labour in which there is some degree of creativity and sociability. In the post-industrialism, the workers do not work upon things; they work with other people to deliver a service. This provides a more rewarding and interesting form of work.

Transformation of working class to professional middle class. The post-industrialism creates a new professional class in place of labour class. In the industrial society, the labour was required to put its physical dexterity. Now that has gone. In the new society, the working class does not exist. It is because of this that Andre Gorz says that in the post-industrial society there is farewell to the working class [2].

Emergence of knowledge elites. The emphasis in post-industrial society is on knowledge as the source of societal change. But, the question is: who controls the sources of knowledge? Bell argues that it is the group of knowledge elites which controls. The knowledge, that is, information processing, comes from the new technical elites in the universities, government institutions and economic enterprises.

Moreover, as intellectual work becomes more specialized, elite technocrat sees the emergence of new hierarchies of technical elites alongside the increased professionalization of work and a shift towards the bureaucratization of technical work within the advanced western economies.

However, it should not be accepted that the emergence of knowledge elites was everywhere a welcome gesture. There are countries like U.S. and France where the post-modern society was looked with disfavour and rebel. In France, in 1960s, there was radical student movement.

Actually, as Alain Touraine says, the post-industrial society is hailed differently from one kind of society to Mother [2]. There is always some element of conflict in this society. Touraine’s analysis of post-industrial society much talks about the formation of a new social divide between, on the one hand technocrats and bureaucrats, and on the other, a range of social groupings, including workers as well as students and consumers.

In Touraine’s words: “On this account, the principal opposition between social classes does not stem from the ownership and control of private property but from access to information and its uses. It is because of such an analysis that the postmodernists argue that in this kind of society, those who own and control information knowledge are the most powerful people.”

This view, obviously, abandons the conventional Marxist view of social conflict which locates class tensions at the point of production, in the factory or workplace. The lines of protest may now take a variety of forms which have little connection to industry or particular material needs and thus generate new social movements that are quite distinct from the older forms of class conflict.

Growth of multiple networks. In the post-industrial society there are combined advances in communication technologies, systems of management and technologies of production. These advances retain their links with markets and production complexes. As a result of this, there is growth of multiple networks between corporations.

These networks enable firms to develop products jointly or to serve specific markets and thus represent a different economic strategy from the establishment of multinational empires. The focus of the coming society on knowledge and information as the driving forces brings multinational corporations together for economic growth.

Divide in society. The debate on the future state of post-industrial society also deals with the problem of the structure of such a society. To recapitulate the transformation of industrial society into post-industrial society, we would say that during the Fordian period there was mass production of goods on standardized scale for market.

Now, there was no decline in the production but it had become flexible, i.e., according to the varying needs of the consumers. There appeared a vast change in the kinds of work: the occupational structure witnessed professional change and manual labour gave way to service class sector.

White-collar workers replaced labour class workers and technology and information processing occupied a central place in the growth of industry. The source of knowledge-information and technology became a field of control by the government, universities and multi-national corporations. Technology, by the process of collaboration, brought different business organizations within a fold. The end-result of these processes created a sharp division in the society. Gorz has developed a set of arguments concerning the changing role of work in post-industrial economies. He has explained the division of society in the following words: "The new technologies are altering the structure of employment within society, and that this has led to a social division between 'aristocracy' secure, well-paid workers, on the one hand, and a growing mass of unemployed on the other. In between, the majority of the population are said to belong to a post-industrial working class, for whom work no longer represents a source of identity or a meaningful activity" [2].

Automation at the workplace has created 'jobless growth' and its rapid extension will, it is argued; progressively undermine the quality and status of the remaining working class jobs. Work in this scenario, thus, becomes an instrumental activity for the majority, undertaken solely to earn a wage with little or no satisfaction or a skill content attached.

Majority sell labour at cheap rates. Elaborating his thesis of unemployment in post-industrial society. Gorz says that the knowledge society remains restricted to professional class only. The labour in this situation remains out of employment. If it gets anything, it is only the domestic work which the professional class requires for its day-to-day living. The wages for the domestic work, obviously, are at throwaway prices. The domestic workers now only remain a servile class without any dignity.

Or, if this class does not get domestic, it is obliged to work at mining and heavy manufacture. Gorz argues that the domestic work or the heavy manual work lacks economic rationality from the point of view of society as a whole and what is worse, the work is not considered as real job.

Gorz's argument of social inequality as a mark of post-industrialism places him closer to Touraine's vision of post-industrialism. Similar are the views of Castell's. It must be mentioned here that both Touraine and Gorz wrote within a broad European context, whereas Bell's account pertains only to U.S.; Castells also remains restricted to U.S.

Post-industrial turn: Towards social and economic polarization. Gorz, Bell, Castell, Gordon, Harvey and other post-industrial society's thinkers do not share in all their views. They differ largely on the strength of their emphasis. Despite their varying positions they can be singled on a number of economic and social fronts.

Above all, the writers seem to agree on one thing: there has indeed been a shift away from industrialism. In broad terms, this movement can be identified with a shift in the balance of the western economies from a manufacturing to a service base, primarily in terms of employment, although it is often extended to include the output of an economy.

However, on occupational class fronts, it becomes difficult to identify common post-industrial themes. At best, it could be said that Bell and Gorz focus upon different aspects of the same transition where Bell sees the growth of white-collar occupations and the formation of knowledge elites, Gorz emphasizes the irrelevance of work to the majority and the fate of a de-skilled working class forced to serve those elites.

Where one offers the prospect of an end to harsh manual labour, the other holds out for a better world outside of, rather than within, work. Even so, it is evident that both Gorz and Castells see social and economic polarization as part of the general direction of change.

Knowledge and information. There are disagreements on the social and economic forms of coming society, i.e., industrial society, but for one thing there is certainty. Knowledge and information, are the prime features of this society. Gorz observes in this respect: "There is nonetheless complete agreement on one principle feature of the coming society among all the writers, namely, the central knowledge and information in the transition, especially as a source of technological innovation".

What is source? The source consists of information and its uses. The sources are used to reshape activities in the manufacturing and state sectors as well as in private services such as finance and commerce. Strong claims have also been made for the importance of information technology as a heartland technology, that is, one capable of generating further innovations at the workplace and beyond.

It is through knowledge and innovation that production is organized by the service class and the technocrats. As a result of information and knowledge, there is rise in industries due to breakthroughs in micro-electronics and information technologies.

Sharp gender division. Normally, the labour force during industrialism consisted of males who worked manually. But, with the coming of micro-electronics and information technologies, there appeared gender inequality in the professional class. In post-industrialism, the women outnumber the male technocrats.

Bocock and Thompson have the following to comment in this respect: "It is women who are disproportionately concentrated in this kind of 'servile' work. We can regard it as a sign of the limits of modern progress, or we can interpret it as yet another illustration of the 'double-sided' character of modernity – with women comprising most of the new servicing class" [2].

New character of modern economy: Globalization. All those who have written on postmodern society, have shown their concern for the new economy. They argue that there has appeared a decisive change in the earlier industrial economy. They characterize the new economy by the name of globalization. In other words, the postmodern society is heading towards global society.

During the 1980s, the concept of globalization began to permeate in social sciences. The modern era has supported a progressive globalization of human affairs. The primary institutions of western modernity, namely, industrialism, capitalism and the nation-state, acquired a new significance in the era of micro-electronic information technology.

Globalization is one of the most visible consequences of post-industrial society. It involves a profound recording of time and space in social life. Giddens terms it 'time-space distancing'. The development of global networks of communication and complex global systems of production and exchange diminishes the grip of local circumstances over people's lives.

Information and knowledge have established linkages between people of the world. Now, the belief that humankind can be turned into a universal community is getting shape with the processes of globalization and technological knowledge. It appears that the world can develop a cosmopolitan order based upon liberty, justice,

and equality for all humanity. Globalization, thus, is a new characteristic of post-industrial society.

Interaction between the informational mode of development and the restructuring of capitalism. The coming up of post-industrial society has brought out tremendous change in the capital formation. There has been techno-economic change in the realm of post-industrial industry.

Lionel Stoleru made a characteristic observation on postmodern industrialism: A wave of technological advances has rendered a whole series of jobs unnecessary and reduced employment on a huge scale without creating an equivalent number of jobs elsewhere.... It will enable us to produce more and better with less human effort: saving in manufacturing costs and in working time with increasing power and create new areas of activity elsewhere in the economy.

Such a process of production reshapes the whole economy and gives a boost to the development of economy. The post-industrialism thus means rise of capitalism. This rise is basically related to informational mode of development.

There are two components which give new form to capitalism in post-industrialism. These are Information technologies, and Organizational mode of development. These two modes are responsible for rise in capitalism. Let's discuss these modes below.

*Information Technologies.* Following are the ways by which the information technology restructures capitalism:

(1) It increases the rate of profit. Productivity is enhanced by the introduction of micro-electronics. The electronic machines transform the production process. The information technology also makes it possible for the decentralization of production, and the spatial separation of different units of the firm.

(2) The new technology also initiates and encourages the process of internationalization of the economy. Advances in telecommunications and flexible manufacturing also allow standardization and customization of goods.

Along with it there is rapid rise in the new transportation technologies emerging from the use of computers and new materials. All these changes' provide material infrastructure for the world economy, as the construction of railway system provided the basis for the formation of national markets.

Thus, the rise of information technologies during the post-industrial period increased the rate of profit; there was also enhancement in productivity through micro-electronics and new transport technology. All these factors resulted in the growth of capitalism during post-industrialism.

*Organizational components.* The high-level organizations in U.S. and European countries have a strong concentration of knowledge generation and decision-making processes. The cells in these areas are concerned with the processing of information.

Given the strategic role of knowledge and information control in productivity and profitability, these core centres of corporate organizations are the only truly indispensable components of the system, with most other work and thus most other workers, being potential candidates for automation from the strictly functional point of view.

*The organizational components* contribute to the growth of capitalism on the following counts:

(1) The result of information is the flexible production. Flexibility affects the relationships among its units, since it is both a requirement of and a possibility offered by new information technologies.

(2) Flexibility is also a necessary condition for the formation of the new world economy. It is because of flexibility that the changing demands of consumers are met with.

(3) Yet another impact of organizational characteristics of informationalism is the shift from centralized large corporations to decentralized networks made up of a plurality of sizes and forms of organizational units. All over the world, such organizational forms are used by major multi-national corporations. Participation in international economy is not possible without entering into such alliances.

Post-industrialism has a very queer economy. It has superseded Fordism. The industrialism of Fordism is transformed into informationalism. The race really has been marathon – from Fordism to post-Fordism, from industrialism to informationalism.

In the field of production, there has been emergence of large corporations. An economy, based on large-scale production and centralized management, generated the growing number of information flows that were needed for the articulation of the system.

*Post-industrialism: Dynamics and trends.* The European countries have scaled long distances from enlightenment to modernity and postmodernity or from agricultural society to industrial and post-industrial society. In the realm of industrialization, there was Fordism or mass production for mass society to post-Fordism, that is, quality-flexible production.

The dynamics of post-Fordism and for that matter, post-industrialism consist of knowledge and use of information and its other composites, namely: Services, Multi-national corporations, Information technologies, Informational mode of development, Information occupations, Think work, Knowledge elites, New servile class, Uneven global development, and New social movements [2].

To understand better modern state of the world economy let's look at the countries' in the context of classification by level of development. According to international organizations approach [3] the construction of development taxonomies very differently. One explanation for this diversity is that economic theory provides little guidance. Another explanation is that the institutions have different mandates and therefore may approach the issue with different perspectives both operationally and analytically. At the same time, a casual inspection suggests that currently the classification systems are quite similar in terms of designating countries as being either 'developed' or 'developing'. All organizations identify a relatively small share of 'developed' countries. All countries that the IMF considers advanced are also considered developed by the UNDP, and only seven countries considered developed by the UNDP (Barbados, Brunei Darussalam, Estonia, Hungary, Poland, Qatar, and United Arab Emirates) are not advanced according to the IMF. The World Bank's highincome group is the larger group and it encompasses all designated advanced and developed countries. High-income countries in the Bank's classification that are not either 'advanced' or 'developed' include The Bahamas, Croatia, Equatorial Guinea, Kuwait, Latvia, Oman, Saudi Arabia, and Trinidad and Tobago. As the institutions reach broadly similar conclusions as to the membership of the developed country grouping, the compositions of the developing country group are, of course, equally similar. Given the large and diverse group of developing countries, all three organizations have found it useful to identify subgroups among developing countries.

Table 1 provides an overview of the development taxonomies used in the three international organizations.

Note that over the last twenty years the shares of 'developed' countries in the World Bank and IMF's systems have increased relative to the share of developed countries in UNDP's system. The reason is that the UNDP's development threshold is relative while the Bank's and (probably) the Fund's are absolute. With an absolute development threshold the share of 'developed' countries will tend to increase in line with general economic and social progress, but not necessarily so with a relative threshold. While the three organizations use very different development thresholds,

there is a lack of clarity around how these thresholds have been established in all organizations [2].

Table 1

**Country Classification Systems in Selected International Organizations**

Criterion	IMF	UNDP	World Bank
Name of 'developed countries'	Advanced countries	Developed countries	High-income countries
Name of 'developing countries'	Emerging and developing countries	Developing countries	Low- and middleincome countries
Development threshold	Not explicit	75 percentile in the HDI distribution	US\$6,000 GNI per capita in 1987-prices
Type of development threshold	Most likely absolute	Relative	Absolute
Share of countries 'developed' in 1990	13 percent	25 percent	16 percent
Share of countries 'developed' in 2010	17 percent	25 percent	26 percent
Subcategories of 'developing countries'	(1) Low-income developing countries and (2) Emerging and other developing countries	(1) Low human development countries, (2) Medium human development countries, and (3) High human development countries	(1) Low-income countries and (2) Middle-income countries

Source: [3].

The three institutions' development taxonomies are presented in table 1 above.

As one can see, the Human Development Index, devised by the United Nations Development Program, is a means of assessing a country's development based on life expectancy, literacy, education and income. Based on these factors, countries are classified into Very high, High, Medium and Low in human development indicator.

Actual state of development by countries according to the United Nations Development Program we will study further in our research. Actual state (for year 2014) of development by countries according to the WB is presented in table 2 below.

As one can see, Nigeria is placed in the third group of countries with lower middle income. A Report of top developing countries [4, 5] shows that, Nigeria is not a developed country by any reasonable measure. The country's per capita gross domestic product (GDP) is much too low, as are its living standards. Industrialization in Nigeria lags behind all the countries upon which universal agreement of developed status exists. Nigeria also suffers from low literacy rates, poor health care and a stratospheric infant mortality rate. As of 2016, Nigeria's per capita GDP sits at \$5,992. Even if you do not adhere to the \$12,000 threshold as a hard-and-fast rule, Nigeria's economy comes in well below any reasonable definition of "developed." At the same time Nigeria is highly endowed with natural and physical resources such as vast arable land, forest resources, rivers and lakes, oil and gas, and solid minerals [4]. Thus it has resource base to develop, but today such development should be innovative. Only this innovative approach can guarantee fast positive result in conditions of modern knowledge economy.

Table 2

**Classification of countries by Levels of development, 2014**

High Income \$12,476 and above	Upper Middle Inc. \$4,036 to 12,475	Lower Middle Inc. \$1,026 to 4,035	Low Income \$1,025 or less
Norway	Russian Federation	Bolivia	Tanzania
Qatar	Romania	Egypt	Somalia
Macao	Turkey	El-Salvador	Uganda
Luxembourg	South Africa	India	Togo
Australia	Malaysia	Ghana	South Sudan
Sweden	Argentina	Nigeria	Malawi
Denmark	China	Indonesia	Mali
United State	Azerbaijan	Pakistan	Guinea
Singapore	Brazil	Philippines	Haiti
Netherlands	Botswana	Honduras	Liberia
Canada	Bulgaria	Ukraine	Nepal
Austria	Columbia	Tunisia	Niger
Kuwait	Costa Rica	Vietnam	Mozambique
Finland	Cuba	Zambia	Chad
Germany	Mexico	Kosovo	Comoros
Belgium	Mauritius	Sudan	Eritrea
Ireland	Iran	Morocco	Ethiopia
United Arab Emi.	Jordan	Nicaragua	The Gambia
United Kingdom	Serbia	Guatemala	Burundi
France	Thailand	Congo, Rep.	Burkina Faso
Japan	Peru	Mauritania	Benin
Hong Kong	Paraguay	Tajikistan	Guinea -Bissau
Israel	Georgia	Djibouti	North Korea
Italy	Belize	Samoa	Madagascar
Spain	Ecuador	Bangladesh	Central African Re

Source: [5].

In today's world, competitiveness is a decisive indicator determining the effectiveness of entities' activities, indicating the ability to successfully grow in a competitive environment [6]. In the context of global competition, traditional factors shaping the competitiveness of companies and countries are losing their significance. Factor conditions, recently considered as a key to achieve sustainable competitive advantage, no longer play a decisive role. Nowadays, a low input costs, attractive interest rates, a weak exchange rate of the national currency and the potential economies of scale cannot ensure the country's competitiveness on the world market [7].

While geographic location is still the main factor of competition, its role has changed significantly. Areas possessing rich natural resources or having unique geographical location, is still reaping the benefits of "comparative advantage". However, in today's world, competition is becoming more dynamic, allowing companies to avoid significant costs by using global supply strategies. Thus, nowadays, the competitive advantage is based not only on factor conditions themselves, but on the more efficient use of them, which requires successive innovative changes [8].

According to the statement of Michael Porter, companies achieve competitive advantage through acts of innovation [7]. However, the term "innovation" is ambiguous



and could be interpreted in different ways. For the first time this term was coined by J. Schumpeter [9]. He defined innovation as the invention that have been commercialized by entrepreneurs, in other words it is the development or discovery, which has a sufficient demand on the market. It could be both new products and new methods of production, services and new market segments, new organizational structures, etc. [10]. A vital aspect of innovation is the need for its practical implementation. Without it the innovation loses its meaning [11].

Let's consider now how level of development is related to innovations in contemporary world. To measure the level of development of different countries and their dependency on innovations, it's expedient to use a range of indexes related to post-industrial stage of economy – knowledge economy.

**Global innovation index.** The global innovation index aims to capture the multi-dimensional facets of innovation and provide the tools that can assist in tailoring policies to promote long-term output growth, improved productivity, and job growth. The GII helps to create an environment in which innovation factors are continually evaluated [12].

**Human development index.** The human development index is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. A country scores higher HDI when the lifespan is higher, the education level is higher, the GDP per capita is higher, the fertility rate is lower, and the inflation rate is lower [13].

**Competitive index.** The competitive index as defined by the World Economic Forum. It is a set of institutions, policies, and factors that determine the level of productivity of a country, conditions of public institutions and technical conditions. GCI analysis the factors that play significant role in creating favorable business-climate environment in the country and are important for competitiveness and manufacture point of view – It considers strength and weaknesses of a country, identifies priorities for the facilitation of political reforms implementation [14].

**Knowledge economy index.** Knowledge Economy Index (KEI) - an aggregate index representing a country's or regions overall preparedness to compete in the Knowledge Economy (KE). The KEI is based on a simple average of four sub-indexes, which represent the four pillars of the knowledge economy: • Economic Incentive and Institutional Regime (EIR) • Innovation and Technological Adoption • Education and Training • Information and Communications Technologies (ICT) Infrastructure The EIR comprises incentives that promote the efficient use of existing and new knowledge and the flourishing of entrepreneurship. An efficient innovation system made up of firms, research centers, universities, think tanks, consultants, and other organizations can tap into the growing stock of global knowledge, adapt it to local needs, and create new technological solutions. An educated and appropriately trained population is capable of creating, sharing, and using knowledge. A modern and accessible ICT infrastructure serves to facilitate the effective communication, dissemination, and processing of information [15].

**Global enabling trade.** The global enabling trade Index measures the factors, policies and services that facilitate the trade in goods across borders and to destination. It is made up of four sub-indexes: Market access; Border administration; Transport and communications infrastructure; Business environment [16]. Each of these sub-indexes contains two to three pillars that assess different aspects of a country's trade environment.

On the next step of our research we will look for relation between mentioned indexes. To find the relation between indexes, we need to apply correlation method.

As one can know from [17], correlation refers to the statistical relationship between two quantities. The correlation coefficient is a single number that you can

calculate for any two sets of data points. The number will always be something between -1 and +1, and it indicates how closely connected the two data sets tend to be close. There are several different correlation techniques. Like all statistical techniques, correlation is only appropriate for certain kinds of data. Correlation works for quantifiable data in which numbers are meaningful, usually quantities of some sort. It cannot be used for purely categorical data, such as gender, brands purchased, or favorite color.

For example, if you were to measure the heights and ages of children up to the age of about 12, you would expect to find a strong positive correlation. As children get older, they tend to get taller.

An example of negative correlation would be data comparing a person's time spent practicing golf shots and that person's golf score. As the practice increases, the score should decrease.

Finally, you would expect very little correlation, either positive or negative, between a person's shoe size, for example, and SAT scores

Correlation coefficient formulas are used to find how strong a relationship is between data. The formulas return a value between -1 and 1, where: 1 indicates a strong positive relationship, -1 indicates a strong negative relationship. A result of zero indicates no relationship at all.

A correlation coefficient of 1 means that for every positive increase of 1 in one variable, there is a positive increase of 1 in the other.

A correlation coefficient of -1 means that for every positive increase of 1 in one variable, there is a negative decrease of 1 in the other.

Zero means that for every increase, there isn't a positive or negative increase. The two just aren't related.

The absolute value of the correlation coefficient gives us the relationship strength. The larger the number, the stronger the relationship. For example,  $|-0.75| = 0.75$ , which has a stronger relationship than 0.65.

Correlation between mentioned development indexes demonstrate the core drivers of development. Absolute scores of indexes for four years (from 2010 till 2014) we collected in attachment A (tables A.1 – A.5). Basic year for analyses is 2014, basic index is Global Innovation Index. Range of countries is 30.

The tables 3-7 below present calculated correlation between indexes related to development for a period of four years.

Table 3

### Correlations, year 2014

GII	HDI		KE		CI		GET	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
10	0.08	0.27	0.41	0.45	0.50	0.76	-0.14	0.15
12	-0.09	0.16	0.32	0.41	0.65	0.79	-0.23	-0.04
14	-0.32	-0.12	0.15	0.30	0.44	0.71	-0.17	-0.06
16	-0.01	0.07	0.32	0.40	0.63	0.76	-0.02	-0.15
18	-0.14	-0.05	0.16	0.29	0.66	0.78	-0.29	-0.33
20	0.12	0.13	0.28	0.36	0.68	0.78	-0.25	-0.28
22	0.30	0.29	0.38	0.42	0.61	0.69	-0.20	-0.23
24	0.46	0.44	0.41	0.45	0.65	0.72	-0.06	-0.08
26	0.59	0.57	0.49	0.51	0.74	0.78	0.05	0.04
28	0.64	0.61	0.52	0.54	0.78	0.84	0.13	0.14
30	0.61	0.65	0.52	0.54	0.79	0.84	0.23	0.17

Table 4

**Correlations, year 2013**

GII Number of countries	HDI		KE		CI		GET	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
10	0.49	0.37	No data		0.74	0.64	0.67	0.61
12	0.34	0.36			0.75	0.67	0.70	0.67
14	-0.09	0.10			0.56	0.56	0.41	0.48
16	0.10	0.21			0.65	0.64	0.59	0.61
18	-0.09	0.07			0.71	0.69	0.63	0.65
20	0.10	0.17			0.64	0.61	0.57	0.59
22	0.23	0.24			0.58	0.55	0.52	0.52
24	0.43	0.40			0.64	0.62	0.58	0.35
26	0.56	0.51			0.72	0.70	0.70	0.53
28	0.61	0.53			0.78	0.77	0.76	0.65
30	0.67	0.65			0.76	0.76	0.75	0.66

Table 5

**Correlations, year 2012**

GII Number of countries	HDI		KE		CI		GET	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
10	0,11	0,08	No data		0,76	0,85	0,47	-0,06
12	-0,01	0,04			0,67	0,71	0,47	0,22
14	-0,27	-0,09			0,52	0,66	0,48	0,35
16	0,09	0,24			0,62	0,49	0,75	0,56
18	-0,09	0,28			0,58	0,20	0,67	0,54
20	0,13	0,17			0,63	0,30	0,64	0,55
22	0,32	0,18			0,54	0,34	0,65	0,55
24	0,41	0,19			0,52	0,36	0,67	0,56
26	0,44	0,13			0,51	0,45	0,71	0,66
28	0,51	0,23			0,59	0,58	0,76	0,70
30	0,60	0,32			0,61	0,62	0,81	0,76

Table 6

**Correlations, year 2011**

GII Number of countries	HDI		KE		CI		GET	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
10	0,30	0,40	No data		0,88	0,92	No data	
12	0,12	0,20			0,83	0,82		
14	-0,15	0,22			0,70	0,78		
16	-0,09	-0,10			0,76	0,80		
18	-0,26	-0,26			0,74	0,77		
20	-0,18	-0,19			0,67	0,71		
22	-0,09	-0,19			0,54	0,58		
24	0,13	0,12			0,60	0,63		
26	0,22	0,20			0,67	0,69		
28	0,31	0,25			0,78	0,78		
30	0,43	0,39			0,79	0,80		

**Correlations, year 2010**

GII Number of countries	HDI		KE		CI		GET	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
10	0,17	0,05	No data		-0,06	-0,32	0,68	0,42
12	-0,13	-0,19			0,30	0,21	0,74	0,48
14	-0,17	-0,17			0,23	0,17	0,72	0,70
16	-0,12	-0,10			0,46	0,17	0,75	0,71
18	-0,15	-0,24			0,39	0,24	0,75	0,68
20	-0,04	-0,15			0,24	-0,03	0,69	0,58
22	-0,03	-0,12			0,26	0,04	0,63	0,47
24	0,31	0,23			0,52	0,40	0,63	0,53
26	0,43	0,38			0,59	0,56	0,66	0,63
28	0,48	0,38			0,66	0,56	0,73	0,63
30	0,53	0,52	0,69	0,65	0,76	0,72		

As one can see, correlation coefficient was calculated for different sets of countries: 10, 12, 14 ... 30. This is to find out the most likelihood number of countries to get reliable data on relations. Graphs below show Correlations for 30 countries for basic year 2014 (fig. 1 – 4).

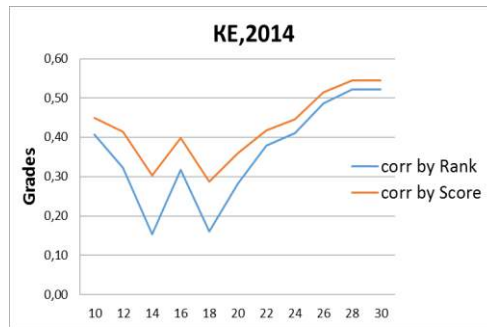
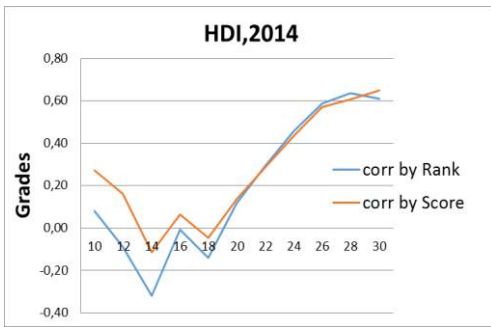


Fig. 1. Correlation between GII and HDI

Fig. 2. Correlation between GII and KE

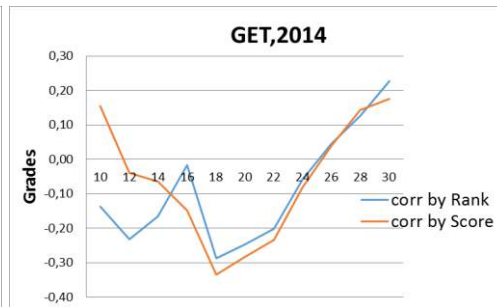
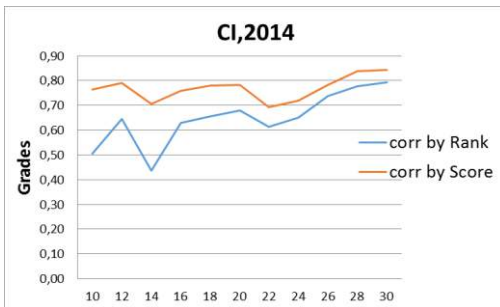


Fig. 3. Correlation between GII and CI

Fig. 4. Correlation between GII and GET

Analyses of collected data supported by visual graphs for the basic year 2014 (fig. 1 – 4) allow noticing two tendencies.

First tendency is about adequate range of countries for the study. All figures show that after the period of 28 countries correlation coefficient becomes stable. It proves that no need to extend the range of countries, 30 is enough to get reliable data.

Second tendency is about most close relation between Global Innovation Index and Competitiveness Index. The base to state is closer correlation coefficient.

If to summarize correlations between Global Innovation Index and Competitiveness Index for all four years (table 8, fig. 5), one can conclude about main tendency for developed countries.

Table 8

**Correlations by years for GII and CI by score**

Year	Correlation GII/CI
2010	0.65
2011	0.81
2012	0.62
2013	0.76
2014	0.84

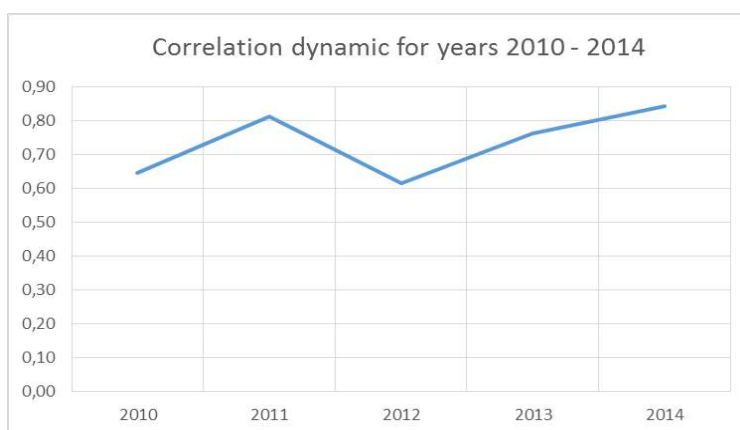


Fig. 5. Correlation dynamic for years 2010 - 2014

Based on made analyses we conclude that dynamic of correlations coefficients reveals the idea that developed countries with high incomes got there due to implementation of innovation. For group of developed countries we studied, competitiveness is highly related to innovations. That is why modern development is based on implementation of innovation and unfortunately, Nigeria is not among the countries under review.

It is common knowledge that Nigeria is not where it ought to be in terms of economic growth and development. Most African and Asian countries that were at the same level of economic development with Nigeria in the 1960s have overtaken her. Such countries include: India, Indonesia, Thailand, Singapore, China, Malaysia, and South Korea, just to mention a few. While most of these countries are enjoying strong economic growth, Nigeria has remained economically underdeveloped due largely to macroeconomic instability, poor infrastructure, government interference, inefficiency, weak public institutions, poor corporate governance, corruption and recently insecurity.

According to [18], Nigeria now belongs to the group of Extremely Poor Countries on earth (World Bank: March, 2014). We lack the necessary legal and administrative mechanisms to harness our rich heritage in Agriculture, Solid Minerals, Tourism and

other non- oil sectors. With infrastructure deficit estimated to be in the region of \$300 billion, about 120 million Nigerians lack access to electricity (World Bank, 2013); transportation network is still very poor across the country thereby making movement of people and goods to be difficult and costly. For macro- economic stability, the good news is that inflation is down to single digit (7.6% in 2013), but interest rate is still high at 12%, with commercial banks lending to private entrepreneurs for as much as 30 to 34% interest (CBN, 2013) - which makes it difficult for Nigerian firms and industries to compete globally. In health and education, preventable public health diseases like malaria, typhoid, polio, cholera are still at epidemic proportions in Nigeria; taking their toll on the productivity of the labour force with the associated loss of man-hours in the economy.

An estimated 56 million people in Nigeria are illiterates, i.e. cannot read or write in any language (UNESCO, 2014). We produce poor quality unemployable graduates who can hardly practice their profession. There's a weak linkage between educational institutions and industry. ICT penetration in Nigeria is very low- in a world that is becoming increasingly knowledge-based. With poverty at 69.9% and unemployment at 25% (NBS, 2013), we lack the purchasing power that is required to effectively stimulate and drive the consumption of goods and services. Again, Nigerians have a great appetite for foreign goods and this attitude is to the detriment of local producers. Insecurity has become an issue in Nigeria due to insurgency.

Lack of protection of property rights has stifled creativity and innovation. Copyright laws are not strong enough to protect intellectual property rights. These issues must be adequately addressed for Nigeria's economic development to be on the development track [18].

Based on the above data, lets introduce the state of 30 countries by mentioned above development indexes that surround Nigeria. For further calculations we adjusted this data deleting empty rows with no data for GII and CI (tables 9-13).

Table 9

**Absolute scores of development indexes for Nigeria, year 2014**

GII			HDI		CI		GET	
Rank	Score	Country	Rank	Score	Rank	Score	Rank	Score
96	30,26	Ghana	138	0,573	111	3,71	102	3,6
98	30,06	Senegal	163	0,485	112	3,7	100	3,6
99	30,03	Egypt	110	0,682	119	3,6	97	3,6
100	29,87	Philippines	117	0,660	52	4,4	64	4,1
101	29,6	Azerbaijan	76	0,747	38	4,53	77	3,9
102	29,31	Rwanda	151	0,506	62	4,27	77	3,2
103	29,08	El Salvador	115	0,662	84	4,01	71	4,0
104	29,03	Gambia	172	0,441	125	3,53	99	3,6
105	28,98	Sri Lanka	73	0,750	73	4,19	84	3,8
106	28,66	Cambodia	136	0,584	95	3,89	93	3,7
107	28,52	Mozambique	178	0,393	133	3,24	110	3,5
108	28,47	Namibia	127	0,624	88	3,96	68	3,4
109	28,18	Burkina Faso	181	0,388	135	3,21	133	2,9
110	27,79	Nigeria	151	0,502	127	3,44	124	3,1
111	27,76	Bolivia	113	0,067	105	3,77	87	3,7
112	27,75	Kyrgyzstan	125	0,636	108	3,37	109	3,5
113	27,61	Malawi	174	0,414	132	3,25	112	3,5
114	27,52	Cameroon	152	0,504	116	3,66	119	3,2
115	27,5	Ecuador	98	0,911	71	4,18	65	4,1
116	27,02	Côte d'Ivoire	171	0,452	115	3,67	117	3,3
117	27,01	Lesotho	162	0,486	107	3,73	108	3,5
118	26,73	Honduras	129	0,617	100	3,82	85	3,8
119	26,18	Mali	176	0,407	128	3,43	123	3,1
120	26,14	Iran	173	0,393	83	4,03	131	3,0
121	25,76	Zambia	141	0,561	96	3,86	91	3,7
122	25,66	Venezuela	67	0,764	131	3,32	137	2,8
123	25,6	Tanzania	159	0,488	121	3,57	111	3,5
124	25,5	Madagascar	155	0,498	130	3,41	103	3,6

Table 10

## Absolute scores of development indexes for Nigeria, year 2013

			HDI		CI	
Rank	Score	Country	Rank	Score	Rank	Score
94	30,60	Ghana	135	0,558	103	3,79
103	29,69	Cape Verde	132	0,586	119	3,01
96	30,48	Senegal	154	0,470	65	3,59
108	28,48	Egypt	112	0,662	96	3,31
90	31,18	Philippines	114	0,654	64	3,60
105	28,99	Azerbaijan	82	0,734	57	3,68
112	27,64	Rwanda	167	0,434	60	3,66
88	31,32	ElSalvador	107	0,680	107	3,16
122	26,39	Gambia	165	0,439	54	3,74
98	30,45	SriLanka	92	0,715	41	3,96
110	28,07	Cambodia	138	0,543	72	3,53
121	26,50	Mozambique	185	0,327	130	2,89
109	28,36	Namibia	128	0,608	92	3,88
116	27,03	Burkina Faso	183	0,343	133	3,34
120	26,57	Nigeria	153	0,471	115	3,67
95	30,48	Bolivia	108	0,675	104	3,78
117	26,98	Kyrgyzstan	125	0,622	128	3,52
119	26,73	Malawi	170	0,418	129	3,38
125	25,71	Cameroon	150	0,495	112	3,69
83	32,83	Ecuador	89	0,724	86	3,94
136	23,42	Côte d'Ivoire	168	0,432	131	3,36
124	26,29	Lesotho	158	0,461	137	3,19
107	28,80	Honduras	120	0,632	90	3,88
106	28,84	Mali	182	0,344	125	3,55
113	27,30	Iran	76	0,742	90	3,81
118	26,79	Zambia	163	0,448	108	3,92
114	27,25	Venezuela,	71	0,748	135	2,78
123	25,35	Tanzania	152	0,476	113	3,55
140	22,95	Madagascar	151	0,483	132	3,18

Table 11

## Absolute scores of development indexes for Nigeria, year 2012

GII			HDI		CI		GET	
Rank	Score	Country	Rank	Score	Rank	Score	Rank	Score
92	29,6	Ghana	140	0,572	114	3,65	112	3,51
97	28,8	Senegal	170	0,461	111	3,7	116	3,4
103	27,9	Egypt	108	0,688	99	4,17	113	3,48
95	29,0	Philippines	115	0,657	100	4,17	72	3,96
89	30,4	Azerbaijan	78	0,745	55	4,31	81	3,85
102	27,9	Rwanda	163	0,476	70	4,19	51	4,35
93	29,5	ElSalvador	116	0,662	91	3,89	7	5,18
130	23,3	Gambia	175	0,440	99	3,84	125	3,04
94	29,1	SriLanka	73	0,749	52	4,33	73	3,95
129	23,4	Cambodia	143	0,546	108	3,99	64	4,00
110	26,3	Mozambique	180	0,408	133	3,43	97	3,65
73	34,1	Namibia	126	0,620	68	4,56	75	3,92
122	24,6	Burkina Faso	183	0,393	136	3,25	122	3,15
123	24,6	Nigeria	151	0,505	139	3,19	123	3,13
114	25,8	Bolivia	119	0,654	95	4,21	23	4,33
109	26,4	Kyrgyzstan	120	0,645	126	3,45	39	4,39
120	25,4	Malawi	173	0,433	120	3,68	85	3,79
121	25,0	Cameroon	153	0,501	114	3,78	117	3,38
98	28,5	Ecuador	88	0,727	101	3,82	22	4,79
134	22,6	Côte d'Ivoire	172	0,452	135	3,41	123	3,07
116	25,7	Lesotho	161	0,484	135	3,26	113	4,41
111	26,3	Honduras	131	0,607	86	3,98	8	5,18
119	25,4	Mali	173	0,433	126	3,59	121	3,18
104	27,3	Iran	69	0,764	62	4,26	132	2,17
107	26,4	Zambia	139	0,576	113	3,67	88	3,78
118	25,4	Venezuela,	71	0,764	124	3,51	130	2,95
128	23,9	Tanzania	151	0,510	120	3,56	94	3,69
126	24,2	Madagascar	154	0,507	128	3,53	107	3,48

Table 12

**Absolute scores of development indexes for Nigeria, year 2011**

GII			HDI		CI	
Rank	Score	Country	Rank	Score	Rank	Score
70	32,48	Ghana	135	0,451	100	3,17
100	27,56	Senegal	155	0,459	108,00	3,8
87	29,21	Egypt	113	0,644	94,00	3,88
91	28,98	Philippines	112	0,644	99,00	4,02
88	29,17	Azerbaijan	91	0,700	66,00	3,5
109	25,86	Rwanda	166	0,429	98,00	3,62
90	29,14	ElSalvador	105	0,674	91,00	3,89
82	30,36	SriLanka	97	0,691	69,00	4,01
111	25,46	Cambodia	139	0,523	103,00	3,56
78	30,74	Namibia	120	0,625	83,00	4,00
120	23,14	Burkina Faso	181	0,331	127,00	2,87
96	28,15	Nigeria	156	0,459	136,00	3,11
112	25,44	Bolivia	108	0,663	125,00	2,88
85	29,79	Kyrgyzstan	126	0,615	111,00	3,44
108	25,98	Malawi	171	0,400	110,00	3,45
103	26,95	Cameroon	150	0,482	121,00	3,31
93	28,75	Ecuador	83	0,720	101,00	3,82
117	24,08	Côte d'Ivoire	170	0,400	116,00	3,38
98	27,81	Honduras	121	0,625	104,00	3,55
95	28,41	Iran	88	0,707	90,00	3,76
114	25,27	Zambia	164	0,430	121,00	3,56
102	27,41	Venezuela,	73	0,735	117,00	3,66
104	26,88	Tanzania	152	0,466	116,00	3,66
113	25,41	Madagascar	151	0,480	124,00	3,21

Table 13

**Absolute scores of development indexes for Nigeria, year 2010**

GII			HDI		CI		GET	
Rank	Score	Country	Rank	Score	Rank	Score	Rank	Score
105	2,66	Ghana	130	0,467	114	3,45	96	3,63
106	2,66	Senegal	144	0,411	92	3,78	90	3,74
74	2,91	Egypt	101	0,620	70	4,04	76	3,88
76	2,89	Philippines	97	0,638	87	3,90	92	3,72
		Azerbaijan	67	0,713	51	4,3	77	3,88
91	2,76	ElSalvador	90	0,659	77	4,02	57	4,16
110	2,64	Gambia	151	0,390	81	3,96	82	3,83
79	2,86	SriLanka	91	0,658	79	4,01	99	3,59
102	2,68	Cambodia	124	0,494	110	3,51	102	3,57
100	2,69	Mozambique	165	0,284	129	3,22	93	3,71
92	2,76	Namibia	105	0,606	74	4,03	70	3,96
122	2,48	Burkina Faso	161	0,305	128	3,23	110	3,41
96	2,69	Nigeria	142	0,423	99	3,65	120	3,05
129	2,37	Bolivia	95	0,463	120	3,42	98	3,59
104	2,67	Kyrgyzstan	109	0,598	123	3,36	100	3,58
97	2,69	Malawi	153	0,385	119	3,42	83	3,82
119	2,55	Cameroon	131	0,460	111	3,5	115	3,35
126	2,43	Ecuador	77	0,695	105	3,56	89	3,74
89	2,77	Côte d'Ivoire	149	0,397	116	3,43	123	2,9
93	2,75	Lesotho	141	0,427	107	3,54	101	3,57
112	2,62	Honduras	106	0,604	89	3,86	66	3,98
107	2,66	Mali	160	0,309	130	3,22	111	3,39
111	2,63	Zambia	150	0,395	112	3,5	85	3,8
124	2,45	Venezuela,	75	0,696	113	3,48	121	3,04
98	2,69	Tanzania	148	0,398	100	3,59	97	3,6
125	2,45	Madagascar	135	0,435	121	3,42	86	3,78

If to summarize correlations between Global Innovation Index and Competitiveness Index for all four years (table 14, fig. 6), one can conclude about main tendency for Nigeria. Graph shows obviously negative dynamic of correlation. It



means that economy and competitiveness of Nigeria from 2010 to 2014 lost its close relation to innovations.

Table 14

**Correlation between indexes related to development for Nigeria**

Years	GII/CI
2010	0,54
2011	0,43
2012	0,56
2013	-0,09
2014	-0,70

If to compare two tendencies between developed countries and Nigeria (fig. 7), we see almost mirror tendencies: while curve for developed countries goes up, curve for Nigeria goes down essentially.

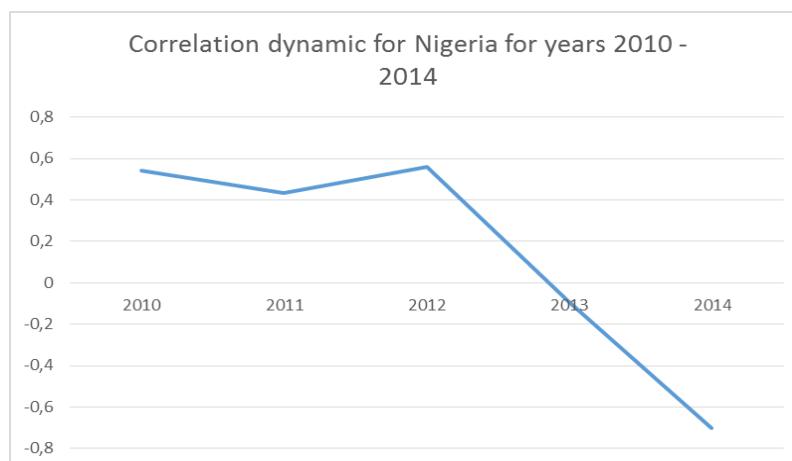


Fig. 6. Correlation dynamic for Nigeria for years 2010 - 2014

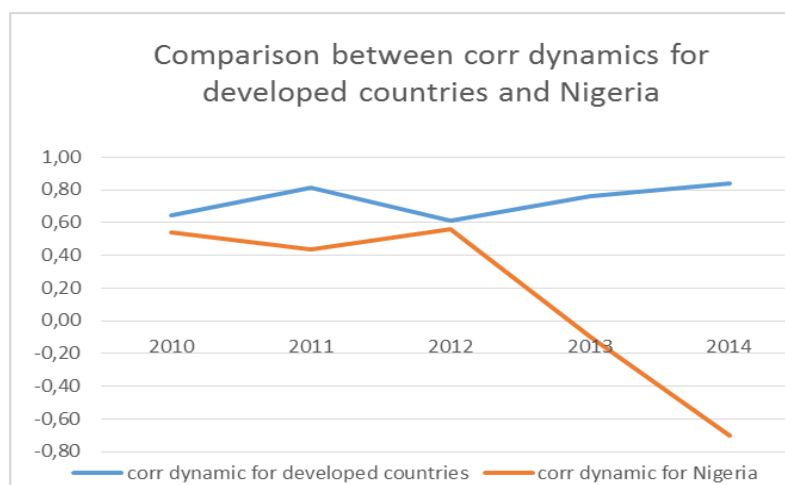


Fig. 7. Comparison of two tendencies between developed countries and Nigeria for years 2010 - 2014

Besides we present absolute grades for Nigeria by indexes GII and CI (table 15).  
Table 15

**Grades for Nigeria by indexes GII and CI, years 2010 – 2014**

Years	GII		CI	
	Rank	Score	Rank	Score
2014	110	27,79	127	3,44
2013	120	26,57	115	3,67
2012	123	24,6	139	3,19
2011	96	28,15	136	3,11
2010	96	2,69	99	3,65

Correlation between GII and CI by rank is 0,79, by score is -0,55. It means that correlation by rank we can consider as more adequate and will take it for calculations. Then correlation dynamic for Nigeria for years 2010 – 2014 by rank will have image as on fig. 8 and comparison of two tendencies between developed countries and Nigeria for years 2010 – 2014 by rank will have image as on fig. 9.

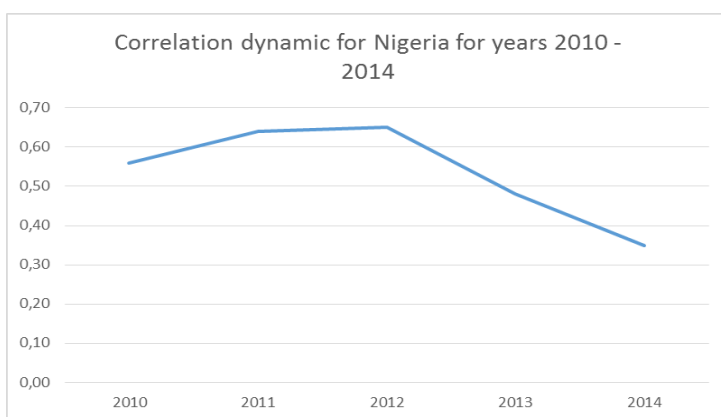


Fig. 8. Correlation dynamic for Nigeria for years 2010 – 2014 by rank

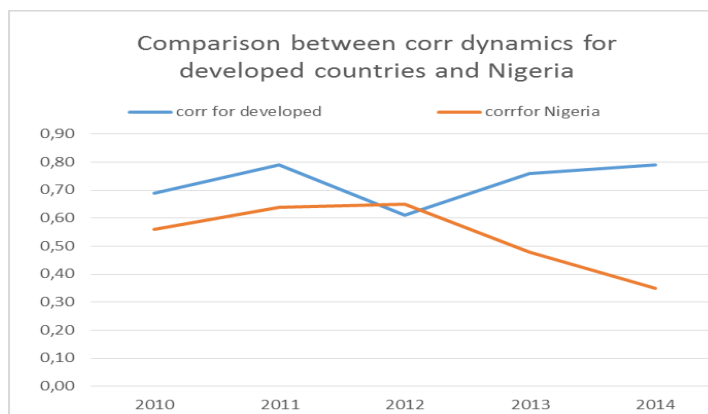


Fig. 9. Comparison of two tendencies between developed countries and Nigeria for years 2010 – 2014 by rank

Conclusion and prospects. One can see that main tendency of relation between correlations of developed countries and Nigeria still remains, though it's possible to consider the difference a little bit less than by correlations by scores as on previous graphs. Also there is notable point on the year 2012, where two curves get crossed. We can suggest that it should mean something happened in the world, some essential fact in economy dynamic. But we will not focus on that fact here in the research, it maybe subject for further researches. For now it is obvious that Nigeria's economy does not have close relation to innovations, but has definite good potential for that if we are to compare it with other African countries in studied group.

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