

## **Economics of Information in a Global Perspective**

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### **Abstract**

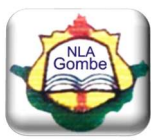
*The paper discusses the economics of information in a global perspective. The paper took into consideration cost, price and value of information as an economic commodity. Documentary methodology was adopted for the study. The paper further highlighted the relationship between economics and information, organizations in the information sector of the economy such as information production, information distribution, information transaction and information equipment organizations were touched, characteristics of information as economic good were highlighted : non-excludability property, information as experience good, infinitely expansible, utility, scarcity, transferrable and the roles of government in the economics of information such as grants, regulations and infrastructural development among others were discussed and conclusion was drawn. The findings revealed that information has price, cost and value, developed countries are now operating an information economy among others. The study recommends high economic ties with developed world for cross-breeding of economic ideas.*

**Keywords:** *Information, economics of information, Cost, Price, and Value*

### **Introduction**

Man's origin is attributed to information. The survival of man and all the activities of the human race hinges of recent on information. In support of the above assertion, Aguolu and Aguolu (2002) stated that information is a human activity. Thus, the growth and the need for information and the indispensability at present have brought a tag on this age, "information age". To buttress the importance and the place of information in human life, Kemp (n. d) stated that information has assumed the position of the fifth need of man, ranking after air, water, food and shelter.

Information at present is a commodity and economic good of worldwide significance, which is contributing to the national economy of nations all over the globe. Today, the criteria that determine power have shifted from industry ownership to the information ownership, as the global economy has shifted from industry based to information based (Kingman, 2001) in Antonelli and Link (2015). Individuals with information are feared in the society just like



nations with information. The United States of America (USA) is the world power today not because of industrialization but because of the information it has and its usage to control the world.

The quality and quantity of the information resources of a country are two parameters for development. Countries with adequate information infrastructure and information technology can create artificial demand for superfluous products and use it as a weapon against the economy of other countries that are behind or have an information gap and imbalance (Arrow, 2010). Information is a negotiable product that moves about in the international markets. In today's international developing economies, a country that is incapable of providing information to her citizens will lose autonomy and be at the mercy of developed countries for information. Thus, the paper covers economics of information specifically dealing with cost, price and value of information on a global perspective.

### **Objective**

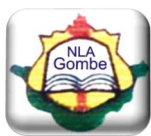
The study is guided by the objective below: To examine Economics of information based on cost, price and value of information

### **Theoretical Framework: Economic Theory of Information**

The study is underpinned by economic theory of information. The economic theory of information (Marschak, 1971) cited in Frankel, and Kamenica (2018) appeared aiming to represent economic aspects of information processes in society. It reflected some changes in the thinking habits of economists that has resulted in a broadening of the concept of 'economics'. As time advanced, problems of decision, information and organization came to the center of many economic theories. The actions considered and their outcomes may, but need not, be inputs and outputs of quantifiable and marketable production factors and products, or their prices. Nowadays, broader 'optimization problems' are pigeonholed as belonging to 'operations research', 'management science', or 'systems analysis'. They occupy economists, engineers, and (to the extent that applied probabilities are involved) statisticians as well. As 'benefit-cost analysis', these tools are also applied to problems of social policy planning. There is a promise of cross-fertilization with the evolutionary theories of life science and anthropology. In the economic information theory, information  $x$  about the state of environment is considered with respect to a person's action  $a$ . Person's profit  $u(a, x)$  is taken as a utility function. It makes possible to consider expectation  $U0 = \max_a E u(a, x)$  of the profit without knowing  $x$  as well as expectation  $U1 = E \max_a u(a, x)$  of the profit when  $x$  is known. Then the value of information  $v(Ix)$  about  $x$  is defined as  $v(Ix) = U1 - U0$ . Thus, value of information in the sense of the economic information theory is an external measure of information. The theory fits here because it quantifies information in terms of monetary value, price and cost.

### **Methodology**

In this study documentary research was applied. Documentary research method refers to the analysis of documents that contain data about the phenomenon under study. The documentary research method was used in investigating and categorizing physical sources, most commonly written and non-written documents, whether in the private or public domain as stated by Harelimana (2015). The data inclusion criteria depended on; authenticity, credibility, representativeness and meaning attached to evidence (Ahmed, 2010). Most of the obtained



data was from; books, brochures and minutes of meetings, electronic journals, press releases, diaries, background papers, event programs, letters and memoranda, and newspaper articles.

### **Economics of Information (EI)**

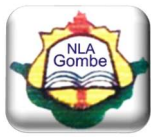
Information and economics have a number of differences, but related connections. One can consider the role of information in economic decision making that is, what information is needed and when to make informed decisions that affect the economy, such as buying and selling decisions in the stock market. Another connection one can consider is how information activities contribute to the economy (Kingman, 2001) in Antonelli and Link (2015). The contribution of information production and use to Gross Domestic Product (GDP), which in Nigeria, it has contributed about 1.6 trillion as at 2017. (Bureau of Statistics, 2017) and the workforce engaged in information work as an indicator of information society all points to economics of information.

There are however, broader issues that have attracted attention of information professionals and the economist. The issues of costs of information from the scale of the information sector of the economy to the value and cost of information. All these issues present problems. Those problems are exacerbated because value, price and cost are used in a number of different ways both in ordinary speech, accounting, and in information and other professions. While there have been different views on the value of information as a post facto, so also are different views on what constitute the value, price and cost of information in the society.

### **Organizations in the Information Sector of the Economy**

According to June, and Koehler (2007) cited in Antonelli and Link (2015), they stated the following organizations in the economy of information.

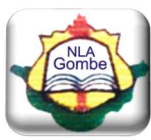
- I. Information production organizations:** These organizations deal with the creation of information that will be made available to the public. They thoroughly identify information that has already been created or need to be created in response to societal needs or demands, filter information through the majors of quality, accuracy and marketability and also assist content creators. Examples of such organizations include research and development for the case of Nigeria (center for management development, international institute for tropical agriculture, and federal institute of industrial research), authoring and composing.
- II. Information distribution organizations:** These organizations deal with publishing such as book publishing industries, newspaper publishing, magazine and journal publishing, film industries, television and the libraries.
- III. Information transactions organizations:** These organizations deal with telecommunication industries, banking and brokerage industries. For the case of Nigeria, we have telecommunication industries like MTN, GLO, 9mobile, and Airtel. Banking sector, we have the apex bank, commercial, developmental banks while we have Nigerian stock exchange in brokerage industries.
- IV. Information equipment organizations:** These deals with computer hardware and software and telecommunication industries. Microsoft Company owned by Bill Gate is a good example of Software Company.



## Information as Economic Goods

Minelli and Baio (2015) defined ‘information goods’ broadly as anything that can be digitised and encoded as a stream of bits, and transmitted over an information network. Information goods include books, movies, software programs, web pages, song lyrics, television programmes, and newspaper columns. Furthermore, information goods are characterised by high fixed production costs and extremely low reproduction costs. Information products typically comprise three macro characteristics – they are physical (e.g., indestructibility, transmutability, and reproducibility), spatial/temporal (e.g., enhancement of competition), and contingent (e.g., real-time or near real-time). Information as a commodity has interesting characteristics such as:

- **Non rivalry property:** This reveals that the consumption by one consumer does not prevent other consumers from consuming it (Shapiro & Varian, 2002) in Minelli and Baio (2015). Taking into consideration the economic point of view, information cannot be destroyed when used, as conventional economic goods. For example, reading a book by one person does not obstruct the others to read the same book. Unlike tangible goods where possession of a good by one deprives another of the good, information can be possessed by many without diminishing its quantity or quality (Shapiro & Varian, 2002) in Minelli and Baio (2015). This property of information good has a consequence for producers and consumers related to the economic category of cost. The marginal costs of reproduction for information goods are low. While production costs are typically high and fixed for information products, these products can be copied cheaply (e.g. the master copy of a book, movie, or soundtrack).
- **Non-excludability property:** Means that it is hard or impossible to exclude other consumers from consuming the good: an often used example of non-excludable information good is knowledge. Since a possessor of information can transfer it to others without losing the information, the laws of supply and demand that depend on the scarcity of products do not easily apply to many information goods. At this point we have to make the following distinction: information non rivalry property is related to the nature of information, while the non-excludability property is conditioned by the legal and technological framework. The scholars in the economics of information do not assume that all information goods are non-excludable. Jones (2002) gave some examples of non-rivalrous information goods that are non-excludable (digital music, computer games) and those that are excludable (e.g. encoded satellite TV transmission). The non-excludability property of information introduced the problem of “free-rider”. This occurs when people do not pay the cost but still gets the benefit of an information good or service.
- **Information as experience good:** Experience goods are goods whose quality or value is revealed only when the good is consumed (Shapiro & Varian, 2002) in Minelli and Baio (2015). For example, the consumer doesn't know whether or not she will enjoy a movie or a live performance of opera until she has seen the movie or experienced the performance. From the viewpoint of social welfare, limited information can lead to suboptimal consumer choices and decrease the incentives of companies to invest in quality, thus lowering social welfare.
- **Information goods are infinitely expandable:** Arbitrarily many copies of information good can be manufactured at a low or zero cost. This property leads to an interesting phenomenon, highlighted by Herbert Simon as “a wealth of



information creates a poverty of attention” (Simon, 2009) in Morris and Strack (2018).

Other characteristics of economic goods include:

- **Utility:** This deal with the following; the goods or service must give a level of satisfaction. Therefore consumers will demand it and pay for it. Thus, this is considered rational behaviour in economics.
- **Scarcity:** This deal with the following; goods or service must be scarce in relation to demand and goods or services must be able to command a price.
- **Transferrable:** This deal with the following; it must be possible to transfer the good or service to individuals and the market can allocate goods and services that can be exchanged for money.

As stated by Zhong (2017) Information products are characterised by no attrition (quality is not degraded over time), they can be easily copied (no additional costs when making a copy), they have network externality (word-of-mouth effects), are easily changed, and goods can be experienced before purchasing. In short, information product characteristics and cost structure (high production cost and low reproduction cost) differ significantly from those of conventional businesses. The value of information goods also varies and pricing strategies can be volatile.

### **Price, Cost and Value of Information as Economic Goods**

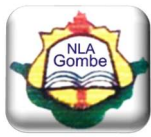
The economic aspects of information that need examination are cost, price and value of information. Thus, price, cost and value of information are discussed below.

**Price of Information:** Pricing is the marketing activity that determines the price of the product on the basis of costs as well as market factors such as distribution channels, discount structure, competitors’ price, ability or willingness of customers to pay and so on.

According to Etukudo and Aliu (2019) pricing is an important factor in marketing which the customer considers before purchasing a particular product. It also refers to the dominant element that determines the revenue or profit or market share for the organization. Price for the product is usually set when the organization introduces or acquires a product. Price could be social or monetary, according to Dhiman and Sharma (2009) in Etukudo and Aliu (2019). Social price refers to the additional effort that the customer must make in order to obtain access to a product while monetary price implies the payment of certain sum by the customer. That means, price is not always considered in monetary terms, but it is also associated with time, effort and psyche. Price is one of the most difficult aspect of marketing exercise.

In economics, price of any commodity is determined by including the cost of production and other market factors of such a commodity. Other sectors of the economy like the agricultural, educational, and several others have price tag and price regulatory system on their products and services. The case is not different from information as a commodity in the information sector. Looking at it on a broader perspective, in Nigeria, information industries like the book publishing, newspaper and magazine publishing industries, Television houses like the Nigeria Television authority (NTA), Arewa Television, African Independent Television (AIT), Wole Adenegu Production (WAP TV), Cable Network News (CNN) and Aljazeera all have prices and price regulatory measures on information services they provide to people. Users pay





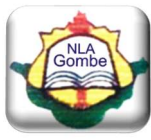
certain amount of money before having access to the information the above mentioned information organizations provide. This amount of money users pay in the name of subscription is the price for the information they have access to. Also in institution of high learning like universities, colleges of education, polytechnics, collages of legal studies, and colleges of health you cannot have access to their information library resources without being a registered member. Globally, broadband access and use are critical enablers of the information economy. Fixed broadband prices can be three times higher in developing countries than in developed countries, and mobile broadband twice as high (ITU, 2016). In landlocked developing countries, high speed international Internet bandwidth access costs and fixed broadband monthly subscription charges are much higher than in coastal countries located closer to submarine communication cables. Recent research suggests that bandwidth is particularly important for developing countries to boost their trade (Abeliansky and Hilbert, 2017). Therefore, pricing and competition are the principal elements used to succeed in the information market. Companies entering the market must be aware that differential pricing is a market practice.

### **Value of Information:**

The value of information is always silent and does not have universal value its value is depends on the individual who uses it, when he wants to use it and the purpose he want to use it for. There is no consensus among authors on the value of information it is therefore depends on the value of information that support decision-making. To a large extent, several authors tend to limit the value of information to information usage only (Shapiro and Varian, 2002) in Rushkina (2019). They looked at the value of information to normative value, which deals with the difference between the expected utility of a decision made without information and the utility of the same decision made with the information, realistic value; which deals with the actual outcomes of use of information and perceived value; which deals with value ascribed to these information by the information user.

The view of the authors on the value of information is not disputed that value of information can be gotten after using the information. But there is more to the view of the authors. Their view is limited or rather too narrowed. The value of information can also extend to the monetary value of information. For instance, a look at Microsoft Company owned by Bill Gate. The company value is at 94 billion dollars (Sunday times, 13<sup>th</sup> March, 2018). This is an information equipment organization. This the monetary value of the company apart from the value users get from using the products and services of the company. Other information transaction organizations like the MTN, Glo, Airtel and 9mobile in Nigeria are value at billions of naira.

**Cost of Information:** In production, cost is the value of money, time that has being used in producing something or rendering service which is readily available for use. Cost is also a monetary valuation of effort, materials, resources, time and utilities consumed, risks incurred and opportunity forgone in production and delivery of a goods or services (Business Dictionary). While information cost total expenditures of both time and money that are needed to obtain an information. In economics, we have fixed, variable and marginal cost, all of which are covered in the economics of information. Cost cannot be separated when dealing with information. The production process of other goods and services is not different from what takes place in the information sector. Industries in the information sector incurred the following cost such as:



- Information creation: for information to be in existence, it must be created from tacit knowledge of individuals or from organizations. This involves content creators such as authors which further need monetary resources to make the creation a reality.
- Production of information in format that will be made available to the potential or targeted users. This could be in print media book form, newspapers and magazines and also non print media such as tape-recorder, compact disk, video tape recorder, slide projector etc.
- Marketing of the information directly or using distribution channels.
- Ordering cost: Cost that is incurred in obtaining additional inventory. For example, transportation cost.
- Carrying cost: Cost incurred on holding inventory (stored items it could be raw materials or finished materials or goods) in hand. Example, opportunity cost of money and storage cost.

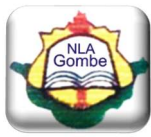
The above is one aspect of the cost of information on the part of the information production industries. On the part of information users, a different cost is incurred by them. Each of the industries mentioned in the information economy, has a cost for its services. In the United States of America, through the cost of information paid by users, the hardware and software industries made 190 billion dollars, production and distribution industries made 783 billion dollars (June and Koehler, 2007) in Rushkina, (2019). In Nigeria, the telecommunication industries for instance make billions of naira from over 154 million subscribers (vanguard news, 1<sup>st</sup> March, 2018). Further, media houses have cost for access to their information. The Nollywood, Hollywood and Bollywood have cost for the entertainment they provide to people. Likewise the telecommunication industries all over the globe have cost for the services they provide to their subscribers. All the money mentioned above for the various information industries comes as result of the cost the users' information commodity incurred.

Theoretically, the market for information goods is not 'perfectly competitive'. Morris and Yang (2016) identified two sustainable structures for the information goods market: dominant-firm monopoly, and differentiated products. Microsoft is a well-known example a dominant-firm monopoly, and movie/TV programmes are examples of differentiated products. Accordingly, feasible strategies for marketing information goods are differentiated based on the product (value-added to raw information) and cost leadership via economies of scale.

### **Roles of Government in the Economics of Information**

The role of government in the economics of information varies, depending on the political structure of the country and on the prevailing political climate. In the words of Moore (n.d), he delineated the role of government in the economics of information as:

- I. **Creation, generation, production, and dissemination of information:** One way obviously, is to serve as creator, generator, producer, and disseminator of information. All governments act in this way, producing voluminous amounts of information in the conduct of and about the conduct of the various functions of government. The costs of this information production are borne centrally, at whatever level of government is acting, and distributed over the base of taxpayers as part of their support of the functions of government. Costs of access to this governmentally produced information may also be distributed across the taxpayer base. For example, look at the



many government web sites that provide access to information at no direct cost to the user (FirstGov for United States and Directory for United Kingdom).

- II. **Infrastructure development:** Another way in which government can act to foster information activity is to create, or support the creation of the necessary infrastructure for information. The activity of the United States government in the forerunner networks to the internet, and the Nigerian Government in the development of Telecommunication provide an example of governmental involvement in information infrastructure construction.
- III. **Regulation:** Additionally, government may foster information activity through regulation, particularly regulation that protects markets so that the private sector can develop information, information goods and information services. Further actions that regulate internal information activities such as copyright law, patent law, trademarks law and trade secret law, all these guide the generation and production of information in a particular country. Government may also impose tariffs in information goods and services imported from other countries as a means of fostering the development of the local information industry activities including all aspects of information creation, production, dissemination, management and use.

Government may also inhibit the development and or the transfer of information. For instance, government has played an important role in the development of nuclear technology but tries to limit very carefully the spread of the fruit of that research. Government may also seek to prohibit or discourage certain lines of investigation while fostering others. In recent years, the United Government has sought to limit research into fetal tissue and stem cells or human cloning. But, at the same time, government has promoted research into the human genome.

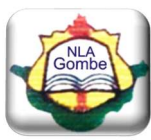
- IV. **Grants and other support:** Government also creates, generate, produce, and disseminate information in areas that are not in any way related to the function of government. However, in order to foster information creation and production and to foster development of new distribution mechanisms and new information systems, even governments that eschew direct production participate in information development through provision of grants or other support mechanisms. An example is the United States federal grants that support information creation and development of distribution mechanisms are offered through a variety of agencies, including the National Endowment for the Humanities, the National Science Foundation, the National Institutes of Health and the Institute of Museum and Library services.

## Findings

The following are the findings:

- i. Information has cost, price and value.
- ii. Developed countries like the Germany, Canada, Italy and United States of America are running an information economy rather than industrial economy.
- iii. Developing countries like Nigeria, other African countries and other countries in the middle East are yet to key into information economy
- iv. Information economy is a good contributor to the Gross Domestic Product (GDP) of a country.
- v. Developing countries are yet to know the value of an information economy that is to say there is lack of awareness in the paradigm shift.





## Conclusion

The importance of information cannot be over emphasized as there is a shift in the global economy from agriculture, and industrial economy to information economy. Though, economics of information has been an issue among economics and information professionals as to whether information is a good or not and if information actually has price, cost and value. Over the years, this issue has been a problem. It has been seen that information has characteristics that made it be a commodity that is marketed just like other commodities that are bought and sold. It is been clearly demonstrated that information as a commodity has price, value and cost just like other tangible goods and services and it is available in the markets both local and international market. To this end, the government also played important roles in the economics of information to help foster the production and distribution of information as it is contributing greatly to the Gross Domestic Product of developed and developing countries. Though, the scale is weighing more on the side of developed countries than developing countries.

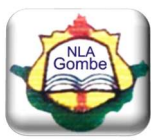
## Recommendations

Base on the findings, the following recommendations were made:

- i. High economic ties should be made among developed and developing countries for flow of and cross-breeding of ideas.
- ii. Developing countries should make policies that will create an enabling environment for an information economy.
- iii. International and regional summit on economic matters will help create more awareness on the new paradigm shift.

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