

BRAZIL'S INFRASTRUCTURE PROJECT LIFE CYCLES: FROM PLANNING TO VIABILITY

CREATION OF A NEW PHASE MAY INCREASE PROJECT QUALITY



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KEY HIGHLIGHTS

- The current planning process, especially in the land transport sector, fails to incorporate socio-environmental components in the selection of projects.
- Brazil has a good opportunity to leverage infrastructure into a powerful tool to achieve the country's medium and long-term goals while taking into account the future of the Amazon – and other biomes – and how their natural resources are used.
- The creation and introduction of a **new phase focused on pre-viability** to the current project life cycle would improve the project selection process and assist in prioritizing projects currently in the portfolio.

There is a growing consensus that investments in infrastructure can help developing countries address two of their main challenges. First, better infrastructure can improve the quality of life of the population and make businesses more competitive. Second, it can increase resilience to climate change and reduce greenhouse gas emissions. In addition, in the current context of the Covid-19 pandemic, infrastructure spending is one of the key levers that government can pull to fuel economic growth.

Brazil lags behind much of the world in terms of quality and quantity of infrastructure,¹ leading to higher production costs, reduced productivity, and a lower growth potential for the economy.

Faced with this scenario, the Brazilian government intends to promote investments aimed at a comprehensive portfolio of projects, some of which are in the Amazon. This includes recent projects as well as projects inherited from national integration and occupation plans put in place over the last 50 years.²

In this brief, researchers from Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-Rio) and Inter.B collaborated to analyze the instruments available for infrastructure planning – particularly those related to the land transport sector.

¹ According to the 2018 World Economic Forum's Global Competitiveness Report, Brazil scored only 3.0 out of the 7.0 possible points in quality of transport infrastructure. For further information, see World Economic Forum, "The Global Competitiveness Report 2018" (2018), bit.ly/2lcfgu1.

² Such as the continuation of BR-163/230/MT/PA (Sinop-MT/Miritituba-PA) and BR-158/155/MT/PA, included in PPI's portfolio, of which other sections had already been provided for under the PNV, established by Law 5,917 of September 10th, 1973.

The analysis found that there is an opportunity to (i) enact a planning strategy that reflects a sustainable development model and includes decisions about the future of the Amazon and other biomes, and (ii) to introduce a pre-viability phase to improve the project selection process and assist in prioritizing projects currently in the portfolio.

This analysis reveals that the newly enacted Brazilian National Development Strategy (*Estratégia Federal de Desenvolvimento para o Brasil - EFD*),³ despite stating that it is a long-term strategy, is actually a medium-term one given its eleven-year time period. Additionally, while it establishes general key index and target goals, they may not be enough to address critical issues, such as deforestation.

Based on this analysis, the authors recommend the introduction of a planning strategy that reflects a sustainable development model and the demand for infrastructure services and underlying assets for the medium and long-term. The Amazon deserves a special chapter in such a strategy, given its position as the largest tropical forest in the world and its role as a provider of essential ecosystem services for Brazil's economy and society at large.

To ensure greater integrity in the project selection process, the authors recommend introducing a new step between the planning and the viability analysis of large-scale greenfield infrastructure projects. They propose the creation of a pre-viability phase that would act as a filter to ensure that only viable projects move forward, avoiding an automatic track between planning and viability phases. In addition, the proposed pre-viability stage would be instrumental in helping prioritize the projects in the current portfolio.

OVERVIEW OF INFRASTRUCTURE PLANNING INSTRUMENTS

The Federal Constitution states that a law should be drafted to “set the guidelines and basis for the planning of a balanced development process at the national level, which should incorporate and ensure compatibility with national and regional development plans”.⁴ Such law, however, does not yet exist.

In view of this, other instruments are currently used to indicate the Federal Government's short and medium-term plans – particularly the recently enacted EFD, as well as plans drafted by sectoral bodies and entities and budgetary instruments, mainly the Multi-Year Plan (*Plano Plurianual - PPA*).

A brief description of existing national planning instruments is provided below.

³ Federal Decree 10,531/2020, accessed November 6, 2020, bit.ly/2GPylTi.

⁴ Art. 174, § 1, accessed May 13, 2020, bit.ly/38stzoE. The law shall establish the guidelines and basis for planning of the balanced national development, which shall embody and make the national and regional development plans compatible.

BRAZILIAN NATIONAL DEVELOPMENT STRATEGY (EFD)

The EFD is a medium-term planning instrument from 2020 to 2031. It comprises five dimensions: economic, institutional, infrastructure, environmental, and social. It replaced the National Strategy for Economic and Social Development (*Estratégia Nacional de Desenvolvimento Econômico e Social* - ENDES) that also set a national strategy for the same period but was never published as an official norm.

The EFD maintained a very similar structure as the ENDES, identifying most of the same challenges and solutions. While the ENDES lacked any tangible parameters to ensure the strategy assessment, the EFD advanced by establishing general key indices and respective target goals for each dimension. By setting these key indices, however, the EFD may also fall short on some specific issues by failing to include deforestation and biomes sensitivities, critical factors for assessing infrastructure in the Amazon.

As a guiding document that focuses on macro-level issues, it does not include specific infrastructure projects or criteria for project selection; multi-year plans, annual budget laws, and sectoral plans are responsible for including them.

BOX 1. INFRASTRUCTURE DEVELOPMENT IN THE AMAZON

The EFD sets “reducing illegal deforestation” as a challenge to be overcome by the Brazilian government, but it makes no explicit mention of the Amazon. Domestic and foreign investors, however, understand the importance of the region and the ecosystem services it provides, and they have taken public stances vis-à-vis investment prospects in the region and in the country.^{5,6,7}

Over recent years, a growing international movement has sought to define a development pathway with a socio-environmental focus. In 2019, the G-20 General Assembly approved voluntary recommendations for quality infrastructure with reference to socio-environmental principles,⁸ and in January 2020 the World Economic Forum recognized sustainability as its core element.⁹ Generally speaking, in 2020 the sustainability imperative in the social and environmental sphere has become part of the *mainstream* for businesses, investors, political and economic leaders, and, more importantly, for new generations. The Amazon features prominently in global commitments and concerns. For Brazil, which is home to approximately 60% of the Amazon basin and has seen its deforestation rates grow,¹⁰ the Amazon is a major focus of policies for preserving the region from a socio-environmental standpoint. Therefore, controlling deforestation is not just crucial, it is also an objective to be achieved under the country’s international climate commitments¹¹ and its National Climate Change Policy¹².

Infrastructure services that provide water, sanitation, health, mobility, and electricity at the local level are essential for the people who inhabit the Amazon. The existence of local infrastructure also encourages farmers to adopt intensive land use practices by lowering transportation costs for inputs and products, and by providing access to technical assistance and electricity for potential processing operations, in addition to fostering a bioeconomy. As is well known, however, large infrastructure projects were one of the biggest drivers of deforestation in the Amazon in the past. Over 80% of forest conversions occurred along roads.^{13,14} In addition, the road, energy, and mining sectors located in the Amazon basin, together, threaten more than 50% of all protected areas, including Conservation Units and Indigenous Lands.¹⁵

This is, therefore, an opportunity to reflect upon a development strategy for the country, with infrastructure as a powerful instrument to achieve national goals, while considering the future of the Amazon and the way its natural resources are used.

5 Gabriel Shinohara, “Em Carta, Ex-Ministros e Ex-Presidentes Do BC Cobram Desmatamento Zero Na Amazônia e No Cerrado” (O Globo, July 14, 2020), accessed July 14, 2020, glo.bo/3kl7myf.

6 Célia Froufe, “Investidores Ameaçam Sair Do Brasil Se Destruição Da Amazônia Não Parar, Diz Financial Times” (O Estado de São Paulo, June 23, 2020), accessed July 14, 2020, bit.ly/3prvrEz.

7 Assessoria Cebds, “Setor Empresarial Cobra Agenda Sustentável Do Governo Brasileiro” (Conselho Empresarial Brasileiro Para o Desenvolvimento Sustentável, July 7, 2020), accessed July 14, 2020, bit.ly/2UeDSEC.

8 Ministry of Finance of Japan, “G20 Principles for Quality Infrastructure Investment” (2019), accessed July 14, 2020, bit.ly/3ePrkNC.

9 Marsh & McLennan, “Global Risks Report 2020” (Davos: World Economic Forum, 2020), accessed July 14, 2020, bit.ly/2ll6Fos.

10 National Institute for Space Research, “The Estimate of the Rate of Clear-Cut Deforestation for the Legal Amazon in 2019 is 9,762 km²”, (2019), accessed July 14, 2020, bit.ly/36lBhhW.

11 Ministério do Meio Ambiente, “Contribuição Nacionalmente Determinada”, accessed July 14, 2020, bit.ly/3kfB300.

12 Federal Law N° 12,187 (December 29, 2009), accessed July 14, 2020, bit.ly/3eJ4GWY.

13 Sadia Ahmed, Carlos Souza, Julia Ribeiro, and Robert Ewers, “Temporal patterns of road network development in the Brazilian Amazon” (Regional Environmental Change, 2013, 13(5), 927-937), accessed July 14, 2020, bit.ly/36mhBua.

14 Christopher Barber, Mark Cochrane, Carlos Souza, and William Laurance, “Roads, Deforestation, and the Mitigating Effect of Protected Areas in the Amazon” (Biological Conservation, 2014, 177(1) 203-209), accessed July 14, 2020, bit.ly/2lkyY6i.

15 Amazon Network of Georeferenced Social and Environmental Information - RAISG, “Amazonía Bajo Presión” (2012, p.60), bit.ly/3eIKWml.

SECTORAL PLANS

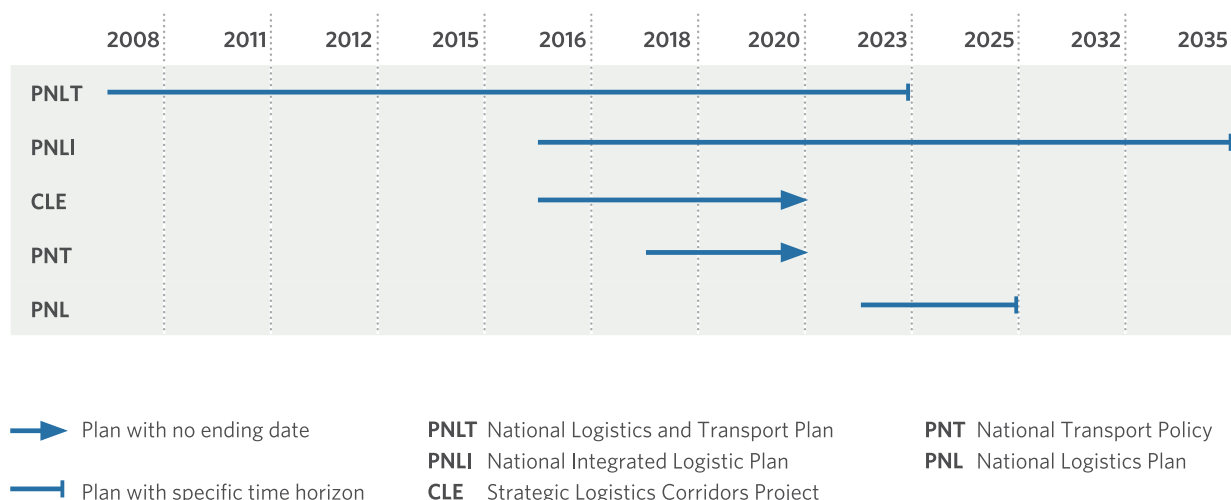
Sectoral plans, such as energy and transport, set the objectives, guidelines, principles, and instruments to be used in achieving the proposed results.

The energy sector has the most experience in drafting plans. Every year since 2006, the Energy Research Office (*Empresa de Planejamento Energético - EPE*) updates the Ten-Year Energy Plan (PDE) laying out the prospects for future expansions in the energy sector. In 2007, the EPE also drafted the 2030 National Energy Plan (*Plano Nacional de Energia - PNE*), the sector’s first long-term plan. The EPE is currently working on the 2050 PNE. In January 2020, it was decided that this plan would be updated every five years for the next 30 years.¹⁶

The energy sector is also more advanced when dealing with socio-environmental issues, as it was the first sector to decide that all PNE studies must take socio-environmental aspects into account.¹⁷ Even more relevant is the requirement to identify non-variable factors when analyzing different scenarios, aspects that must be taken into account in all projections. With regard to socio-environmental issues, these factors relate to environmental pressures on energy production and use, as well as rising power consumption rates. The plan also suggests “conditioning investments in energy sector projects to longer and more rigorous assessment, licensing, and environmental monitoring processes, with an impact on project implementation schedules and costs”.¹⁸

The land transport sector, in turn, has issued five sector plans since 2008, none of which has formally been revoked to date. These plans, were drawn up by different government agencies and there is no effective interface among them, making long-term planning difficult or perhaps impossible. Figure 1 illustrates the plans and time horizons for each one.

Figure 1. Plans and Time Horizons for the Land Transport Sector



Source: *Climate Policy Initiative, 2018*¹⁹

¹⁶ MME Ordinance Nº 6 (passed Jan. 7, 2020), accessed May 13, 2020, bit.ly/2Imz1Ps.

¹⁷ Empresa de Pesquisa Energética, “Plano Nacional de Energia – 2050”, accessed July 22, 2020, bit.ly/3keTsun.

¹⁸ Ministério de Minas e Energia, “Nota Técnica DEA 05/13 – Termo de Referência (TDR) para Elaboração do PNE 2050” (2013), bit.ly/3eJliwA.

¹⁹ Luiza Antonaccio, Juliano Assunção, Maína Celidonio, Joana Chiavari, Cristina Leme Lopes, and Amanda Schutze, *Ensuring Greener Economic Growth for Brazil* (Rio de Janeiro: Climate Policy Initiative, 2018), bit.ly/2GMopZk.

Considering that each plan has its own guidelines (with specific incentive structures and rules) and project portfolios, the overlap, and lack of coordination among them generates uncertainty regarding the incentives currently in effect.

While none of the plans have been expressly revoked, the Federal Government is currently indicating that the National Logistics Plan (*Plano Nacional de Logística* – PNL) prepared by the Planning and Logistics Office (*Empresa de Planejamento e Logística* – EPL) will be the plan to guide the policy on public works and concessions for the land transport sector.

National Logistics Plan (PNL)

The PNL was published in 2018 by the EPL with a time horizon up to 2025. A new PNL is expected with a time horizon of 2035. The plan reviews the guidelines of the National Transport Plan and other plans in the logistics sector, such as the National Waterway Integration Plan (*Plano Nacional de Integração Hidroviária* – PNIH) and the National Port Logistics Plan (*Plano Nacional de Logística Portuária* – PNL_P).²⁰

The goal of the PNL is to strike a balance among transport modalities, considering the relative efficiency of each one. Secondary objectives aim to lower carbon dioxide (CO₂) emissions and reduce cargo transportation costs.

The PNL's planning exercise was meant to pinpoint "bottlenecks" (i.e., markets where the supply of transport infrastructure fails to meet demand) by comparing the current scenario²¹ to an optimized scenario ("2025 Scenario") and using priority projects in the road, rail, and waterway sectors as a reference. A total of 40 projects were included in the PNL (31 road, eight rail, and one waterway project).²² To be included in the PNL, projects had to have been on the agenda for execution when the plan was drawn up, and scheduled to be up and running by 2025.

Based on these criteria, the following projects were considered: qualified projects under the Investment Partnerships Program (*Programa de Parcerias de Investimento* – PPI), components of the *Avançar* Program, current concession obligations, and capacity expansions in concessions subject to potential term extensions. The plan did not explicitly feature any socio-environmental criteria for project inclusion. It merely points out the possible impacts on CO₂ emissions if the optimized scenario comes to pass.²³

The EPL is currently preparing an update to the PNL, known as the 2035 PNL, which is expected to feature a chapter devoted to the socio-environmental components of infrastructure projects. As of yet, however, no announcement has been made about which components will be listed or the weights assigned to them in project selection as part of the sectoral planning process.

20 The drafting process for the PNL took into consideration existing sectoral plans tied to federal and state governments. In addition to the PNIH and PNL_P, other references were: the PNL_T; PHE; PELTs; and PNLI.

21 The current scenario includes the main works in progress plus the ones that were expected to be completed by the end of 2018.

22 Annex 1 includes the list of the projects included in the PNL. Furthermore, in addition to the projects considered under the "2025 Scenario", a Project Portfolio was proposed with other strategic undertakings to resolve the remaining bottlenecks (especially in the road sector), since many of the initial bottlenecks were mitigated by increasing the supply of railroad transportation. As such, the Portfolio also included 23 other projects, including 19 focused on adapting road sections, two on highway construction, and two on railroad construction.

23 The document also states that the new version of the PNL will include a cost-benefit analysis involving PAE and a socio-economic impact assessment. The PAE proposal is under development by the EPL and seeks to change the way the environmental variable fits into strategic infrastructure planning, while taking the concept of AAE into account. It also seeks to inform decision making on priority investments and provide additional legal, economic and technical security to project development in the realm of transport.

BUDGETARY INSTRUMENTS

Public expenditures are subject to budget restrictions. The Federal Constitution provides for three instruments for planning and authorizing expenses, namely: the Budget Guidelines Law (*Lei de Diretrizes Orçamentárias* – LDO), the Multi-Year Plan (*Plano Plurianual* – PPA), and the Annual Budget Law (*Lei Orçamentária Anual* – LOA).²⁴

The PPA sets the guidelines, goals, and objectives of the Federal Government and its expenses.²⁵ Based on the PPA, the LDO sets the goals and priorities for the following year and the spending cap for the legislative, executive, and judicial branches of government. LDO also lays out financing priorities for public banks and sets other provisions. The LOA takes the PPA and LDO into consideration and sets the annual budget.

The current PPA (from 2020 to 2023)²⁶ sets as one of its guidelines “increased private investments in infrastructure, guided by long-term planning coupled with less legal insecurity”.²⁷ This showcases a concern with the infrastructure sector and the need for closer alignment with long-term plans, combined with legal frameworks that offer more security to investors.

INTRODUCING A NEW STAGE BETWEEN THE PLANNING AND VIABILITY PHASES

Infrastructure projects that undergo concessions must go through different stages before beginning operation. However, recurrent flaws in Technical, Economic and Environmental Feasibility Studies (*Estudos de Viabilidade Técnica, Econômica e Ambiental* – EVTEA) fail to prevent poorly-designed projects from moving forward (i.e., projects that are economically unsustainable without lofty government subsidies, whose execution is highly complex, or which cause negative socio-environmental impacts). These projects tend to become assets that provide low return rates to society and, in extreme cases, may even be abandoned. This means that early stages currently lack the proper reviews to prevent the misallocation of investments with high opportunity costs.

To improve infrastructure planning and development, researchers from CPI/PUC-Rio and Inter.B propose the creation of a pre-viability analysis stage. This stage would serve as an administrative rite capable of reducing uncertainties throughout the planning cycle, and introducing more granular reviews as the projects progress through the various stages to prevent low-quality projects (due to inertia or political economy) from reaching a point of almost no return. This procedure would also allow for the coordination of government efforts and the territorial contextualization of the project, which are necessary factors for ensuring that projects deemed viable are well structured.

²⁴ 1988 Federal Constitution, Art. 165.

²⁵ Câmara dos Deputados, “Orçamento da União”, accessed May 12, 2020, bit.ly/2lq7AEr.

²⁶ The multi-year nature of the PPA is often criticized for failing to include yearly reviews. There is even a PEC before the Federal Senate that seeks to extinguish the PPA and make the LOA and the LDO the primary instruments for regulating the federal budget and, in doing so, outline priority infrastructure project and other objectives.

²⁷ Federal Law N° 13,971/2019, accessed May 12, 2020, bit.ly/38oAboe. Annexes to the law are available at: bit.ly/36qs7AR.

INTRODUCTION TO THE PRE-VIABILITY PHASE

This pre-viability phase should be instituted for large greenfield infrastructure projects to be granted under concession. It contains two stages: (i) the description of the project, in which a questionnaire (see Box 2) must be answered without requiring in-depth studies to pinpoint first-order obstacles including socio-environmental risks and to assess whether these obstacles are avoidable (or not), and (ii) a socio-environmental complexity analysis (see Box 3) that serves to anticipate discussions that are currently only addressing the viability phase by the EVTEA and by the EIA.

BOX 2. STRUCTURING QUESTIONNAIRE FOR THE PRE-VIABILITY ANALYSIS STAGE

1. What service does the project seek to provide? What is the reason for the project?
2. What problem does the project seek to solve? What is the cause or condition that motivates the existence of the project? What is the expected impact?
3. Are the project objectives clear and measurable?
4. Are the project's objectives clearly related to the government's long-term planning?
5. Is the project synergistic with – or antagonistic to – other projects?
6. Are there other projects that provide or seek to provide the same type of service or solve the same problem? Do they share the same objectives?
7. Are there other works (completed or halted) that provide or seek to provide the same type of service or solve the same problem? Do they share the same objectives?
8. Does the project's functionality depend on other ventures? For example, ports require transportation logistics; power generation plants require transmission networks.
9. Which public and/or private entities may react in such a way as to impact the project's viability?
10. Considering the entities identified above, what possible reactions to the project can be expected (e.g., price reductions, improved service quality, expansions and/or upgrades to existing infrastructure, etc.)?

Once the project has been evaluated using the structuring questionnaire, a socio-environmental complexity analysis of the project should be carried out to (re)validate the degree of execution viability. The socio-environmental complexity analysis starts by identifying the geographical areas directly and indirectly affected by the project and organizes a set of questions based on three axes: territorial, environmental, and social governance (Box 3). This analysis would draw upon secondary information to answer questions that, without requiring the production of new knowledge, address critical points that help ascertain a given project's viability.

BOX 3. SOCIO-ENVIRONMENTAL COMPLEXITY ANALYSIS

Territorial Governance

1. Are there environmental agencies working in the area where the project will be developed?
2. Will the project be developed in an urbanized area?
3. Is the area where the project will be developed close to highways or railroads? Is it connected to a mode of transportation? To what degree (i.e., is the interconnection dense, medium, or marginal)?
4. Are there other infrastructure projects under development in nearby regions? If so, were there any execution-related conflicts (e.g., regarding expropriations, local communities, lawsuits, etc.)? How were these conflicts resolved (parties involved, court decisions, local agreements, etc.)?
5. Are there other future infrastructure projects expected in or near the project region?
6. Does the area where the project will be developed have a history of social conflict?
7. What are the government plans (at the municipal, state, and federal levels) for the area where the project will be developed?
8. What is the fiscal situation of local governments in the cities affected by the development of the project?

Environmental Governance

1. Is the project located in a strategic, environmentally fragile area?
2. Is the project located in areas with relevant natural resources?
3. Will the project have a relevant impact on an ecosystem or watershed (e.g., land use changes, water cycle changes, water consumption, etc.)? The effects do not have to be described in detail.
4. Will the project be developed in an area with endangered species?
5. Are there technical and locational alternatives (superior or equivalent) from an environmental component perspective?
6. Does the project entail direct or indirect deforestation?
7. Are there any projects or undertakings that could enhance or mitigate potential environmental impacts?
8. Does the project entail extensive use of water resources?
9. In the case of rivers, will the project have an impact downstream?
10. Could the project generate competition for water use?
11. Does the project directly or indirectly contribute to CO₂ and/or greenhouse gas emissions?
12. Does the project cause the release of sewage and other solid, liquid, or gaseous waste, flooding, silting, erosion, landfills?

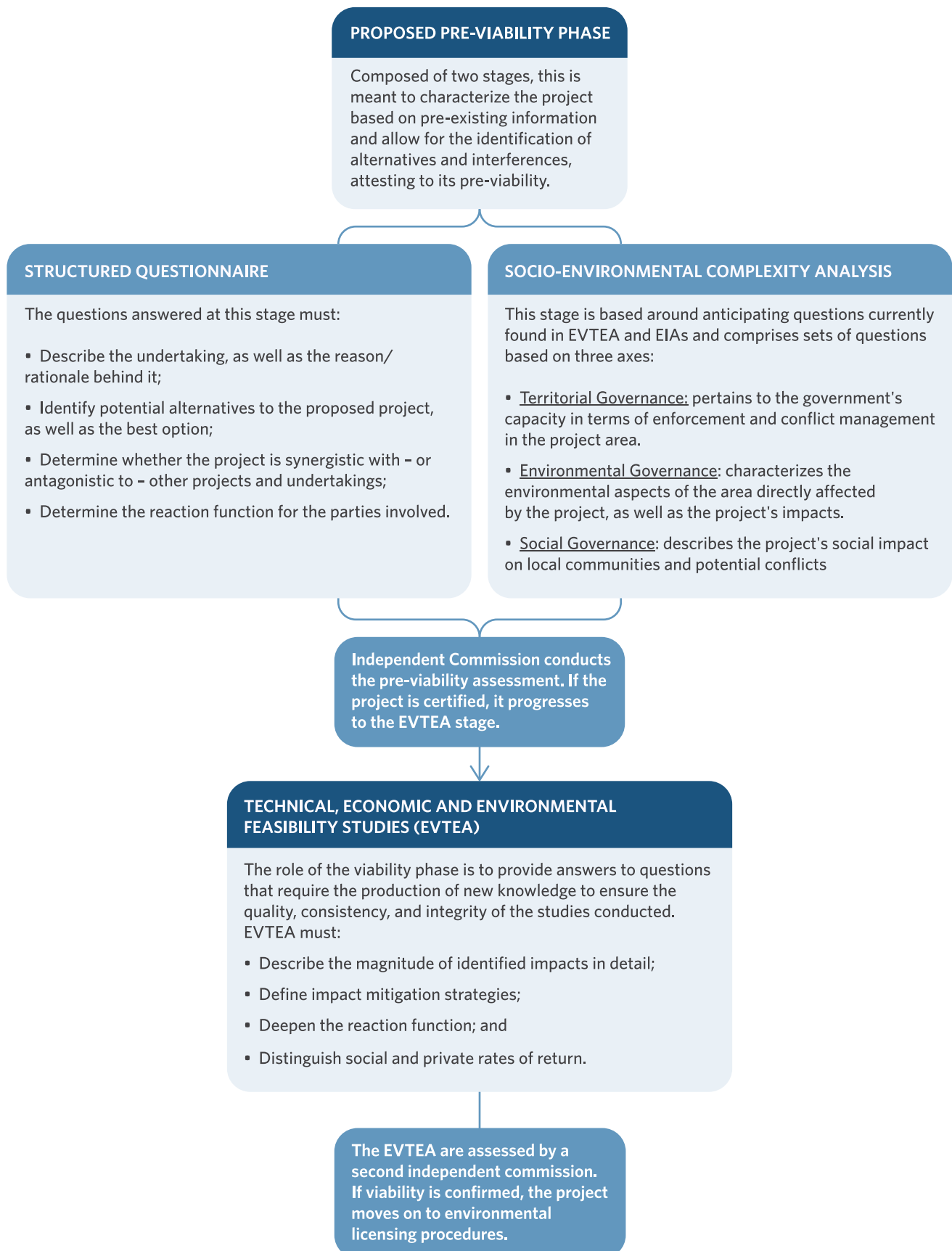
Social Governance

1. Is the project located in, or in close proximity to, indigenous communities, *quilombolas* or other traditional populations?
2. Does the project affect, directly or indirectly, indigenous communities, *quilombolas* or archaeological heritage sites?
3. Are there technical and locational alternatives from a social component perspective?
4. Does the project require expropriation?
5. Does the project require the territory be urbanized, temporarily or permanently?
6. Is the project expected to provide social benefits? What is the nature of those benefits? Are they quantifiable?

The complexity analysis creates an extra review that adds greater rationality to the process, by excluding projects that, at first sight, are deemed unsustainable – either because they are not bankable or because they provide low or negative returns to society – as well as those that are inconsistent with the development strategies championed by the country. Furthermore, this step imposes greater granularity and rigor in subsequent analyses, as it is based on a set of questions whose answers will serve as starting points or grounds for further analyses. Such analyses, by design, must be more rigorous, granular, and based on new data. In principle, the more complex the project – or the greater territorial scale or socio-environmental impact it has – the more useful the proposed methodology would be and the more desirable its adoption becomes.

Figure 2 (below) illustrates the proposed concept of a planning cycle as described here, with the introduction of the pre-viability phase.

Figure 2. Introduction of the Pre-Viability Phase



Source: Inter.B, 2020

CONCLUSION

Despite excess demand for infrastructure investments in Brazil, there are still structural flaws in the administration of public or government-funded investments. This weakness in investment governance reflects, to a large extent, a lack of medium and long-term planning in the country, especially in the land transport sector, in a way that fails to ensure greater project integrity and rationality. The importance of a new plan is clear: it is needed to make new projects feasible for the economy to recover after the pandemic, to improve the well-being of the population, to make businesses more competitive, and to prepare the country, its cities, and structures to deal with the climate crisis while contributing to the reduction of greenhouse gas emissions.

This analysis proposes a new phase in the current project life cycle that filters projects prior to the viability phase in order to exclude those that are not economically, socially, and environmentally sustainable based on a rigorous analysis using secondary data. The process also allows projects to be prioritized at a stage when sunk costs are still limited. The pre-viability phase would play a crucial role in preventing infeasible or low-viability projects from reaching the bidding phase only to be excluded by government decisions or as a result of an empty bidding process. This will make the business environment more secure and reduce transaction costs in the sector. Lastly, the introduction of a pre-viability phase would help the government prioritize projects already in its portfolio.

Given the vital ecological role of the Amazon region, it is imperative to measure the socio-environmental risks of infrastructure projects and assess the extent to which they can be prevented or mitigated. The need to introduce a pre-viability phase is even more pressing in a sensitive environment like the Amazon and is meant to minimize the likelihood of damage to the biome, high (and avoidable) ecosystem costs and first-rate impacts on reputation.

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