

CONCESSION OF BRAZILIAN ROADS: CRITICAL ISSUES AND FUTURE PERSPECTIVES

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1 – Introduction

In recent years, a worldwide tendency on the establishment of public-private partnerships to promote efficiency and productivity of infrastructure-related services is observed. Due to budgetary restrictions, many countries are considering these partnerships as a form to keep and improve the quality of services supplied to users taking advantage of non-governmental funds¹⁾. This tendency is more visible in developing countries, since their economy do not present stable conditions to support huge investments as needed in the development of infrastructure²⁾.

Among developing countries, Brazil's case on public-private partnerships can be highlighted due to its continental dimension and acknowledged role as a leading nation in South America. Since 1990, Brazilian government has been developing extensive policies of concession on public services and facilities. Transportation, telecommunication and energy sectors have been transferred to private companies. Especially in transportation, which involves many social, economical and political aspects, the transference of the infrastructure is fundamental since it is responsible for 250 billion dollars or 40% of Gross Domestic Product (GDP)³⁾.

There have been few technical and scientific researches to evaluate BRCP under a critical approach. Efforts were noticed, but they lack of a general vision and are mostly dedicated to perform specific analysis such as the evaluation of the concession results for some road segments⁴⁾ and calculation of toll fees⁵⁾. Moreover, due to BRCP's peculiar characteristics, international experiences and models can not be integrally adopted. Therefore, it is essential to perform a deep study on the understanding of this program in order to specify new perspectives for future developments.

This work intends to introduce and analyze past, present and future of BRCP. Throughout a historical analysis, we focus on the comprehension of the program since its origins, evaluation of its basic conceptions, identification of changes and tendencies and comparison of development stages. In this sense, we contribute both for the improvement of BRCP and for identification of critical aspects that will interfere in concession programs in developing countries.

This paper is structured in five sections. After this introduction, we describe the framework of BRCP focusing on achieved results. On third and fourth sections, a critical analysis and future perspectives are described, respectively. Finally, on the fifth section, based on the complete examination of the BRCP, conclusion topics are stated.

2 – Brazilian Road Concession Program

BRN is divided into three jurisdictions that are federal, state and municipal. Federal roads are administered by DNER (National Department of Roads) and comprehend 66 thousand Km. Roads under state's jurisdiction are controlled by DER (State Departments of Roads), which responds for 187 thousand Km. Local bureaus are responsible for 1,21 million Km of municipal roads. The basic network was established between the years of 1945 and 1975 as part of the National Plan for Terrestrial Transportation System and that defined the current technical-administrative framework⁶⁾. Resulting from the implementation of this plan, main urban areas were connected and its main conception and structure remains the same after 25 years. Resources for the development of BRN were originated from consumption of oil and specific road taxation that formed a national road fund. Using this fund, BRN expanded 17 times in a 30 year-period.

Due to changes and reductions on the amount of investments in the system, conservation status of BRN sharply decreased creating various socio-economical problems in many areas of Brazil. As verified by CNT⁷⁾, 92% of BRN were classified as strongly damaged. Magalhaes³⁾ argues that these conditions are directly affecting operational cost of transportation, generating more accidents and increasing travel time. Furthermore, this situation is much more critical in Brazil, since its primary economical sector is deeply dependent on BRN to reach consumers all over the country⁸⁾.

Since 1993, the Ministry of Transportation initiated its decentralization activities in 1993 by applying the concession model in recuperate and maintain federal roads. Following, we describe these activities into two phases of development.

2.1 First phase

Preliminary, a technical group was formed aiming to identify and select road segments in terms of economical return and therefore attractive to private sector. Additionally, this group dedicated to the conception and elaboration of a framework to conduct the legal process of concession. Studies were performed in approximately 52 thousand-Km of federal roads in order to select 15 thousand-Km. After this selection, it was concluded that it was essential to firstly recuperate the existent network and then move to construct of new roads. Therefore, the technical group adapted the BOT (Build, Operate and Transfer) system into a ROD (Recuperate, Operate and Devolution) model⁹⁾. It is clear that the adoption of ROD in opposition to BOT leads to the reduction of the amount of investment, since construction activities were abolished. Consequently, it was expected that toll fees would be inferior to those if BOT system was applied in order to create short-term benefits to users.

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Next, as part of the concession process, specific studies were conducted for each road to be transferred. These studies, which were performed by consultant companies, consist on the obtainment of information to describe operational conditions and requirements to be used in the selection process of the concessionaire. Mainly, they concentrated on the evaluation of original construction projects and on reports from field surveys. Resulting from these studies, a descriptive and detailed manual called PER (Program of Road Exploration) was generated, which contains minimum requirements and standards of quality and quantity to be reached by the concessionaire at short and long terms ¹⁰⁾.

After these definitions and an extensive process of legal qualification had to take place. The winner concessionaire was chosen considering the lowest toll fee to be charged from users. Variable terms of concession were established considering specific revenues of each road under concession. It was also stipulated that the payment of toll fees could only initiate after the preliminary reconstruction activities, due to the long period without careful maintenance that directly affected the level of service ¹¹⁾.

Additionally, it was regulated that the acquirement of financing funds was a strict attribution of concessionaires. Funds could come from bank loans, toll fee collection and commercial exploration of road area. These regulations intended to limit or eliminate any participation of public funds, but in practice it was not verified. Another important characteristic of this phase was the payment system of toll fee. Differently of systems commonly used in many countries, a fix value of toll fee was charged according to vehicle's category. Called "open system" ¹²⁾, it means that for every 100 Km, user had to pay the toll fee, without any consideration on the total distance of the displacement within the ¹¹⁾.

During three years, four federal roads and one bridge were conceded. Table 1 shows a brief description of the results in these concessions. Involving only 857 Km and representing investments around 1 billion US dollars ¹³⁾, we observe that all roads under concession do not present extension superior to 200 Km, except Presidente Dutra Highway (BR116) that connects the most important cities of Brazil (Rio de Janeiro and Sao Paulo). It is observed that there are different values of toll fees, which can be understood due to the variety of conditions in each one but the toll fee at Rio-Niteroi Bridge can be considered extremely high since there was not structural reforms or any special projects. It is also observed that for all roads toll fee values suffered variations along the time. Though the inflation rate in this period was almost insignificant ¹⁴⁾, variations on toll fee values reached 93%.

Table 1. Results and characteristics of the initial concessions in Brazil

Road Segment	Length (Km)	Date of contract signature	Term of concession (years)	Estimated investment (US \$ mi)	Forecasted Vehicle Per day	Investment (US)/ Km/years	Toll fee /Km (US/Km) at opening	Toll fee evolution (US/Km)		
								1997	1998	1999
Rio-Niteroi Bridge	13.2	Dec 94	20	70	72.000	265.152	0.030	0.053	0.057	0.058
Rio de Janeiro - Juiz de Fora	179.7	Oct 95	25	150	58.000	33.388	0.017	0.026	0.027	0.028
Presidente Dutra	406.6	Oct 95	25	720	197.000	70.831	0.012	0.017	0.018	0.019
Rio de Janeiro - Alem Paraiba	144.4	Nov 95	25	150	30.000	41.551	0.026	0.031	0.032	0.034
Osorio- Porto Alegre	112.3	Mar 97	20	20	60.000	8.904	0.010	0.028	0.030	0.034
Total / Average	856.4	-----	23	1.110	83.400	83.965,2	0.019	0.031	0.032	0.034

Source: DNER- *Annual report*: 1997, 1998, 1999.

2.2 Second phase

In 1996, expansion of BRCP was firstly considered by DNER. Through the creation of a new division specifically devoted to concession, initial studies were introduced in order to evaluate more than 7 thousand-Km ¹¹⁾. Simultaneously, some state agencies also decided to institute their own process of concession according to regional needs ¹⁴⁾. At State's level, approximately 7,5 thousand-Km were independently evaluated from federal regulation.

Despite of the expansionist image that was associated to this phase, in fact, it comes from the redefinition on many criteria previously applied. Mainly due to economical problems and negative reactions from users and society, serious changes on the initial conception of BRCP were urgent. Specially concerning users' reactions, Pires and Giambiagi ¹⁵⁾ and CNT ¹⁶⁾ show that toll fee was accepted, but the value was considered very high. Moreover, some definitions in the first phase such as the "open system" of toll fee collection generating uncharged traffic, the overestimation of demand and critical conditions of road conservation were decisive to the implementation of new directions on BRCP. Additionally, economical crisis in Asia devaluated Brazilian currency and consequently there was increase on interest rates affecting the obtainment of internal and external loans by concessionaires.

In order to establish clear and correct definitions and then overcome the problems of first phase, the following changes were processed: reduction of service levels provided by concessionaires; reorganization of time schedules for implementation of investments; studies on the determination of new locations for toll gates; selection of the winner concessionaires considering both the lowest toll fee and bidding value; and revision of equivalent vehicle indexes to reduce the amount of toll fee paid by trucks ¹⁷⁾.

The second phase is undergoing and partial results have not been displayed yet. As previous experiences generated more impacts due to user's reaction than the benefits, results have been carefully and gradually inserted into media. It is known that about 15 thousand-Km are under concessionaire selection. Another interesting point is that the major part of the roads under

concession is concentrated in South and Southeast Regions of Brazil, notably the most economically important regions that involve 56% of BRN.

3 – Critical issues

BRCP has contributed to restructure the road network and provide a better condition of traffic. Before its implementation, a large part of BRN was damaged, but in 1999 it was verified that only 37,8% of federal roads need recuperation. It shows that considerable amount of investments has changed previous scenarios, reducing the number of accidents and travel time as well as the creation of several new jobs. These results were also decisive to provide a competitive level for Brazilian products in international markets. Nevertheless, despite of all positive facts, still there are several aspects leading to a deeper discussion on BRCP's efficiency. Among them, we could point out the adoption or not of this concession program, but it will not be discussed here since the decision to proceed is already taken and consolidated. Therefore, we focus on the evaluation of critical points that are expected to be part of current discussion in Brazil and many other developing countries.

The gravest point in BRCP is that it is not part of a strategic planning inside governmental sphere. Decentralization agencies of Brazilian infrastructure defined their own limits, terms and criteria without a more detailed linkage between themselves such as observed in BRCP. This conduction is totally opposite to World Bank's ¹⁸⁾ recommendation that the success of road toll programs depends on the establishment of a stable structure of planning, as observed in France, Italy, Japan and Spain. In the same situation of Brazil, Indonesia and Mexico conceived their concession programs in an isolated way and consequently faced serious problems during and after the transference.

In the same direction, it is clearly observed that BRCP's conception is devoted to punctual and immediate topics. Punctual in the sense that it is not concerned on the expansion of BRN, while immediate refers to the urgent necessity to obtain resources and results to improve the traffic conditions in Brazilian roads. Contributing for this conclusion, some facts such as the adoption of ROD model and the selection of concession roads in saturated areas with great perspectives of financial revenue are noticed. First phase of BRCP concentrated on the existent roads without any preoccupation towards the construction of new ones, so investments were directed into areas with a high concentration network that just need recuperation and maintenance. This policy is extremely conservative and arguable since public-private partnerships should be used to attract investments towards the development and create incentives for implementation of new industries and economical activities all over the nation ¹⁹⁾.

Another aspect to be discussed is BRCP's vulnerability to users' reactions. In the first phase of BRCP, as shown in Table 1 toll fee were readjusted during a short period mainly because initial definitions (demand, recuperation, etc) were incorrect in their forecasts. This caused severe reactions and pressures over road agencies in all levels of jurisdiction (federal, state, municipal). Therefore, new definitions for second phase were influenced but decisions were taken separately, i.e., each road agency made their own criteria without specific regards to the others ¹⁵⁾. Consequently, negotiations have led to the reduction on toll fees and quality of services provided by concessionaires generating totally different values and levels of concession ¹⁷⁾. Obviously, such behaviour expresses that BRCP's structure is not constructed under reliable basis of confidence and on technical principles either it is indifferent to external political pressures. According to Halperin ²⁰⁾, experiences in Hungary and Thailand show that the governmental agencies are very tempted to interfere in the process after demonstration of user's dissatisfaction, but hardly they can establish again the equilibrium that is reached only through tribunal disputes.

Contributing for this situation of BRCP comes from the limited source of information and technical-scientific studies supporting its activities ¹⁴⁾. In order to define prices, terms and conditions of operations on concession roads, concessionaires mostly confine their studies bearing the information obtained from PER. However, this manual lacks of detailed description of road conditions those are hardly updated and not so much reliable for deeper analysis. On the other side, staffs of DNER and DER agencies struggle to keep a database with all necessary information, due to budget and personnel limitations. Consequently, suitable analyses are not conducted and risk factors are overestimated influencing on toll fee definition and in the program as well.

4 – Future Perspectives

The comprehension and projection of BRCP's future comes from the historical and organizational understanding and its relation to socioeconomic and political issues. Until now, we discussed and detailed all the steps and their respective problems as well as the solutions that were taken along seven years of experiences. Based upon the context of BRCP's evolution, we establish here two distinct scenarios for future perspective. The first scenario describes possible progresses considering that the same conception that has been applied. On the other hand, the second scenario is an exercise of reflection in order to create new perspectives that have not yet been debated.

In the first scenario, the continuity of BRCP certainly would improve the most important part of BRN at a short term. Results show that the quality of services is increasing and that the concessionaires, DNER and DERs are trying to create a better concession environment. However, it is not clear what kind of impact this policy can generate in a near future. There are many factors indicating that future perspectives will be correlated to the increase of conflicts between users, concessionaires, and government.

In a second scenario 2, concerning the creation of new paradigms for BRCP, facing the current level of progress reached by BRCP, since we understand the impossibility and unfeasibility to restart the program from the scratch. Therefore, we propose two distinct approaches considering a short and a long-term perspective. The former would be concentrated on the solution of urgent issues in undergoing and for future concessions to reduce conflicts looking for a framework that has to be tuned with user's expectations and capacity of payment. Similar to experiences in Argentine and Chile ^{21) 8)}, the more the concession process is clear and simple in its assumptions, the more it would create an attractive environment for all concession's players. Such a concentration on user's point of view and necessities is narrowly related to market' delineation

and segmentation using appropriated techniques as proposed by Kotler ²²⁾. A great effort to obtain reliable information would be conducted to precisely define criteria, levels of services, benefits, risks and costs. This procedure would suppress any doubt related to toll fee values that have been charged and for future concessions ²³⁾. Concessionaires would take advantage in the sense that their risks could be reduced and investors would have total clarification on how and when their revenues would come.

Meanwhile the second one would prepare the basis for a new conception. A review of BRCP's conception towards a strategic planning approach is expected to create a new dimension for Brazil's development. As part of a national planning in a macro and long-term perspective, concession program has to be re-evaluated and re-structured in order to define targets and goals, to incorporate internal and external factors affecting concession environment and then to establish future strategies. For instance, it has to be defined what part of road system will contribute for nation's developments such as how, where and when road concession must be considered necessary. Japanese road system, for example, is a remarkable demonstration of government intentions trying to expand not only in essential area but also in regions that need better infrastructure for socio-economical development activities. In Brazil's case, clear decisions have to be taken in order to specify policies of recuperation, expansion or both, always regarding previous strategies defined in a national planning level and considering the maximization of benefits for network analysis.

5 – Conclusion

The Brazilian concession experience has been important to repair some parts of BRN. This paper showed the reasons that made necessary the implementation of BCRP, its development and results. Nevertheless, BCRP has suffered some criticizing from the Brazilian society. We analyzed the critical issues and verified their causes in order to reach a better comprehension and understanding of the program. The principal criticizing of program were: absence of a national strategic planing; conception devoted to punctual and immediate problems; vulnerability to users' reactions; and deficiency on technical-scientific studies and information.

Considering this context, we established two distinct future perspectives. Firstly, we described a scenario taking into consideration the continuity of BRCP without alterations and we verify that this direction will lead to the increasing of conflicts between concession program's players. In the second scenario, new paradigms were proposed for short and long-term perspectives of development based upon international experiences and the understanding of BCRP. We presented some alternatives to solve and reduce current and future conflicts. We expect that our analysis will contribute to improve not only BCRP but also concession programs with similar characteristics. This work is an effort towards a critical and technical approach that is supposed to be followed by many others researches in this topic.

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