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PUBLIC ADMINISTRATION AS THE DRIVER IN SOCIO-ECONOMIC DEVELOPMENT: TOWARDS AN INTEGRATED MODEL OF DEVELOPMENT

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ABSTRACT

The question of development has been studied but an integrated model is still lacking.

Our research question is how can we assemble an integrated model of development in light of the current development theories and the historical evidence of the last five centuries.

The methodology is the comparison, and model building based on existing theories.

We found that a seven elements world model could create a framework to analyze the evidence. Then it allowed the creation of an expanding co-opetition model that explains the spread of European co-opetition and development model in the last five centuries.

This model exposed that a core model and an extended model were possible. These models point to public administration as the main causal driver of the development. This Core model incorporates the institutionalist and innovation theories of development. The extended model incorporates also the economic and military theories of development.

Keywords: Strategy, Modeling, State, Public administration, Development

INTRODUCTION

Many authors have studied the question of what causes development, and although evidence has been found for many correlations, an integrated model of the causal relations is still lacking.

This article wants to assemble an integrated model of development, and as the relations between variables are assembled together a model emerges that supports public administration and the modernization of the State as having a central role, as the main driver in development.

This combined model involves a blend of economic and military power, and social development, as these variables are related to each other. We tried to use a variety of authors with complimentary views instead of choosing between one way of looking at the problem rather than others.

Therefore our research question is how can we assemble an integrated model of development in light of the current development theories and the historical evidence of the last five centuries.

This subject is of high relevance because there is no integrated view of development that can explain the evidence of the last five centuries, in fact a model must take into account that development is neither linear nor certain and nations can rise and fall depending on both external and internal conditions.

OVERVIEW OF PREVIOUS RESEARCH

The main subject of this study is the National State, or Leviathan, which has been the major actor in the last five centuries and is good unit of study. However, as Tilly (1992) has explained the states interact by two major ways, economic power (Capital) and military power (coercion).

Development cannot occur without economic power and since economic power needs military power, both are requisite for development. Therefore the national power variable is good proxy of development.

Since these interactions can be modeled by the game theory this is an important knowledge field too.

In this way this study involves four bodies of knowledge: National State power, economic power development, military power development and game theory. Each of these four has extensive previous research. We intend here to give a brief overview of each one.

NATIONAL STATE POWER

Hobbes (1988) has described the State as an artificial animal composed of many animals, or the Leviathan. This National State as a subject has appeared in the late medieval period as an aggregation of City States and the result of many technological, cultural and political changes that can be viewed together as a change in the state of the systems from local networks (cities) to regional networks (nations).

The Nation State has since dominated the global landscape in the last five centuries and many nations appeared and disappeared. While some nations grew almost from nothing others that once were great entered in crisis and never recovered, sometimes disappearing. As examples of the two extremes we can cite the USA and the Austro-Hungarian Empire.

Arrighi (1996) has proposed that there exists a wave like pattern since 1492 in these movements in terms of hegemony cycles lasting from 100 to 140 years with wars of transition between these cycles that last 30 years. In such a way the technology has reached a point at the end of XVth century that the regional systems of Europe, America, Middle East, India and Far East become one single large system, a global system. Modelski (2005) has proposed that this system began to exist as early as 930 but was not consolidated yet. Alves (2010) has tied the evolution of the State to these cycles of hegemony as well as the Kondratieff technological cycles and co-opetition.

Kennedy (1987), Modelski (2005) and Alves (2010) believe that the co-opetition provoke a dynamic evolution of the States as they compete for power, both military and economic, and thus result in a cooperation in technological, economical and military development.

Table 1 shows the summary of this view of hegemonic cycles and transition wars. Notice that the 2065 date is purely a mathematical projection based in the mean duration of the cycles.

In this hegemonic cycle view the States are organized around a hegemonic power that dominates the global system both economically and militarily, so that the economic strength allows for maintaining a military strength, and vice-versa. This hegemonic power maintains itself in power for a period until it enters a crisis and a transition period starts.

In a certain way this Leviathan behaves very much like many animals that need a social structure in which an alpha leader dominates the group, an when it becomes old it's challenged by another in a transition that eventually leads to a new alpha leader.

Tilly (1992) has described that the interaction between States is done by means of capital, and coercion, representing the economic and military power that affect the relations between the States.

A State can develop itself by developing economically and militarily and these two forms of power are interrelated, but development models that have been designed so far deal with only one of these spheres. The development of nations has rarely seen one form of power developing without the other and those distortions have not survived long.

ECONOMIC POWER DEVELOPMENT

There are many economic development models and theories.

North and Thomas (1993) point that the economic organization determines the property rights and institutional arrangements that create a proper environment for development. This allows for a reduction of transaction costs that allows the expansion of the economy. This is the basis of th einstitutionalist theory of development.

Schumpeter (2007) sees the innovation as the main drive behind economic development as it allows for new products and productivity expanding the demand as well

as supply and creating new equilibrium points. This is the key of the innovation theory of development.

Mokyr (1992) indicates four types of growth: investment (Solowian), commercial expansion (Smithian), scale or size effect, and technological progress (Schumpeterian). All these modes of growth are affected directly by the reduction in transaction costs provided by institutions and property rights.

Public Management plays a central role in this since can not only be considered to determine economic organization but also be responsible for assuring that property rights and institutional agreements are valid and secure. Castells (2000) believes that public management is also responsible for promoting innovation.

Mokyr (1992), North and Thomas (1993) and Castells (2000), found that transaction costs reduction and innovation have a positive feedback relation, as one drives the other and vice-versa.

Despite these theories having different positions they are related to each other. Transaction costs and innovation are tied together and they can be promoted or not by public management. These three variables form the core of the discussion.

Economic development is measured basically by means of GDP and GDP per capita. Sometimes HDI (human development index) indicators have also been used to moderate these data since in some nations it's too biased by commodity production, particularly when oil, gold or diamonds are produced in a nation.

However data on GDP and HDI is limited in time, and for a time frame before the XXth century other variables have to be taken into account, usually qualitative interpretations, or quantitative approximations.

MILITARY POWER DEVELOPMENT

The birth of the rudimentary state in the Neolithic is linked to the need of protection and defence. The State was born to protect its citizens. Where the State could control the situation and project military power it could be considered to be its territory, where it could not was another State territory, or a non-organized region.

The military power is also benefited by innovation and transaction costs reduction as pointed by Mahan (1987), Kennedy (1989) and Keegan (1994).

Keegan (1994) has described the evolution of the military as an evolution of technology through several stages. Mahan (1987) has put a focus on the naval power as the most important, and in fact all the hegemonic powers described by Arrighi (1996) were naval military powers.

In terms of transaction costs, a secure transport system means that the cost of freight is reduced, as there is a reduced need for protection. Whether maintaining secure naval lines or an inland transportation network the military are an important factor in maintaining transaction costs low.

They also benefit from these low transaction costs particularly when related to technology improvements that can reduce the costs of transportation and communications. They can respond faster and more effectively to threats.

Public management again forms a central variable that controls this power. During the period analyzed, that is, 1492 to the present, the military power has been mostly controlled by the Nation State that has the monopoly of military power within its borders.

Also, the hegemonic power must be capable of projecting its power on its sphere of influence in order to maintain control, when it cannot do so other powers will contest it and conflicts will arise in border regions.

Kennedy (1989), Tilly (1992) and Arrighi *et al.* (2001), argue that the competitiveness of a nation is ultimately measured not only by its economic power, but also by its military power. That is understandable in face of conflicts arising from limited resource distribution.

Here we can see again the triad of variables of innovation and transaction costs and public administration working in conjunction.

GAME THEORY AND NATIONAL STATE

Game theory deals with the way entities interact and it started as a mathematical model until it evolved into becoming one of the cornerstones of economy, management, biology and political science. In fact it revealed why and how entities co-evolve forming systems of interacting entities, or ecosystems.

Ordeshook (1986) have show how the game theory can be applied to political science and States in general. Tirole (1994) established game theory as having a central role in industrial organization, that is the basis of business and organizational strategy. That includes public management and national strategy.

Game theory deals with mathematical models of behavior, both human and other entities. If we consider the State as being an animal made of other animals, that is, the Leviathan, then it's not surprising that Game theory being applicable to biological beings as well as

organizational ones, will be able to deal with the study of the State as being both at the same time.

The game theory is organized into games generally described in either matrix or decision tree formats and showing situations were competition and cooperation appear, sometimes together forming co-opetition, their hybrid.

The most commonly referred games are the chicken game (competition), the bargaining problem (cooperation), and the prisoner's dilemma (co-opetition). This last one will be used in this article in one of its many versions, the innovation game, to show the result of competition between States leading to evolution together, or co-evolution.

Co-opetition induces co-evolution since as the entities compete for resources they force each other to improve in performance. This is why game theory has become a cornerstone of biology to explain the co-evolution of the species. Since organizations are entities too, they co-evolve. Analogies and contrasts can be drawn as shown by Alves (2011).

Mokyr (1992) has proposed that technologies co-evolve too in a way similar to biological entities. Alves (2010) has used this idea and the hegemonic and Kondratieff cycles to see the State as a technology that has co-evolved in the last five centuries.

METHODOLOGY

The method used for this work is the comparison, and the model building based on other author's models, and so it can be considered a meta-theoretical analysis, or an integrated model building.

The empirical evidence comes from the last five centuries as these are more relevant to the theme than past ones, and also there is more reliable data upon which to study and analyze. To avoid using purely western evidence and thus introduce bias, Chinese, Japanese, Indian and Arabian regions are also taken into account. Only the information from sub-Saharan Africa is missing due to lack of strong evidence.

FINDINGS

From the overview of literature it becomes clear that three variables are central in describing why and how economic and military power of a nation state develops: public administration, innovation, and transaction costs. These variables will form our core model and from it we will develop the extended model.

Our sample is the last five hundred years and the major nation states, to do so we will look at the most important national states at the beginning of each hegemonic cycle and today and compare them in order to understand the dynamics of change.

But before we assemble the model we must have a look at the evidence in terms of comparison. For this task we are going to create a model of the world in order to avoid Euro-centrism.

THE SEVEN ELEMENTS WORLD MODEL

Figure 1 shows our simplified world-model in which six regions are considered to be relevant in the last five hundred years and this model excluded in hinterland of Eurasia, sub-Saharan Africa and Antarctica, as deemed not very important economically and militarily.

The seven elements of the system are: Oceans, Europe, Middle East, Indian Subcontinent, Far East, North America and South America. This simplifies the world as it's composed of "six islands of civilization" that were disconnected before 1492 and became one single system afterwards, when the Ocean became traversable. Before that the world was composed of six islands worlds set relatively apart.

The purpose of the model is not to be complete, but to arrange a framework for evaluation in order to avoid excessive euro-centrism. The model could, of course, be perfected and more detailed, but its main intention is to be simple yet efficient.

The oceans link the six regions that are relatively isolated. The four regions other than Americas have a dashed line connection indicating that commerce and military actions are possible between these regions but not in a very efficient way. In this sense the Eurasian continent is a series of four links in a line making the Middle East and the Indian Subcontinent central position in this game board.

A dashed line also links North and South Americas, representing the difficult terrain linkage of these continents.

One important part of the model is that it doesn't show Europe as special in location from other areas with the exception of being in a tip of the main "islands stream" but in this it's equal to the Far East. In that way the

model cannot be charged of being euro-centric, it can be charged however of being “ocean-centric”, which in fact it is.

EVIDENCE COMPARISON

Based on this model we could assemble a table with the most important national states of the world at five periods of time, the span of each hegemonic period, but with one exception, the current hegemonic period was divided in two, based on the breakup of USSR. We assumed that there was a global system with a hegemonic power, a main competitor for this hegemony and several regional powers located in the elements of the system.

Table 2 shows our interpretation of the most relevant national states at each point of time.

The 1492-1618 period includes one major power from each region. The Mughal Empire appeared only in 1526 to unify the region, so they are listed in this region, despite not existing yet as of 1492. It could be argued that other European Nations had enough economic and military power to be listed but in our interpretation they were not comparable to the Habsburgs alone and could not challenge any regional power like the Habsburgs did. Portugal, France and Britain were still relatively small powers in a global game.

The 1648-1785 period shows Holland and the Habsburgs as the main players of Americas as well as Europe. The three Asian nations fit well the three Asian “Islands”. Portugal is listed because of its dominance of South America in conjunction with the Habsburgs, despite being now excluded from global trade.

The 1815-1914 period also shows the start of industrial revolution making three European nations appear on the list while the Ottoman Turkey is excluded, as it was a minor power in the power struggle of 1785-1815. France and Britain are still the power of Americas as the recently independent USA was not yet a global player, nor are the fragmented nation of Spanish America. Brazil can be seen as in the sphere of influence of UK most of the time. The German and Russian Empires are strong regional powers in Europe and are starting to expand. This is the period of the strongest European centered power. China is still included despite its crisis at the end of the period because it was a strong economic power until its partition.

In the 1945-1991 period the USA has rose to hegemonic status, Japan despite destroyed by the war is still the major power in the Far East surpassing China. The Middle East and Indian subcontinent are dominated by European nations and so four major powers are European. South America can be seen as part of the USA sphere of influence. USSR is expanding its influence worldwide.

The 1991-2012 players include two Far East players and none from the Middle East, and for the first time since 1492 only one European nation appears on the list. China is for the first time a main competitor. Also South America appears again with a local regional power that is not entirely part of a sphere of influence.

One important point is how the model behaves in terms of Naval power, both for economy and military sides. Since the Ocean is the central link for all elements whoever controls it will control the economic access to the other regions. The hegemonic power was always trying to defend its naval military control from the main competitor either directly or indirectly. While that the regional powers were capable of controlling their interior lines of communication but could rarely project naval power outside its regions. These naval conflicts had three types: open conflict, technological race and merchant race.

Good examples of open conflict can be the Habsburg-Ottoman dispute for the Mediterranean leading to the apex in the Battle of Lepanto, and the English-Dutch wars that marked the downfall of the Dutch as a major power and the rise of UK, but also being challenged during the Napoleonic wars by the French culminating in the battle of Trafalgar.

As examples of technological races we can point to the French British co-opetition during the XIXth century, as well as the cold war co-opetition between USSR and USA during the XXth century. This type is very important because it leads to massive investments in technology and therefore advances that later can be used economically.

The last case is the more common and does not occur solely between the hegemonic power and its main competitor but it need only the will to have merchant navy and the disposition for trade. However to protect lines of commerce eventually the need for a military navy arises.

Notice that to become a hegemonic power a nation must develop a strong navy, but to be a regional power that is not necessary, one can either rely on an alliance with a hegemonic power or, at least, be in good terms with it, and have important production to sell. A regional power must be capable of projecting power, both economically and military within its region and for that it needs some efficient sort of transportation and communication system. The more efficient this system is the larger the area that it can control and affect.

In that way we can see that in the first two periods the transportation and communication systems were limited by the wind power and horse drawn vehicles and

therefore the system were slow, and transaction costs high. In the last three periods the advent of internal combustion motors and telecommunications both starting with steam power and telegraph respectively become faster and faster making the transaction costs cheaper. This acceleration sharpened the differences between nations that were seeking innovation and those that don't.

From looking at the model of figure 1 and the table 2, a few questions appear:

- Why Europe and USA became so important in the last periods?
- Why the list changes so much from period to period?
- Why the hegemonic powers don't maintain hegemony forever?
- Why the new hegemonic powers come from unlisted nations?

To answer these questions this article will try to use two factors, the expansion of the co-opetiton game from Europe to Americas and then the world, and the emphasis of public administration in fostering either, development and growth, or stability and status quo maintenance.

THE EXPANDING CO-OPETITION MODEL

In the 1492-2012 period Europe was fragmented and competitive and when it colonized the Americas expanded this competitive system from one element (or "island') to three elements of the system. By contrast the other three elements were in general controlled by a single political entity or nation.

This means that in the many elements the political entities that were monopolist of power and were interested chiefly in maintaining the status quo of their dominated region. This is the case of Aztec, Inca, Ottoman and Mughal Empires, and the Ming and Qing dynasties but also the Habsburgs and Portuguese Empire after some point.

What happened in those cases was that innovation and growth was seen as a risk more than an opportunity, a threat to the controlling political factions that growth would be unequal and therefore increases the chances of power fragmentation.

In Europe due to its fragmented nature no power could try to maintain stability as the competition between them established a situation know as co-opetition, that is, a hybrid of competition and cooperation. It's commonly described in game theory and pictured by the prisoner's dilemma and its versions like the innovation game.

The basic point is made by a version of the prisoner's dilemma named the innovation game. In this game two competing organizations dispute a six units market evenly divided between them. An innovation is possible but it consumes the equivalent to two units to be implemented. If only one of the organizations implements it will have the equivalent to four units since it will have all the market less the innovation cost. If both implement it they will have the equivalent of one unit each (three less two). Figure 2 shows the game in the matrix form.

From the prisoner's dilemma we know that the dominant strategy in this game is to innovate, and so both players are expected to do so if they cannot reach an agreement as to not innovate. Even such an agreement will be temporary if the game is repeated many times.

If more players are present in versions of the game with more than two players this agreement is increasingly difficult leading to a perfect competition in the limit.

This is the model for competition. The more players are present, then the greater the pressure for innovation. Even with two players the dominant strategy is to innovate.

In the case of inter-state competition the market being disputed is the global or regional market, that is, access to new resources and markets. The competing organizations are the states themselves either national or sub-national.

The more options the markets have for investments the greater the number of State-players competing for the investments and therefore the greater the pressure to be more efficient.

In a certain way the globalization process changed the State market from monopoly to an oligopoly market. This has increased the pressure for a better State.

This co-opetition process expanded from Europe itself in the first period to Americas in the second period and reached a global level in the third period. In the fourth period non-European players began to arise in the game. In the fifth period the game is a multi-player global game.

Europe was where this system first appeared and then by co-opetition it spread through the world making Europe initially more important, then USA, in a certain way a "spin-off" of Europe, and finally the whole world.

Since this is a game the leader does not necessarily maintain its lead, in fact it has a powerful incentive not to innovate and maintain status quo, and therefore hegemonic nations tend to eventually lose its innovation

and development drive and become stagnant. If it can maintain itself isolated in its element (or "island") it can maintain its status quo, but once it can no longer do that it will have to pass through a period of transformation until being capable of inserting itself in the system.

In such a model the Far East, Indian subcontinent and Middle East elements could maintain their isolation for the first two periods until it was no longer possible. They were substantially altered and passed through an external domination and instability system from the third period onwards. The Far East and the Indian sub-continent seem to be emerging from this period, while the Middle East is far from organized yet, perhaps due to the importance that its oil has in the system.

The Americas, both south and north elements, could not maintain its isolation from the very start and were occupied by European nations in a co-opetitive game of colonization. This transformed the continent during the first two periods. In the third period the elements became minor players and North America became hegemonic in the Fourth period while South America started to become sufficiently important on its own in the fifth period. Why North America rose first and whether it will continue to maintain its preeminence in relation to South America is not the object of this article.

The list changes come from the growth of the co-opetition system and the fact that leaders had incentives not to innovate in order to maintain the status quo.

This model of a co-opetition system expands from one element of the "six island" world model to the others is in fact a synthesis of previous models of rise and fall like depicted by Olson (1982), Kennedy (1989), Tilly (1992), North and Thomas (1993), and Arrighi et al. (2001). It also incorporates much of the Euro-centric versus non-Eurocentric models discussion as seen in Frank and Gills (2006), Blaut (1993), Frank (1998), and Wallerstein (2007).

PUBLIC MANAGEMENT AS REGULATOR

So far we have developed two models, that is, the seven elements (or "islands") world model, and the expanding co-opetition model. These models and the historical evidence work well together and expose the central variable of development as being the public management.

This variable regulates how the nation will behave, either trying giving preference to development or to stability. It can be seen as a two-state variable, or a continuous spectrum variable between two extremes. It's of course simpler to model it as a two-state variable.

In one extreme the public management is trying to maintain the status quo of the society and therefore it's accepting to sacrifice the development and growth in order to maintain stability. In the other extreme it's willing to compromise stability and order to achieve growth and development through innovation and transaction costs reduction. If we accept that there are intermediate positions between these extremes, so there are compromise decisions between those in several public policies and therefore there can be shades of grey.

Public management assumes in this case a central role as it determines the strategic decision of a society. This decision can be either made by an elite that dominates the public management, such as in the case of many empires, or the resultant will of the majority through voting, in the case of pluralist systems like democracies and republics.

Small and backward nations have very little to gain from maintaining status quo and will probably push for development one way or another, and establish a public management that wants to innovate and reduce transaction costs. In the same vein, large and powerful states have little to gain from challenging status quo, moreover if they are controlled by an oligarchy that prefers to maintain itself in power rather than allowing others to obtain more power and resources by meritocratic competition.

This would put a system in motion in which small nations would grow and larger one would tend to enter stagnancy and fall. Even when a nation becomes too powerful as to eliminate all competition it would succumb from time to time to its own weight. This can explain very well why public management is a central tool of a society, as well as how empires rise and fall.

From 1492 onwards the system became global and an expanding co-opetition system helped destabilize even the regional powers that had achieved local dominance. In a co-opetition regime large and small nations alike have incentives to keep development moving forward. This has changed the world.

Europe was "unified" during the Roman period and eventually fell into fragmentation during the Middle Ages, it never regained unity and this has set a co-opetition system in place there. In comparison the other elements of the model regained unity and therefore become slow in innovation in such a way that the relatively backwards European society advanced faster.

It was in Europe that the modern State began to appear as a response to this situation from the feudalism to modern state and the federalism in Germany, Britain, France and Portugal. The public administration advance could be seen also as an innovation as well as a network

of city-states or fiefs working together competing among them while cooperating to develop the whole element.

CORE MODEL

We are now ready to state our core model as show in Figure 3.

The evidence and previous models point to the fact that public management is the main driver or barrier to innovation and transaction costs. Innovation and transaction costs by themselves affect each other creating a positive feedback system.

Castells (2000) pointed the causal link between public management and innovation. For him once the political decision to foster innovation is made a nation can become an innovation leader in less than a century.

At first the reverse engineering and low taxes can attract industry and close the innovation gap, but as the nation becomes closer to the technological frontier the real drive for innovation is needed and that's when you need other changes like creating universities, sending students abroad, setting venture capital funds and innovation clusters. All those can be facilitated or complicated by the State. It's clear that public management by choosing policies and implementing them is key to the innovation level of a society.

North and Thomas (1993) state that public management is fundamental in reducing transaction costs. For them that is what made the difference in the west when compared to other regions of the world in the last five centuries.

To reduce transaction cost the State must invest in infrastructure, have an efficient and neutral legal system, low taxes, low corruption, high transparency, attractiveness to investments, efficient and neutral statistical institutes, efficient education system, efficient research and development and efficient public security and national security. Once again public management is central in defining and implementing policies making the transaction costs of a society lower.

Mokyr (1992) explained how lower transaction costs could improve innovations since it's cheaper to test new possibilities and adapt and improve existing ones. At the same time innovations reduce transaction costs by improving the efficiency of transportation, communication, manufacturing, resource exploitation, health care, education and services. In this way a positive feedback system is formed. It can either become explosive in growth or a barrier to growth.

Our model points out that this positive feedback can be switched on and off by public management. If the focus of public management is growth and development the switch is on, while if the focus is on control and stability the switch is off. This can explain why and how some societies and nations grow for a time and suddenly stop to do so and then become stagnant and then decadent.

EXTENDED MODEL

However the system can be extended to include more variables and reach to the point of describing development as an increase in competitiveness. Figure 4 shows our extended model.

The public management variable has been expanded to include property rights and institutional arrangements as part of it and therefore include the complete North and Thomas (1993) framework. On top of it the economic organization is shown as influencing these variables with the mediation and regulation of public management.

Below the core model the consequences of innovation and transaction costs are explicated in terms of economic power development and military power development, which are characterized by the variable of productivity and military efficiency. They both contribute to the national power that is a requisite and proxy of development.

Mahan (1987) and Keegan (1994) point how innovation makes military establishments more efficient. As new technologies are introduced new weapons and tactics are possible, changing in this way even strategic relations. Efficiency is more important than size, since there are innumerous examples of smaller forces being capable of defeating larger less advanced forces in all the period examined, raging from the Aztec-Spanish conflict in XVIth century, to the US-Iraq conflict in 2003 in the XXIst century. In many cases a big force is difficult to supply and maneuver becoming less effective than a smaller force.

Kennedy (1989) and Keegan (1994) show that transaction costs can also improve military efficiency. As the transaction costs are reduced so are the costs of intervening into a region and communicating and gathering intelligence from a region. That means the same force can watch and protect over a larger area with the same efficiency or the same area with improved efficiency. There are several evidences along the period analyzed from the capability of the Spanish and Portuguese to project force in the Americas and Asia in XVIth century, to the global strike capability of modern air forces, cruise missiles and ICBM's in the XXIst century.

Schumpeter (2007) was the first to point out that productivity is improved by innovation and this is in fact the basis of modern Kondratieff cycles theory as pointed by Freeman and Perez (1988) and the core of development as innovation theory. Each of the five types of innovation becomes available they improve productivity by creating new products, new markets, new forms of organization, new methods of production, and new resources. It transforms the economy albeit not linearly as evidenced by technological cycles. Again there are evidences as the great navigations and the introduction of America as a new supply of resources in the XVIth century, to the telecommunication and informatics revolution in the 5th Kondratieff cycle in late XXth and early XXIst centuries.

North and Thomas (1993) and North (1990) describe the connection between reduced transaction costs and a higher productivity, which form the core of the institutionalist development theory. Smaller transaction costs create increase the opportunities for interaction in short range and increase the range of interaction opportunities. Since the transaction costs are lower more interactions are possible and therefore the production grows and with it productivity. Evidences are easy to gather from the long-range trade and new products on the colonialism in the XVIth century, to the new digital products, e-commerce, home-office work and project networks of XXIst century.

Tilly (1992) and Kennedy (1989) have show that the power of Nation is a function of both economic power and military power and that rarely one can raise without the other. Arrighi (1996) have shown that this means that there's only place for one hegemonic power. We have established and that this power must control the central element of the world system, that is, the Oceans. Through this element trade is carried out and to be able to ensure this trade a military naval projection is needed. In that way the military power is needed to ensure the economic power and vice versa. Evidence can be shown from the naval trade with gunned ships of the XVIth century and the clashes for hegemony like the battle of Lepanto in 1571, to the dependency on oil shipping through the world and the need to keep these supply lines open at choke points like Ormuz, Suez canal, Gibraltar, Panama canal, Cape Good Hope and Magellan strait.

In this way the model can come from Public management as an expression of a society, either through democratic or oligarchic channels, all the way down to national power. What is missing now to reach for development is how national power connects and relates to development.

NATIONAL POWER AND DEVELOPMENT

Development cannot occur without economic power and since economic power needs military power, both are requisite for development. Therefore the national power variable is good proxy of development.

However, not all nations will look for hegemonic status, and neither for a regional power, many will seek only developing their territory and inserting themselves into the hegemonic power prevailing system of commerce, contributing militarily as necessary as a sort of "insertion tax".

We can now see this model as being capable of understanding, and explaining, development as a causal network starting with public management and leading to increase in national power. This can be understood in three levels: hegemonic power, regional power and minor power

For hegemonic powers not only the whole model is necessary to be used but also a nation viewing for hegemony must excel at all levels to surpass their competitors. That mean the need for military and economic power is high and this will force public management to be seeking actively to promote innovation and transaction costs reduction.

For regional powers the whole model needs to be used too but now they need not surpass all competitors, only those in the region where supremacy is intended. This means it may insert itself or not in the hegemonic power system and develop economic and military power either complimentary to the hegemonic power or barring it to intervene in on its sphere of influence. Land communication and power projection may be more important since the naval power projection is not necessary but the nation will not be capable of developing its full potential unless aligned with the hegemonic power.

For minor powers, that is, those who aim to develop themselves but not reach even regional supremacy the model is still valid but their economies and military might be complimentary or barring intervention of the regional power, sometimes aligning with the hegemonic power if possible. Whether land or naval power projections will be more important depends on political alignments with the hegemonic power and regional power.

CONCLUSIONS

We have started with a seven elements world model in order to create a framework of analysis of the unorganized historical evidence. The result was a schematically organized historical evidence. With the support of game theory we could create a second model the expanding co-opetition model. In this way we could create a basis for analysis that takes into account both the Eurocentric and non-Eurocentric views

This model has allowed us to create a core model of public management as regulator of innovation and transaction costs reduction. This model incorporates the innovation and institutionalist theories of development.

This model was then improved to create the expanded model that describes how this increases economic and military power leading to development. This model incorporates the economic theory and military theory of development, and therefore integrates several views of development.

Figure 5 shows a simplified view of the article where the evidence is in the cloud shape as it's inherently disorganized and needs models to be analyzed. All models are show in rectangles, and their derivations are show by the arrows. The theoretical bodies are show in hexagons

These four new tools of analysis, that is, the seven elements world-model, the expanding co-opetition model, the core model and the extended model can help advance into and integrated view of the many development models, they include five theories in its body: game theory, institutionalist theory, innovation theory, military theory and economic theory. They also integrate Eurocentric views with non-Eurocentric ones, and therefore advance the understanding the phenomenon of development.

For public managers it's very relevant as it puts their activities and decision in the very center of how and why development occurs and this is sustained by several theoretical perspectives and supported by five hundred years of global evidence.

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Table 1 – Hegemony Cycles and Wars of Transition

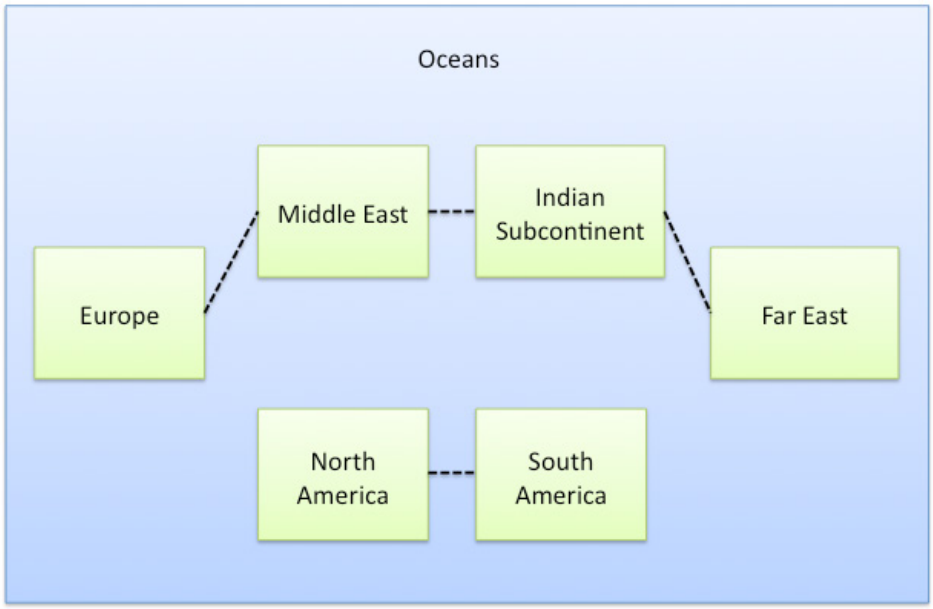
Type	Period	Description	State type
Hegemony	1492-1618	Genovese-Habsburg Hegemony	National state
Transition	1618-1648	Thirty Years war	
Hegemony	1648-1785	Dutch Hegemony	Mercantile State
Transition	1785-1815	Revolutionary and Napoleonic wars	
Hegemony	1815-1914	British Hegemony	Modern State
Transition	1914-1945	World Wars (WWI & WWII)	
Hegemony	1945- 2065?	USA Hegemony	Industrial State

Source: Author

Table 2 – Most relevant national states at the start of each hegemonic cycle and today

Period	1st	2nd	3rd	4th	5th
Hegemonic cycle	1492-1618	1648-1785	1815-1914	1945-1991	1991-2012
Hegemonic nation	Habsburgs	Holland	United Kingdom	United States	United States
Main competitor	Ottoman Turkey	Habsburgs	France	USSR	PR China
Regional powers	Ming China	Qing China	Qing China	Japan	Japan
	Mughal Empire	Mughal Empire	Mughal Empire	United Kingdom	Republic of India
	Aztec Empire	Ottoman Turkey	German Empire	West Germany	Germany
	Inca Empire	Portuguese Empire	Russian Empire	France	Brazil

Figure 1 – Seven elements world model (six "islands of civilization" linked by the Oceans)

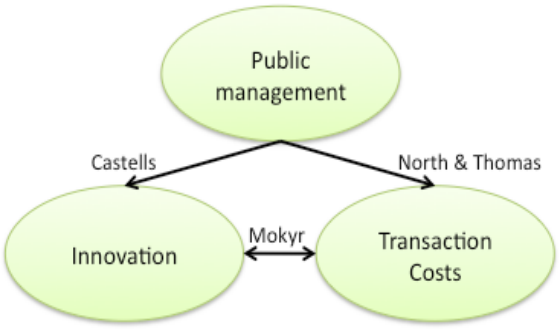


Source: Author

Figure 2 – The innovation game (a version of prisoner's dilemma)

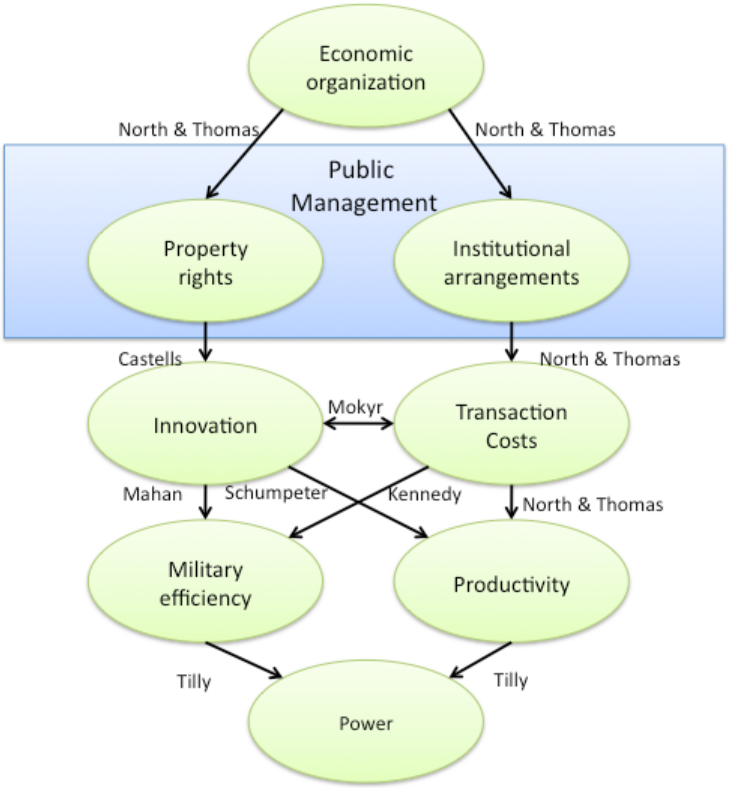
		Player 2 - (State 2)	
		Don't innovate	Innovate
Player 1 (State 1)	Don't innovate	3,3	0,4
	Innovate	4,0	1,1

Figure 3 – The core model



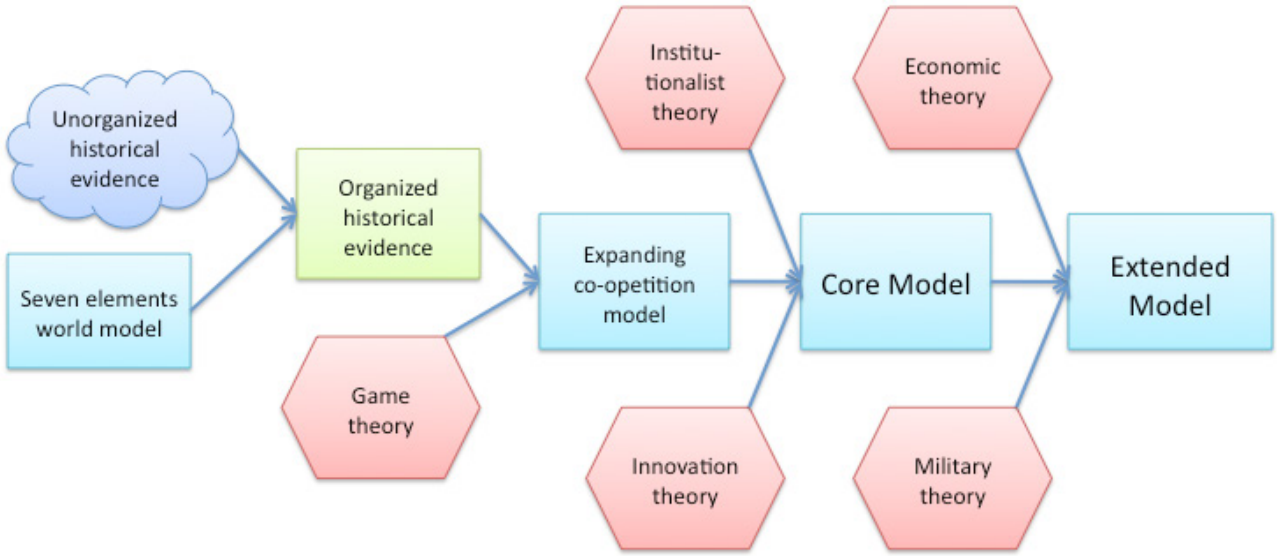
Source: Author

Figure 4 – Extended model



Source: Author

Figure 5 – Schematic view of the article model creation



Source: Author