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Role of institutions in ICT Contribution to development: Elements of Response through a Critical Reading of Douglass North – Understanding the Process of Economic Change

دور المؤسسات في مساهمة تكنولوجيات الاعلام والاتصال في التنمية: عناصر الاستجابة من خلال قراءة نقدية لدوجلاس نورث – فهم عملية التنمية الاقتصادية

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Abstract:

The aim of this article is to understand how Information and Communication Technologies (ICT) can contribute to the development of developing economies. To address this issue, we first propose a critical reading of Douglass North's "Understanding The Process of Economic Change" in which the author analyses institutional factors that may or may not promote growth and development. Then we try to highlight the contribution of this approach to our issue. We conclude that the quality of institutions plays a crucial role in the appropriation of ICTs for economic growth and development.

Keywords: institutions; development; economic growth; ICT; Douglass North

الملخص:

الهدف من هذا المقال هو فهم الكيفية التي يمكن بها لتكنولوجيات الاعلام والاتصال أن تساهم في تنمية الاقتصاديات النامية. لمعالجة هذه الاشكالية، نبدأ بتقديم قراءة نقدية لعملية التنمية الاقتصادية التي تحدث عنها دوجلاس نورث (Douglass North)، حيث يحلل العوامل المؤسسية التي قد تعزز النمو الاقتصادي والتنمية، ثم نحاول إبراز إسهامات هذه المقاربة في إشكالتنا. ونستخلص أن نوعية المؤسسات تؤدي دورا حاسما في استعمال تكنولوجيات الاعلام والاتصال من أجل النمو الاقتصادي والتنمية.

الكلمات المفتاحية: المؤسسات: التنمية: النمو الاقتصادي : تكنولوجيات الاعلام والاتصال : دوجلاس نورث.

1. INTRODUCTION

Over the past thirty years, most developed countries have experienced significant changes (technical, economic, cultural, social, geopolitical...) attributed to information and communication technologies (ICT). ICT has made it possible to find fast ways of accessing and distributing information and new ways of doing business, both in real time and at a lower cost. For several years, ICT has been of particular interest in terms of its links with the development of emerging countries. Today, these links have not been clearly established and rigorously demonstrated by real facts and from experience in developing wealth creation.

Technological determinism is very present in many modes of reasoning, and history teaches us that the technical capacity to exploit certain energy resources or raw materials has allowed certain forms of development to appear. It cannot, however, be concluded that technology is a precondition for development. It goes without saying that ICT has played a crucial role in developed countries, but does the economic structure of these countries not favour this role played by ICT for development? Faced with technological determinism, socio-constructive people see the development of technology from a completely different point of view. For them, it is the social contexts in which they are introduced and implemented that

determine their uses and impacts.

If we want to take an intermediate position between technological determinism and social determinism, we could say that the state of technology determines the state of society, but that it is also conditioned by it. In reality, we are not in a one-way relationship between two terms, where technology imposes its laws on society, but in an interactive relationship between three spheres that influence and enrich each other: techno-economic, socio-cultural and politico-institutional. The issue for this paper is how ICTs can contribute to the growth of developing economies. We want to focus on user demand and show that institutions play a key role in the ownership of ICT for economic growth and development. This is based on Douglass North (2005) "Understanding the Process of Economic Change" in which the author analyses institutional factors that may or may not promote growth and development.

In his previous researches, Douglass North mainly wondered what impact on economic activity different institutions have in explaining growth or decline. To do this, it was based on Coase's concept of "transaction costs" (Coase, 1937, pp. 386-405). North is questioning why one institution emerges over another. He tries to understand the process of economic change, which it associates with political change and social change. Such an understanding, he said, would advance human well-being and reduce poverty. Compared to his earlier studies, he integrates here the character of societal change and how humans understand and introduce it into their actions. It shows that economic change is primarily a deliberate process, shaped by people's perceptions of the consequences of their

actions.

In his book "Understanding the Process of Economic Change", North reconstructs a theory of economic change that takes into account the beliefs of individuals. To understand the process of economic change, North argues that it is necessary to understand the articulation between the mental models that individuals build, shared beliefs built in a given society and institutions that define the rules of the organization. On the basis of these elements, it seems appropriate to integrate North's analysis into our problem.

In this article, we propose a critical reading of this famous book, and we try to apply its lessons to the problem of the growth and development opportunities associated with the introduction of new technologies. Thus, our first point is to present an analysis of economic change as conceived by Douglass North. In a second point, we continue our critical reading of North's book which provides an overview of the changing human environment and explores the institutional complexities of economic development. Finally, in a third point, we try to highlight the contribution of this approach to the problem of the contribution of ICT to development.

2. Douglass North and Economic Change Analysis

North emphasizes the notion of human learning, which he believes is not only the accumulation of an individual's experiences during his life, but also includes the accumulation of the experience of previous generations. North's focus on human learning is to focus "what is learned and how it is shared by members of a society, the incremental process by which beliefs and

preferences change, and how they determine economic outcomes over time” (North, 2005, p. 15.)

North argues that economic change results from changes in the quantity and quality of human beings, in the stock of human knowledge, and in the institutional framework that defines a society’s voluntary incentive structure. He concludes that the development of a complete theory of economic change must incorporate theories of change relating to demography, knowledge stock and institutions. North is looking at where institutional innovations are coming from to reduce uncertainty or turn uncertainty into risk.

North starts from the principle that the nature of a society’s politico-institutional system is perceived by individuals according to beliefs that can be consensual if shared by the vast majority of that society, or on the contrary very disparate. For example, North uses the notion of “path dependence”, which means that majority beliefs translate into a set of institutions that determine the functioning of the economy and politics. In other words, it is the means by which past institutions and beliefs influence present choices. The result is an institutional matrix that severely restricts the choice of innovation or institutional change.

Individuals structure their environment according to their perception of the world in order to reduce uncertainty in their relationships. The perceptions of some individuals are more important than others and how these perceptions transform the human environment depends on the institutional structure defined by North as a set of formal rules, informal constraints and the means used to enforce them (North, 2005, p. 25). Institutional change then

results from formal rules or informal norms, or the means of enforcing them.

North proposes to integrate the time dimension into a theoretical framework for understanding economic change. In this first part, he wonders how individuals build their human environment, which includes rules, norms, conventions and ways of doing things that define the framework of their relationships. Then, using the tools of the new institutional economy (which looks at the beliefs that humans develop to explain their environment and the institutions they create to shape it). He proposes a framework for explicitly analysing the nature of economic change.

2.1 Uncertainty in a non-ergodic world

As the world is constantly changing, North wonders to what extent a theory developed from past experience remains valid in a new world. Traditional economic theory takes into account uncertainty for a long time but considers it an exceptional condition even if it is responsible for the evolution of the structure of human organization throughout history and prehistory.

In general, humans strive to make their environment more predictable. “Building an institutional framework has been an essential building block of civilization” (North, 2005, p.33) as institutions, by limiting the number of choices available, can enable individuals to improve their ability to control the environment. Thus, the deep source of institutions lies in human attempts to structure the environment to make it more predictable, even if it generates even more uncertainty for other actors. The question is: who sets the rules, for whom and with what objectives? The

uncertainty faced by every human being is reduced by learning from the physical environment on the one hand, and from the socio-cultural linguistic environment on the other. Depending on their culture, humans will interpret uncertainty differently. So North points out that you need to know how learning happens in the mind. Human history is characterized by a systematic reduction of uncertainty related to the physical environment at the same time as the human environment becomes more complicated. The understanding of the latter remains very limited especially because of the non-ergodic nature of the world, which is constantly altered.

North uses the Webster dictionary to define the word ergodic: «which implies or relates to the probability that any state will reproduce, and especially to the probability that any state will never reproduce» (North, 2005, pp. 37-38). For much of the current economic theory, the ergodic hypothesis is implicit. North is rejuvenating it: today's changes in the environment create a new environment for tomorrow that no historical experience prepares. As for uncertainty in a non-ergodic world, on the one hand, if the perception is perfect, new uncertainties may arise because if the perception is perfect at a given moment, the value of knowledge changes over time; on the other hand, in the case where perception is imperfect, the major change is that institutions created for a given epoch, even if they are optimal for that epoch, may no longer be so at all when the environment changes over time. In reality, the imperfection of information and feedback means that uncertainty is always present. How do humans approach such developments?

2.2 Belief systems, culture and

cognitivescience

Standard economic theory is based on the assumption of rationality. However, it does not make it possible to understand the choices made by humans in economic, social and political contexts that are fundamental to the process of change. In addition, it does not adequately reflect the relationship between the mind and the environment. For its part, North wants to know how humans perceive their environment, how they learn and what they learn. He describes the process of human learning as a cognitive process. According to him, the learning process is unique to each individual but a common institutional/educational structure will result in shared beliefs and perceptions. A common cultural heritage thus helps to reduce the differences in mental models among members of a society and to transmit unifying perceptions across generations.

North (2005, p. 55) repeats Hayek (1952) for whom beliefs are a construction of the mind interpreted by the sense, and the human being does not reproduce reality but builds classification systems to interpret the external environment. The emergence of the scientific method, together with statistics and interactions between theory and empirical observation, has changed the way in which the physical and human environment is understood. According to Hayek, culture is an adaptive process that accumulates partial solutions to problems frequently encountered in the past, which highlights the importance of the cognitive role of social institutions. Also, culture and social institutions are more directly involved in explaining economic change if the relationships between individual beliefs and the social context are well specified.

Cultural heritage provides a structure that consists of beliefs, institutions, tools, instruments, technologies. In the long term, a rich structure increases the chances for a society to succeed.

2.3 Scaffolding erected by humans

The performance of an economy is mainly determined by the structure created by humans to organize their political and economic environment. This structure provides the incentives that guide individual choices. The rules, the informal norms and the effectiveness with which they are applied derive from the beliefs of humans. Here North studies the nature of the cultural context that determines human beliefs, and compares it to scaffolding that frames human interactions. These are made up of physical capital (all material artifacts accumulated by humans to control their environment) and human capital (stock of knowledge owned by humans). North is particularly interested in the institutional framework, which includes political structure, property rights structure and social structure. There is a strong relationship between belief systems and the institutional framework: belief systems express an internal representation of the human landscape, institutions are the external manifestation. If multiple beliefs are in conflict, institutions will represent the beliefs of those who succeed in imposing their choices. To understand the process of change, North emphasizes that the nature of path dependence must be considered in determining the nature of the boundaries to change it imposes in different contexts.

The scaffolding erected by humans defines the economic and political game but also determines who can participate in the decision-making process. It is the policy that

defines and enforces the formal rules of the economic game (property rights) and is therefore the primary source of economic performance. Transaction costs make it possible to measure the costs of trade and provide a tool for analysing the costs of economic organisation and identifying the sources of poor economic performance. As a prerequisite to understanding the processes of economic change, North (2005, p. 86) issues five proposals relating to the sources of institutional change:

- 1) Relations between institutions and organisations drive institutional change through the economic distribution of scarcity, hence competition.
- 2) Competition requires ongoing investment in skills and knowledge by organizations. The acquisition of these skills and knowledge informs the choices that will change institutions.
- 3) The institutional framework provides incentives to acquire the skills and knowledge that provide the best performance.
- 4) Perceptions come from the mental constructions of the actors. These are the result of their cultural heritage on the one hand, of the local problems they have to face and solve, and of non-local learning.
- 5) Institutional change is incremental and path dependent.

Finally, neoclassical economic theory, in addition to analysing the functioning of markets in developed economies and without taking into account the evolution of the economy as a whole, has three major deficiencies that North believes need to be overcome to understand the process of economic change. First, it is frictionless,

meaning that markets operate without outside intervention, so transaction costs are zero. To conduct a useful institutional analysis, it is necessary to recognize that institutional incentive systems are imperfect and to take them into account in the analytical framework. Secondly, the standard economic theory is static, the time dimension not intervening in the analysis. Time represents the present experiences but also the cumulative experiences of past generations and the learning process depend on the various experiences at different times. North's third deficiency for standard economic theory is that it ignores human intentionality. To better analyse the process of economic change, North seeks to build a new analytical framework that takes into account the limitations of the current theory. He argues that successful development is developing a complex structure of symbolic institutions and storage systems to bring together the scattered knowledge of modern systems with low transaction costs. On the contrary, poor countries are unable to carry out this meeting and that is what would be at the heart of development problems.

3. The Path to follow

According to North, the world is a construction of the human mind and the culture of a society is a combination of surviving beliefs and institutions. To understand the process of economic change, this author proposes as a starting point the belief system, formed by individual and shared beliefs. Constructs created by humans are a mixture of rational beliefs and non-rational beliefs that determine the choices made. North seeks to understand where belief systems that reflect or hinder the creation of political and economic institutions come from.

3.1 The human environment and its evolution

Developed countries have succeeded in overcoming the complexities of the human environment and developing impersonal exchanges by bringing together the essential specialized knowledge to be used effectively in complex economic structures and by acquiring more or less successful political regimes promoting these changes. The less developed countries have not been able to make this transition and, as a result, have not had a good economic performance. The study of the contrast between the institutions and beliefs formed to face the uncertainties of the physical environment and those developed to face the human environment allows us to understand the process of change. The physical environment was characterized by collectivist cultural beliefs on which an institutional structure based on strong personal ties was built. Then the new human environment led to the individualistic framework based less on personal ties than on a formal structure of rules and mechanisms ensuring compliance with them. These two structures each nurtured a set of beliefs that guided the resulting evolving structure of political regimes, economies and societies.

3.2 Sources of Order and Disorder

The question of the social order is fundamental in a context of dynamic change. According to North, beliefs lead to order or disorder. The order, which is a necessary condition for long-term economic growth, can be established with or without the consent of the governed. There are thus two ideal systems of order: the authoritarian

political order, which is more or less coercive according to the coherence between the system of common beliefs and the politics of power, and the consensual political order, in which members of society feel encouraged to obey and apply the rules. These two ideal types represent the opposite ends of the spectrum of political organization and are rare in their pure form. For both types of power, the order is based on a mixture of coercion and social norms. Disorder increases uncertainty because it threatens the rights and privileges of individuals. It may result from changes that lead to a reduction in coercive means to enforce the rules or to a weakening of standards of cooperation that leads organizations to try to radically change the rules of the game. North concludes that order and disorder have their basis in the institutional structure as it was formed over time. Crises followed by periods of disorder are possible for all societies, but those that have inherited stable institutions will be able to remedy them more quickly.

3.3 Pass or fail

In a dynamic context, sustainable success depends on a correct perception of changes in the human environment, the integration of these perceptions into a belief system and the consequent modification of institutions. This involves the following (North, 2005, pp. 150-162):

-understand the effects of three sources of fundamental change (demographics, knowledge stock and institutions) and the resulting new interactions‘

-incorporate this new knowledge into the belief system of individuals who may modify the institutional matrix‘

-the modification of formal rules, informal constraints and the means of their implementation so that they produce the desired changes in the functioning of society.

However, in the face of pervasive uncertainty, it is not said that humans properly understand changes in the environment, that they then create appropriate institutions and develop policies to solve new problems. They are all the more likely to fail when accumulated experiences and beliefs from the past do not guide their decisions correctly. In order to survive and grow, developing countries must necessarily build an efficient pricing system and complement it by creating the institutions and organizations needed to gather knowledge with low transaction costs.

3.4 Improving economic performance

Throughout this book, North has identified three main dilemmas concerning the process of economic change: the transition from personal to impersonal exchanges, the complex interdependent institutional structure characterizing the modern human environment, and the non-ergodic world. The ideal economic model includes a set of economic institutions that provide individuals and organizations with the incentives to engage in productive activity. A necessary step is the development of a system of property rights ensuring low transaction costs (costs of measuring what is exchanged and protecting contracts) in the production and exchange of goods and services. Improving economic performance means lowering production and transaction costs. To do that, we have to change the institutions. North (2005, pp. 208-210) argues that developing countries need to

create an incentive structure to produce economic development. It is relatively easy to modify formal rules to achieve the ideal political model defined by four components: an institutional matrix that establishes a set of organizations, rights and privileges; a stable structure of trading relationships on the markets; an underlying structure allowing a credible commitment of the State to the political rules and means of enforcing them that protect the organizations and the trading relations; conformism that results from the internalization of norms and coercive measures. But in the long term, a consensual political regime is essential and these formal rules will only be effective if they are accompanied by informal rules and means of enforcing them .

According to North, to understand the role of institutions in a society, we must first of all admit that they materialize the intentionality of our conscious mind. A structure is a human creation whose proper functioning, which is not automatic, is conditioned by its continual modification according to the evolution of the essential parameters of technology, information and human capital. North agrees with Hayek's call for the maintenance of institutions and organizations so that different policies and effective means can be tried to eliminate bad solutions. It highlights four conditions for improving economic performance: Understand where poor performance comes from, be familiar with the sources of the institutional structure in order to improve it, underdeveloped economies need to bring together dispersed knowledge to achieve low costs, a viable political system that establishes the necessary economic institutions and effectively enforces the rules. Even if the decline in information costs and the possibility of knowing the

performances of others have encouraged institutional imitation and adaptability, the gaps between developed and other countries continue to widen, and it seems a long way to go to improve performance through the institutions created. Adaptive efficiency, which is at the center of Hayek's reasoning on human survival, is a permanent condition in which society constantly alters its institutions, or creates new ones, as new problems arise.

North's central idea at the end of its study is that one must understand the process of economic growth before one can improve performance and that one must know the characteristics and complexities of a society before attempting to change it effectively. This book from North is the result of a consideration of cognition in institutional analysis aimed at better understanding the behaviour of agents and at thinking about the diversity of institutional architectures. North's work on institutional change incorporates a more realistic view of the economic reality. These analytical inputs, however, remain largely to be supplemented in two directions: empirically, by studies on the precise modalities of change in shared beliefs; and analytically, by the combination of levels of analysis distinguished by North.

4. The essential role of institutions in contributing ICTs to development

The concept of "ICT for development" refers to the use of ICT for socio-economic development. In this perspective, it aims to encourage the integration of these tools in the various human activities. (Loukou, 2012, p. 5)

To be able to benefit from the positive effects of ICTs, any economy must be prepared to receive them because it is at the level of society that technical change manifests itself as a success or a failure. It should be noted that in developed countries, the development of ICT has been supported by society, while for developing countries, the state has a key role to play in the conduct of this action. It must pursue a policy of promoting ICTs in order to generalize their dissemination and use for development. In other words, ICT can contribute to the development of a new economy, but it must be part of a national ICT strategy.

The question is: how can ICTs adapted to a country's socio-economic context facilitate its development? In this perspective, while the force that mobilizes the existing paradigm is that of economic benefit considered as the only source of technological change or innovation, the strength that drives the alternative paradigm we find ourselves in is the demand of the users, the developing countries in our case. On the assumption that ICTs are transformative in nature, it is right to expect, in developing countries, profound and significant changes resulting from their wider use, provided that they are adapted to local uses and contexts and that each country is able to understand innovations in order to adapt them to its own development imperatives. If developing countries do not create an environment conducive to the introduction of ICTs, this may further exacerbate existing inequalities. From this point of view, the institutional context is important in the implementation of ICT projects.

We will support this with the work of North, which assumes that the nature of the

political and institutional system of a society is perceived by individuals according to beliefs that can be consensual if they are shared by the vast majority of that society, or on the contrary very disparate. For example, North uses the notion of "path dependency", which means that majority beliefs translate into a set of institutions that determine the functioning of the economy and politics. Individuals structure their environment according to their perception of the world in order to reduce uncertainty in their relationships. The perceptions of some individuals are more important than others and how these perceptions transform the human environment depends on the institutional structure defined by North (2005, p. 25) as a set of formal rules, informal constraints and the means used to enforce them.

4.1 The essential role of institutions

Technology can be defined as knowledge (Mokyr, 1998) that Douglass North believes is part of a society's cultural heritage: he defines knowledge "such as the accumulation in the physical and human environment of regularity and patterns leading to organized explanations of aspects of this environment" (North, 2005, p. 35). Douglass North's work shows that each nation is evolving in its path dependency. It therefore appears that the quality of institutions plays a fundamental role in creating value from technology. To clarify the nature of the institutions, we adopt the definition of this author which distinguishes the institutions as defining the rules of the game from the organizations that are the players; it is the relationships between them that drive institutional change. These rules are both formal and informal (standards, conventions, codes of conduct). Formal

institutions are consistent only if they are consistent with informal institutions, which give a fundamental role to the evolution of belief systems that express an internal representation of the human landscape while institutions are the external manifestation of it.

North states that there is an intimate relationship between belief systems and institutions, both formal and informal. From there, we will examine how these belief systems are evolving in the face of the ICT revolution and to what extent institutions need to adapt in order for society to take full advantage of these ICTs. Among North's proposals on the sources of institutional change, some are of particular interest here:

-The institutional framework provides incentives to acquire the skills and knowledge that provide the best performance.

-Perceptions come from the mental constructions of the actors. These are the result of their cultural heritage on the one hand, of the local problems they have to face and solve, and of non-local learning.

-Institutional change is incremental (too abrupt a change would penalize existing organizations that would oppose it) and dependent on the path.

The evolution of the state must be seen from two angles, in accordance with the contributions of Douglass North, distinguishing organizations and institutions. The evolution of institutions depends much more on the evolution of belief systems than on the learning achieved in the evolution of organizations. According to North, one of the conditions for improving economic performance is a viable political regime and

for a state that lacks it, remedy it "requires authoritarian authority with the knowledge, desire and ability to put in place and enforce the necessary economic rules" (North, 2005, p. 209). State reform is therefore a central factor in technological progress.

In the process of improving economic performance, the state plays several roles: it defines the rules of the game while being a player, as Douglass North has shown. The State defines the institutions that will reduce transaction costs. At the same time, it is an organization that manages policies such as research and technology, the construction of infrastructure, investment in education, which represent an increasingly important cost in terms of Gross Domestic Product (GDP). Technological progress can then be understood in two ways: either it is the result of "laissez-faire" or it requires specific state action. The first option is that of the neoclassical school today heavily criticized by the theory of endogenous growth and the new institutional economy which shows the role of institutions in growth. This option gave rise to New Public Management, that is to say that the reform of the State is reduced to that of its administration by the introduction of market mechanisms in its operation (McLaughlin, Osborne, Ferlie, 2002). The second option comes from the neo-Schumpeterian current, which shows that technological disruptions make it possible to «replay» the comparative advantages of nations, and particularly the break-up of information technology makes these advantages based on largely intangible elements (Benabderrahmane, 2019, p. 12).

The question is: how can institutions create value? North defines institutions as uncertainty reducers that establish stable structures for the interaction of actors in

society. Institutions can identify opportunities by creating appropriate incentives. North states that there may be inefficient institutions that no competitive pressure drives reform, usually because they serve established interests and not the public good. In the face of organizations which cannot be reformed, the reaction of the public may be to reject in the same movement the economic and social cost of an unbearable bureaucracy and the very principle of public intervention.

4.2 Growth of economies through technology

According to Claude Rochet (2005), an economy can grow in three ways:

-The first is Smithian growth. Smith's great contribution was to show that international trade was a non-zero-sum game and beneficial to each party. But his theory was based on prices fixed by exchange value, which presupposed an exchange between countries with roughly similar levels of development, where the value of the technology incorporated in the goods was roughly equivalent. Another contribution, the division of labour which increases productivity, opened the way to the accumulation of capital, which will lead to the formulation of the neo-classical theory in the 1950s by Robert Solow (1956, pp. 65-94) with the increase of productivity by that of the capital-ratio the convergence of price and productivity levels and decreasing yields. The main limitation of this approach is that it is static. In addition, there is no incentive to create new knowledge, new technology.

-The second mechanism of growth is Schumpeterian growth, based on innovation through technology, which is an

evolutionary process based on imbalance. Technology is above all knowledge. In the process of evolution, therefore, it is the ability of a society to accept new knowledge against established technologies – and the situational rents attached to it – that will determine its evolution. In the Schumpeterian evolution, a «good system» is one that will be able to choose the right combinations, retain the right innovations and eliminate the wrong ones. The system will stabilize once it is able to coordinate all elements in a turbulent environment. The key to success in this political knowledge economy will therefore be the standards according to which a society judges the relevance of a new technology, the quality of the culture on the basis of informal constraints. This culture is incorporated into informal institutions (customs, conventions, consensus), by the permissions it gives and the protections it creates and is the basis of formal institutions.

-This leads us to the third growth mechanism, Northian growth. The institutions play the role of reducing uncertainty that enables us to face a more complex and risky world, the cause and condition of technological innovation. Their most notable contribution is the existence of a rule of law that guarantees property rights. Without such a guarantee, there can't be economic growth.

Except for international organizations, neo-classical ideas are now heavily criticized. For North, the assumed conditions of the neo-classical economy (absence of transaction costs, decreasing returns, no information asymmetry, utilitarian behaviour of the players, possibility to calculate a mathematical optimum, etc.) which called for market and

price regulation – and therefore for the State not to intervene – to be implemented only in very exceptional cases where transaction costs are non-existent, as Coase has shown. On the contrary, North points out that the more the world opens up and becomes more complex, the more economic actors are dependent on their “limited rationality” as described by Herbert Simon (1982). The increasing specialization and division of labour induced by information technology increases complexity, thus information asymmetries, this increases the limited rationality of the players and weighs on the productivity gains that these same technologies could bring. For North, it is the institutions that can play the role of uncertainty reducer and that can take advantage of the current technological revolution. North establishes a direct correlation between the performances of nations and the quality of their institutions. According to him, the improvement of the institutional structure of a society requires an understanding of its cultural heritage (North, 2005, p. 209).

5. CONCLUSION

From an evolutionary perspective, access to science as a technique remains essential, but it is a much broader view of knowledge, such as that of Douglass North, that makes the difference. This knowledge is only for a small part made up of scientific knowledge and explicit knowledge and much more beliefs and implicit knowledge. Belief and implicit knowledge depend on individuals' mental models and a social climate that may or may not foster innovation in society. Trust can be seen as one of the “informal institutions” mentioned by Douglass North that determine the ability to build effective formal institutions. As

early as 1990, North stressed that it is culture, acquired and transmitted over generations, that determines our relationship to reality, our ability to process information and create knowledge, and defines path dependency in our learning abilities: « The long run implication of the cultural processing of information that underlies informal constraints is that it plays an important role in the incremental way by which institutions evolve and hence is a source of path dependence » (North, 1990, p. 44). It is therefore not possible to impose new institutions that would not be supported by the informal constraint of culture, and it is not possible to "change culture" by trying to destroy the past and sever the link between man and his heritage.

We believe that the real engine of growth is the knowledge base, embodied in formal and informal institutions at North. This approach is consistent with the theory of endogenous growth, which explicitly links technological change to knowledge generation through human capital accumulation and R&D. Technology thus appears as a vehicle for development which is possible only through the evolution of the institutions. In this institutional evolution, we will focus, with Douglass North, on the role of informal institutions, enabling the evolution of formal institutions. Technology can then become, through appropriate institutional strategies, a lever for development. Technological change therefore necessarily depends on the evolution of the State. In other words, technology is a lever of the evolution of the state and it is the way in which this lever is operated that is the basis of the wealth or poverty of nations. From this point of view, the dominant powers are those which find the right combination to ensure their internal

equilibrium as well as that of their relations with the other national systems of political economy.

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