Digital migration and regulation of the virtual structures of accumulation in Brazil

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Abstract

The thematic one of this work represents a new scope of study in the area of Geography. It is affiliated to the research line: "Globalization, Public Policies and Territorial Reorganization" in the Post-Graduate Program in Geography at the Rio de Janeiro State University - UERJ, in the field of knowledge "Cyberspace and Society of the Information". It is also part of the research project "Virtual Structures of Accumulation and Cyberspace: The morphologic production of cyberspace and the appropriation of the informational flows in Brazil ", financed by the Foundation Carlos Chagas Filho for Research Support of Rio de Janeiro State – FAPERJ.

This research is a sequence of studies dedicated to the need of conceiving a geographical theory on the new productive forms of accumulation based on technical nets . These nets have enabled the consolidation of virtual structures accumulation and the manifestation of a new social space of communication or sociability, the cyberspace.

From this perspective, this work is firstly aimed at analyzing the territorial formation of the virtual structures of accumulation in Brazil, according to the theory of the social structures of accumulation; secondly, it aims at revealing how the processes of regulation and institutionalization of the Internet and the relations of electronic commerce, as planned by the recently created Internet Governance in Brazil (http://www.cg.org.br/) and Executive Committee of Electronic Commerce (http://ce.mdic.gov.br/), are relevant governmental instruments for digital migration and normative management of the territorial flows in Brazilian cyberspace; thirdly, this essay is intended to demonstrate how these two processes contribute to the strategic repositioning of the national states in the South, in face of current digital division and expansion of the electronic commerce and the "immaterial capital"; in the fourth place, to demonstrate the growth of services and the establishment of new network territorial dynamics and the considerable increase in the number of financial transactions through the Internet.

Finally, the establishment of this regulatory landmark is a condition for the consolidation of a paradigm of regional governance that has engendered conditions for the reterritorialization of the virtual structures of accumulation in the Brazilian late capitalism.

KEY WORDS
Digital migration, digital divide, virtual structures of accumulation, social structures of accumulation, electronic commerce, cyberspace, immaterial capital, geography.
Acknowledgements

First of all, I would like to thank the academic committee of this event for inviting me to be here to participate in this discussion of the theme: Digital migration and regulation of the virtual structures of accumulation in Brazil.

A quick introduction to the theme

I am presently working in the field of “Cyberspace and Information Society”, which became a new field of study of Geography and is part of the line of research in “Globalization, Public Policies and Territorial Restructuring” of the post-graduate course in Geography of Rio de Janeiro State University – UERJ. I have been developing a research project in this field about “Virtual Structures of Accumulation and Cyberspace”, which is financed by the Carlos Chagas Filho Foundation for Research Aid of the state of Rio de Janeiro – FAPERJ.

In three years, this area of knowledge, in Rio de Janeiro State University’s Geography Department, has already produced two master’s degree dissertations. These studies in light of the theory of social structures of accumulation reinforce and expand cyberspace studies¹.

About today’s theme

This study is divided into three parts:
1. the first part deals with the “Territorial Formation of Virtual Structures of Accumulation and Cyberspace”;
2. the second part examines the “Regulation and Institutionalization of the Internet and of Electronic Commerce Relations”;
3. the third part analyzes “Regional Governance and the Reterritorialization of Virtual Structures of Accumulation in ‘Financial' Capitalism”.

¹As is the case of the following works:
1. Territorial Formation of Virtual Structures of Accumulation and Cyberspace

From a geographical perspective, this study intends to contribute to reflection upon the phenomenology of the territorial formation of virtual structures of accumulation in light of the Theory of Social Structures of Accumulation - SSA (Kotz; Mcdonough; Reich, et al. 1994).

Important efforts, seeking to reveal the spatial dimension contained in Marx’s accumulation theory, emerged in the field of geographical science in the mid-70s. The merit of these studies was to reveal and explain how capitalist accumulation engenders spatial structures and, in turn, how these structures can impel and reinforce the contradictory expansion of capitalism (Harvey, 2005). The spatial structures of accumulation are the results of the SSAs.

Also according to this premise, the spatial processes of concentration, agglomeration and conglomerate, which so characterize the contemporary urban phenomenon, are almost always historically impelled by capitalist accumulation.

The essential, requisite conditions that unleash capitalist accumulation are: a) a growing supply of material and immaterial work (Gorz, 2005; Lazzarato & Negri, 2001), reasonably adapted to the technological standard of the expansive capital cycle (Goldstein, 1988); b) spatial concentration of means of production, of productive network infrastructure and of financial selective investment (Gordon, 1994); c) a market to absorb growing quantities of new merchandise or to expand the demand for tangible or intangible goods. The spatialization of these structural conditions can influence and reverberate in the growth of capitalism.

Overcoming distances, destroying spatial barriers, reducing the time of capital circulation and increasing the speed and scale of markets are the main fundamentals of capitalist accumulation.

2 In the 70s, David Harvey produced a collection of articles with the goal of revealing the spatial dimension contained in Marx’s theory of accumulation. This collection was published by the New Left Review and republished in 2005 under the title Geography of Capitalist Accumulation.

3 According to Gorz (2005:15), “Simple abstract work, which was considered to be a source of value since the time of Adam Smith, is now substituted by complex work. The work of material production, measured in product units per time units, is substituted by immaterial work, to which classical standards of measurement can no longer apply.” Meanwhile, for Lazzarato & Negri (2001:45): “All of these characteristics of the post-industrial economy (present in industry as well as in outsourcing) are accentuated in the form of “immaterial” production, properly speaking. Audiovisual production, publicity, fashion, software production, territorial management, etc., are defined by the particular relation that production maintains with its market and its consumers”.
Networks and their technical composition play an important role in territorial integration, for they allow for the transport of material, energy or information (Santos, 1996).

Networks, as infrastructures of capitalist accumulation (waterways, railways, highways, telephony, underwater cable, “infoways”, etc.), reflect technological (Reich, 1994) and geographical investment standards required by the different forms of capital (commercial, mercantile, industrial, financial and informational). These networks possess a morphology whose design can reveal: a) the scale of digital division and the global connectivity (fig. 1); b) the urban hierarchy and the power of dominion of its territories (Smith & Timberlake, 2002); c) the concentration of the social knowledge or economy of knowledge (Gorz, 2005).

Spatial structures in networks have a mediative or virtual link with the dynamics of accumulation, for these spatial structures can play an important role in reducing the time taken for capital returns. The landscape and territory are altered and modeled by the engineering structures of the hegemonic technological standard, which imposes unequal temporalities and rhythms upon them.

Digital networks are organized by differentiated geographical standards hierarchically articulated by international satellites and super information highways (Abilene - fig. 3, Aarnet - fig. 4, Alice - fig. 5, Clara - fig. 6, Ampath - fig. 7, Géant - fig. 8, Eur med - fig. 9, Cernet - fig. 10, Janet and Linx- fig. 11, Saix - fig. 12, TEIN2 - fig. 13, etc.). These super “infoways”, interconnected by satellites, combine elements and devices of creation (art), production, commercialization, communication, simulation and knowledge, and form a quasi-embryo of “collective intelligence” (Levy, 1994), cyberspace (fig. 14).

4 See the attached figures.
5 Gorz argues (2005:29): “If it were not a metaphor, the expression ‘economy of knowledge’ signifies important setbacks for the economic system” (...). “It also indicates that the trade value of goods, whether or not material, in the final analysis is no longer determined by the quantity of general social work that they contain, but, principally, by their content of knowledge, information and general intelligence. The latter (and no longer abstract social work measurable according to one sole standard) becomes the main social substance common to all goods. It becomes the main source of value and profit, and, as such, according to various authors, the main form of work and of capital”.
6 To confer the Africa map of Internet host in: http://demiurge.wn.apc.org/africa/afmain.htm
7 According to The Opte Project, the symbolic map of cyberspace, designed in 2003, reveals more than 5 million borders and almost 50 million spots distributed according to the following color distribution (In: http://www.opte.org/):
   1. Pacific Asia – in Red
   2. Europe/Middle East/Central Asia /Africa – in Green
   3. North America – in Blue
   4. South America and the Caribbean – in Yellow
   5. RFC1918 IP’s – in Gray
   6. Unrecognized spots – in White
The study of cyberspace through the eyes of geography is a recent effort that has been expanding and consolidating itself rapidly, impelled mainly by the necessity of establishing ontological and conceptual bases that explain and elucidate how this network structure affects territorial dynamics and, through the internet, influences the growth of electronic services and activities.

Within this perspective, it has also been important to investigate how the consolidation of two important processes characteristic of the expansion and development of cyberspace – digital migration, designated as a “new colonialism” (Vilches, 2003), and digital division, represented by the scenario of unequal access to the internet (Castells, 2003) – makes possible the reconfiguration of social, economic and political activities in territorial structures of accumulation.

1.1. Cyberspace as a Virtual Structure of Accumulation

Cyberspace, a term coined by William Gibson in 1984, was often confused, through common sense, with the internet, or has been improperly treated as a virtual “dimension” whose nature is “non-territorial”, “post-organic” or “immaterial space”, occasioning innumerous equivocations, mythifications and imprecision. The fetishism of cyberspace is the opposition between the representation, from viewpoints, and that which is represented, as SSA.

Seeking to demythify common sense’s consecrated use of the term cyberspace; Koepsell (2004) affirms that these incorrect notions originate from ontological questions pertaining to all phenomena mediated by computer technology, suggesting that the term “cyberspace” refers to the set of transactions of information and commutations that occur within and between computers by way of these commutations. E-mail exists and moves through cyberspace. Computer programs exist and function in cyberspace. Virtual reality exists and occupies cyberspace. Financial transactions occur with growing frequency in cyberspace.

Using a philosophical approach, Koepsell (2004) seeks to derive the concept of cyberspace from a perspective originating from a formulation elaborated within the discipline of ontology, without, however, dialoging with thoughts produced by the debate over the theme within the scope of geography and economics.

Geographical science has also been making efforts to elucidate and demythify all ideology producing attempts to dissimulate the “nature” of cyberspace.

Cyberspace is treated, in this study, as “techno space” (Turco, 2002), that is, as territory articulated and structured by the primacy of its technological networks and of its SSAs.
Cyberspace is no longer a “public space” eminently made up of academic networks, and has transformed itself into a virtual structure of accumulation subsumed by digital migration.

The imperative of cyberspace and of the digital age is an irreversible fact. The growth of electronic commerce and the trade of tangible and intangible goods over the internet reveal this tendency.

2. Regulation and Institutionalization of the Internet and Electronic Commerce Relations

Seeking to sketch a brief history of the constitution of cyberspace and of virtual structures of accumulation in Brazil, some recent studies point out that they were structured in two large phases: academic and commercial (Stanton, 1993, 2004; Filippo & Sztajnberg, 1996; Pires, 2005).

The first initiatives to create the network and the infrastructure necessary for the development of cyberspace in Brazil were undertaken by non-commercial public institutions, mainly composed of university and research institutions, namely: the National Laboratory of Scientific Computation (LNCC) in Rio de Janeiro, the Sao Paulo State Research Aid Foundation (FAPESP) and the Federal University of Rio de Janeiro (UFRJ). The principal justification for these initiatives was to perfect the atmosphere of integration and intra-institutional articulation to the global networks, mainly those of American universities, in such a way as to make it capable of promoting and expanding scientific exchange and collaboration by the use of advanced technologies of information and communication (TIC’s).

Within this perspective, in September 1988, the National Laboratory of Scientific Computation (LNCC) in Rio de Janeiro – previously pertaining to the National Council of Scientific and Technological Development (CNPq) and presently subordinate to the Brazilian Ministry of Science and Technology – was responsible for the initiative of establishing the Brazilian scientific institutions’ first connection to the BITNET network through the University of Maryland at College Park, using a 9,600 bps connection. In November of the same year, the Sao Paulo State Research Aid Foundation (FAPESP) provided the BITNET and HEPNET networks with a second connection, hooked up to the Fermi National Laboratory in Chicago at 4,800 bps; this connection served university and research institutions maintained by the state government. In May 1989, UFRJ undertook a third connection to access the Bitnet through UCLA in Los Angeles, connecting itself in a similar manner at 4,800 bps (Stanton, 1993).

During this same period, the Brazilian Ministry of Science and Technology (MCT) created a task force whose goal was the formulation of a plan for the construction of a
national academic network, which would be responsible for the management and planning of Brazilian cyberspace. In this direction, already in 1989, the MCT (SEI), CNPq and FINEP formulated the project, setting up the National Research Network (RPN), which had the support of the most important state research aid institutions: FAPERJ – Rio de Janeiro State Research Aid Foundation; FAPESP – São Paulo State Research Aid Foundation; and FAPERGS – Rio Grande do Sul State Research Aid Foundation. However, only in 1990 was the RNP formally launched.

In the early 90s, besides offering courses in utilization of the BITNET and the Virtual Machine (VM) on IBM terminals, the CNPQ, through the LNCC, at Praia Vermelha, in Rio de Janeiro, permitted its researchers dial-up access to this network, soon after the standardization and use of TCP/IP internet protocols, already commonly disseminated in PC’s that used operational systems based on UNIX, Macs or Windows 3.1.

The first morphological representation of cyberspace in Brazil, elaborated by Michael Stanton in 1993, reveals topology mainly made up of university and research institutions.

The structural design of the national network in 1991 was morphologically based on the model furnished by the National Science Foundation (NSFNET) of the United States; within this perspective, the backbone of Brazilian cyberspace was structured on four levels of solidarity: global, national, regional and local or institutional (Santos, 1996). The global level is maintained with the collaboration of large international research centers. The Brazilian federal government was an important agent responsible for maintaining the backbone through one internet connection distributed among the states. The state governments collaborated to promote the connection of the institutions of their own regions. At a local or institutional level, the universities and research centers were responsible for the costs of and access to the existing networks on their campuses.

The territorial implantation and consolidation of the Brazilian cyberspace structure occurred officially soon after Eco’92, when the RNP, the CNPq and the state research aid foundations inaugurated the national spinal column, or backbone, founding it in the states of Rio de Janeiro and São Paulo, through the networks:

1. Rio Computer Network (Rede Rio), composed of the LNCC, UFRJ and PUC-Rio. Rede Rio resulted from academic interchange programs and research established between the Federal University of Rio de Janeiro (UFRJ) and the University of California at Los Angeles (UCLA) in the late 80s. Rede Rio was officially inaugurated in May of 1992 with an initial investment by FAPERJ of 300 million dollars <http://www.rnp.br/noticias/2003/not-030923b.html>;

2. Academic Network of São Paulo (ANSP), maintained by FAPESP and by Fermilab - Fermi National Accelerator Laboratory.

Originally conceived in 1985, and with an international connection linking UFRJ to CERFNet (California Education and Research Federation Network) in San Diego,
California, Rede Rio had almost all of its institutions interconnected at 64 Kbps. This advance in the use of TIC’s, based on TCP/IP internet protocols with multi-protocol routers, made it possible to offer this service for commercial use on a regular basis to Telerj (phone company of Rio de Janeiro), known today as Telemar.

In 1992, with international connections between Fapesp and Fermilab, the ANSP gradually expanded this 9,600 bps connection to 64 Kbps. Some universities also began to connect at 64 Kbps, as, for example, the University of São Paulo (USP).

In 1993, the national network’s morphology began to have institutional connections greater than 9,600 bps and 64 Kbps. During this period, there was significant growth of other regional academic networks; the National Research Network’s (RNP) connections expanded in 1993 beyond the Rio-São Paulo axis; this impulse favored decongestion of the RNP’s infrastructure and helped to reduce the digital division that always characterized the development of the territorial structure of cyberspace in Brazil. Support from state governments and research aid foundations were fundamental.

In 1994, with saturation of the 64 Kbps international connections beginning, the RNP planned to upgrade its connections to 2 Mbps between Rio de Janeiro and São Paulo. During this period, with the consolidation and use of TCP/IP internet protocols and with the solution of the problems with digital modems, the dissemination of the culture of services (such as e-mail, ftp, gopher, news WWW (Lynx) and of dial-up connections, it had become rather popular in the academic circles. Besides RNP, there was prosperity for other non-commercial networks, such as the:

- Ibase/AlterNex, of the APC network;
- amateur radio community network;
- Bulletin Board Systems networks (the Brazilian BBS’s);
- National Package Network (RENPAC), operated by Embratel, which became the main network infrastructure to reach cities in the interior and became the embryo of commercial internet in Brazil;
- Telebrás X.25 operator networks, which offered e-mail services (Filippo & Sztajnberg, 1996).

The commercial supply of internet services in Brazil was taking its first steps.

In 1995, with the network’s speed increased to 2 Mbps, the RNP began to act not only as an academic network, but also as a network with services and activities of a private and commercial nature. During this same period, the Brazilian federal government, under President Fernando Henrique Cardoso, through the Ministries of Communication and of Science and Technology (MC and MCT), established the Internet Management Commission (CG) by way of Interministerial Act #147, which became a judicial device for regulation and privatization of the internet in Brazil.
Besides regulating the functioning and providing of commercial and private internet services to the public in general, the main duties of the CG were to:

a) aid the development of internet services in Brazil;

b) recommend technical and operational standards and procedures for the internet in Brazil;

c) coordinate the allocation of internet addresses, the registry of dominion names, and the interconnection of backbones;

d) collect, organize and disseminate information about internet services.

In 1996, the BITNET network, with a speed of 9,600 bps, was gradually dismantled. The national computer network gave up being a predominantly academic network and went on to definitively become a network that offers services and activities of a private and commercial nature.

The commercial expansion of services and of access to cyberspace and to the internet favored the growth of innumerable economic activities and of the number of internauts in Brazil, and transformed Brazilian cyberspace into a large virtual structure of accumulation. The maturity reached by Brazilian electronic commerce on the internet well reveals the strength of this market, which was able to move 1.8 billion reais (840 million dollars) in 2004 and 2.3 billion reais (1 billion dollars) in early 2005 <http://www.e-commerce.org.br/STATS.htm>.

According to the Internet Telecommunication Union, from 1996 to 2001 the number of inhabitants connected to the internet in Brazil rose from 170 thousand to 11.9 million, or 6.84% of the Brazilian population.

In 1999, Brazil possessed 77% of all persons with access to the internet in South America (NUA, 2002). During this same period, Brazil was in twelfth place in the world ranking of numbers of hosts – computers with an active internet address – and tenth place in regard to the number of inhabitants connected to the internet, a total of 6.79 million persons, which is only 4% of the Brazilian population. By 2002, this number was already greater than 8%. Data furnished by the Brazilian Treasury confirm this number and reveal that the number of income tax returns (IRPF) filed via internet increased from 706 thousand, in 1997, to more than 14 million in 2002; this growth was due to the extraordinary increase in the speed of and of the services offered on the internet.

In 2004, the maximum speed reached by informational flows between the two largest metropolitan regions in Brazil was 622 Mbps, but by 2007 this speed could reach a high of 10 Gbps (RNP - fig. 15) with the implantation of Project Giga Net (fig. 16), which is presently in the experimental phase (Santoro, 2004).

Implantation of Project Giga Net will extend to eight universities and nine research and development centers along the Rio-São Paulo axis.
Seeking to identify the territorial paradigm that subscribes the material expression of the leading sector in the region, the virtual structures of accumulation (Pires, 2004), it can be observed that, in light of the dispersion of the information age's economic activities, cities have acquired new forms of composition of capital and of centrality, associated with new arrangements in the management and operational command of their activities on a planetary scale.

Electronic commerce represents one of the most important pieces of evidence of digital migration; at the present time, its existence as an economic activity is the result of the purchase and the exchange of goods (tangible and intangible) on the internet. Electronic commerce is the fruit of the intensive and combined utilization of informational and communications technologies. Stated simply, electronic commerce can be defined as the purchase and sale of products and goods on the internet (Neto, 2003).

According to Takahashi (2000), since 1999, Brazil has been the leader in Latin America's electronic commerce market, having transacted 450 million US dollars, which represent close to 88% of the total value of all electronic transactions made by Latin American countries during that period.

The process of judicial regulation of commercial and trade relations on the internet constitutes an important mechanism for the control and normative management of flows, for it contributes to the strategic repositioning of the Brazilian states faced with the expansion of electronic commerce, beginning with the creation of mechanisms of regulation and institutionalization of activities generated by the development of the digital economy, influenced by the “techno-economic paradigm” and based upon the financialized regime of capital globalization (Chesnais, 1997).

In this age of informational and communications technologies, the financial sector is having “a love affair with the technological revolution”, as Carlota Perez put it. In Brazil, the financial sector, through the process of banking automation (Pires, 1997; Pires, 2001) was responsible for the introduction of the most important technological innovations, mainly in the area of informational and communications technologies.

This perspective of normative necessity is emphasized by the State due to the fragility of national markets faced with the onslaught of global entities that operate through the digital paradigm of accumulation or, in other words, under the protection of the virtual structures of accumulation.

The implantation of instruments that regulate electronic commerce in Brazil occurred when the Electronic Commerce Executive Committee was instated in August of 2001. At that moment, this committee had been oriented to act through resolutions, technical recommendations and other appropriate devices for the regulation and definition of the management processes of this new field of the economy. In February of 2005, through the initiative of the ministries of Development, of Science and Technology, and of
Planning, the Electronic Commerce Executive Committee improved its field of action and also went on to conceive actions focused on the promotion and dissemination of electronic commerce.

Presently, the Electronic Commerce Executive Committee’s priority is to define public policies in four large task areas: territorial limit lines, digital inclusion, exportation, and industrial, technological and external commerce policies.

As the years passed, the Electronic Commerce Executive Committee elaborated and catalogued a data bank with more than 230 records of the most diverse statistics on topics that encompass: e-commerce, information science, internauts, the internet, markets, telecommunications and innovation (Cf. http://ce.mdic.gov.br/estatisticas/ page accessed in August of 2005).

According to the Electronic Commerce Executive Committee, by August of 2005, the number of providers of products and services for electronic commerce, electronic government and information technologies already amounted to 393 licensed businesses, which employ 61,777 employees. The work force employed by these firms demonstrates a high level of education: 613 have doctorate degrees, 4,962 have masters’ degrees and 40,570 are graduates with a superior level of knowledge in diverse areas (Cf. http://ce.desenvolvimento.gov.br/e-tools/ page accessed in August of 2005).

From 2001 to 2005, electronic commerce in Brazil increased from 549 million to 2.3 billion reais, and the use of the internet in financial activities grew, in volume of transactions, from 3.7% in 2000 to 13% in 2004 (Valor Econômico, 2005). In 2003, the majority of these transactions was made by 48% of the internauts.

Brazil has a quite impressive number of internet users within the context of South America. There are approximately 19.2 million internauts (Pires, 2004b), which constitute a valuable and important segment of the e-commerce market of this region. According to a survey conducted by Ibope in 2005, among persons over 16 that navigate the internet in Brazil (28 million people), 56.5% effectuate at least one price consultation on the net. The number of on-line consumers went from a little over 2.5 million in early 2004, to 3.25 million by the end of the same year (Felipini, 2005).

3. Regional Governance and Reterritorialization of Virtual Structures of Accumulation in Financial Capitalism

Internet governance went through three phases: the first phase was in the 60s at the time of the cold war and was marked by military control on the part of the US Defense Department through the ARPANET®, which had its origins in the earlier Defense Advanced Research Projects Agency (DARPA); the second phase, in the 70s and 80s, was...
consecrated by scientific-military bias and regulated by academic institutions linked to the National Science Foundation (NSFNET), and it remained controlled by the Internet Assigned Numbers Authority (IANA); the third phase, back in the late 90s, distinguished for its corporate-nature bias, maintained by the Internet Corporation for Assigned Names and Numbers (ICANN), a non-profit organization that inherited its management responsibilities from the IANA network.

With the growth of the internet, ICANN’s excessively unilateral corporate bias\(^9\) and its capacity for management began to be questioned (Goldsmith & Wu, 2006; ), mainly by European authorities who wanted greater autonomy in the elaboration of public policy proposals for its development.

In the 90s, in contraposition the expansion of the digital division and to the bias of corporate governance produced by the great companies of proprietary software, emerge the community of free software, a multilateral socialist alternative of the governance in the world wide web, based on the solidary and shared production of free software.

In 2002, the United Nations General Assembly took an important step toward preparing a new model of multilateral governance, organizing two large conferences, the first being held in Geneva in 2003, and the second, in Tunisia in 2005 (Kapur, 2005, CMSI, 2005, Afonso, 2005).

In this sense, it may be stated that the formation of a movement for the formation of regional governance represented a repositioning process for the Brazilian states, faced with the necessity of establishing political mechanisms and common regulatory instruments, with the goal of implementing regional actions that would promote, in an integrated manner, economic and social development, participation, cooperation and the construction of cultural relations among nations.

Since 2004, the Brazilian state has adopted public policies to promote the free software use in the educational institutions and in the administration institutions.

Four factors contributed to the constitution of regional governance among the Brazilian states: digital migration; digital division; expansion of the electronic commerce of tangible and intangible goods; and the globalization of the financial markets.

In the case of cyberspace, regional governance is characterized by the establishment of actions focused on guaranteeing:
- rules for protecting intellectual property;
- the control of and combat against cyber crimes. For example, in Brazil, Law Project #84 of 1999, which regulates the use of data banks and the providing of services through computer networks, has authority over crimes committed in the area of information science;

\(^9\) More information to confer in The Internet Governance Project: http://www.internetgovernance.org/
norms for defining standards and models of identification of internet users (IP, Domain Name System, etc.);
• policies for the integration and development of technologies;
• measures for establishing universal access and combating digital exclusion;
• development of institutions that can represent common interests and interests of regional markets in United Nations forums.

Since 1993 in Brazil, the federal government has promoted and perfected the politics of Electronic Government consolidation, whose goal was to formulate policies, establish directives, and coordinate and articulate actions aimed at providing services and information to the common citizen, such as:
• electronic income tax declarations and tax payment certificates;
• registry of researchers’ curriculums (Currículo Lattes);
• electronic auctions and purchase declarations;
• registration of governmental suppliers;
• accompaniment of judicial processes;
• information about economic and social indicators, etc.

The dispute over the implantation of this virtual structure of accumulation, within the context of extreme digital division, represents a new battle deflagrated by the appropriation, maintenance or reterritorialization (Cocco; Galvão & Silva, 2003) of markets, mainly by late-blooming capitalist countries that are still entering the age of the knowledge economy.

The implantation of the virtual structure of accumulation is in need of institutional changes that favor the development of immaterial capital and the expansion of “financial capitalism”.

Conclusions

Virtual structures of accumulation possess a morphology that is the fruit of digital division and represents the historical basis of consolidation of the process of capital investment in space.

The expansion of electronic commerce and its financial operations via internet, which are associated with the establishment of digital division and the intensification of digital migration, constitute a new topical area to be tamed by research in geography and economics.

Could it be that the exhaustion of the model of financialized accumulation based on virtual structures of accumulation is near? Will simulation and virtualization be able to engender a society of knowledge? What will be the limits on or barriers to the expansion of this form of metamorphosed capitalism?
The expansion of free software represents an alternative international effort for the digital inclusion. The economic advantages of the free software model already are recognized.

Presently, there are some contributions that follow a line of investigation that deepens the analysis of the consolidation process of virtual structures of accumulation.

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November 2-4 2006, Galway - Ireland

The attached figures

Figure 1

GEANT2 At the Heart of Global Research Networking

www.geant2.net

Figure 2

7,998 Mbps

U.S & Canada

Asia

181,410 Mbps

Europe

Latin America

2,662 Mbps

Africa

68,744 Mbps

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Figure 3
Abilene International Network Peers

Figure 4
AARNet
Red Clara Setember 2006
AMPATH network
November 2005
GÉANT2
Lighting the pathway for European Research and Education

The first international hybrid research and education network. Lighting dark fibre for greater network performance.

GÉANT2 is operated by DANTE on behalf of Europe's RENs.

GÉANT2 is co-funded by the European Commission within its 6th R&D Framework Programme.
Figure 9
Figure 11

JANET External Network Access Provision

Key
- CERNET: China Education and Research Network.
- ESnet: Energy Sciences Network in the US.
- GEANT: The pan-European research and education network.
- HEAnet: Ireland’s national education and research network.
- ISPs: Internet Service Providers.
- NII: National Institute of Informatics - the Japanese inter-university research institute.

Network Connections:
- People's Republic of China (CERNET)
- HEAnet
- Global Transit to the World
- Private Peering with ISPs
- UK ISPs
- US Research Networks
- Abilene
- ESnet
- SuperJANET
Figure 12
Figure 13

**TEIN2**
Regional Connectivity for Asia-Pacific
Research and Education
Linking Asia-Pacific to Europe and beyond

[Map of TEIN2 connectivity with various nodes and arrows indicating linkages across Asia, Australia, Europe, and other regions.]

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TEIN2 is co-funded by the European Commission through the Competitiveness and Growth Programme.

Figure 14
Figure 15
RNP
Figure 16
Rede Giga