WHICH INSTITUTIONS, LEGAL AND ECONOMIC, ALLOW INNOVATIONS?

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Abstract

The follow work has as its main goal to explain the assimetric paths of technological innovation in Brazil and United States and to show how the "Lei da Inovação Brasileira" (Lei 10.973/04 - Brazilian Innovation Act) can contribute to ameliorate this difference, creating a favorable environment to research and new technologies development in Brazil among firms and universities. Since both countries were discovered about the same time and passed trough colonization and immigration processes, what would be the reason to the severe differences regarding technological innovation? As the United States occupy a leading position in the world scenario, Brazil doesn't even appear in the most innovative countries in the world ranking. The reason would be in the path dependence of both countries.

Keywords: Path dependence. Institutions. Technological innovation.

INTRODUCTION.

The follow work has an interdisciplinary content, being based in studies of Law and Economics. The paper has as its main theoretical stepping stone the work of Douglas North, the 1993 Nobel Prize laureate economist. North is an institution economics scholar, belonging to the New Institutional Economics.

The three main concepts of the New Institutional Economics are namely: the limited rationality, informational asymmetry and transactional costs principals. The interdependence

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of these factors occurs as follows: the limited rationality and uncertainty are hypothesis of behavior that justifies the existence of transactional costs. As greater is the uncertainty framework, the greater are the transactional costs.

Agents in Institutional Economics don't have perfect knowledge and also are not capable to process the imperfect information available.[2] These factors results in uncertainty and transactional costs.

During the 1960's scholars developed a great interest about a new area known as the New Institutional Economics that resulted in its expansion. The main authors that supported this analysis were Ronald Coase and Oliver Williamson. Not claiming its paternity, the authors suggests that many studies made in less than two decades has been attributed to this subject. Coase is considered the father of this school, which its milestone is his seminal work of 1937.[3]

The Brazilian institutional economist Otávio Conceição states that despite the fact of the large number the recent studies that shows main elements of an institutional analysis they can be roughly separated in three main approaches: the ancient Veblen, Cromos and Mitchel's North American Institutionalism; the New Institutional Economics from Coase, Williamson and North; and the Neo-Institutionalism from Hodgson, Samuels and Rutherford.[4]

There are in this three approaches a few pacific points about the role of institutions. Firstly, the economics growth is a process, which implies in incorporate their historical environment and their local characteristics, which means that the path dependence is a main concept of the mentioned approaches. Secondly, due these characteristics, we cannot ever infer that individual paths shown in some economies can be historically copied, revealing that the institutional role for growth is characterized by uncertainty. Finally, the economic growth process, despite the broad species of institutions – as a pack of regalements, rules and habits, and that their evolution has an mark in the individual action of agents, which reveals the necessary and mainly the importance of firms, organizations and therefore of the

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[2] SZTAJN, Rachel.; AGUIRRE, Basília. Mudanças Institucionais. In: ZYLBERSZTAJN, Decio; SZTAJN, Rachel (Org.) **Direito e Economia**: análise econômica do direito e das organizações. Rio de Janeiro: Elsevier, 2005. p. 228-243. p. 241.

[3] CONCEIÇÃO, O. A. C. Além da Transação: uma comparação do pensamento dos institucionalistas com os evolucionários e pós-keynesianos. **Economia**, Brasília, v. 7, n. 3, p. 621–642, set./dez. 2007. P. 625

[4] CONCEIÇÃO, O. A. C. Elementos para uma Teorização Apreciativa Institucionalista do Crescimento Econômico: uma comparação das abordagens de North, Matthews e Zysman. Available in: <http://www.anpec.org.br/encontro2003/artigos/A38.pdf>. Last access: 20 ago. 2012. p. 01-20. p. 05.

microeconomic environment in different trajectories definition.[5]

Thus the goal of this work consists in show, historically and legally which are the institutional, legal and economical paths that allow innovations. We'll take as an example the case of the asymmetric trajectories of the institutionalization of technological innovation in Brazil and United States and how Brazilian institutions formal or informal, influence the path dependence of Brazilian technological innovation and that due this fact, the institunalization process of technologic innovation its still ongoing in Brazil, differently of the United States, where the Institutional Matrix formed is very distinct, that allows this country to take a leading position in the innovation scenario.

1) Which would be, after all, the mechanisms through Law and Economics that affects the institutional arrangement of a country to allow innovations?

The great Law and Economics researcher Rachel Sztajn, perceiving the importance of the theme treats institutions as:

> Polysomic word from the Latin *institution* of *institutive* that means the act or effect of institute, create, fund, establish something lasting as organize, put in order. Also its used to indicate costumes or social structures that mold accepted and respected practices in an community of social core.[6]

The basic difference among formal of informal institutions (White and Gray markets) are that the first are products of a deliberated products of the choosing process of actors. This choosing process can be of many kinds, but is always possible do recognize it when concerning formal institutions changes. In the informal institutions, often is difficult to identity its origin thus they are spread and can be found in daily social behavior of individuals and incorporated through an often unnoticed process.[7]

The idea of a lock and complete system has been abandoned to recognize how the applied Social Science, Law (system) cannot ignore the fact the fact that institutional transformations that result from social changes, some from technologic changes and others

[5] CONCEIÇÃO, p. 05.
[6] SZTAJN; AGUIRRE, 2005. p. 228.
[7] SZTAJN; AGUIRRE, 2005. p. 237.

from new social values and even others resulting of knowledge advances in traditional culture fields, that generate new needs and demands a new normative formulation.[8]

About the institutional chances process, professor Sztajn states that:

> The formal is easier to analyze than the informal. The actors are recognizable, the field is determined and rules of decision making established, while in informal changes it is not easy to identify which are the actors, which are the decision making rules and the alternatives available. The genesis of each one of institution kinds explains why the informal institutions are more resistant to changes than the formal. An formal institutional changing process can be triggered deliberately through competent forum. The institutional change doesn't have specific arenas.[9]

Therefore Law is known as a organic manifestation of interests and practices of community and thus the social element must be always presented in written law. We must insist that the normative system is in itself a social institution which includes the Estate Law as Social Rules, Practices and Costumes that grow out human relations.[10]

There is in the quotidian life acts, relations and choices that for Law are the subject of valuation and therefore, incorporated by the system.[11]

This would result the necessity of Law being plastic, flexible and agile in the receiving of all and any substantial changes in the social subtract to reflect them in a second moment.[12]

Thus is impossible to comprehend Law as it is without comprehend how Law were in past. To base in the precedents chain take courts to begin all new cases with a past study. The resolutions that comes by they turn makes the foundation to future cases. [13]

The past forms the stepping stone to the present. The present by its turn forms the stepping stone to the future. Therefore, the historical path that takes each consequence or decision at stake, molds directly their products in a systematic and specific way. Oliver Wendell Holmes was correct when saying that the historic comprehension to Law is a

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[8] SZTAJN; AGUIRRE, 2005, p. 233.
[9] SZTAJN; AGUIRRE, 2005. p. 237.
[10] SZTAJN; AGUIRRE, 2005. p. 234.
[11] SZTAJN; AGUIRRE, 2005. p. 232.
[12] SZTAJN; AGUIRRE, 2005. p. 231.
[13] HATHAWAY, O. A. Path Dependence in the Law: the course and pattern of legal change in a common Law system. **Law, Economics, and Public Policy Working Papers**, Paper 270, p. 100-165, 2003. p. 102.

milestone in Law comprehension as it is today. [14]

As any other organism or organization, public or private must follow the social needs, thus is not up to discussion, but the social needs follow a historical pattern, there are connections between social practices and expectations that comes from prior facts and decisions which are called path dependency. The historical rupture mostly comes from revolution, general unconformity rather through legal changes.[15]

The external circumstances can change, causing the effect that what was an efficient rule to become inefficient due the alternate context. Or what was an efficient rule can be less efficient in a different context. Or even new information can be available, altering the legal subject perception and therefore the adequate resolution. Or finally, the ruptures can make a prior efficient rule in a particular group of circumstances and spread its application which would diminish its efficiency.[16]

It is an ancient discussion among scholars the role of history in Law. They debate the importance of tradition in the constitutional interpretation, the role of historic narrative in the decision making process and the precedent value.

A determinate central group among scholars proposed and developed a theory that can be called a legal evolution.[17] To the most basic level, therefore, path dependence implies that what happens in a prior point in time can affect possible consequences of a sequence of events that may occur in a posterior point. [18] Which means that there are current situations can lead to tomorrow institutions.[19]

Therefore, the new knowledge builds cumulatively through past's knowledge and it does that throughout ways that in many circumstances the advances of yesterday makes the advances of today relatively easy.[20]

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[14] Ibidem, p. 163.
[15] SZTAJN; AGUIRRE, 2005, p. 232.
[16] HATHAWAY, 2003. p. 131.
[17] HATHAWAY, 2003. p. 102-103.
[18] WILLIAM JUNIOR, H. S. Three Temporalities: toward an eventful sociology. **The Historical Turn in the Human Sciences**, Chicago, 1996. p. 262-263
[19] VEBLEN, T. Why is Economics not an Evolutionary Science. **The Quarterly Journal of Economics**, v. 12, 1898. p. 190
[20] CASTALDI, C.; DOSI, G. The Grip of History and the Scope for Novelty: some results and open questions on path dependence in economic processes. In: WIMMER, A.; KÖSSLER, R. (Ed.). **Understanding Change**: models, methodologies, and metaphors. Basingstoke: Palgrave Macmillan, 2006. p. 99-128. p. 103.

The majority of our society is inclined to see social conventions and more consistently formal structures of rules that govern the organizations activity and nowadays institutions, including many legal institutions as they were historical experiences. [21]

Historians traditionally demonstrate interest in institutions in which human actions occur and many of their work concerns the exam of the interaction between persons and these institutions.[22] Society and institutions are open systems that feedback each other and alternate themselves permanently.[23]

A large part of written history dedicates to the study of evolution and the political, military and social institutions development; and only these sophisticated institutions evolved throughout history as complex economic institutions that emerged from this framework where a highly technologic society can survive and flourish.[24]

The secret to achieve growth is in the building of a Matrix that stimulates the physic and human capital accumulation. The great distance observed nowadays among rich and poor countries can be found more in Institutional Matrix differences that in technologies access problems. Poor societies found themselves in this situation due their lack of development in a rules, laws and costumes capable to stimulate economic profitable activities foundation, specifically in capital and knowledge accumulation.[25]

The main legal failure that retards economic growth in poor countries is the lack of an effective property law, followed by contract law and corporative law.[26]

To direct behavior, the sanctions of violation of norms must be effective. Effective sanctions demands social norms as estate institutions. As effective social norms demands a community of compromised people. Both requisites to a effective law – social compromise

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[21] DAVID, P. A. Why are Institutions the Carriers of History? Path Dependence and the evolution of conventions, organizations and institutions. **Structural Change and Economic Dynamics**, v. 5, n. 2, p. 205-220, 1994. p. 205. Ver mais em: ARTHUR, W. B. Competing Technologies and Lock-In by Historical Small Events. **Economic Journal**, v. 99, n. 1, p. 116-131, 1989. ARTHUR, W. B. **The Nature of Technology**: what it is and how it evolves. The Free Press, 2009. DAVID, P. A. Clio and the Economics of QWERTY, **American Economic Review**, v. 75, n. 2, p. 332-337, may 1985. DAVID, P. A. **Path Dependence, it's Critics and the Quest for Historical Economics**, 2000. DAVID, P. A. Path Dependence: a foundational concept for historical social science. **Cliometrica**, v. 1, n. 2, 2007, p. 91-114.

[22] DAVIS, L. E.; NORTH, D. C. **Institutional Change and American Economic Growth**. Cambridge University Press: New York, 1971. p. 03.

[23] SZTAJN; AGUIRRE, 2005, p. 232.

[24] DAVIS; NORTH, 1971, p. 03.

[25] GALA, P. A Teoria Institucional de Douglass North. **Revista de Economia Política**, v. 23, n. 2, p. 89-105, abr./jun. 2003. p. 92.

[26] COOTER R. et al.: O Problema da Desconfiança Recíproca. Available in: <http://services.bepress.com/lacjls/vol1/iss1/art8>. Last access: 30 mar. 2013. p. 13

and estate institutions – doesn't emerge only through law expedition.[27] As an corroded sprocket wheel that spins, but doesn't propel the vehicle, an ineffective property and contract law cannot push economic growth forward.[28]

In the XIX century, the United States were followers of technology and could, therefore, borrowed many of its science from the rest of the world.[29] In the middle of the XX century, though, the United States became world leaders in technology and couldn't risk to depend from the rest of the world to their necessary base researches.[30] Thus, as bigger the technologic gap is and therefore, the productivity gap between the leader and the follower, stronger will be the potential of the second to grow in productivity; and in other factors, therefore it can be expected the growth rate of the follower do rise.[31]

The subject of knowing if the growth is faster in richer or poorer nations will determinate if the world life standards will converge or diverge. If poor nations develop faster than richer nations, than the gap between them will shrink surprisingly quickly. If the logic is reverse, though, it will spread surprisingly fast.[32]

The technologic retard is not just an accident. Social characteristic, usually are partially responsible, and maybe a substantial portion of a country to failure to achieve great levels of productivity *vis a vis* developed countries. The same deficiencies maybe in an attenuated form usually keep to constrain a underdeveloped country to complete its technological cycle by its mere hypothesis. [33] Moses Abramovitz, after Kazushi Ohkawa and Henry Rosovsky, calls this phenomenon of Social Capacity.

Regarding the Social Capacity, though, we expect that the developments anticipated by the hypothesis to be clearly demonstrated in comparisons among countries, only if the Social Capacity of the countries are the same. It can be said then that the potential for one country for accelerated growth is Strong when it is socially advanced and not if its retard is unqualified or it is technologically behind.[34] A combination of the technological gap and the Social Capacity defines the potential to the advanced productivity for the alignment of a

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[27] COOTER et al.: p. 13
[28] COOTER et al.: p. 11
[29] DAVIS; NORTH, 1971, p. 235.
[30] DAVIS; NORTH, loc. cit.
[31] ABRAMOVITZ, M. Catching Up, Forging Ahead, and Falling Behind. **The Journal of Economic History**, v. 46, n. 2, p. 385-406, jun. 1986. p. 385-387.
[32] COOTER et al.: p. 02
[33] ABRAMOVITZ , 1986, p. 387.
[34] ABRAMOVITZ , 1986, p. 387-388.

country.[35]

Countries technologically retarded has the potential to generate knowledge faster than developed countries when their Social Capacities are developed enough to allow the successful exploration of the technologies used by the technology leaders. [36]

The human and institutional capital that composes the Social Capacity, develop as slow as the education and the organization responds to the technology opportunities and experiences to explore that. Their development rate limits the potentially adequate technologies. In addition, the speed of the achievement of a potential alignment depends of the number of other conditions that govern the diffusion of knowledge, resources mobility and investment rates. [37]

The market forces by themselves are dealt as less adequate to generate efficiency, transference and spread of innovation. Governments has many fundamental and not replaceable roles in the process that promotes technological changes that can take many forms:

Firstly, the scientific direct actuation and technological activities such as universities and public research institutions support; secondly, the financial support to innovation throughout the business sector and finally, the supply of infrastructure to the necessary production, including education and training, rules and regalements and e legal system that protects intellectual property to allow people and firms to innovate. [38]

The institutions configuration is decisive to determine in which degree the transactional costs differ among economies. It is expected that in development countries in which laws are not always well defined, slow and inefficient court systems that disrespect contracts, the transactional costs would be considerable elevated.

Thus Law is nowadays the battlefield in which opportunities do technological development in periphery countries are being defined, as normative structures that comes from technology (relationship between traditional regalements and the code).[39]

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[35] ABRAMOVITZ , 1986, p. 389-390.
[36] ABRAMOVITZ, 1986, p. 390.
[37] ABRAMOVITZ, 1986, p. 405-406.
[38] ARCHIBUGIL, D.; MICHIE, J. Technical Change, Growth and Trade: new departure in institutional economics. **Journal of Economics Surveys,** v. 12, n. 3. p. 01-20, 1998. p. 03.
[39] LEMOS, R. **Direito, Tecnologia e Cultura**. Rio de Janeiro: FGV, 2005. p. 14.

As seen, institutions evolve sophisticatedly, connecting the past with the present and future; History consequently is also the institutional evolution story in which the historical development of economies can be understood only throughout a sequential study.[40] Values can be built and accessed, contrasted, valued and appropriated institutionally.[41]

In other point of view, namely the economic, institutions reduce uncertainty and the transactional costs involved in economic activity, thus making possible the coordination of agents and the efficient operation of the markets; the variation in prices can alter marginally the negotiation power of the actors and through time can provoke changes pronounced or not in institutions that form the economy as we know.[42]

The economic and social environment of agents is surrounded by uncertainty. The main consequences of this uncertainty are the transactional costs. These can be divided in measurement and enforcement problems. To reduce the transactional costs and coordinate human activities, the societies develop institutions. These are a continuum of rules in two fashions: formal and informal. The bundle of these rules can be found in the Institutional Matrix of the Society. The dynamic of this matrix will be always path dependent,[43] where social actors take compromises based in institutions and existent politics. As they do that, the cost of revert the main course raises dramatically.[44]

North tries to demonstrate the difficulty faced by economic agents due the uncertainty existence. Thus he introduces the institutions concept. These, through the reduction of transactional costs and ameliorating the problem of uncertainty will make social and economic coordination easier.[45]

The perplexity with this fact, countlessly repeated in a same economic politics in resembling situations can redound in different results that raised the conscience that institutions produces consequences in the economic development.[46]

An efficient Institutional Matrix is one that is capable to stimulate an agent or

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[40] MILGROM, P.; NORTH, D. C.; WEINGAST, B. The Role of Institutions in the Revival of Trade: the law merchant, private judges and the champagne fairs'. **Economics and Politics**, v. 2, p. 0l-24, 1991. p. 98.
[41] CONCEIÇÃO, 2007, p. 632.
[42] NORTH, D. C.; THOMAS, R. P. apud CRUZ, S. C. V. e. Teoria e História: notas críticas sobre o tema da mudança institucional em Douglass North. **Revista de Economia Política**,, v. 23, n. 2 (90), p. 106-122, apr./jun. 2003. p. 108.
[43] GALA, 2003, p. 103.
[44] PIERSON, P. **Politics in Time**: history, institutions, and social analysis. Princeton: Princeton University Press, 2004. p. 35.
[45] NORTH, D. C. apud GALA, 2003, p. 100.
[46] SZTAJN; AGUIRRE, 2005, p. 235.

organization to invest in an individual activity that brings higher social returns compared to their social costs. The key to this successful arrangement lies in establish a property system well defined and sided by an effective enforcement system.[47] The principle of property for innovation demands laws and politics to raise equity and create wealth.[48]

In taking formal and informal institutions of one society in a specific period of time, the Institutional Matrix will be responsible to define the incentives vector for many social agents, especially those involved in economic activities. In a large part of history of societies, it can be resumed according to North through the evolution of their Institutional Matrix and their economic, political and social consequences.[49]

There are not any institutional arrangement that can be defined as optimum, thus they are the outcomes of cultural and political contingences of each country. In some countries the institutions were developed to favor the economic progress, while in others it was not. The institutional environment defines the profit opportunities directing decisions and the accumulation process of knowledge in organizations, generating vicious or virtuous paths.[50]

The nature of institutions results from different economic performances between countries.

2) The asymmetric paths of institutionalization of technological innovation in Brazil and Unites States. Why are these paths asymmetric? Due path dependence!

2.1) The Historical *Path Dependence*

While researching about Brazil and the United States, since the discovery, passing through colonization and immigration periods, getting to nowadays, we can comprehend which values, cultures and institutions were created and adopted by their societies. Excluding or inclusive? Extractive or integrative? Wouldn't be possible do understand why the

[47] NORTH, D. C.; THOMAS, R. P. **The Rise of the Western World**: a new economic history. Cambridge: Cambridge University Press, 1973. p. 01-02.
[48] COOTER, R.; SCHÄFER, H. B. **Solomon's Knot**: how can law end the poverty of nations. Princeton: Princeton University Press, 2012. p. 54
[49] NORTH, D. C. apud GALA, 2003, p. 102.
[50] TIGRE, P. B. Inovação e Teorias da Firma em três Paradigmas. **Revista de Economia Contemporânea**, n. 3, p. 67-111, jan./jun. 1998. p. 92.

institutional differences in technological innovation in these countries without comprehend their colonization systems and institutional changes that occurred in these places.

The history matters for this work, due its evolving trajectory, demonstrates firstly the political differences by which Portugal and England were passing during the colonization period in the American Continent. It is clear from the beginning that the Colonization goals were different for one and other colonies. England came with an commercial intent in the occupation of their colony and the expansion of their official religion, while Portugal came to extract Brazil's wealth.

According to Douglass North:

> History matters. It matters not only because we can learn from the past, but because the presented and the future intertwine to the past through the institutions continuity in a society. The choices of today and tomorrow are dictated by the past. And the past can only be comprehended as the history of institutional evolution. The integration of institutions to the economic theory to the economic history is an essential step to make this history and theory better.[51]

In the understanding of Schumpeter, nobody will understand the economic complexity of any age, including the current if not by a adequate vision of historical facts and the historical sense.[52] The existence of path dependence expresses the irreversible and historic character of the studied system. The past is irrevocable, cannot be reproduced with fidelity as the initial conditions are not the same; the future, by its turn is only in the imaginary of agents: ex ante, the future doesn't exist yet.[53]

Thus observing the note that history matters, ie., that the legacy of the past pushes the future and the concept of the path dependence, it is offered as an analytical tool to comprehend the importance of the temporal sequences of development in time and social processes events.[54]

In a broad sense, the path dependence means that the consequence or decision is formed by an specific and systematic manner by historic trace that is prior to it. This implies,

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[51] NORTH, D. C. **Institutions, Institutional Change and Economic Performance**. Cambridge: University Press: Cambridge, 1990. p. vii.

[52] SCHUMPETER, J. A. **História da Análise Econômica**. Rio de Janeiro: Centro de Publicações Técnicas da Aliança, 1964. p. 35.

[53] MOREIRA, R. R.; HERSCOVICI, A. Path-Dependence, Expectativas e Regulação Econômica: elementos de análise a partir de uma perspectiva pós-keynesiana. **Revista de Economia Contemporânea**. Rio de Janeiro, v. 10, n. 3, p. 547-574, set./dez. 2006. p. 549.

[54] KAY, A. A Critique of the Use of Path Dependency in Policy Studies. **Public Administration**, v. 83, n. 3, p. 553-571, 2005. p. 555.

in other words, the relational cause between stages of a temporal sequence, in which each stage influences strongly the direction of the next stage. [55]

Mahoney believes that the institution that is initially favored establishes a pattern of legitimacy; this institution is reproduced because is acknowledged as legitimate; and the reproduction of the institution sustains its legitimacy.[56]

Institutions are frequently resistant to changes: they crystalize routines in their structures, develop their own criteria of adequate and success as well as arrangements of social existence[57]. The prior events have grown this effect through time, but the order by which alternatives are presented matters little but probably will deprecate in the final outcome. [58]

This was precisely that happened in England until the XVII century, when the country passed through an intense institutional change due the Glorious Revolution. The institutions which were until then statics and excluding were transformed gradually in inclusive. The result of this change can be seen in the fashion of the American colonization.

In Brazil, history is different. The Liberal and against the crown Porto Revolution in Portugal, occurred in 1820, a retard of more than one century it compared to the Glorious Revolution. With the revolution, the Portuguese system of excluding and extractive institutions was changed. In spite of that fact, when Brazil was discovered, Portuguese intentions were extractive. During Brazil's independence in 1822, due the Portuguese colonization system, the country would pass by many institutional crises.

It was a period of social convulsion. The elite fought to sustain their privileges and keep their new benefits. This great instability turns groups in power to seek pacts and reestablish the order. Nevertheless, that came to be an end of it. Social casts that were benefited by the status quo struggled to pass the conquered rights. The independence brought an institutional void in the country.

The result of this poor institutional structure after the independence can be observed in the fashion of Brazilian technological innovation institutionalization. Societies bounded to prior experiences and evaluated innovative changed with suspicion and antipathy contrasted

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[55] HATHAWAY, 2003, p. 103-104.
[56] MAHONEY, J. Path Dependence in Historical Sociology. **Theory and Society**, v. 29, p. 507-548. 2000. p. 524.
[57] HATHAWAY, op. cit., p. 140.
[58] Ibidem, p. 147-148.

dramatically with these with an favorable heritage to an environment healthy for changes.[59]

While the United States has a strong root innovation culture, Brazil is still building it. Path dependence is more than a qualification process of institutions evolution in which the institutional framework of yesterday gives the opportunities to organizations and individuals of today. Path dependence can make institutions evolve or remain stagnated.

The majority of fundamental errors committed in economic analysis can be credited to a historic deficiency than to any failure of the economic instruments.[60] The alternatives available in a given moment depend of the existent institutions. The decision making also is conditioned to the prior events.

According to Peters, choices made while an institution if being formed or when a politic is still being initiated will have an influence continuously determinant [...] in the future.[61] Each event in the sequence is a reaction to prior events as it is a cause to future events.[62]

Path dependence is an historical fact and one of the lections more significant that can be originated by the past study. The difficulty of altering fundamentally the paths is evident and suggests that the learning process through we get to nowadays institutions can restrain future decisions. And more than a fact that institutions originated by the Institutional Matrix existent owe their survival and welfare to itself and therefore will try to impede changes that can alter it against their wellbeing. And also is a fact that the system of beliefs belonging to the Institutional Matrix will determinate the breakthroughs.[63]

2.2 Normative *Path Dependence*

2.2.1) Brazil

[59] NORTH, D. C. **Understanding the Process of Economic Change**. Princeton: Princeton University Press, 2005. p. 21.
[60] SCHUMPETER, 1964, p. 35.
[61] PETERS, 1999 apud GAINS, F.; JOHN, P. C.; STOKER, G. Path Dependency and the Reform of English Local Government. **Public Administration**, v. 83, n. 1, p. 25-45, 2005. p. 25.
[62] MAHONEY, J. Analyzing Path Dependence: lessons from the social sciences. In: WIMMER, A.; KÖSSLER, R. (Ed.). **Understanding Change***:* models, methodologies, and metaphors. Basingstoke: Palgrave Macmillan, 2006. p. 129-139. p. 135.
[63] NORTH, 2005, p. 77.

The innovation act - Lei da Inovação (10.973/04) – was created to pushes the technological development of Brazil regulating innovation and technology transference between firms and universities. As the great majority of Brazilian researchers work for universities, it is necessary to create an effective interaction between these institutions.

According to the report published by the Strategic Studies Center - Centro de Estudos Estratégicos (CGEE), the perceptual distribution of entitled doctors in Brazil between 1996 and 2006 employed during 2008 by the national classification of economic activities section (CNAE) from the employers selected is: Education (76,77%), Civil Services (11,06%), Professional Activities and C&T (3,78%), Health (3,00%), Transformation Industry (1,39%), other services (1,11%), Financial Activities (0,53%), Extractive Industry (0,42%), Agriculture (0,41%), Commerce (0,39%), Administrative Activities (0,28%), Informatics and Communication (0,23%), Construction (0,22%), others (0,42%).[64]

It is safe to say than, that the Law came to fulfill the need to regulate and make institutional the culture of innovation in Brazil. In Brazil, in contrast to the Unites States, where innovation was already being propagated since the XVIII century, the innovation culture needed a regulatory institutionalization process. The American Innovation statute, the *Bayh Dole Act* of 1980, that as the Brazilian Law also regulates the technology transfer between university and firms, didn't institutionalize innovation. The *Bayh Dole* Act only regulated a current situation.

About this subject, professor Saldanha states well when saying that in the common law systems, rights came to be firstly from the social conflicts that by asking for the aid of courts lead them to create a legal solution to the case at stake, usually without a statute previously existent; which means that rights comes in the first place to be, conflicts are solves and then passes to orientate behaviors.[65]

In the Civil Law systems, in general, there is a state legislation prior to problems with principles and rules that leads society's behavior and gives to the judge criteria and means necessary to solve future conflicts; meaning that rights comes first, orientates social behavior and then solve conflicts.[66]

The interaction between society and the legal system is apparently more intense in the

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[64] CENTRO DE GESTÃO E ESTUDOS ESTRATÉGICOS. **Doutores 2010**: estudos da demografia da base técnico-científica brasileira. Brasília: CGEE, 2010. p. 220.
[65] SOUZA JUNIOR, C. S. **A Supremacia do Direito no Estado Democrático e seus Modelos Básicos**. Porto Alegre: Do Autor, 2002. p. 81.
[66] SOUZA JUNIOR, loc. cit.

common law which explains that by its formation it adheres more to uses and costumes than rights given by the civil law's formality.[67]

In Brazil, before the Innovation Act (Lei da Inovação), the economic and social environment of agents were surrounded by uncertainty, thus there were not specific regulations about innovation and the transferring of technology originated by the interaction between universities and firms. The main consequence of these uncertainties is the elevated transactional costs, adding to legal insecurity (lack of rule of law). The transactional costs emerge due the incomplete information of the agents to take proper decisions.

As detailed in the introduction of this work, between the current institutionalism strings, we chose the New Institutional Economics. The main characteristic of the NIE is its insistence in the idea that transactions can seldom be made without costs, which would make the analysis more adequate. In the models often used by neoclassic economics, its adopted the unlimited rationality standard without transactional costs.

The transactional costs are those which the agents face every time they try to bargain. Among this costs we could enlist the negotiation, writing and enforce contracts costs. In order to the transactional costs could be included in economics, it was necessary to abandon some presupposes of neoclassic, such as unlimited rational, and embrace concepts of the NIE, such as limited rational and informational asymmetry.

The transactional costs can be divided in two species: the *measurement* and *enforcement costs*. The first relates to the difficulty of the agents to define clearly the subject of the transaction in course (and others emerged before the conclusion of the transaction).[68]

The *enforcement costs*, by their turn relate to the uncertainty of the agents about the fulfillment of the trade[69] (the effect of the pact) and, therefore, relate to the legitimacy of the transaction made.

In the *measurement costs*, the problem lies in the impossibility of acknowledge the product quality *ex ante* by the buyer in a transaction, triggered mainly by informational asymmetry. In the *enforcement costs,* the question lies in the complexity of transactions that involved products already bought or that will be made *ex post*. If any king of legal protection is not available in these transactions to ameliorate the uncertainty, the transactions will not

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[67] SZTAJN, Rachel.; GORGA, Érica. Tradições do Direito. In: ZYLBERSZTAJN; SZTAJN, 2005. p. 137-196. p. 141.
[68] NORTH, 1990, p. 29.
[69] Ibidem, p. 32.

occur.

Cavalli states that the transactional costs derive from the use of a few legal contract institutions that can be avoided by the use of other contractual legal institutions.[70]

North seeks to show the difficulty confronted by the economic agents due the existence of uncertainty.[71] Thus introduces the concept of institutions which will be the foundation of his model. These, by reducing the transactional costs and ameliorating the uncertainty problem will make easier the economic and social coordination.[72]

In the presence of uncertainty and to overcome the transactional costs, institutions are born. Since the beginning of days to currently, individuals interact throughout rules. Only through them it is possible to understand the society's organization.[73]

To reduce the transactional costs and to coordinate human activities, societies develop institutions. These are an continuum of rules with two extremes: formal and informal. The pack of these rules can be found in the Institutional Matrix of societies.[74]

The institutions reduce the uncertainty and the transactional costs involved in the economic activity, making possible the agents coordination and the efficient Market operations; the variation in prices alter marginally the bargain power of actors and in the course of time it can provoke changes more or less pronounced in institutions that shapes the elected economy.[75]

With the diminishment of uncertainty, the transactional costs shrink and the rule of law rises,[76] and therefore, the number of transactions. It is what has been happening to Brazil since 2004 with the Innovation Act advent. Since then, the country has been filled with a new

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[70] CAVALLI, C. M. **Empresa, Direito e Economia**: elaboração de um conceito jurídico de empresa no direito comercial brasileiro contemporâneo a partir do dado teórico econômico. 304 f. 2012. Thesis (PhD in Law) Faculdade de Direito da Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012. p. 199.
[71] NORTH, op. cit., p. 27.
[72] GALA, 2003, p. 100.
[73] GALA, loc. cit.
[74] PIERSON, P. **Politics in Time**: history, institutions, and social analysis. Princeton: Princeton University Press, 2004. p. 35.
[75] NORTH; THOMAS, 1973 apud CRUZ, 2003, p. 108.
[76] In its work Filosofia do Direito, Miguel Reale states that the idea of justice connects strictly to the idea of order. In the concept of justice itself it is necessary an order, that cannot be recognized as the most urgent value that lies in the axiological root scale, but it is a fundamental step to any ethical development. In the same work the author states that in any community it is imperative that a legal order declare it; ultimately what is legal or illegal*:* REALE, M. **Filosofia do Direito**. 17. ed. São Paulo: Saraiva, 1996. According to the thought of Carlos Aurélio Mota de Souza security is implied in the justice value, being a legal priority. The scholar states that if the law is granted with the legal relationships stability, the security is destined to them and people realated; it is na goal concept which is a goal of law itself. In: SOUZA, C. A. M. de. **Segurança Jurídica e Jurisprudência**: um enfoque filosófico jurídico. São Paulo: LTr, 1996.

perception about innovation and technology transfers between firms and universities.

In the attempt to reduce transactional costs, either *measurement* or *enforcement costs*, a Law brought regulations specifying the subject of transactions which may or not be contracted and established the property of Technologies produced with this interaction (universities and firms).

2.2.2 United States

Despite the considerable number of universities that already transfer the results of their academic researches to industrial labs; even before the 1920's; with the goal to be commercialized, it was only in 1945 that the concept of technological trade among firms and universities became legal in the United States. Vanevar Bush wrote a report in 1945, by the request of the president Roosevelt in 1944 entitled Science: the endless frontier.[77] At the time, the Project Manhattan has shown the importance of university researches to the American defense system.

In the words of the president Roosevelt to Bush in 1944, new frontiers to the mind are ahead of us. If they can be explored with the same vision, boldness and will which we used in this war, we can create better jobs with more outcomes and a better life.[78]

In spite of that, the government incentives to research with firms, universities and federal labs had its beginning only in the 1960's. The reason lies in the lack of ability of the federal government to promote the adoption of the new technologies by the industry. There were none politics concerning procurement and federal subsides. This problem occurred due the restrictions imposed in the new Technologies public bids and the constrains by federal agencies to concede the authorship of the inventions to universities and other involved.

This reality began to change with the approval of the S*tevenson-Wydler Technology Innovation Act*, of 1980. Through this act the American government made easier the access of the industry to federal labs, making available the infrastructure highly specialized and also opportunities of partnership in the finance and private use of public institutions of research.

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[77] CASA BRANCA. **Science The Endless Frontier**: a report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development. Washington, July 1945. Available in: <http://www.inovacao.unicamp.br/report/Sciencetheendlessfrontier.pdf>. Last access: 15 jan. 2013.

[78] CASA BRANCA. **Carta do Presidente Roosevelt**. Washington, 17 de novembro de 1944. Available in: <http://www.inovacao.unicamp.br/report/Sciencetheendlessfrontier.pdf>. Last access: 15 jan. 2013.

The *Stevenson-Wydler Act* made easier the transfer of technology between federal labs and non-government agents and established the mechanisms of information spread of federal researches outcomes.

With the edition of the *Stevenson-Wydler Act* and the *Federal Technology Transfer Ac of 1986,* it was created a mechanism of compulsory procurement of patents registered by federal labs of the private sector and the establishment of compulsory agreements of research cooperation of research and development (Crada's),[79] among federal laboratories and firms, as a co-investment mechanism in applied researches. These changes resulted in the technology transfer from federal laboratories and industry, collaborating to the rise of the patents registries.

With the same goals, other statements were created such as:

The *Small Business Innovation Development Act* of 1982, with effects magnified by the *Small Business Technology Transfer Program, STTR of 1992* and the *National Cooperative Research Act* of 1984 with aid from *National Cooperative Research and Production Act of 1993*. This statement establishes the creation of public-private cooperation to research developments. As an example: The *Semiconductor Research Corporation* and the *Microelectronics and Computer Technology Corporation*. Establishing rules of antitrust and making *joint ventures,*[80] analysis, as research cooperatives and production among concurrent firms.

Though, the legal measure with most importance in the research filed in the United States would be the approval of the *Bayh Dole Act,*[81] that would lead to the question f the intellectual property, allowing universities, research institutes and firms to keep the patent authorships of innovation financed by public funds and let the institutions benefited by them to transfer them to third parties.

In the United States, the *Bayh Dole Act* (PL 96.517 of 1980) came to regulate the interaction between university and firms. Contrasting to the Brazilian Law (10.973/04), that dealt with the hard function of help the regulation of the technology produced in this kind of interaction's property, to legalize the innovation, in the United States, the innovation culture was already present, giving the Law the simple function to regulate the interaction. In Brazil, the culture of innovation is still an ongoing process.

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[79] *Cooperative Research and Development Agreements.*
[80] Enterprises united.
[81] Legislation introduced by senators Birch Bayh and Robert Dole.

The *Bayh Dole Act* was a regulatory mark to the technology transfer and inventions funded by the government to that commercial market. The *Bayh Dole*, has its effects magnified by the *Patent and Trademark Clarification Act* of 1984, allowing small firms, universities and not-to-profit organizations to become owners of the Technologies developed with public aid. Federal laboratories were authorizes to give exclusive licenses of patents to commercial firms. The *Bayh Dole Act* was responsible for the significant raise of the patent level in that country's universities.

According to *The Economist*:

> Possibly the most inspiring piece of legislation approved in the United States in the last century, was the *Bayh Dole Act* de 1980. Among alterations of 1984 and 1986, it unleashed all inventions and discoveries that were made in labs in all the United States, with the help of tax payer's money. Above all, this unique politic measure help to reverse the vertiginous fall in the industrial production in America.[82]

The *Bayh Dole*, according to the magazine detailed was born from the despair of American industry. The industry sector was passing through a crisis moment due the Japanese model f production that had in the Toyotism its most prominent example. The Fordism, symbol of American production gave place to Toyotism, a new production model, cheaper and more efficient. There was a technologic crisis in the United States during the 1970's.[83]

Though, only one decade later, things were already different. Japanese industry was retreating. An exhausted Soviet Union was about to collapse. Europe was settled and began an age of Strong investments in America. Why this sudden wealth trade occurred? In America, there was an innovation run as never seen before.[84] The *Bayh Dole* was na economic revamp initiative. The intention was to reconnect academic researches and the industrial economy.

The initiative was successful. The evidence would be brought by the number of participants in the Technological University Managers Association (TUMA) that rose from 691 in 1989 up to 2.178 in 1999. In 1979, the year pior to the *Bayh Dole Act*, the association

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[82] INNOVATION'S GOLDEN GOOSE. Inovação. **The Economist**, 12 Dec., 2002.

[83] See in: NELSON, R.R. Why do Firms Differ, and how does it Matter? **Strategic Management Journal**, V. 12, p. 61-74, 1991.

[84] Idem, ibidem

had only 113 members.[85]

The US Government intervene in the technologic market through a great amount in subsides to capital accumulated in this field. The mains instrument used by the north-American government is the consume power of the State to favor local producers (*Buy American Act*).

In addition to that legislation, the American government uses a broad and generous finance program to technological development of small and micro entrepreneurs, the *Small Business Innovative Research – SBIR*, which determines that state agencies of research funding spend their fund partially in small business researches in the specific fields elected by them. The *SBIR* is a fund program to small and medium sized firms SMFs, created by na 1982's law and coordinated by *Small Business Administration – SBA*. Since then this agency has the important role to select research Projects and government investments with the establishment of new firms and university relations.

The great volume of subsides conceded by the American government to the private sector is considered an fundamental instrument to stimulate small business of that country to invest in technology. As for the large industries that seek for resources in the capital market, the State support comes from public contracts and local business acquisitions.

In the United States two transformation focus were identified. The first is related to a new institutions creation movement, represented mainly by the *Technology Administration, TA* creation. The second is related to the definition of rules to investments and innovation funding, marked by the intense work in develop legal institutions apparatus, during the whole 1980's to let the researches results from universities, federal labs and other research institutes were applied in industry and transformed in commercial products.[86]

Both have the goal to make the economy more innovation, entrepreneurship and economic cooperation friendly, which lead partially in a firm focus, which were understood as capable to commercialize the scientific researches results; and by the other hand, the creation

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[85] COUNCIL ON GOVERNMENTAL RELATIONS. **The Bayh-Dole Act**: a guide to the law and implementing regulations. Washington: COGR. 1999. p. 01-12.

[86] MATTOS, P. T. L.; ABDAL, A. **Estados Unidos**: mudanças jurídico-institucionais e inovação. Available in:<http://www.cebrap.org.br/v1/upload/biblioteca_virtual/ABDAL_estados_ unidos_mudancas_juridicas.pdf>. Last Access: 20 nov. 2012. p. 96-97.

and development of private incentives to Research, Innovation and Development (R&I&D), that resulted in the shrinking of risks associated by these investments.[87]

The North-American innovation system from 1980 forward, despite the specific institutional arrangements between its many actors – State and Federal Governments, Congress, Agencies, Industry, University, Public and Private Research Institutions and Private Investors – which determined the formulation, definition and implementation of public policies to innovation processes, can be defended by three basic arguments:

The creation, maintenance and development of independent external mechanisms and the scientific excellence to select, evaluate and monitor results of researches and the investment performance, as the demands of the private sector acknowledgment - industry, research centers and innovators;

The creation, maintenance and development of a clear, stable and flexible regulatory framework that allow the information spread through the entirety of the system, technology trades between private and public sectors, the partnership formation between public and private sectors to invest and the development of a *seed capital*[88] *and venture capital*[89] market as the establishment of research and production *joint ventures*;

The risk reduction through selected project certification by public service agencies specialized in direct public investments creates an attractive environment to private investments and the development of a *venture capital* market.[90]

The north-American investments mobilization system of innovation and industrial competition funding can be described as nonlinear, deregulated and without an unified national policy with decision processes both *top down and bottom up.*[91]

The nonlinear, deregulated and top-down/bottom-up aspects of the system can be characterizes by the existence of different decision stages regarding public-private investments for innovation that are roughly independent among each other.

The firms with their own systems of *venture capital* and *angel investments*, as in Google and universities, do direct investments in research for innovation which can be automatically established or through universities of federal labs partnerships.

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[87] MATTOS; ABDAL, 2008, p. 96.
[88] It is the first layer above the investment angel investor.
[89] It is usually used to describe all classes of venture capitalists.
[90] MATTOS; ABDAL, op. cit., p. 98.
[91] Ibidem, p. 98-99.

The investment decisions, as described above can occur:

> As plans defined by the cabinet of the President insulated institutions; The Congress, through the formulation and approval of the plans of investment, which can be autonomous or through the validation or reformulation of the plans by the Executive power; By the public agencies and state foundations created to administrate with Independence, the public investment programs to innovation; By The Federal labs, which work as autarchies with research activities and must be associated to universities and private firms; By Universities that receive public resources according to their projects and research programs; By firms that seek partnerships with federal labs and universities to get access to public resources designated to R & D & I; By the investors of *venture capital,* that seek opportunities of investments in innovative firms with great value aggregation through time potential.[92]

In spite of that fact, the great advances in the Intellectual Property regulations lies in the statements of the *Bayh Dole Act* that says that the ownership of the intellectual property passes from the public agencies to the universities and labs that execute the researches with government funds.

This change was fundamental to alter the structure of public and private investments to incentive to innovation. Before the *Bayh Dole Act,* the fact of the funding of the research was made with public resources constrained the commercial exploration of the patents by universities and labs, thus the property would be necessarily of the public agencies by law determination. This legal structure generated a lack of incentives to the creation of partnerships among universities, labs and firms to transform results from basic researches into applied researches and commercial products.

This occurred mostly because, by one hand the universities didn't had the financial incentives to transform basic researches into applied researches, since they couldn't get *royalties.* And by the other hand, because the license contracts of research should be celebrated, necessarily with the intellectual property owners, which were the public agencies. This situation didn't incentive researches and thus innovation.

The *Bayh Dole* does not question if research professor in universities should apply patents to their work to solve world problems, and that wouldn't lead to meaningful results. As any inventor, they need to get patents from their inventions to attract investments

[92] MATTOS; ABDAL, 2008, p. 99.

necessary to develop them. Off course that inventions must be developed only if useful.[93]

Instead, the *Bayh Dole* states only about who should own and administrate scholar inventions and who should share the profits of its result. Before the *Bayh Dole*, inventions made with federal resources corresponded to 70% or more of university researches funds, which were government owned which believed that no firm should take the benefits of an investigation made with public funds and thus would only get non-excluding patents.[94]

The *Bayh Dole,* thus took the ownership of innovations back to the universities that made them and gave them freedom to bargain the license terms that stimulated their development. It essentially legalized the scholars invention's ownership as it is today.[95]

The results were so remarking that from 1980 to 2008, 6.652 new firms were made and 3.381 which were in operation up to the ending of 2008. Each state, except Alaska had at least one start-up formed as the result of the technological licensing to universities researches. In 2008 alone, 595 new *startups* were created 11 per week. 76% of biotechnology firms have university licenses. At least 50% of the current biotechnologies had their start in na university licensed result.[96]

A strong national infrastructure of support to technological trade was established in scholar institutions in all the country since the *Bayh Dole*. In 1980 there were around 25 to 30 universities that were actively engaged in the planning and licensing of inventions. There was a growth of roughly 10 times in the institutional engagement since then.[97]

The AUTM research reflects the impact of this growth in the activity: the scholar institutions conceded more than 8.000 patents in US between 1993 and 1997 to technologies discovered by their researchers. More than 2.200 new firms were made since 1980 based in the license of an academic institution invention, including more than 330 corporations constituted during the tax year of 1997 alone. About US$ 30 billions were invested in economic activities each year, 250.000 jobs can be attributed to new technologies commerce. There are more than 1000 products currently in the Market that are based in university licensed results. The university licensed technologies has been fundamental to new industries creation and can rise production and competition among firms and thus creating new firms

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[93] LOISE, V.; STEVENS, A. J.**The Bayh-Dole Act Turns 30**. [s.l.]: Les Nouvelles, 2010. p. 186.
[94] LOISE; STEVENS, loc. cit.
[95] Ibidem, p. 188.
[96] Ibidem, p. 189.
[97] COUNCIL ON GOVERNMENTAL RELATIONS, 1999, p. 08-09.

and jobs. Summarizing, the *Bayh Dole* and its utter alterations made incentives to the government, universities and industry to work as a whole to the commerce of new Technologies to the public benefit. The success of this partnership of three shades cannot be ignored.[98]

The Stanford University, for instance has enabled to the PhD program associates could work in potential commercial Works using university resources. Their Office of Technology Licensing (OTL) had a broad view of its role. Instead of taking for itself all technologies made by students and professors, the office helped and funded the patent process. After that, would begin long processes of license agreements that let scientists that excel themselves develop their own *startups*. In return, the office would often receive shares of the newborn technology firms.[99]

The *Bayh Dole* acknowledged a fundamental reality: that firms are the main engine in technology trade and the main channel to the obtain new products for the Market and to therefore benefit society. Not even the government without universities can or should accomplish this function. Thus in order to develop inventions born from universities and give them to the local market, firms is an essential partner. By giving to universities the right of ownership of research inventions funded by the federal government and the obligation to try commercializing inventions through licenses, the *Bayh Dole* provoked this framework that made technology's trade from universities to the industry easier. That, ultimately benefited the United States.[100]

The impact of the *Bayh Dole* can be measured by technological innovation terms (publish and applications of patents), conceded licenses and new *spin off firms*.[101] It can be also measured by its financial gains from universities that support new researches and new jobs created in the region. According to the most recent survey, published by the FY2005 report from the University Technology Managers Association (UTMA), 4.932 new licenses were signed in 2005 with 28.349 active licenses. 527 new products were introduces in 2005 from 151 organizations and also 3.641 new products were released between the FY98 and the FY05. 628 *spin off firms* were created in 2005, 5.171 since 1980. In 2005, the technology

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[98] COUNCIL ON GOVERNMENTAL RELATIONS, loc. cit.
[99] VISE, D. A.; MALSEED, M. **Google**: a história do negócio de mídia e tecnologia de maior sucesso dos nossos tempos. Rio de Janeiro: Rocco, 2007. p. 41.
[100] UNITED STATES HOUSE OF REPRESENTATIVES. **The Bayh–Dole Act (P.L. 96–517)**: amendments to the patent and trademark act of 1980. The Next 25 Years. p. 40-41. Available in <Http://www.House.Gov/Science.>. Last access: 20 jun. 2012
[101] Firm created by a group of researches inside a firm or university.

trade offices received 17.382 invention publishes and archives 9.536 patent claims, from which 69,9% were provisory claims that gave opportunity of one year to test the firm interest before to present a complete utility application. Licensed Technology Trade Offices, mainly for starters (12,7%), small firms (50,2%), and large firms (30,9%). 37% from the totality of licenses and options related in the research were given by exclusive licenses.[102]

The *Bayh Dole* also molded the relation of cooperation between industry and university in researches beyond the direct licenses. The industry help universities through a great spectrum of activities since knowledge trade and research trade for intellectual property acquisition. There is a perception that the *Bayh Dole* was largely influent to these activities.[103]

John Hennessy, Stanford's president stated: I don't want that the university to become a obstacle to the technology trade. We have an environment here in Standard that favors the entrepreneurs and the high risk researches. It is an environment that makes that people think about ways to solve popular problems. We have an environment that supports that these are taken to the outside world, through industry. People here really understand that sometimes it's the best way to show something to the world is not to write a remarkable scholar work about it, but to take the technology that he believes and do something with it.[104]

The priority to technology trade in the future will not change. It will be always taking someone with the will to make an substantial investment necessary to develop the its viability and take it to the market, thus this is the finality of the *Bayh Dole*.[105]

CONCLUSION

In the first phase of this work, we analyzed how institutions influence the *path dependence* of countries as well as we demonstrated that this phenomenon can be responsible for this asymmetric relationship between Brazil and The United States regarding the technology innovations. The history, according to Douglass North, always matters.

Portugal and England passed through economic and political different moments during the XVI and XVII centuries. In England, the Glorious Revolution occurred, when the

[102] UNITED STATES HOUSE OF REPRESENTATIVES, 1980, p. 4.
[103] Ibidem, p. 5.
[104] VISE; MALSEED, 2007, p. 41-42.
[105] UNITED STATES HOUSE OF REPRESENTATIVES, 1980, p. 193.

King lost its Absolute Power, passing to rule with the aid of the parliament. In Portugal, the Porto Liberal Revolution, that created a similar framework compared to the Glorious Revolution, occurred in the year of 1820, almost two centuries later. These phenomena explain the distinct colonization systems current to these nations.

Due these different starting characteristics, the Institutional Matrix were formed differently by the two colonies, that resulted in their industrialization processes and therefore the innovation legalization to be prior in the United States than Brazil. As the result, Brazil and United States have distinct Institutional Matrix.

Although, to that could be possible, a deep institutional change was necessary to change the informal institutions and utterly change the formal institutions. It was necessary therefore the construction of the adequate institutional framework to these changes to occur.

Brazil needed to make an environment with more trust, valuing and regulating technologies resulting from researches in the university/firms interactions or would remains to not keep a leading position in the international scenario in technological innovations and growth. The country noted that it could generate the development investing and believing in innovation. The societies economic development results from their institutional dynamics.

Therefore, the Innovation Act in Brazil surged from the necessity of regulation and institutionalization of innovation. To regulate the ownership of new technologies produced by the university/firms interaction, shrinking the transactional costs and creating a clearer and more rule of law friendly environment for trades.

In this work, we established the Innovation Act as a milestone to contrast the history and we identified advances, stagnation and backset in this story. Comparing the situation before and after the new Act, we can conclude that the Innovation Act can be considered as a positive factor to the system.

Douglass North, the main milestone of this work was correct therefore, in affirming that institutional changes can be more important than technologic changes themselves.

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