Research Article

Information and Communication Technologies (ICTs) and Innovative Financing in a Developing Economy: An Exploratory Approach in Beac Area

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Abstract: Information and communication technologies have grown remarkably over the last 20 years. They are not only a means of information management but also a process of saving mobilization that is very much missing in developing countries. Financial savings, a variable in the financing of the economy and development, can be mobilized if the strategies to collect savings integrated ICTs as a mobilization process. Monetarization, which is one of its forms, is a fundamental variable that can boost the financing process by the mobilization of savings.

Keywords: ICT- Monetarization – trust - Savings – developing countries.

1- Introduction

The problems of development precisely those of financing the development are acute when we invest in the field of basic infrastructures and those of collective goods. Public policies which were privileging external financing are more and more reoriented towards the mobilization of internal savings of both public and private agents. With the crisis of the financing of the welfare State and the rise in public debt, associated with the crisis of raw material prices, the formation of internal financial savings to the States becomes an imperative imposed to any economic space especially to developing countries lacking of financing.

Following this path, we notice that the main idea of a number of authors supported the need for an economy to have financial institutions able to channel savings. J. GURLEY and E.S. SHAW (1955), R.I. GOLDSMITH (1969), R. I. Mc. KINNON (1973) argued differently the necessity for the developing countries to collect financial savings and to ensure its better use to profitable projects. But from the traditional debates about the implications of savings concerning the development, we notice that there is no econometric study with a real correspondence between the explicative variables mentioned by these authors and the level of savings. The interest rate played backwards as BOTTOMLEY pointed out.

Information and communication technologies (ICTs) have thus changed the living environment, the work environment, the monetary and banking sector as well as the trade space. They can be considered as all the means of information and the data storage, communication and information processing. So, it is all the computer means, which extend over all intelligent media given by electronic processes than by mobile or magnetic cards, etc. In Africa, the average rate of phones invasion was 1% in 2000 and 65% in 2016(ITU, 2007). This ratio is above 92% today, especially in South Africa, Congo and Gabon, etc.

The formation of savings traditionally presented as the result of income and consumption in facto obeys to several variables that are often economic, psychological and/or sociological. It can be summarized as a dynamic and non-static process that last the entire life cycle of economic agents as that found in a synthesis in the works of R.H MIKESSELL and J.E. ZINSER(1973) and the conclusions obtained by M. FRY and M. MASON(1982).

1.1- Trust in African economies as a foundation of savings

We find with O.E WILLIAMSON [1993] a conception of trust related to the economic calculation that say that trust can only be used to describe the feeling of security that follows the economic decisions. Invisible institution as the rules of law, trust becomes according to K.I. ARROW
[1974] the standard based on ethical principles. So, trust can in a certain extend be considered as an important link guiding life in society and therefore is a cement necessary to the implementation of contracts. Thus with this conception, trust appears as an element of interaction and cooperation between agents engaged in the exchange process. It appears that, taken as a simple monetary variable, the formation of bank savings is not justify by the level of purchasing power or the bank investments remuneration, but also by the degree of confidence that economic actors put in the institutions responsible for collecting them. The savings collection must be based on variable other than those mentioned above, that means confidence.

Economists have come more to deal with the problems of money than those related to the economy of credit and therefore of confidence. They focused more on the financing of the economy than on the personal and subjective relationships that guide human action. Already in ancient societies, people were wondering about the future wanting to protect themselves from certain hazards. If we refer to economic [A. DORSINFANG-SMETS (1970)] we realize that the desire to save was not always related to the presence of money [G. DALTON (1965. pp44-65)].

On the basis of anthropological studies, we realize that long before the use of money, the non-commercial payments were already existing [F.L PRYOR (1977, pp 391-409), P. EINZIG (1966)]. People were paying to organize the religious ceremonies, the dowry, the cares of the healers, etc. Even in these non-commercial payments societies, it seems like people needed to save before making such payments. As well, if the credit was cheaper with family partners, it became scarce with the evolution of the society. As a result, people were obliged to ensure their future and their family’s future too. Uncertainty will guide economic actors to find some palliatives to build trust. Savings is one of these palliatives. This foundation of savings has often been ignored and taken as such, trust did not acquire the place it deserves in the search for the ways to train bank savings in developing countries, especially in central Africa. The fact remains that with savings, it is necessary to associate the notion of property.

1.2- Property and content of savings

The notion of property, on the other hand allows to explain what savings represent for an economic agent. It is the property of an agent who establishes it and who must get it back once entrusted to another agent that is the bank. The idea the saver has of savings is that when he/she wants to get it back, it must be done without any difficulty. Savings must therefore, if it is established, return to the saver as it is in fact his/ her property.

To the banker who is entrusted to keep his/her savings, he is given the obligation not to use it for individual ends and no longer repay it. This idea escapes many analysts, can be explained by the anecdote reported J.M SERVET (1994) about this wealthy Beninese peasant convinced by his colleague F.G. AMOUSSOUGA, to put his savings in an agricultural credit fund. In the next half day, the depositor comes claiming an urgent need for money and want to withdraw his deposit. His request went so far as to demand to be returned the identical banknotes he had deposited the day before, as he refused to take the new notes he had been given. The refusal of the new banknotes reveals the idea that the economic actor has of the property and savings in African economies. Such behaviors obviously raise the problem of monetary knowledge. But this is also understandable as for the agent, the bank only keeps his/her savings and he/she expects to get it back on sight. Thus the saving act is above all a transfer of property based on the confidence that savings would be returned at any time by the bank.

All these arguments, based on trust and the bad appreciation of property only lead to the very poor mobilization of savings in African countries, including those in the BEAC area. From this observation, we retain that the economic actors prefer, considering the time, withdraw all their assets as soon as their accounts are supplied to escape the costs listed.

The study is structured in four points. A review of a literature will precede the results of the previous work about savings mobilization. This will be followed by the revitalization of the strategies of stimulation of the savings by the good ICTs taken as dynamic determinants of the savings.

2- Brief Review of Literature

Feldstein and Horioka (1980) can be considered as the precursors in the debate about the formation of the savings and better the relations between the savings and the other determinants of the growth of the investment etc. the other works will be grafted around these contributions.

De Wet and Van Eyden (2005) using panel data come to the conclusions drawn up by Vamvakidis and Wacziarg (1998) then by Isaksson (2001) that foreign aid was a investment determinant
resulting from external finance. Also, the determinant of savings can be grouped into economic and non-economic factors or simply social (P. PRISSE, 1995). They are about the level of income, the interest rate, the tax system, the risk etc. G. WILLIAMSON (1968) using the Keynesian savings equation \( S_t = a + \alpha_1y_1 + \alpha_2y_2 \) identifies the role of income in the formation of savings in developing countries. He concludes that in these countries, the variation in per capita income explains 83\% of the variation in per capita savings. This hypothesis confirmed by several studies, however, points out important differences in the income-savings level, depending on the source of income and the place of mobilization [R-H. MIKESELL et J.E. ZINER (1973)]. According to Ch. PAXSON (1992), identified to rural savings, the marginal propensity to save resulting from transitional income is greater than that of permanent income. This contribution, which is based on the perfect market, is difficult to identify with the reality of the BEAC area.

The interest rate: According to the neoclassical approach, since A. MARSHALL, the interest rate plays an active role in the formation of savings. Also, the impact of the variations of the interest rate in the savings level has been one of the nodes of the debate on the formation of savings in Africa. According to a widespread point view, of which the precursor works are those of R. Mc KINNON (1973) et E.S. SHAW (1973), a variation in the real interest rate in developing countries could have a positive effect on the level of saving. For V. GALBIS (1993), it seems unclear to establish such a relationship. However SCHMIDT-HEBBEL et al. (1992) and M. SAVASTANO (1995) say that a kind of consensus exists between authors regarding the banking practice point of view while A. GIOVANNINI (1985) says that such relationships can only be identified for a small number of developing countries. This point of view is shared by N. ROSSI (1988) and J. OSTRY; C.M. REINHART (1992) who come to the same identical conclusions reporting the impact of consumption effects on savings.

Another determinant that derives from the theoretical details of public finances is tax system. However, we can say that tax system has effects on both public and private savings. The effect of tax system would be discriminatory as it could affect the income distribution structure and thus the level of savings. Non-economic determinant are based on social, demographic and psychological considerations.

- We note indeed after F. MODIGHIANI (1970) and Attanasio and Weber (2010) that there are interactions between the level of savings formation and the structure of the population. According to this author, the savings rate of a socio-economic entity is all the more important as the ratio of the active population to the total population. The savings profile for an agent could be identified with the life cycle given by the sequence : non-saving state at the beginning of one career, savings during the active life then non-saving for the rest of life. Also, the studies of R.H. MIKESELL and J.E. ZINER (Op. Cité) and A. DEATON and Ch. PAXSON (1992) about the relationships between age structure and savings rate come to the conclusion that an age structure dominated by young or inactive population is an obstacle to the formation of internal savings.

- From a social point of view, the formation of savings can be supported by the social rank of the agent, the weight of family solidarity and any other considerations related to the family organization. These determinants are certainly justified, but all of them present considerable limits. They, in fact hide two dimensions: property and trust. It is noticed that in Africa, savings takes many forms. It can be the monetary value or physical goods represented by a herd of cattle, fruit trees, family solidarity etc. whether monetary or physical, it represents an intrinsic property made to reduce uncertainty and therefore the lack of trust in future. The problem is to wonder about the mechanisms that preside in the training procedures not to say bank savings capture. In other words, we discuss about the opportunity of a strategy to achieve the objective of collecting bank savings. This preoccupation has the corollary of the assertion that mobilizing savings consists to identify with precision the content of the process of its formation given by its determinants.

3- EMPIRICAL APPROACH OF SAVING DETERMINANTS

The institutional factors are not sufficient but partially considered. In this sense, ICTs must integrate with the banking and financial system in the absence of the capital market to facilitate the mobilization of saving. The purpose of the study is to establish the link between ICTs and saving in selected LDC of Central Africa. The empirical researches applying themselves to capture the effects of savings on savings behavior are based on three types of data, namely:

- Chronological series for each country;
The result of that is that several studies based on chronological series, all being otherwise equal, these results are generally obtained by evaluating the aggregate consumption function of chronological series based on the social heritage associated with other variables. The result of these estimations is a depressing incidence, more or less marked on household savings. However, these estimated coefficients are generally not different from zero at the normal levels of significance; in addition, the value of the corresponding coefficients and (t) are very sensible to the inclusion and exclusion of other explanatory variables in the estimation equation. Following this in the case of household saving in the United States, Esposito (1978) concludes that the chronological series identified do not allow to isolate the impact of social security programs on private savings. The same conclusion seems to apply to the other countries; in addition more fundamental considerations suggest that chronological series regression are not the appropriate method for analyzing the complex relationships between stocks and flows which determine the saving behavior over a lifetime.

The inspection of the chronological series does not indicate the equilibrium values (in long term) observed. The fluctuations in these series are due to a combination of cyclic movements, delayed adjustments to imbalance, transitions between the old and new path of equilibrium growth, measurement errors etc. It is difficult to see how the coefficients resulting from that could be interpreted without ambiguity, even if they are significant and statistically justified. These reserves are less marked for the case of transverse data samples in which the various observations represent averages over several years and that limits the adjustment effects related to cycle or delayed adaptations. The institutional differences between countries to determine the impact of public pension systems on savings behavior will come online.

The impact of the determinants of savings is appreciated differently by the authors. Also, it is important to say that the determinants of savings are not quantifiable and the absence of reliable statistics leads to focus the analysis on the only economic determinants given by the income and the real interest rate.

The process $S$ is generated by an AR (1) model thus:

$$S = a_i + \alpha Y_{t-1} + \beta \text{Cons} + \text{Int}_t + \lambda \text{Inf}_t + \eta_1$$

Where $S$ represent savings, $\text{Int}$ the interest, $\text{Cons}$ the consumption, $\text{Inf}$ the inflation of the period. $\alpha$, $\beta$ and $\lambda$ are the stochastic perturbations and $\eta_1$ the term of errors and $a_i$ the specific effects non registered. The estimation of income is made under certain hypotheses and is identified with household income available. This one is estimated by balance from the national accounts data, from which the State and companies incomes are extracted. The interest rate is the one practiced by banks. Stationary tests made are those of co-integration panel tests of Pedroni and Fischer which lead to panel data processing with unsatisfactory results in term of mobilization of savings through traditional determinants.

The results obtained by N. ROSSI (1988) and J. OSTRY; C.M. REINHART (1992) result from the linking of the effects of consumption on savings. They show that in the absence of other incentives, consumption is a relevant determinant of saving mobilization. It appears that this is not sufficient in a developing economy in which the income attributed to the consumption is important.

Also, the dynamic of R.H. MIKESELL and J.E. ZINSER (1973) and A. DEATON and Ch. PAXSON (1992) studies is limited even if they dynamize their works considering the age structure. It appears that this structure is dominated by a population that is young or inactive, a source of braking for the formation of internal savings. Like these authors few studies establish a direct link between ICTs and the formation of savings in African countries even less in Congo.

Concerning the link between interest rate and savings, the studies are based on the reality of advanced capital markets. This is not easy to establish in developing economies in which there is a kind of insensitivity of households to the variation of rates. What remains then of the content of the bank techniques of savings mobilization? One would be tempted to say that they are all either partial or unsuitable. So it would be good to rethink the appropriate strategies, favorable to the activation of savings collection by banking institutions.

We therefore agree with J.M SERVET (1994) that trust is a fundamental variable in the formation of savings. So, it is necessary to integrate besides economic and non-economic factors, the production of trust as determinant of savings in developing economies including those in the BEAC area. Monetarization, for example, could be of great service to the BEAC area if it were practiced there. It will allow among other things to absorb the costs inherent to proximity problems, the holding of large amounts of cash and especially the costs of trust.
ICTs and Monetarization: A Strategy for Stimulating Savings

Monetarization consists to generalize the use of bank money and to free economic actors from the constraint of holding cash. Credit is diversified to meet all needs (M. SAINT-MARC 1970). This approach to the monetary problem is a source of production of confidence, since the actors are no longer subject to the constraint of holding their assets to face non immediate expenses.

BEAC area: a semi-monetarized economy

We distinguish with M. SAINT-MARC (1970) the semi-monetarization to the monetarization proper. Semi-monetarization corresponds to an economy in which the use of fiat money is widespread. This can be identified with the BEAC area and suppose the existence of constant pressure to use paper money in the settlement of a contract. From the act of purchase to the act of sale, the use of bank note is required.

To what extent can an economic actor entrust his/her assets to the bankers when he is obliged to hold the Central Bank money to face his/her contracts. As an illustration, the purchase of a household appliance or the purchase of a commercial vehicle must be done in cash. The use of the check is not explicitly prohibited, but generates additional costs: those of waiting and the confidence related to the authenticity of the check. Thus, the economic actor must be able to pay in cash a product that costs 400.000 F.CFA or 500.000 F.CFA francs for certain categories of goods or even 10, 15 or 20 million for others such as vehicles for example (2).

Such practices are becoming generalized and forcing economic actors to move away from banks and only having informal relationships with them. Indeed, the bank becomes, in the case of salary income payment for example, a channel of income transit. Agents go there once a month to collect their salaries. As a result, they receive the full amount of their monthly income and only return for the next pay.

These behaviors can be explained by the fact that as confidence is fading, economic actors are not reassured to withdraw their incomes by sequence. Besides, the obligation required to the economy of the area to use banknotes leads the actor to withdraw all his/her assets. Such constraints are not meant to stimulate savings, but to generalize the already widespread hoarding.

It is true that the semi-monetarized economy provides a definite advantage as far as the exchange process absorbs important resources. However, there are some significant transaction costs related to the holding and the carrying of the fiduciary money, those of information between suppliers and applicants etc.

A relevant fact is that money is not, in term of efficiency the best asset. Also, we know that sequential economy imposes to actors the temporal holding of the monetary assets to untie the contracts and also the totality of their income is not entirely assigned once they are collected. There is a time lag between the collection of their income and the expenses of the period.

It is therefore possible, by providing them with means of payment other than banknotes, to consider the possibility to see their assets remain in the bank for a certain period of time. Step by step, these deposits can promote capitalization. This is one of the advantages monetarization.

2- A gradual approach to saving mobilization

Let’s start thus from the contribution of ICTs through monetarization, that is to say, the fact of removing the economic actors from the constraint of carrying banknotes, except for small amounts for the benefit of electronic or scriptural money generalization. This passage allows a better management of time and therefore of the resources; gives rise to savings by managing sequential budget constraints.

If we admit the income-expenditure gap, the monthly income assignment configuration can be represented as follows.

Graph n°1: Representation of income over time

The level of income diminishes when we move away from the beginning of the period simply because the income is gradually spent according to the needs and time.

Let- us imagine that these economic actors have the
possibility to make use of scriptural money and not only cash. We can say that over a period (the month for example), the economic actor can make expenses 0-t1 and that t1-t3 only start at the end of t1, then will follow the expenses of the period t1-t2.

Both in t1 and t2 his assets are not fully absorbed. T1 can as well represent the half, the third of time etc. from this moment, the funds that pass through the banks can be on average left temporarily at their disposition. Considering the case of Congo-Brazzaville, we notice that the monthly payroll represent about 14 billion CFA francs including the transfers.

The use of ICTs should present the advantage to see, as illustration this wage bill at the same time transit the banks and to maintain itself there even to a small proportion, the time of complete use of these assets. If the system can thus retain 10% to 15% of the funds that transit there, this will allow the banks to retain huge funds.

At 10% for example, we can estimate the retained funds at 16 billion 800 million of the CFA francs per year only for Congo Brazzaville. This process generates a savings that can be identified to a transaction savings. It is in fact, the demand deposits which are achieved monthly and can be used at any time.

On the other hand, if the financial system is able to capture these transaction cash balances deposited in bank in a sustained way for one year (12 months), this will allow to have transaction deposits such as the configuration of the accumulated cash balances that can be given by graph n°2.

m1 represents the first month, m2 the second, etc. Dt represents the transaction deposits of the period i (the year). The level of accumulated deposits for year 1 is equal to:

\[ DT_1 = dtm_1 + dtm_2 + dtm_3 + \ldots + dtm_{12} \]

where \( dtm_1 \) represents the volume of transaction balances collected on month 1 (m1). It is the same for \( dtm_2, dtm_3, \ldots, dtm_{12} \).

We notice that the annual volume of the collected deposits given by \( dt_1 \) corresponds to the total accumulated deposits or savings of transaction made during the year 1. this savings can be identified to a savings on sight as the achievement process is about the short term.

**Graph n°2: Total of monthly cash balances transactions figure**

So let us start from this consideration and examine two axes of production of savings.

The first one is about the presence of cash savings called transaction. This one is that is often neglected wrongly is identified to a momentary savings compared to a durable savings represented by the securities, buildings, lands etc. however, the reality show us that cash savings is very stable. This has led the banks to use it to finance long-term investments from short-term capital. This practice is called transformation. Therefore, the role of the bank and their dynamics are demanded. Savings can thus be formed from this reality as a stock of cash purchasing power or not, kept by the saver who can use it at any time for investment or consumption purposes. Monetarization taken in this angle, thus allows to encourage the formation of such a reservoir of values. So, it is the financial institutions which must make the stock of cash savings thus generated to be productive.

The second axis is part of a long-term process. Let us integrate the time, especially the long term and consider that each year corresponds to a level of deposits so that the total of the cash balances is:

\[ DT_1 + DT_2 + DT_3 + \ldots + DT_n \]

That is to say that the process being in extension, the bank system captures in average, each year, a level of transaction savings. This savings cannot be formed in a socio-economic area without having some effects at the level of the incomes, the consumption structures, etc. in the same way, it is easy to see that the durable formation of the cash balances transaction generates in the long term some term deposits.

Also, it is proved when we believe to A. CHOINEL and G. TOUYER [(1990) p. 7] that over the long term, whenever the income increases by 1%, the saving increases by 1.35%. We can thus see that the accumulation of short-term deposits is followed by a formation of long-term deposits.

If we admit that from year to year, the increase of the transaction deposits captured by the financial
The increase of savings \( \Delta S \) will be equivalent to \( \Delta S = t \Delta dT; \) where:

\[ \Delta S = t \Delta dT; \]

That implies that the formation of long-term savings will be:

\[ \Delta S_T = \Delta DT_1 + \Delta DT_2 + \Delta DT_3 + \ldots + \Delta DT_n = \Delta DT_1 + \Delta DT_1 (1-t) + \Delta DT_1 (1-t)^2 + \ldots + \Delta DT_1 (1-t)^n \]

\[ = \Delta DT_1 [1 + (1-t) + (1-t)^2 + \ldots + (1-t)^n] \]

We know that \( 1 + (1-t) + (1-t)^2 + \ldots + (1-t)^n \) tends to \( \frac{1}{t} \) when \( n \) tends to infinity.

Thus we will have:

\[ \Delta S_T = \frac{1}{t} \Delta DT_1 \]

We can therefore believe that the long-term savings are built on the basis of previous formation of short-term savings. In other words, how can economic actors make long-term investments if they have no short-term resource to face their transaction?

Besides, the passage from short-term investments (cash balances transaction) to long-term investments (savings) is related to the production of trust by financial institutions. Monetarization is an innovation for the BEAC area countries to restore the lost trust. This process is not subject to the level of consumption as pointed out by the Keynesians even less at the level of interest rate as the classics say. It is related to a variable that is often ignored: trust. With monetarization we can suspect that trust is coming back to life and savings with it. This one cannot remain durably without trust. This imposes some investments costs that are often hidden by the bank decision-maker to financial institutions.

Savings as money and credit represent trust. When this one fades out, it is good for the economy to make it come back to life with credible and long-lasting elements.

**Conclusion**

The existence of a high interest rate and a high level of income can be used as structures of incitation and stimulation of savings, but, they are not however enough to justify the formation. Monetarization which of course has a cost represents an innovation which could reduce the crisis of confidence in the relations between economics actors and banks if it is practised with the acceptance to pay the investment costs inherent in trust. This trust is fundamental to start the process of savings formation which however exists in these socio-economic entities, but in a non-official way.

Is it reasonable to believe that the availability of means of payment of the type of scriptural money to economic actors will not cause new behaviors to them?

Beyond trust and savings, it is to believe that monetarization can even discipline the bank decision-makers including the Central Bank which up to now seems to be pleased with its function of emission Institute. It is no longer sufficient to coin money, but to ensure its circulation for the users of money services not to say convey the monetary knowledge which becomes a component of monetary quality. Do the users of the developing countries really know money?

**Notes**

1. The BEAC area includes Cameroun, Congo, Gabon, Equatorial Guinea, RCA et le Chad.
2. Let us dare some generalizations and note for example that in developed country the cash purpose of a vehicle from a dealer leads this one to propose to the customer to contact a bank from which, the customer must be able to apply for a car loan. The advantage, better, the interest of such an arrangement is obvious for the customer as well as for the consumers of bank services and for the whole economy.

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