Digital Money in a Digitally Divided World: Nature, Challenges and Prospects of ePayment Systems in Africa*

By

Charles Bassey†

1.0 Introduction

Modern society is characterized by a new economy, engendered by the convergence of globalization (existing connections and relationships among countries, continents and cultures that transcend their immediate local environment) and information and communication technology (ICT), riding on the backbone of the Internet. An important feature of this convergence is that information has become codified in a manner that renders its processing and distribution quick and cheap. In effect, information has become a dematerialized economic entity and a measure of power and, by extension, wealth, as depicted in the convertibility of currency notes to data. Inevitably, this new economy encompasses the vicissitudes of the old, magnifying extant "object gaps" with new and stringent forms of "ideas gaps." The consequence is that developing countries (like those of sub-Saharan Africa) have to confront the twin challenges of technology inequality and poverty with the uncanny option of devoting attention to fighting the former as a mean of addressing the latter, often with innovative livelihood mechanisms.

The above scenario has drawn the continent of Africa, as much as the rest of the world, steadily and inevitably on the destined path of globalization. At the centre of this destiny is money as an increasingly dematerialized and deterritorialized entity. Owing largely to globalization effects, it may be argued that the destiny of money is to become digital, thereby narrowing the financial intermediation effects of distance and space in the payment system. However, globalization with its engines of growth is opening up opportunities for more currencies, albeit digital, to come into play with more private sector players and traditional state actors competing side by side as currency creators. This future destiny of money, coupled with the convergence of globalization and ICT, poses present challenges to Africa as a continent, especially as money seems destined to remain a basic feature of financial payment and settlements systems.

The point to note about the challenges is that facing them is, arguably, both inevitable and promising. Inevitable because they offer a path-dependence for

* Paper presented at the "Workshop on Everyday Digital Money: Innovation in Money Cultures and Technologies" held at the University of California, Irvine, CA, USA, September 18-19, 2008.
† Central Bank of Nigeria.

Africa's integration into the global economy; and promising because they hold inherent opportunities to leapfrog and close up gaps. Taking up the discussion from this point, this paper assesses the effect of convergence of globalization and ICT on sub-Saharan Africa and how this convergence challenges, as well as holds prospects, for the development of an efficient payment system. This discussion is divided into three broad sections. The first section focuses on Africa's place in the new digital economy. The second section explores the nature of payment system in Africa and its readiness for integration into the global e-payment system. In section three, the paper presents the challenges facing development of efficient e-payment system in Africa with a look at prospects.

2.0 Africa in the New Economy

2.1 Characteristics of the New Economy

Though several debates have evolved around the construct of the new economy, delineating the features of transition from the old to the new economy is not an easy one, especially at the level of measurement and practice. Nevertheless, a theoretic espousal construes the old economy as one where economic growth is achieved primarily through industry or the deployment of traditional productivity inputs like labour and natural resources. On the other hand, the new economy, otherwise tagged the "knowledge economy," is one in which ideas and information drive economic growth and society's advancement. Advances in ICT underpin knowledge intensity in the production process of the new economy, bringing about qualitative and quantitative changes in function, process and structure of the economy.

Clarke (2003:6) outlines the characteristics of the new economy as follows

i. A rising knowledge intensity in all industries, including in the service sector.
ii. A corresponding decline in the resource-intensity of economic activity.
iii. A global focus resulting from increased international flows of capital, technology and skilled labour, the opening of markets, and improved transport and communications technologies.
iv. High and rising productivity levels in manufacturing especially in advanced countries, together with a growing link between technology and quality and the use of technology to replace even low-cost labour.

The above succinct characterization of the new economy can be elaborated further to cover the fact that within the new economy, much of the workforce

are not involved in the physical production of objects or material goods; rather in their design, development, sale and servicing. Since information is an intangible resource in the new economy, when unbundled from its tangible conveyor, it becomes possible to imagine that the infrastructure has been created for replacing old prevalent economic structures with knowledge as input for economic progression. In the face of digitization of production and consumption, confrontation with the knowledge access and usage requirements of the new economy creates digital divide, both within and between countries. Digitization of production and consumption confers systemic properties on the new economy through a process that transforms inputs into outputs on the strength of some predetermined prerequisites, making the construct of autopoiesis relevant for conceptual purposes.

2.2 The New Economy as Autopoietic System

This paper is inclined to view the new economy, *a la* Luhmann (1986), as an autopoietic system, given the primacy of knowledge and interplay among the three elements of ICT, globalization and Internet in organizing and reinforcing the economy's systemic character and growth. In reviewing diverse viewpoints on autopoiesis, Ritzer (2000) expressed four characteristics of autopoietic systems relevant for our consideration here. However, for contextual and illustrative purposes, information and ICT are used to espouse these features.

First, an autopoietic system produces its basic elements that make up the system. For instance, money is a basic element of the new economy because the value of things within the economic system can be given in terms of money and the symmetric inter-dependence of both (economic system and money) makes each indispensable to the other. In similar manner, information also serves as a basic element of the new economic system in the sense that the ICT revolution, having given birth to the new economy, further generates technologies to reinforce its resilience such that it would be impossible to talk about one without the other.

Secondly, autopoietic systems are self-organizing in two ways – they organize their own boundaries and they organize their internal structures. The former is done by distinguishing between what is in the system and what is in the environment; and the latter is done by producing its own structures within its boundaries. Illustratively, information that drives the economic system becomes a scarce commodity and its control confers power and influence, such that boundaries exist between those with and those without information and its resultant power. In relation to organization of internal structures, we observe that the generation of information has led to the evolution of secure storage facilities and transmission lines which are impersonal and increasingly deterritorialized through the basic elements of ICT and the Internet. This provides the infrastructure for electronic monetary transactions.

The third point is that autopoietic systems are self-referential in the sense that the new economy refers to itself as an economic system and perceptibly the use of monetary value within this context aids the self-reference. Given the commodification of information, the economy determines its price or market value and generates its own rules of engagement and legal system for keeping or changing the price of knowledge, ideas or information in an information exchange arena typifying a market system. This market influences pricing levels and convertibility of currencies.

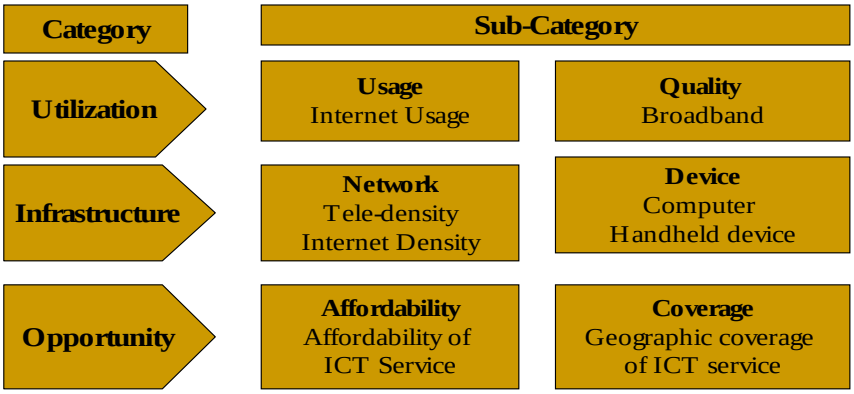
The fourth characteristic of an autopoietic system is that it is a 'closed' system. I use the term 'closed' both circumspectly and with emphasis. The dynamics of the new economy as a closed system is captured in two aspects. First, once drawn into it, you cannot opt out. Secondly, its self-referential and self-organizing features create certain desirableness for those outside through creative portrayal of its competitiveness as a mark of equality and the one guaranteed path for advancement. The new economy markets information and its accessories – benefits, ICT devices, levels of Internet access, etc – as though they are meant to provide those without information with assets of the new economy; whereas, in reality it is meant to protect and expand the frontiers and influence of those already *in* the new economy. That underlies Ritzer's contention that "the economic system responds well to the material needs and desires of rich people but very poorly to the needs and desires of poor people" (p.324). Somewhat this depicts the dilemma of African countries in the face of the digital divide challenge.

2.3 Digital Divide and Competitiveness in the New Economy

As used by International Telecommunications Union (ITU), the term "digital divide" highlights the uneven distribution, differences or gaps that exist in opportunities to access and use of ICTs amongst diverse population groups, be they individuals, households, businesses or geographical areas (ITU, 2005: vii). The divide can be either vertical (highlighting gaps existing between users and non-users of ICT) or horizontal (analyzing the gap among ICT users).

Several indicators have been identified for capturing the digital divide and so has diverse indexes been developed. However, for the purposes of our discourse, the Digital Opportunity Index (DOI), an e-index based on internationally accepted ICT indicators, is considered most tenable. The DOI framework is based on availability and suitability of data and lends itself to a logical, sequential classification of three categories, viz. opportunity, infrastructure and utilization as captured in Figure 1 (ITU, 2005, 2007).

Figure 1: Classifying the DOI



Source: ITU (2005: 24)

Opportunity encompasses *accessibility* and *affordability* with the following indicators: percentage of population covered by mobile cellular telephony; internet access tariffs as a percentage of per capital income; and mobile cellular tariffs as a percentage of per capita income.

Infrastructure includes *network* indicators as well as *devices* that provide interface between the user and the network and has the following indicators: proportion of households with a fixed line telephone; proportion of households with a computer; proportion of households with Internet access at home; mobile cellular subscribers per 100 inhabitants; and mobile Internet subscribers per 100 inhabitants.

Utilization indexes the extent of ICT *usage* and the *quality* which reflects a level of access that enables higher degree of functionality. This is measured by the following indicators: proportion of individuals that used the Internet; ratio of fixed broadband subscribers to total Internet subscribers; and ratio of mobile broadband subscribers to total mobile subscribers.

The classification represents a transition from a lower level (basic voice communication) to a higher level (broadband connectivity). Access to infrastructure is determined by users having opportunity to be covered by the service and being able to afford it while utilization depends on having infrastructure and a device.

Table 1
Africa Digital Opportunity Index (DOI) 2005

Rank	Economy	Opportunity	Infrastructure	Utilization	DOI
1	Mauritius	0.98	0.41	0.06	0.48
2	Seychelles	0.97	0.32	0.10	0.46
3	Morocco	0.87	0.12	0.23	0.41
4	Algeria	0.91	0.15	0.12	0.39
5	Tunisia	0.96	0.16	0.05	0.39
6	Egypt	0.94	0.17	0.02	0.38
7	South Africa	0.90	0.18	0.05	0.38
8	Botswana	0.92	0.12	0.01	0.35
9	Libya	0.92	0.12	0.01	0.35
10	Gabon	0.86	0.11	0.01	0.33
11	Cape Verde	0.80	0.15	0.04	0.33
12	Namibia	0.85	0.10	0.01	0.32
13	Senegal	0.72	0.06	0.14	0.30
14	Swaziland	0.80	0.09	0.01	0.30
15	E. Guinea	0.73	0.05	0.00	0.26
16	Djibouti	0.74	0.04	0.00	0.26
17	Lesotho	0.65	0.03	0.00	0.23
18	Angola	0.60	0.02	0.00	0.21
19	Cameroon	0.59	0.03	0.00	0.21
20	Gambia	0.53	0.08	0.01	0.21
21	Sudan	0.51	0.05	0.02	0.19
22	Cote d'Ivoire	0.54	0.01	0.00	0.19
23	Togo	0.48	0.03	0.02	0.17
24	Benin	0.48	0.02	0.00	0.17
25	Ghana	0.47	0.03	0.01	0.17
26	Zimbabwe	0.42	0.05	0.03	0.17
27	D.R Congo	0.46	0.05	0.00	0.16
28	Guinea	0.47	0.01	0.00	0.16
29	Uganda	0.45	0.01	0.00	0.15
30	Congo	0.39	0.05	0.01	0.15
31	Nigeria	0.41	0.03	0.00	0.15
32	Zambia	0.39	0.01	0.00	0.15
33	Comoros	0.40	0.02	0.00	0.14
34	Sao Tome/Principe	0.32	0.05	0.04	0.14
35	Mauritania	0.36	0.05	0.00	0.14
36	Madagascar	0.38	0.01	0.00	0.13
37	Burkina Faso	0.36	0.02	0.00	0.13
38	Kenya	0.34	0.03	0.01	0.13
39	Tanzania	0.35	0.02	0.00	0.12
40	Central Africa Rep	0.34	0.01	0.00	0.11

Source: ITU, 2007

Table 1 continues

Table 1 (cont'd)
Africa Digital Opportunity Index (DOI) 2005

Rank	Economy	Opportunity	Infrastructure	Utilization	DOI
41	Mali	0.30	0.01	0.00	0.10
42	Mozambique	0.26	0.02	0.01	0.09
43	Burundi	0.27	0.01	0.00	0.09
44	Sierra Leone	0.26	0.01	0.00	0.09
45	Ethiopia	0.26	0.01	0.00	0.09
46	Malawi	0.23	0.01	0.00	0.08
47	Rwanda	0.22	0.01	0.00	0.08
48	G. Bissau	0.10	0.02	0.01	0.04
49	Eritrea	0.07	0.01	0.00	0.03
50	Niger	0.05	0.01	0.00	0.02
51	Chad	0.03	0.01	0.00	0.01

Source: ITU, 2007

A geographic representation of digital opportunity index on the global map reveals a bleak cloud over Africa in comparative terms. Africa falls within the low digital opportunity index scores, with an average score of 0.22 compared to the world average of 0.40, Europe's 0.58, Americas' 0.45 and Asia's 0.40. While a surge in high-speed access, widely available infrastructure and high utilization set apart some countries with high-DOI scores, those with medium DOI scores are also doing averagely well on the three indicators of opportunity, infrastructure and utilization. What distinguishes this group from the low-DOI economies is the reasonable infrastructure and growing use of advanced technologies in the medium-DOI countries. Albeit, at levels around a third of those achieved by high-DOI economies. Only a few African countries (like Algeria, Egypt, South Africa, Tunisia, Botswana, Gabon, and Namibia) are in this group (ITU, 2007).

In low-DOI economies, digital opportunity is expressed in terms of *potential* access to the information society that has not yet been fully realized. For the low-DOI economies, it is the mobile wireless communication that is driving the digital opportunity and this underpins Africa's mobile market being adjudged the fastest-growing market over the period 2000-2005 with a 50 per cent annual average growth rate, more than twice the global average of 24 per cent over the same period (ITU, 2007).

In specific terms, the 2005 DOI reveals that no African country made it into the high DOI group, few fell within the medium DOI scores group and the rest in the low-DOI group. Thus, Onyeiwu's (2002) review of statistics on Africa's digital performance for capturing horizontal divide is explicit. For instance, in spite of being home to 10 per cent of global population, Africa was recorded as having less than one per cent of the world's Internet users in 2000. It is also reported that in the same year, Africa had 2.5 million Internet users compared with 136 million

in North America, 83 million in Europe and 679 million in Asia. Thus, moving beyond this, the picture of inter-country variations in digital technology in Africa is imperative in appreciating the infrastructure which will drive digital currency and payment in the continent.

In assessing the inter-country variations in digital technology, we are mindful of the fact that data on Africa may not be available on some indicators for some countries. To fill this gap, while still offering a robust framework for analysis, Onyeiwu (2002) proposes the following index for computing the levels of digitalization of African countries with data drawn from the International Telecommunication Union (ITU).

IT Index = [1/10(A+B) + 10 (C+D+E)]/50

Where:

A	=	number of internet hosts per 10,000 of the population
B	=	Internet users per 10,000 of the population
C	=	number of personal computers per 100 of the population
D	=	telephone lines per 100 of the population
E	=	cellular phones per 100 of the population

With an upper bound limit of 100 and a lower bound of zero, a completely digitalized economy would have an IT index of 100, implying that there is an Internet host for every person in the country and that everyone also uses the Internet. In addition, there would also be a telephone and cellular line for every person (Onyeiwu, 2002). The relevance of this index for our discourse is its complementarity fit with the Digital Opportunity Index indicators. This complementarity allows for comparison between both indexes in relation to Africa.

Table 1 and Table 2 show that some countries have remained in the top echelon of digitalization in Africa. One country which occupies a unique position in both the Digital Opportunity Index and IT index even in the analysis of international global economy is South Africa. The frontier position of South Africa as a case study for assessing deviation of other African countries from it is significant for various reasons. And Cogburn and Adeya (2001) offer some of these. First, South Africa engaged in one of the most unique telecommunications policy restructuring processes in the developing world, which placed a high priority on achieving its universal access goals. Second, South Africa has made numerous movements towards creating a more liberalized telecommunications sector and promoting the development and use of information infrastructure. Third, there has been a marked e-commerce in South Africa since 1996 in terms of market and policy activities. Fourth, the racialised nature of the South African economy has left the country with a dualist economy or society that has elements of both

developed and developing country. In addition, there is the empirical reality that South Africa has been investing heavily in ICT such that its 1999 share of ICT expenditure per GDP was 7.2 per cent, higher than the world average of 6.6 per cent. Finally, within the context of the CIBS (China, India, Brazil and South Africa) countries, South Africa is the one African country which has potential to provide resources for investment and technologies for productivity in the new economy (Nayyar, 2008).

Table 2
IT index ranking of African countries

		No. per 10,000 people		No. per 100 people				
Rank	Country	Hosts	Users	PCs	Telephone Lines	Cell Phones	Weighted sum	IT Index
1	Reunion	0.01	1859.80	4.63	38.86	39.50	1015.88	20.32
2	Seychelles	1.11	739.54	13.56	23.45	32.00	764.17	15.28
3	Mauritius	27.44	728.91	10.05	2353.00	15.08	562.24	11.24
4	S. Africa	42.95	549.38	6.18	11.36	19.02	424.83	8.50
5	Botswana	14.53	92.48	3.70	9.27	12.33	263.70	5.27
6	Cape Verde	0.62	183.99	0.00	12.62	4.54	190.06	3.80
7	Namibia	18.51	170.78	3.42	6.27	4.67	162.53	3.25
8	Morocco	0.66	70.54	1.23	5.03	8.26	152.32	3.05
9	Gabon	0.28	122.35	0.98	3.18	9.79	151.76	3.04
10	Egypt	0.35	70.89	2.21	8.64	2.14	137.02	2.74
11	Tunisia	0.03	104.32	2.29	8.99	0.58	129.04	2.58
12	Libya	0.05	17.84	0.00	10.79	0.71	116.79	2.34
13	Sao Tome	52.65	436.48	0.00	3.10	0.00	79.91	1.60
14	Swaziland	9.73	99.21	0.00	3.19	3.27	75.49	1.51
15	Senegal	1.93	42.00	1.68	2.16	2.63	69.09	1.38
16	Algeria	0.01	16.19	0.65	5.7	0.28	67.92	1.36
17	Togo	0.34	216.03	2.16	0.92	1.08	63.24	1.26
18	Zimbabwe	2.16	37.08	1.19	1.85	2.29	57.22	1.14
19	Cote d'Ivoire	0.41	27.05	0.61	1.78	3.04	57.05	1.14
20	Gambia	0.12	30.70	1.15	2.56	0.43	44.48	0.89
21	Congo	0.02	1.75	0.35	0.75	2.38	34.98	0.70
22	Djibouti	0.02	21.94	1.02	1.52	0.04	28.00	0.56
23	Zambia	0.86	19.19	0.67	0.80	0.95	26.21	0.52
24	Kenya	0.53	65.21	0.49	1.05	0.42	26.17	0.52
25	Ghana	0.01	14.84	0.30	1.17	0.64	22.59	0.45
26	Lesotho	0.47	18.58	0.00	1.03	1.00	22.21	0.44
27	Cameroon	0.21	26.52	0.33	0.64	0.98	22.17	0.44
28	Benin	0.00	24.60	0.16	0.85	0.91	21.66	0.43
29	Mauritania	0.45	18.87	0.94	0.72	0.27	21.23	0.42
30	Guinea	0.25	10.12	0.37	0.79	0.53	17.94	0.36
31	E. Guinea	0.00	11.32	0.23	1.35	0.07	17.63	0.35
32	Sudan	0.00	9.65	0.32	1.24	0.07	17.27	0.35
33	Comoros	0.58	21.61	0.43	1.00	0.00	16.52	0.33

Table 2 continues

Table 2 (cont'd)

IT index ranking of African countries

		No. per 10,000 people		No. per 100 people				
Rank	Country	Hosts	Users	PCs	Telephone Lines	Cell Phones	Weighted sum	IT Index
34	Tanzania	0.23	32.75	0.28	0.49	0.51	16.10	0.32
35	Uganda	0.08	18.01	0.27	0.28	0.85	15.81	0.32
36	Nigeria	0.07	17.57	0.66	0.43	0.03	12.96	0.26
37	G. Bissau	0.17	24.97	0.00	0.93	0.00	11.81	0.24
38	Malawi	0.01	14.51	0.12	0.44	0.47	11.75	0.24
39	Mozambique	0.06	15.24	0.30	0.44	0.26	11.53	0.23
40	Madagascar	0.34	18.82	0.22	0.34	0.40	11.52	0.23
41	Eritrea	0.05	13.05	0.16	0.80	0.00	10.91	0.22
42	Angola	0.01	22.84	0.11	0.53	0.20	10.69	0.21
43	Burkina Faso	0.32	8.38	0.13	0.45	0.21	8.74	0.17
44	Rwanda	0.47	6.47	0.00	0.23	0.50	7.99	0.16
45	S. Leone	0.18	10.30	0.00	0.39	0.25	7.45	0.15
46	Mali	0.08	16.74	0.12	0.35	0.09	7.28	0.15
47	CAR	0.02	4.15	0.17	0.26	0.14	6.12	0.12
48	Burundi	0.00	4.48	0.00	0.30	0.24	5.85	0.12
49	Ethiopia	0.01	1.58	0.09	0.37	0.03	5.06	0.10
50	Chad	0.01	3.92	0.13	0.13	0.07	3.69	0.07
51	Niger	0.16	4.66	0.05	0.19	0.02	3.08	0.06
52	Liberia	0.00	1.59	0.00	0.21	0.00	2.26	0.05
53	Somalia	0.00	0.21	0.00	0.15	0.00	1.52	0.03
54	D. R. Congo	0.02	0.10	0.00	0.04	0.03	0.71	0.01

Source: Onyeiwu, 2002

As indicated by the Economist Intelligence Unit (2008) IT industry competitiveness, South Africa is the only African country at a stage where emerging IT outsourcing can significantly receive a boost with faster, competition-led infrastructure development. Thus, using the IT index in Table 2 and South Africa's frontier position, the IT index of 8.50 marks South Africa out as very advanced in IT; hence countries with equal or greater index are also tagged very advanced within the African context. Those with indexes between 3.0 and 7.99 are regarded as advanced; those within 1.0 and 2.99 are semi-advanced; those between 0.40 and 0.99 are 'catching up access' and those between 0.2 and 0.39 are considered weak while those below 0.2 have very weak access (Onyeiwu, 2002). The taxonomy translates into the presentation in Table 3.

Table 3
Classification of African Countries according to their levels of digitalization

IT Index of:					
8.50 & above	3.0-7.99	1.0-2.99	0.40-0.99	0.2-0.39	below 0.2
Very advanced	Advanced	Semi-advanced	Catching-up	Weak access	Very weak access
Reunion	Botswana	Egypt	Gambia	Guinea	Burkina Faso
Seychelles	Cape Verde	Tunisia	Congo	Eq. Guinea	Rwanda
Mauritius	Namibia	Libya	Djibouti	Sudan	Sierra Leone
South Africa	Morocco	Sao Tome	Zambia	Comoros	Mali
	Gabon	Swaziland	Kenya	Tanzania	Central African Rep.
		Senegal	Ghana	Uganda	Burundi
		Algeria	Lesotho	Nigeria	Ethiopia
		Togo	Cameroon	Guinea Bissau	Chad
		Zimbabwe	Benin	Malawi	Niger
		Cote d'Ivoire	Mauritania	Mozambique	Liberia
				Madagascar	Somalia
				Eritrea	D.R. Congo
				Angola	

Source: Onyeiwu (2002)

The picture in Table 3 is that of nine (9) countries in Africa being classified as advanced or very advanced. When compared with the rest of the world, even these are far below those of the developed world. Yet, it is this collectivity of Africa's levels and opportunity which serve as her critical asset for competing in the highly competitive digital economy and payment system.

3.0 Payment Systems in Africa

A payment system is a mechanism comprising institutions, instruments and procedures by which monetary obligations are transferred and settled by financial agents. An efficient payment system is one which the financial architecture guarantees transfer and settlement of monetary obligations with minimum delay, cost and convenience. This efficiency revolves round two critical components of the payment system: clearing and settlement. The first involves the transfer of bonds and cash between buyers and sellers while settlement entails completion of financial transaction involving delivery of securities or funds from one party to another.

The financial intermediary role of registered banking institutions moderated by nationalized central banking procedures predominate Africa's payment system. In each country the central bank exists to formulate and implement policies that facilitate the operation of the payment system. Often this is done to protect the

national currency given the regulatory authority's burden of ensuring its value. However, as part of efforts to liberalize the payment system, increase its efficiency and achieve international acceptability, non-bank institutions and private sector players also provide payment services. Common examples are the Western Union, Visa, MasterCard, American Express, Diners Club, etc.

The payment system of the continent, however, reflects efforts at national and regional levels. Given the orientation of this paper towards a continental analysis, attempt is made to capture payments infrastructure primarily from regional basis while incorporating country analysis to aid our discourse.

3.1 West African Monetary Zone (WAMZ)

The West African Clearing House was established in 1987 to facilitate payments and settlements in West Africa. The West African Monetary Zone sub-region is reflective of the geographic space of Economic Community of West African States. This evolved into West African Monetary Agency (WAMA) in 1995 to expedite the monetary cooperation of the sub-region and move towards a West African Central Bank. However, the payments system development has not advanced significantly as cash transactions still persist across the border, complemented by transactions through correspondent banks. In addition, the West African Monetary Zone is characterized by disparate payment mechanisms and at different levels of development, thereby making integration risky and challenging, especially given the levels of ICT development.

Looking at specific payment infrastructure within the region, cash and cheques are the major forms of payment in Gambia and Sierra Leone, without automated clearing house while the Bank of Ghana is implementing a National Electronic Payment System comprising electronic funds transfer, automated clearing house and smartcard payment systems in Ghana (Madhavan, 2008). In Nigeria, cash and cheques still dominate the payment system, complemented by continued growth in electronic payment options through the National Automated Clearing System (NACS) and the Nigerian Inter-bank Settlement System (NIBSS) infrastructure. The CBN Inter-Bank Funds Transfer System (CIFTS) and the Real Time Gross Settlement (RTGS) are also in operation to cater for large inter-bank transfers. In 2007, a National Payment System Vision 2020 was developed as subset of the Financial System Strategy 2020 (FSS 2020) to reform the national payment systems (CBN, 2008).

A survey of developments in the e-payment products of the financial sector in Nigeria carried out by the Central Bank of Nigeria (CBN, 2008) revealed that most widely provided facilities were internet banking, electronic card, mobile banking and telephone banking in descending order. However, in terms of patronage, internet and telephone banking products were poorly patronized for

all categories of services offered, especially for internet shopping, funds transfers and bill payment. For electronic cards, all the banks were involved in issuance of one form of electronic card or the other, with debit cards being the most patronized, followed by naira denominated credit cards. The international Visa and MasterCard were poorly patronized as they were in foreign currencies which limit their utilization to high net worth customers.

The survey discovered that mobile banking was at rudimentary stage despite its potential and increasing mobile tele-density in the country. Within this category, only recharge phones were widely used, while fund transfers outside and within a financial institution were limited. Mobile banking was hardly used for bill settlement. The Automated Teller Machines (ATM) has been reported to have gained prominence in Nigeria settlement system and this has been greatly due to the need for cash in completing transactions. Thus, ATM was highly patronized in the areas of cash withdrawal and account enquiry compared to low patronage for Point of Sale terminal services. Cash and cheque lodgment services on ATM were virtually non-existent.

3.2 West African Economic and Monetary union (WAEMU)

Initiated by the Central Bank of West African States (BCEAO) in 1999, the West African Economic and Monetary Union (WAEMU) exists within the West African sub-region and comprises mainly French-speaking countries of Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo. It was established to address the issues of predominant cash payments, high-cost transactions and legislation unsuited for payment system developments in addition to promoting new electronic payment instruments. The WAEMU has recorded significant strides towards enhancing efficient payment system within the sub-region.

In 2006, the automated inter-bank clearing system was successfully launched in Senegal, Burkina Faso, Cote d'Ivoire and Benin, following similar launch in Mali in 2005. The year 2006 also witnessed the successful test of the regional inter-bank card processing solutions as well as enforcement of the instruction on issuance of electronic money and electronic money institutions. In spite of the developments in the sub-region, member countries are still predominantly cash-based. In Cote d'Ivoire, for instance, date on cheques clearing ranges from +3 to +30 days depending on where it is drawn or deposited (Madhavan, 2008).

3.3 The COMESA Clearing House and SADC Payment Systems

The Common Market for Eastern and Southern Africa (COMESA) Clearing House is another major regional economic initiative designed to facilitate the payment system. Its member countries include Burundi, Comoros, D. R. Congo,

Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe. The COMESA was established to improve the efficiency of clearing operations and complement the services of commercial banks as well as facilitate monetary and fiscal policy harmonization within the region. Given the limited amount of convertible currencies in the region, the COMESA Clearing House was to promote cross-border payment and settlement through the Regional Payments and Settlement System by allowing businesses to invoice their exports in national currencies as against the scarce convertible currencies like the United States dollars. COMESA has not recorded much achievement in promoting the payment systems of the member countries and clearing activities were suspended due to the disparate policies and infrastructure of member countries.

Looking at specific situation in some of the countries of the COMESA, the situation is not much significant. In Uganda, cash and cheque usage dominate payment and settlement systems even though payments are automated with high value inter-bank payments processes through the Real Time Gross Settlement (RTGS) system. Zambia and Zimbabwe are also cash-based economies, but cheques are cleared through the SWIFT-based RTGS system for high-volume transactions.

The possible strides of the COMESA seem to have been overshadowed by the activities of the Southern African Development Community (SADC) payment framework given the membership of some COMESA member countries in the SADC and the influential role of South Africa. The SADC Committee of Central Bank Governors initiated the Payment System Project to facilitate efficient intra-country and cross-border settlement process. This has led to the introduction of the real-time gross settlement (RTGS) system in most member countries. Much of the payment system developments in the community follow the path of development in South Africa.

The South African Multiple Option Settlement (SAMOS) system was introduced in 1998 to bring domestic inter-bank settlement practices in line with international best practice. The SAMOS, which forms the core of the country's payment system, provides the facilities for banks to settle their obligations on a real-time basis. Among the services carried out by the South African payment system include automated clearing, electronic funds transfer, switching of electronic payments between banks and clearing of South African Payment System and South African Netting System payments through SWIFT.

3.4 Synthesizing the Nature of Electronic Payment Systems in Africa

The totality of payment system in Africa reveals predominance of cash in settlement of financial transactions. Even though electronic process is

incorporated into the payment system, limited services exist where such payment is electronically initiated, processed and completed with finality without interfacing with some form of cash. Given the IT situation in the continent and the context of e-payment, Africa can be classified largely as a mobile continent as depicted by its phenomenal growth in mobile telecommunications technologies. As pointed out by ITU (2007), strength in mobile is the main driver of digital opportunity in Africa, with the mobile sector accounting for over half of total digital opportunity in the majority of African countries. The mobile telephone has functional capabilities for serving as a virtual bank, internet banking terminal or ATM-point of sale terminal, thereby making it strategic alternative for bridging the digital divide in Africa.

Strategic investors in the mobile sector include MTN, Vodacom, Orascom, Zain (Celtel), Orange, Millicom and Etisalat, all having an estimated 97,018,000 subscribers across Africa as at March 2006 (ITU, 2007). Thus, the growth in mobile tele-density in the continent has rubbed off positively on the payment system. These include services such as funds or credit transfer and payment for goods and services. Usually, the short messaging service-based account is in existence with transaction carried out using text commands. The point to note is that much of the services have been initiated by conventional banks or non-bank private sector actors working in relation with the traditional banking institutions.

Given its ICT levels, South Africa has widespread mobile phone and internet banking services. These include, among others, the combination of mobile phone and Cell Pay Point facilities offered by First National Bank which allow for third party payments, funds transfer, traffic fine payments, etc; and the virtual WIZZIT Bank which utilizes unstructured supplementary service data (USSD) mobile payments technology. The latter, sponsored by the South African Bank of Athens with equity stake by International Finance Corporation represents an innovative and embracing technology providing conventional banking services to the non-banked mobile telephone users, including services like third party payment, funds transfer, etc.

An exemplary usage of the mobile phone technology in monetary transactions in Nigeria is the FlashMeCash facility offered by First Inland Bank. The facility is a mobile payment solution designed specially to serve as a means of payment for goods and services (such as purchase of virtual recharge vouchers, bill settlement, fund transfer, etc) through GSM phones and the internet. The mobile phone number of the registered user serves as the account number and offers the capabilities of making payments to third parties by generating automated text messages via the server to recipient's phone. The generated message suffices as authority for payment which can be presented at any branch of First Island Bank for monetary claim and the recipient is not required to be an account holder.

The picture depicted in this section is one where automation processes of settlement are broadly widespread and complementary to the dominance of cash transactions. Innovative platforms such as the Virtual Terminal Network (VTN) are also anchored on enabling transmission and access of cash. In summary, therefore, the e-payment systems in Africa can be described as being in the forms of E-Purse transaction, online credit card payment, electronic payment based on trusted third party, smart card (credit and debit) transactions, cheque book order, bulk payments, mobile funds transfer and payment, electronic billing presentment and payment.

4.0 Challenge and Prospect

The old economy is risk-avoiding, even though it has harboured signs of incipient risks. In contrast, however, the new digital economy is primarily both risk-generating and risk-managing, making it resilient in responding to risk. Riddled with risks, therefore, it becomes inevitable for a part to be divorced from it, whether one is within or outside the scope of the new economy. Risk being an invention escalated by the new economy, the "novelty of the world risk society lies in the fact that we, with our civilising decisions, cause global consequences that trigger problems and dangers that radically contradict the institutionalised language and promises of the authorities…." (Beck, 2002: 4). Thus, risk permeates every aspect of modern economic activity, indexed by natural and technological risk, real and socially constructed risks, invisible, visible and virtual risks, actual and perceived risks as well as borderless risks (Ekberg, 2007).

The "omnipresence of risk" underlies our perspective in appraising the challenges and prospects of electronic payment in Africa in the sense that acting or not acting does not provide immunity from the effects. It is not hard to imagine a future scenario where it may not be possible to produce currency notes in the conventional form arising from non-manufacture of currency minting machines; or where the cost of insisting on producing existing forms of money (cash) would be so outrageous that it would be both impossible and undesirable to continue. It is not hard to imagine given that we are witnesses to what is happening in the broadcasting industry, where not going digital is not an option.

Electronic payment systems ride on the information and communication technology infrastructure. Thus, developing the ICT infrastructure is a natural precondition for development of electronic payment system. This presupposes that the major challenge is lack of good and dependable ICT infrastructure. Thus, we identify three interrelated dimensions for appraising the challenges, viz. the infrastructure, the regulatory and cultural-cum-human dimensions. The infrastructure dimension encompasses ICT accessibility, affordability, networks, connectivity and usage. Related to these are issues of interconnectivity, network failure, low bandwidth, high cost of connectivity, frequent power outage, etc.

The indicators used by Economist Intelligence Unit (2008) in benchmarking IT industry competitiveness are important in giving us insights to the component challenges of ICT infrastructure. These include specific overall business environment, IT infrastructure, human capital, legal environment, research and development environment and support for IT industry development which would enable the flourishing of the ICT industry.

Though Africa has faired poorly in terms of digital opportunity, it is also appreciated that ICT development has potential to affect growth positively in other aspects of society. Thus, without an option, efforts must be made to address the deficit. This prospect underlies the efforts of several countries to pull through certain reforms that would strategically promote ICT infrastructure. Senegal represents a good example of what is possible. By connecting to two submarine fiber optic cables, its international connectivity was greatly increased, followed by doubling of the traffic bandwidth on Internet services in less than two years. What this translates to is that more are using the Internet reliably both at work and at home with the capacity to leverage on this infrastructure (ITU, 2007).

At the regional level, fifteen West African countries sought to create a harmonized information and communication technology (ICT) market in West Africa through a meeting of telecommunications regulatory authorities of the countries held in Ghana in September, 2005. At the continental level, a framework for addressing the ICT deficit in Africa tagged the *Connect Africa Summit* was held in Rwanda in October, 2007 under the auspices of International Telecommunication Union (ITU), African Union, Economic Commission for Africa, World Bank Group, United Nations Global Alliance for ICT and Development (GAID), African Development Bank (AfDB), African Telecommunication Union (ATU) and the Global Digital Solidarity Fund. The following Connect Africa Goals were adopted to bridge the digital divide in the continent (UNECA, 2007).

i. Interconnect all African capitals and major cities with ICT broadband infrastructure and strengthen connectivity to the rest of the world by 2012.

ii. Connect African villages to broadband ICT services by 2015 and implement shared access initiative such as community telecentres and village phones.

iii. Adopt key regulatory measures that promote affordable, widespread access to a full range of broadband ICT services, including technology and service neutral licensing/authorization practices, allocating spectrum for multiple, competitive broadband wireless service providers, creating

national Internet Exchange Points (IXPs) and implementing competition in the provision of international Internet connectivity.

iv. Support the development of a critical mass of ICT skills required by the knowledge economy, notably through the establishment of a network of ICT Centres of Excellence in each sub-region of Africa and ICT capacity-building and training centres in each country, with the aim of achieving a broad network of inter-linked physical and virtual centres, while ensuring coordination between academia and industry by 2015.

v. Adopt a national e-strategy, including a cyber security framework, and deploy at least one flagship e-government service as well as e-education, e-commerce and e-health services using accessible technologies in each country in Africa by 2012, with the aim of making multiple e-government and other e-services widely available by 2015.

The five goals, designed to support the African Regional Action Plan on Knowledge Economy (ARAPKE) as well as other continental efforts, hold the key in making Africa the miracle waiting to happen. However, the cost and commitment of individual countries to provide enabling business and legal environment for IT infrastructure, support and research and development, to see the goals through are key stumbling blocks which must be addressed.

Faced with the threat of globalization and confronted by the digital economy, developing ICT in Africa is not an option. It is recognized as a need. However, having a legal and policy framework that would ensure that the use of ICT for financial settlement purposes anchors effectively to sustain a safe, secure and sound system is critical. Presently, participants in the payment system hardly understand their liabilities, thereby acting on unequal terms. The lack of a robust legal framework which covers the intricacies of the electronic payment system, especially when such transcends the borders of sovereign nation states is visible in many countries. Such regulatory framework would be needed to address issues covering licensing and functions of institutions, refund policies, liabilities of customers, merchants and institutions, flow of data and mechanism for protecting digital identity against theft, etc. The prospect in this regard is that regional groupings have recognized and begun the process of monetary integration with underlying policy framework in addition to the strategic guidelines of Bank for International Settlement (BIS).

African countries must move beyond the strategy and visions which their regulatory agencies have evolved, to deliberately building infrastructure that would power productivity and accelerate ICT development. The regulatory framework for a payment system which accommodates electronic processes requires dynamism to address the emergent issues in the system in a self-

referential manner. Given the unique experience of mobile technology growth in Africa, opportunities to solve everyday lived experiences and needs is inevitable. Regulation must recognize and encourage this potential, especially in a bid to address possible lacunae in existing regulation vis-à-vis emerging trends in the application of technology in payment systems.

Beyond the above, it must not be forgotten that Africans are deeply cultural people with attitudes, values and beliefs. Like all things that are new, and fraught with visible challenges, electronic payment faces the human dimension challenge. People require awareness of the nature of services offered and their benefits over existing ones. The issue of cost reduction being central to the argument on adoption of e-payment is not discernible to the generality of financial services users. Furthermore, there is a general perception that e-payment involves risk. And the experience of African users in this regard has been well founded. There have been cases of ATM debiting accounts without payments and refunds never made. Often the reasons belying this include non-traceability of who is the liable partner: the transmitter, the operating institution or the user.

Furthermore, people want to know what to expect in the future before they commit themselves in the present. Some may want to know how electronic payment would affect the gift system if all cash goes digital or the carrying of cash becomes impossible. This concern may even extend into the sphere of religious celebrations where worship and cash offering are viewed as a related mode of religious expression involving thanksgiving. Another challenge from the cultural-human angle is the increasing dollarization of e-payment and the attendant convertible inconvenience which undermines national currencies of most African countries.

In addition, the lack of virile credit database on individual account holders has not aided the development of electronic payment. In most cases, individuals using electronic payment terminals are generally required to draw within limits of available funds in their account. The establishment of a private credit bureau (Credit Reference Company) by nine commercial banks in Nigeria to provide reliable credit information on individuals is a step towards addressing the needs of poorly served segments of society. In South Africa, where there are fairly developed credit services, credit bureaus have been blamed for non-transparency in the process of blacklisting individuals, thereby reducing their credit worthiness rating.

As e-payment takes root and facilitate cross-border transactions, more positive involvement of national currencies would be expected where the people would not be required to own a dollar account before they can open or fund their international credit/debit cards like the Mastercard or Visa. Just like language,

the extinction of national currencies is considered by some as a loss of economic independence and people might not be too receptive to losing their freedom of choice in using national currencies. Adapting e-payment services to reflect this is imperative for the growth of such payment options.

5.0 Conclusion

Having lost out on the industrial revolution as a means of eliminating the object gaps, Africa stands on the edge of ICT revolution with an opportunity to use the latter to solve the problems associated with former. This paper represents an attempt to explore the status of Africa's digitalization within the context of the ICT revolution, including its intra-continent variations, vis-à-vis countries with advanced digital opportunity. In doing this, we had recourse to the Digital Opportunity Index and the IT index. The relevance of these indicators lies in the fact that Africa's inevitable participation in the digital economy cannot be negotiated. Thus, understanding its status, orientation, challenges and opportunities is imperative to wading through the turbulent sea which modern day globalization represents. The prospects for breakthrough thrive within the very challenges confronting African nation states.

As a system that induces admission without offering the option of opting out, the power of the new digital economy is a reality. And Africa, with its varied resources, is an important player in the system, especially given the omnipresence of risk if the continent's potentials and opportunity are not harnessed. But, beyond this, Africa presents the world with future pathways for technology innovations, given its adaptability and needs. However, these possibilities can best be harnessed through deliberate, responsible and consistent governmental actions by African leaders through creation of continental climate that is technology-engendering rather than inhibiting.

Money, being an instrument for creating and storing value within the economy, is presented as losing its traditional character, both in time and space. Hence, the place of money as a value resource within the payment system of any economy makes the payment process an important aspect of people's lives. However, while money in its old and new forms will always remain a key resource for facilitating payment and settlements of financial obligations, the forms of payments and settlements risk change to accommodate new forms of money and technologies. African central banks must be ready for this change and incorporate its dynamics into their regulatory function at both national and regional levels.

As the paper contends, electronic payment can only override traditional, or be fully incorporated into, the payment system of Africa if certain conditions are met. Thus, an effective discussion on digital money within the global system

cannot be held without a discussion of the digital asset or deficit of Africa. To effectively participate in this, Africa aspires for electronic payment architecture with the capacity to eliminate their sense of distance which fosters the reality of deprivation, an architecture they can trust and that translates to visible benefits, especially in overturning the blockades of the old economy and accelerating the continent's development pace. It is therefore, the conclusion of this paper that the continued growth of electronic payment system in Africa is contingent upon bridging the digital divide and adapting technologies to the needs and conditions of the users. This would require an effectual act that transcends infrastructure to empowerment; forms of empowerment that engender space for innovative responses to deprivations.

References

Beck, Ulrich (20020 "The silence of Words and Political Dynamics in the World Risk Society" In *Logos*. 1, pp 1-18.

Central Bank of Nigeria (2008) *Banking Operations Department Activity Report 2007* Abuja: Central Bank of Nigeria.

Clarke, Matthew (2003) *e-development? Development and the new economy* United Nations University – World Institute for Development Economics Research (UNU – WIDER) Policy Brief No 7, Helsinki: UNU – WIDER.

Cogburn, D. L. and C, N. Adeya (2001) "Prospects for the Digital Economy in South Africa: Technology, Policy, people and Strategies" UNU-WIDER Discussion Paper No 2001/77. Helsinki: UNU-WIDER.

Cohen, Benjamin J. (2004) *The Future of Money* Oxford: Princeton University Press.

Economist Intelligence Unit (2008) "How Technology Sectors Grow: Benchmarking IT Industry Competitiveness 2008" http://global.bsa.org/2008eiu/study/2008-eiu-study.pdf

Ekberg, Merryn (2007) Ed. "The Parameters of Risk Society: A Review and Exploration" In Current Sociology, 55 (3), pp. 343-367.

Luhman, Niklas (1986) "The Autopoiesis of Social Systems" in R.F Geyer and J. van der Zouwen (eds.), *Sociocybernetic Paradoxes: Observation, Control and Evolution of Self-Steering Systems*, pp 172-192 London: Sage.

Madhavan, Vinod (2008) "A Review of Payment Systems in Africa" http://www.gtnews.com/article/7297.cfm

Nayyar, Deepak (2008) "China, India, Brazil and South Africa in the World Economy: Engines of Growth" UNU-WIDER Discussion Paper No.2008/05. Helsinki: UNU-WIDER.

Onyeiwu, Steve (2002) "Inter-Country Variations in Digital Technology in Africa: Evidence, Determinants and Policy Implications" UNU-WIDER Discussion Paper No. 2002/72 Helsinki: UNU-WIDER.

Ritzer, George (2000) *Sociological Theory*. 5th Ed
New York: McGraw Hill.

ITU (2005) *Building Digital Bridges*
Geneva: International Telecommunication Union (ITU).

ITU (2007) *World Information Society Report 2006*
Geneva: International Telecommunication Union (ITU)

UNECA (2007) "Connect Africa Summit adopts five goals to bridge the digital divided in Africa" http://www.uneca.org/eca_resources/news/2007/071106ConnectAfrica.htm