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Infrastructure, Competitiveness and Determinants of Private Investment in the Brazilian Context

[1]Hugo Ferreira Braga Tadeu, [1,2]Jersone Tasso Moreira Silva,
[1]Carlos Alberto Arruda de Oliveira and [1]Daniel Berger
[1]Fundacao Dom Cabral, FDC, Innovation Center, Rua Bernardo Guimaraes,
3071-Santo Agostinho-Belo Horizonte, 30140-083 Minas Gerais, Brazil
[2]Department of Business Administration, FUMEC University, Av. Afonso Pena,
3880-Cruzeiro-Belo Horizonte, 30310.009 Minas Gerais, Brazil

Abstract: The objective of this study is to evaluate the infrastructure segment, investments relative to GDP and major competitiveness indicators, based on published data on the 2001-2010 period. Lastly, analyses of segments showing higher potential for investments and returns in the 2011-2017 period are carried out. Initially, it was made a survey on the specialized literature followed by a segment valuation and opportunities for the 2011-2017 period. The qualitative method was used and analyses were conducted on information available in databases. The analyses carried out indicate a great need for improvements in the segments of electric power, telecommunications, road, rail and air transportation, harbours, waterways and sewage systems in a model where private investment offers substantial return and become more attractive than public investment.

Key words: Public inevstment, infrastructure, private investment, competitiveness, Brazil

INTRODUCTION

Infrastructure and competitive environment are essential to maintain the flow of private investments. As for the Brazilian context, low investment relative to GDP in segments such as electric power, telecommunications, road, railroad and air transportation, harbours, waterways and sewage systems result in unsatisfactory expectations about long-term economic growth. Similarly, evaluation of the country's competitiveness suggest that gross capital formation, internal savings, GDP, public finances and productivity could be in better situation relative to other OECD countries if long-term investments were made. From this standpoint, this study is intended to evaluate the infrastructure segment, investments relative to GDP and major competitiveness indicators, based on published data on the 2001-2010 period. Lastly, analyses of segments showing higher potential for investments and returns in the 2011-2017 period are carried out.

Survey on the specialized literature: Investments in infrastructure are a necessary condition for keeping economic growth on the long run in Brazil. Data issued by the World Bank (2005) indicate that to keep quality growth, countries would have to satisfy the following conditions:

- Constant investments in infrastructure of approximately 3% of GDP as a way to keep capital stock. These investments should be concentrated in the segments of transportation (air, road, railroad and cabotage and waterway transportation), electric power and sewage systems
- To achieve a significant GDP growth in the long term, developing countries should invest between 4 and 6% of their GDPs. Korea and its process of infrastructure modernization is the example to be followed
- As for the Brazilian case, a public investment between 5 and 7% of the GDP could have a significant impact on the economic conditions (the current investment rate is 2.5% of the GDP which in theory would not sustain growth)

It is clear that public investments in infrastructure in Brazil are not sufficient. According to estimates carried out by Tadeu *et al.* (2012), the data suggest that public investments will remain in a level below growth needs, reaching 1.61% of the GDP, as shown in Table 1.

Table 1: Public Investments in Infrastructure

Period 2011-2017	Amount
GDP in Reais*	3,548,704.97
Public investments in infrastructure**	57,192.54
Investment/GDP (%)	1.61

*In trillion (10^{12}) reais; **In billion (10^{9}) reais (Tadeu *et al.*, 2012)

Corresponding Author: Hugo Ferreira Braga Tadeu, Fundacao Dom Cabral, FDC, Innovation Center, Rua Bernardo Guimaraes, 3071-Santo Agostinho-Belo Horizonte, 30140-083 Minas Gerais, Brazil

Table 2: Public and private investments in infrastructure in the 2001-2011 period (billions reais)

Segments	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Electric power	8.73	11.05	9.94	9.69	12.18	15.60	16.29	17.71	17.82	17.89	17.97
Telecommunications	21.99	9.69	8.02	13.30	14.21	12.41	12.46	12.64	12.73	13.40	13.78
Road transportation	5.87	5.53	3.86	5.40	6.74	8.67	9.36	9.43	9.48	9.55	9.61
Railway transportation	0.82	0.72	1.11	1.90	3.24	2.53	2.74	2.87	2.92	2.96	3.37
Air transportation	0.46	0.58	0.57	0.55	0.74	0.89	0.57	0.58	0.62	0.64	0.66
Harbours	0.33	0.44	0.20	0.44	0.50	0.58	0.72	0.64	0.62	0.74	0.72
Waterways	0.2	0.09	0.05	0.08	0.10	0.11	0.13	0.11	0.10	0.09	0.12
Sewage systems	4.82	4.43	3.74	4.46	6.44	8.28	9.76	9.82	9.87	9.87	9.93
Total	43.22	32.53	27.49	35.82	44.15	49.07	52.03	53.80	54.16	55.14	56.16
Nominal GDP	1302.00	1477.00	1699.00	1941.00	2147.00	2322.00	2558.00	2889.00	2890.00	2087.00	2492.00
Investment/GDP (%)	3.32	2.20	1.62	1.85	2.06	2.11	2.03	1.86	1.87	2.64	2.25

Table 3: Investments in infrastructure in the 2001-2011 period (billion reais)

Source	2001 (%)	2002 (%)	2003 (%)	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011(%)
Federal government	0.37	0.25	0.09	0.14	0.24	0.29	0.33	0.21	0.19	0.43	0.21
Public investment*	0.73	0.76	0.65	0.61	0.74	0.86	0.69	0.54	0.49	0.59	0.41
Private investment**	2.22	1.19	0.88	1.10	1.08	0.96	1.01	1.13	1.19	1.62	1.63
Investment total	3.32	2.20	1.62	1.85	2.06	2.11	2.03	1.88	1.87	2.64	2.25

Applied Economic Researches Institute data*Government-owned companies; **Private companies

Higher public investments are necessary in infrastructure. If they are not made, private capital will be required, bringing risk of stagnation in the segment.

Also, according to data issued by the World Bank (2005), investments in infrastructure made by developing countries mostly determine increase in competitiveness. Data issued by Applied Economic Researches Institute data shown in Table 2 indicate investments made in infrastructure and demonstrate the need to increase their values in coming years.

Data presented in Table 2 suggest that public and private investments in Brazil in the 2001-2011 period are World Bank (2005) that is 3% relative to GDP. In the assessed period, telecommunications was the segment that attracted higher volumes of investment, followed by electric power. The transportation segment has been showing low levels of investment. For a country with a vast territory as Brazil, investments should be necessarily and especially higher in railway and air transportation, airports and harbours in order to improve transportation of both passengers and load.

Even considering investments brought by the Growth Acceleration Program (PAC-Programa de Aceleracao do Crescimento) whose goal is to stimulate public-private investment in infrastructure, Applied Economic Researches Institute data estimate that growth in investments in infrastructure will achieve 2.65% in 2012, a level much lower than the countries needs. Confirming this analysis, Tadeu *et al*. (2012) believe such investments would reach 1.61% in the 2011-1017 period.

The problems related to investments in infrastructure are linked to the regulatory environment to the high tax burden which inhibits investments to high interest rates to public expenditure and to the bias of banks operating in the country, typically focused on retail.

As far as public expenditures are concerned, investments in infrastructure seem doomed to constant limitations, thus being a real opportunity for private banks. The main aspects that prevent a more significant presence of the government in the segments listed in Table 2 is the increase of current expenditures now around 32% of GDP and the difficulty to increase taxes to cope with this need.

In this scenario, public investments in infrastructure by the Federal Government alone do not exceed 0.40% of the GDP, a value well behind international levels. Therefore, insertion of private banks is mandatory to complement government efforts.

Developing countries, according to World Bank in 2012 data cultivate an intimate public-private relationship, investing in infrastructure around 7% of GDP as in China and Chile. Data on the Brazilian investment in infrastructure for the 2001-2011 period are available in Table 3.

Table 3 indicate that public and Federal Government investments in infrastructure increased in recent years, with a relative decrease in the last 2 years. Meanwhile, private investments increased significantly, bringing the investment/GDP ratio to the 2.25% level in 2011. However, this percentage is still too low for a country willing to develop itself. Accordingly, item 2.1 evaluates segments for public and private investments in infrastructure, opportunities being analysed for the 2011-2017 period.

Segment evaluation and opportunities for the 2011-2017 period: Investments in infrastructure are related to long-term return especially due to the assignment of resources to assets, the need for permanent evaluation of liabilities, high level of competition for markets and intensive activity of regulatory agents. The lack of

investments in the segment, however may result in reduced competitiveness and economic growth. Therefore, investments in infrastructure display particular risk and return characteristics, despite the ample social aspect that stimulates growth in other economic segments. Next, segments in Table 1 will be addressed, analyses of opportunities for the 2011-2017 period will be made using simulation techniques presented in the study of Tadeu *et al*. (2012).

Electric power: Recent search for tariff reduction and energy auctions has shown the need for a new business model for the segment. The complexity inherent to energy companies and the 2002 crisis in generation and distribution indicates the necessity of reviewing the regulatory framework of investments in even new energy alternatives, such as oil derivatives for the industry. The financial balance of energy companies in a scenario of expansion demonstrates the need for ample participation of public and private investments and consequently, changing the operational model of companies of the segment. Given its relevance, several EPE studies show that investments should be greater to allow the system to operate in an increasingly integrated way. Applied Economic Researches Institute data, however, indicate that Petrobras is investing approximately 0.18% of the GDP while states invest 0.11% and the private market 0.33%, considering the increase of costs for companies resulting from outdated generation technology when compared to countries such as China, Germany and the United States.

Opportunities: Energy Planning Company indicate that investments around R$230 billion are needed in the following years to avoid the risk of blackouts. The reason is related to the increase (4.8%) in demand for generation capacity. A gradual reduction in the participation of hydroelectric power plants due to the increase of investments in wind power and even the use of coal in thermoelectric plants can be also observed. Large-scale projects, such as the Sao Luiz do Tapajos hydroelectric power plant will require heavy investment, especially because of the region's hydroelectric potential. Several companies operating in the segment are creating internal structures in order to be able to respond to the increasing demand for investments, despite constant problems in obtaining environmental licenses.

Telecommunications: In the last few years, the Federal Government is trying to establish a new regulatory and tariff framework for the segment with the main objective of increasing competitiveness. However, control and service quality of private companies are weak. Despite the clear rules of the open market and the spatial distribution of operators, growth that would favour clients depends on investments in broadband infrastructure. Applied Economic Researches Institute data indicate that investments in the segment do not exceed 0.58% of GDP higher participation being currently mobile telephony. An excellent opportunity for investments is the greater integration between mobile telephony, fixed telephony and open and subscription TV. It is the right occasion for companies from other segments but huge investments in telephony cabling will be required.

Opportunities: National Telecommunications Agency indicate that the growth of data traffic in the mobile telephony environment, together with Internet information traffic, requires investments in the whole Brazilian telecommunications network. Investments needed amount to R$ 180 billion, especially in fibre optics broadband applications and in the deployment of the new 4G communications standard, a very important issue considering the major sport events scheduled for 2014 and 2016. Still according to National Telecommunications Agency, the percentage of households connected to the Internet is still very low, namely 31% for urban areas and 6% for rural areas, again demonstrating the need for public and private investments.

Road transportation: Large investments are required in this segment. Brazilian roads are characterized by variables such as high percentage of unpaved roads, number of accidents, low average speed, significant increase in truck traffic and sections that urgently demand doubling. Despite concessions granted to private companies, private investments are drastically decreasing because of lower return rates. Despite this decrease, concessionaires invested 2.8 times more than the government, according to National Terrestrial Transportation Agency. Applied Economic Researches Institute data indicate that investments by the Federal Government achieved 0.23% of GDP by concessionaires 0.12% and by states 0.14%. Considering this is a long-term model, the government should carry out a technical evaluation and private participation should increase, reducing the segment's bottlenecks.

Opportunities: Despite all the aforementioned problems National Terrestrial Transportation Agency data suggest that investments of approximately R$190 billion are needed along the following years to improve paving conditions of federal highroads. Investments using only

resources from CIDE-Contribution for Intervention in the Economic Domain are not sufficient. Therefore, the best option for Brazil is the concession approach. In 2010 and 2011 alone, concessionaires invested about R$ 7 billion, a significant amount for the segment.

Railroad transportation: The segment exhibits great participation of iron ore agricultural and oil products. Since privatization in 1996, the main investments favour mining companies transporting products to harbours in the coastline of Rio de Janeiro, Espirito Santo and Maranhao states. To expand the rail network, the segment requires participation of the public sector which demands increase in capital investment. National Railroad Transportation Agency data suggest that several operational problems still affect the quality of railroad transportation, unveiling the need for investments. Outstanding problems include low average speed (30 km h^{-1}), modest total extension of rail branches (29,000 km), strangling of large-size railroads, metropolitan trains in the city of Santos, geography-related problems and large number of accidents.

Opportunities: National Railroad Transportation Agency (2012) indicate the need for investments in the country's railroad structure; the goal is to achieve 52000 km of railroad. Estimates indicate that to achieve that, investments will have to reach R$ 160 billion in the coming years. It is important that the railroad transportation be regarded as a system that connects to harbours especially in periods of heavy investments in agriculture, mining and steel production.

Air transportation: The segment has reached the limits of its operational capacity, as far as both airports and airlines are concerned. Air travel has never been so intense. Nevertheless, airlines are always making losses. This is a consequence of outdated infrastructure, insufficient number of airports, outdated passenger terminals compared to international standards and expansion-greed runways. Recently, the Federal Government auctioned concessions. Despite premium and segment's strategic importance, public and private investment did not exceed 0.4% of GDP, falling short of country's demand for growth.

Opportunities: According to Tadeu (2010), the number of passengers carried in 2016 may reach 170 million $year^{-1}$. If investments to expand terminals and to build new airports do not come true, the whole service chain may suffer with negative consequences. In spite of the constant demand in the airports of Sao Paulo, Rio de Janeiro, Brasília, Belo Horizonte, Porto Alegre and Minas Gerais, most of the transportation within national borders is served by small-size airports with a 12% average increase per year, according to. International Air Transport Association (2011). To support this growth, approximately R$ 5 billion in short-term investments are needed to streamline and expand existing airports and to create new ones all over Brazil, regardless of the potential impact of coming international sports events.

Harbours: The Federal Government is paying close attention to this segment because of its importance to both cabotage and long-range sea transportation. If harbours were conveniently structured, Brazilian import and export capacity would be favoured with positive results in the country's trade balance. The Law number 8.630-93, also known as Harbour Law, facilitates private investments, considering both terminals and access areas. Resistance mounted by companies operating in the docks and in charge of labour management. In the last few years and despite the importance of the segment, the Federal Government invested only 0.009% of GDP in it and private investment reached only 0.06% of GDP, amounts too low to cope with the country's development plans.

Opportunities: A tremendous potential opportunity is the investment in harbour terminals by means of specialized operators and in the accesses to Brazil's main harbours. Tadeu *et al.* (2012) data indicate that the segment would demand R$ 40 billion in investments in the coming years. It is astounding that PAC investments in the segment do not exceed R$ 2.6 billion, considering the segment is strategic for the country's trade balance.

Sewage systems: In the last few years, according to data issued by Applied Economic Researches Institute, investment in this segment did not exceed 0.40% of GDP, private investment being smaller. Outstanding is the great participation of companies owned by state governments with 50% of all investments, participation of both Federal Government and private companies being smaller. Despite a number of changes made to the segment's regulatory framework and even the listing of sanitation companies owned by Sao Paulo and Minas Gerais state governments in the stock exchange, uncertainties are still considerable due to control by ANA-National Water Management Agency.

Opportunities: In this segment, the big opportunities are those related to the improvement of sewage treatment and collection, treatment and final destination of waste water. Because of its impact on the quality of life of populations, the Federal Government assigns great relevance to this

Table 4: Investments necessary in the 2011-2017 period

Segments	2011-2017
Electric power*	230.00
Telecommunications*	180.00
Road transportation*	190.00
Railway transportation*	160.00
Air transportation*	5.00
Harbours*	40.00
Sewage systems*	450.00
Total*	845.00
Estimated nominal GDP**	3548.00
Investment/GDP (%)	23.82

Adapted by researchers; *In billion reais; **In trillion reais

particular area. However, only 7% of PAC's investments have been so far executed. To achieve the level of developed countries, Brazil would have to invest approximately R$ 450 billion in close association with private investments, according to Applied Economic Researches Institute.

According to assessment carried out by infrastructure segments, private investment could be higher, ensuring national long-term competitiveness. Table 4 summarizes investments necessary in the 2011-2017 period (23.82%), therefore earliar current rates (2.25%) and below OECD standards.

Results in Table 4 suggest that investments are necessary in consequence of aforementioned conditions and opportunities in the infrastructure segment. Item 3 presents the method adopted to carry out the research.

MATERIALS AND METHODS

The qualitative method was used and analyses were conducted on information available in databases such as of National Terrestrial Transportation Agency, National Railroad Transportation Agency, World Bank in 2005, Energy Planning Company, WEF (2012) and Applied Economic Researches Institute, technical analyses being done a posteriori.

Also, included are the evaluation of the Brazilian infrastructure and public and private investments made along the last few years. The problems detected along the preparation of this study are related to long-term expectations of private investments, concerned with the inherent risks of the infrastructure for the Brazilian economy.

RESULTS AND RESULTS

Competitiveness and determinants of private investment: Investment in infrastructure depends crucially on GDP growth, according to item 3. However, economic activity is perceivably slowing down since, the last quarter of 2011, according to data issued by Applied Economic Researches Institute, indicating loss of competitiveness. In an attempt to support economic activity, the Federal Government is stimulating interest rate reductions and expansion of household expenditures. This is a short-sighted policy in contradiction to a policy that would adopt long-term vision and stimulate infrastructure, as guarantees of competitiveness. Next, the main indicators proposed by the World Economic Forum and the impacts on the infrastructure and on the determinants of private investment are analysed.

Household economy: The consumption of households is responsible for 60.33% of GDP, earliar the world average in 2011. The Government share alone, on the other hand, corresponds to 20.68% of GDP, a participation above the world average of 17.03%. Also, surprising is the level of internal savings, lower than overall world standards, despite the growth of per capita GDP. Finally, GDP growth forecasts, inflation rate expectations and surplus in the current account may be improved, according to a World Bank report (Table 5).

Public finances: The government's budget when compared to GDP, betrays a negative sign; in other words, expenditures exceed the GDP. To cope with this situation the government is forced to incur both internal and external debts at interest rates earliar the world average (Table 6).

Total fiscal revenue: Total fiscal revenue and income tax on individuals are the 2 main sources of government revenue. Table 5 shows that despite the Federal Government's revenue, the official expenditures exceed income (budget deficit), pointing to low capacity for investing (Table 7).

Productivity: National total productivity (PPP) is 36% lower than the world productivity. Peculiarly, productivity in services is higher than in the industry, a fact in disagreement with the world average (Table 8).

Infrastructure: The Brazilian population is growing but the country's infrastructure lags behind. Air and road traffic is heavier than the world average. As for fuels prices and electric power offered to companies, values are above the world average (Table 9).

Data issued by the World Economic Forum indicate high participation of internal consumption in keeping GDP. At the same time, public budget shows deficit (a fact that might suggest low investment in infrastructure, as mentioned in item 3) together with low

Table 5: Internal economy-% GDP

Economy	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	World Average 2011
Household consumption	62.22	61.72	61.93	59.78	60.27	60.30	59.90	58.94	61.74	60.57	60.33	55.95
Government consumption	19.82	20.57	19.39	19.23	19.91	20.03	20.26	20.19	21.81	21.17	20.68	17.03
Gross fixed capital formation	17.03	16.39	15.28	16.10	15.94	16.43	17.44	19.11	16.95	18.45	19.28	21.43
Gross internal savings	17.96	17.71	18.68	20.99	19.82	19.67	19.85	20.88	16.45	18.26	18.99	27.02
Actual growth of per capitaGDP	1.30	2.70	1.10	5.70	3.10	3.96	6.09	5.16	-0.64	7.50	1.53	2.70
Consumption of ppulation-atual gowth	0.08	-0.47	1.69	1.91	6.53	2.31	6.64	6.33	-	6.33	4.09	3.47
Government consumption-actual gowth	4.74	6.58	-4.68	4.83	6.83	2.02	4.79	-0.26	-	-	1.93	2.39
Gross fixed capital formation-actual gowth	-	-	-	-	-	-	10.10	7.90	-3.22	5.69	4.72	5.25
GDP per capita (US$)	3177.10	2869.61	3090.32	3664.90	4809.84	5870.72	7284.26	8719.63	8352.13	10,952.36	12,822.74	30,312.36
GDP actual growth forecast	-	-	-	-	-	-	-	-	-	4.29	3.30	2.25
Inflation rate forecast	-	-	-	-	-	-	-	-	-	5.34	5.30	3.69
Current account surplus forecast	-	-	-	-	-	-	-	-	-	-1.71	-3.00	1.45

Table 6: Public finances in % GDP

Public finances	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2011
Government budget	-3.41	-5.87	-2.32	-1.22	-3.20	-3.63	-2.80	-2.04	-3.34	-2.55	-2.61	-2.64
Total government Debt-general	-	-	-	-	-	56.39	57.97	57.42	61.96	54.74	54.15	56.82
Internal debt of federal government	33.10	30.55	30.81	28.67	26.31	24.77	22.25	-	-	42.43	43.49	38.67
External debt of Federal government	13.01	18.25	13.30	10.50	8.27	6.05	4.09	4.37	3.11	2.40	2.05	10.08
Interest paid	11.23	9.69	19.26	12.51	16.56	18.51	16.39	14.28	13.94	-	-	6.91
government Expenditures-general	31.32	32.35	31.17	31.47	32.70	33.82	34.09	34.84	36.51	35.89	-	35.79

Table 7: Total fiscal revenue in % GDP

Fiscal revenues	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	World average 2011
Total fiscal revenue	31.25	32.25	29.92	31.67	30.01	29.61	28.30	31.70	30.84	25.36	-	26.79
Income tax-individuals	3.68	3.51	3.57	3.46	3.59	3.47	3.66	3.76	3.36	3.16	-	5.85
Income tax-corporations	1.30	2.29	2.04	2.11	2.52	2.40	2.85	2.99	2.65	2.58	-	3.05
Indirect fiscal revenue	10.35	9.84	9.53	9.74	9.78	10.10	9.58	10.41	9.86	11.18	-	9.77
Tax on property and financial operations	1.87	1.92	1.91	1.90	1.90	2.73	2.66	1.68	1.70	1.95	-	1.53
Effective income tax-individuals	11.01	11.00	8.99	7.65	7.64	7.63	7.65	8.64	9.00	-	-	17.54

Table 8: Productivity in % GDP

Productivity	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	World Average 2011
Total productivity (PPP)	-	-	17046.95	17567.58	18172.49	19019.16	20531.70	21679.78	21668.31	21,668.31	-	59,899.98
Total productivity (US$)	-	-	6890.57	7845.92	10127.96	12196.82	15055.53	17894.40	17186.70	25,264.86	-	62,319.51
Total productivity actual growth	-	-	-	0.17	0.21	1.37	4.38	3.33	-0.96	0.62	-	2.06
Labour productivity (PPP)	-	-	8.83	9.10	9.41	10.49	11.32	11.96	11.87	12.56	-	31.84
Labour productivity (PPP) growth	-	-	-	3.05	3.44	11.45	7.95	5.59	-0.69	0.59	-	2.15
Productivity in agriculture (PPP)	-	-	-	-	-	-	7413.60	-	6671.28	6,699.15	-	35,119.51
Productivity in industry (PPP)	-	-	-	-	-	-	22408.21	-	21404.27	21,493.69	-	73,268.72
Productivity in services (PPP)	-	-	-	-	-	-	27277.51	-	26029.91	26,138.65	-	59,093.31

IMD: International Institute for Management and Development (2012)

Table 9: Infrastructure

Variables	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	World average 2011
Population (i)	173.81	176.30	178.74	181.11	183.38	185.56	187.64	189.61	190.73	190.73	192.99	-
Roads (ii)	-	0.14	-	0.14	-	-	-	-	-	-	0.01	1.1
Railroads (iii)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Air Trans portation (iii)	34285.57	35889.54	32372.04	35263.80	37661.73	40945.04	45286.99	58763.23	67945.58	77,254.95	-	41,907.31
Gasoline Prices (iv)	-	-	-	-	-	1.19	1.41	1.07	1.44	1.42	1.63	1.59
Price of Electric power offered to the industry (iv)	0.04	0.04	0.04	0.05	0.08	0.12	0.10	0.15	0.16	0.18	-	0.12
Total energy consumed, per capita (v)	0.89	0.90	0.90	0.94	0.94	0.96	1.00	1.03	1.03	1.00	1.03	2.48

IMD-International Institute for Management and Development (2012); (i) Million inhabitants, (ii)% GDP, (iii) Billion reais, (iv) US$/Liter, (v) US$

productivity of the population and prices charged for infrastructure above the world average. What would be long-term expectations for private investments?

Opportunities for Infrastructure projects: Analyses carried out on infrastructure and competitiveness suggest the need for higher investments that may lead to economic growth, adopting a long-term vision.

Much can be done to help Brazil, starting from interest rate and fiscal burden reduction by the government. Similarly, a significant increase of investments in infrastructure, as a guarantee to improve quality of energy, telecommunications, transportation and sanitation would result in higher productivity.

The correlation between economic growth, return and infrastructure is clearly evident in data on items 3 and 4 and even more considering the potential unfolding of invested capital.

Given the scarcity of public resources, opportunities of financing infrastructure projects could bring high capital gains for the private sector. Investments in infrastructure with high rates of return are projects related to the segments of transportation, energy, sewage systems and industry as shown in Table 10.

Gains in competitiveness would only be possible in accordance with a balance between economic growth and generated investments. Major opportunities for projects in the areas of transportation, telecommunications, energy, sewage systems and industry are indicated in Table 10.

Traditionally, economic theory considers investments in infrastructure as an exclusive attribution of governments. However, private investment, especially in the case of Brazil, becomes more attractive and returns substantial, particularly in times of privatizations and unstable public finances (Table 11).

Table 10: Opportunities of infrastructure projects

Segments	Investments*	No. of projects
Transportation	343	1136
Telecommunications	180	90
Energy	182	750
Sewage systems	85	7390
Industry	83	301
Other	15	56
Total	888	9723

Economic value (2012)

Table 11: Manufacturing Industry; Brazilian industrial segments

CNAE	Manufacture
15	Fabrication of food and beverage products
16	Fabrication of tobacco products
17	Fabrication of textile products
18	Production of clothing articles and accessories
19	Leather treating and fabrication of leather items, travel articles and shoes
20	Fabrication of wooden products
21	Fabrication of cellulose, paper and paper products
22	Edition, printing and reproduction of recordings
23	Production of coke, oil refining, preparation of nuclear fuels and production of alcohol
24	Fabrication of chemical products
25	Fabrication of rubber and plastic products
26	Fabrication of non-metallic mineral products
27	Basic metallurgy
28	Fabrication of metal products except machines and equipment
29	Fabrication of machines and equipment
30	Fabrication of office machines and data processing equipment
31	Fabrication of electric machines, devices and materials
34	Fabrication and assembly of automotive vehicles, carts and cabins
35	Fabrication of other transportation equipment
36	Fabrication of furniture and other industries

IBGE

CONCLUSION

The goal of this study is the evaluation of the infrastructure segment, the investments relative to GDP, the major competitiveness indicators and the long-term expectations regarding private investments.

The analyses carried out indicate a great need for improvements in the segments of electric power, telecommunications, road, rail and air transportation,

harbours, waterways and sewage systems in a model where private investment offers substantial return and become more attractive than public investment.

RECOMMENDATIONS

Concluding, it may be inferred that the determinants of private investment in Brazil require a fundamental change in the positioning of banking institutions. Banks, traditionally focused on short-term and retail should move to long-term and into the improvement of infrastructure conditions if they want to keep current profitability rates. In future studies, other segments (Table 11) will be analysed, according to the results of Tadeu *et al*. (2012).

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