Accelerating the roll out of 5G in Brazil

A logistics and supply chain perspective

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Key findings:

- 14% of respondents believe Brazil is fully ready to deploy 5G from a logistics and supply chain perspective.

- 76% of respondents indicate that Brazil is only partially ready, 10% of respondents indicate that Brazil is not ready at all.

- The main challenges identified include initial 5G site selection and readiness, logistics coordination, installation of 5G equipment, regulatory (legislation) and security challenges.

- Material shortages, contract liability and finding capacity are identified as the major challenges for network providers.

- Coordination between different parties (e.g., engineers, last mile providers, material suppliers), resource availability, capacity and risk of theft are identified as the major challenges for installation companies.

- 3PL companies (3rd Party Logistic Providers) could provide many additional services, including installations of 5G equipment, to assist with the 5G roll out, but concerns exist about their experience in this field.

- Rolling out 5G should be considered as a distinct logistics and supply chain challenge to the roll out of previous 2G, 3G and 4G technologies. The 5G roll out will be more complex due to 5G technologies requiring more unique materials and equipment installation locations being much more widely geographically dispersed.

- Brazil's geographical landscape creates particular logistics and supply chain challenges to rolling out a dispersed 5G network, with a combination of dense urban regions and difficult to access rural areas creating particular challenges.

Additional details and data about these findings are contained in later sections of this report.

Our Recommendations:

- **A right-first-time installation approach is needed** to ensure that installation costs remain competitive and that equipment is installed in a just-in-time manner to reduce the risk of on-site theft.

- To achieve right-first-time installations, **data visibility and coordination of all involved parties will be the key enabler for success**. A single control tower approach, providing a single source of truth on the site, material, engineer, and transport readiness is an essential requirement for success.

- The control tower should provide visibility on key supply chain events and provide **access to metrics to enable collaborative information sharing for all involved parties**. Real-time visibility of project statuses for all parties will also ensure a quick response to any unplanned events and disruptions.

- A new logistics and supply chain network is needed for the 5G roll out. Given the range of materials and the dispersed nature of the installation sites, a multi-tier supply chain network is recommended. This will combine larger, central warehouses **with smaller, more flexible, micro-fulfilment warehouses closer to installation sites**. To achieve flexibility and minimize supply chain costs, multi-user environments should be used wherever possible.

- Different materials will require different forecasting approaches, inventory levels and positioning strategies. The multi-tier network will allow companies to **design inventory strategies for each individual part,** locating inventory in either the central warehouse or in the micro-fulfilment warehouses.

- Different parts will require different warehouse handling techniques, for example, small cell equipment should be handled **using automated warehousing technologies,** whereas larger equipment such as large cable drums will require bulk storage and more manual handling.

- Brazilian road conditions are complex and uncertain, especially in the North, North-East and Middle-West areas. As well as using different transport delivery services (FTL, LTL, Express), **predictive path optimization enabled by AI/machine learning** that considers road conditions, truck availability, traffic network, delivery windows, and transportation will reduce the distribution time and improve on-time delivery performance.

- There is a need to **maximize the value in de-installation**. Many areas of Brazil are covered with 3G/3G+ cell towers, especially in the southeast and coastal cities. Ensuring a circular closed-loop supply chain, including testing & grading, repair & refurbish, re-sell & re-marketing, will ensure the maximized value of materials in the supply chain. The inclusion of a circular supply chain network will drive sustainability performance and reduce inventory and costs in the network.

The 5G roll out in Brazil – an overview

5G is expected to be the fastest deployed mobile communication technology in history. It is forecast to cover about 75 per cent of the world's population by 2027 (Ericsson Mobility Report, 2020).

Not only will the deployment be rapid, but the impact of 5G will be transformative. It is expected to add over $13 trillion in global economic value by 2035 and create more than 22 million jobs in the 5G global value chain alone (World Economic Forum, 2020).

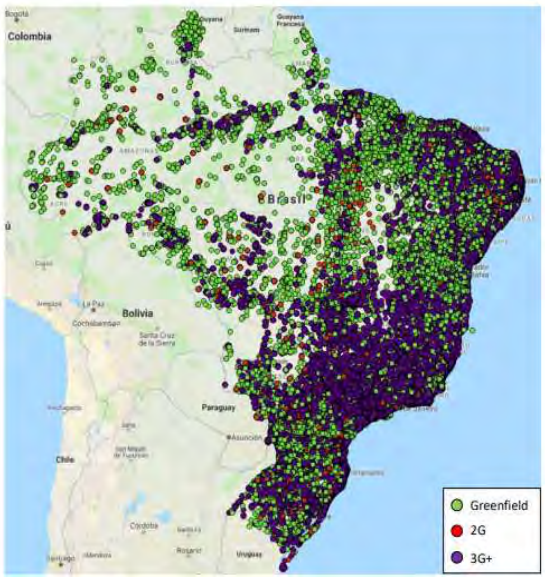


Figure 1: Current internet coverage across Brazil (Cavalcante AM, 2021)

Brazil is the world's fifth-largest country by area, the ninth-largest economy, and with a population of over 213 million, it is the sixth most populous country on the planet.

Despite its importance to the global economy, the country still lacks internet coverage in many areas.

It is estimated that between 10 and 20 million people in Brazil remain digitally unconnected. Figure 1 shows greenfield areas (no internet access in that area) and some 2G coverage, indicating very limited internet access. (Cavalcante AM, 2021). The 5G mobile auction by Brazil's government in November 2021 makes this report timely. With the auction raising $8.5bn, making it the second-largest auction of assets in the country's history, this signals the importance of the 5G rollout in the next few years. (BN Americas, 2021).

Brazil aims to deploy 5G in all 26 state capitals by July 2022 and across all municipalities with more than 30k inhabitants by 2029. (Reuters, 2021; LicksLegal, 2021). Open and interoperable fifth-generation (5G) telecommunications networks in Brazil would deliver a fast, secure internet, transforming the country's industries and economy.

Our findings in detail:

Our findings are based on data collected using an online survey and four workshops with managers who are heavily involved with the logistics and telecoms industry in Brazil.

The survey was designed by members of the PARC Institute of Manufacturing, Logistics and Inventory, a joint University-Industry Institute, managed by Cardiff University and DSV.

The survey design was assessed by senior academic advisors and was also subject to, and passed, an ethical review by Cardiff University.

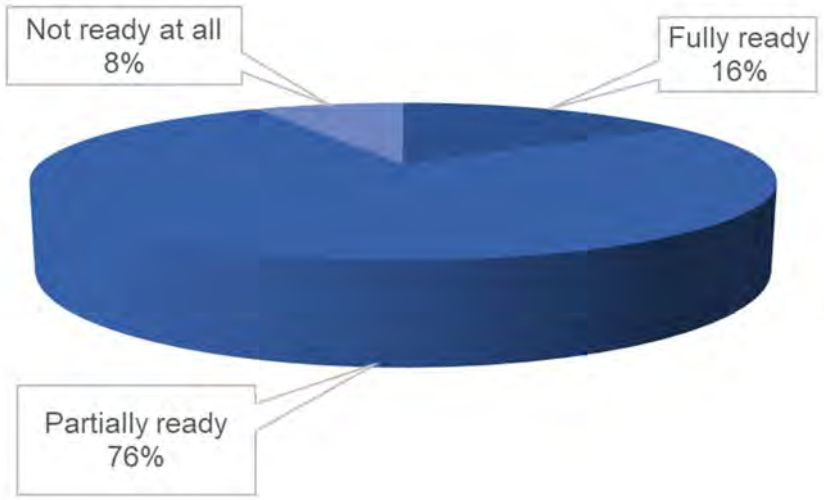
Using various networks, both academic and industry, the survey was sent to more than 80 experts working in the telecoms industry in Brazil. 24 respondents provided their expert insights. Respondents came from four main areas:

- Telecom Network operators
- Telecom Equipment providers
- Installation companies
- 3PL (3rd party logistics providers)

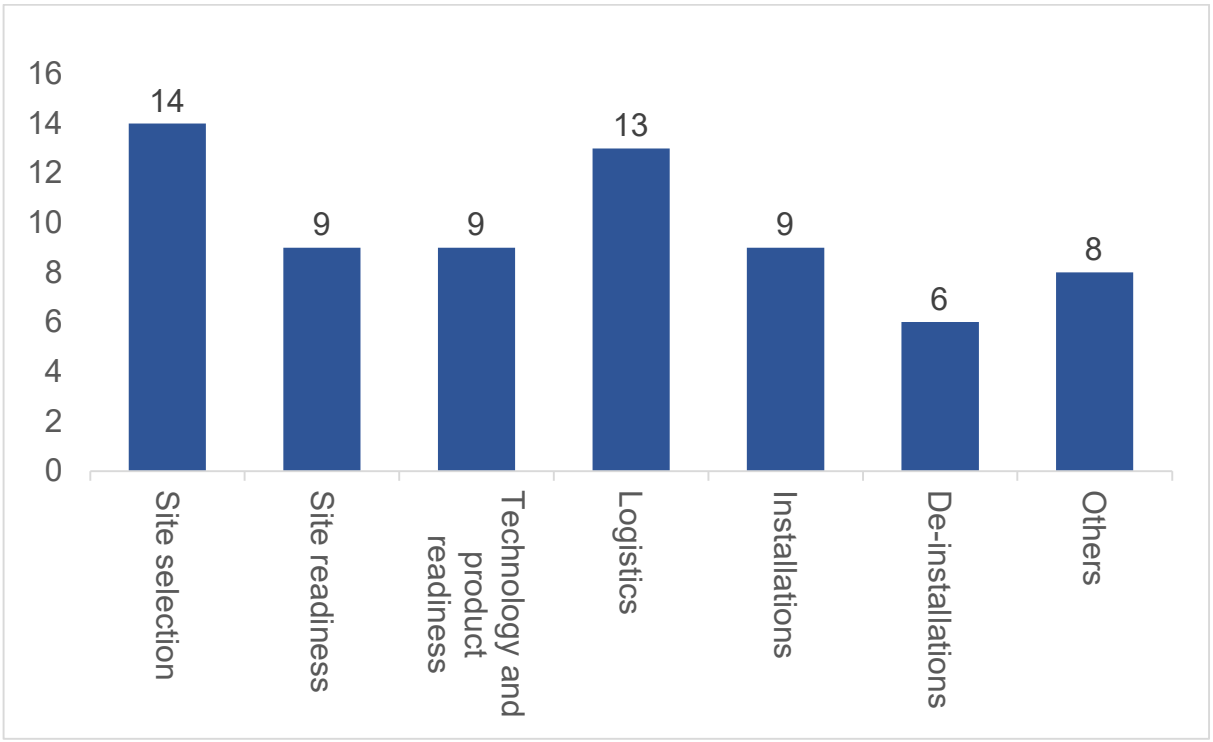
Once collected, the data was anonymized and analyzed by researchers from Cardiff University to ensure objectivity and anonymity. Once analyzed, the data and insight were reviewed by managers who provided additional industry insights.

Academic and industry experts worked together to analyze and interpret the survey data collected and prepare this report and recommendations.

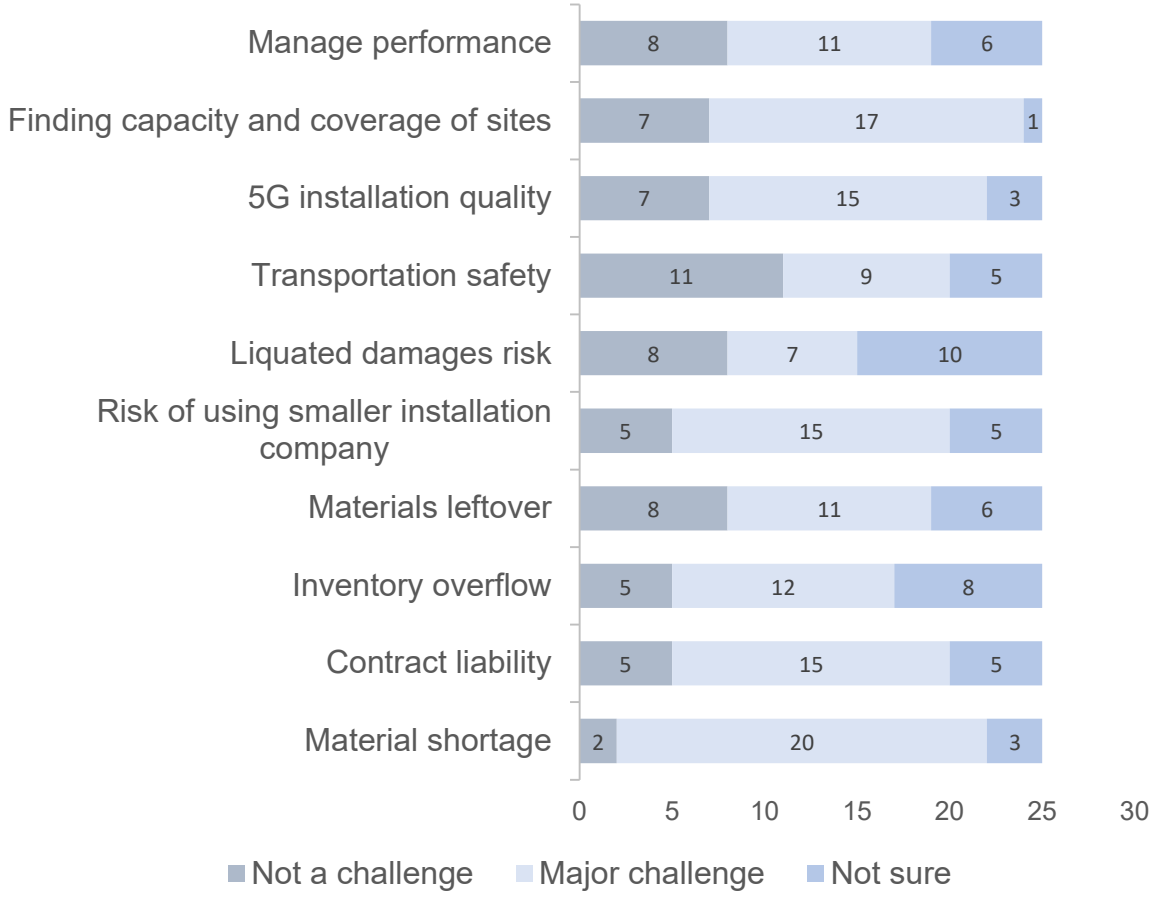
Key finding 1: Most respondents indicated that Brazil is only partially ready to deploy 5G from a logistics and supply chain perspective, illustrating that there is still work to do



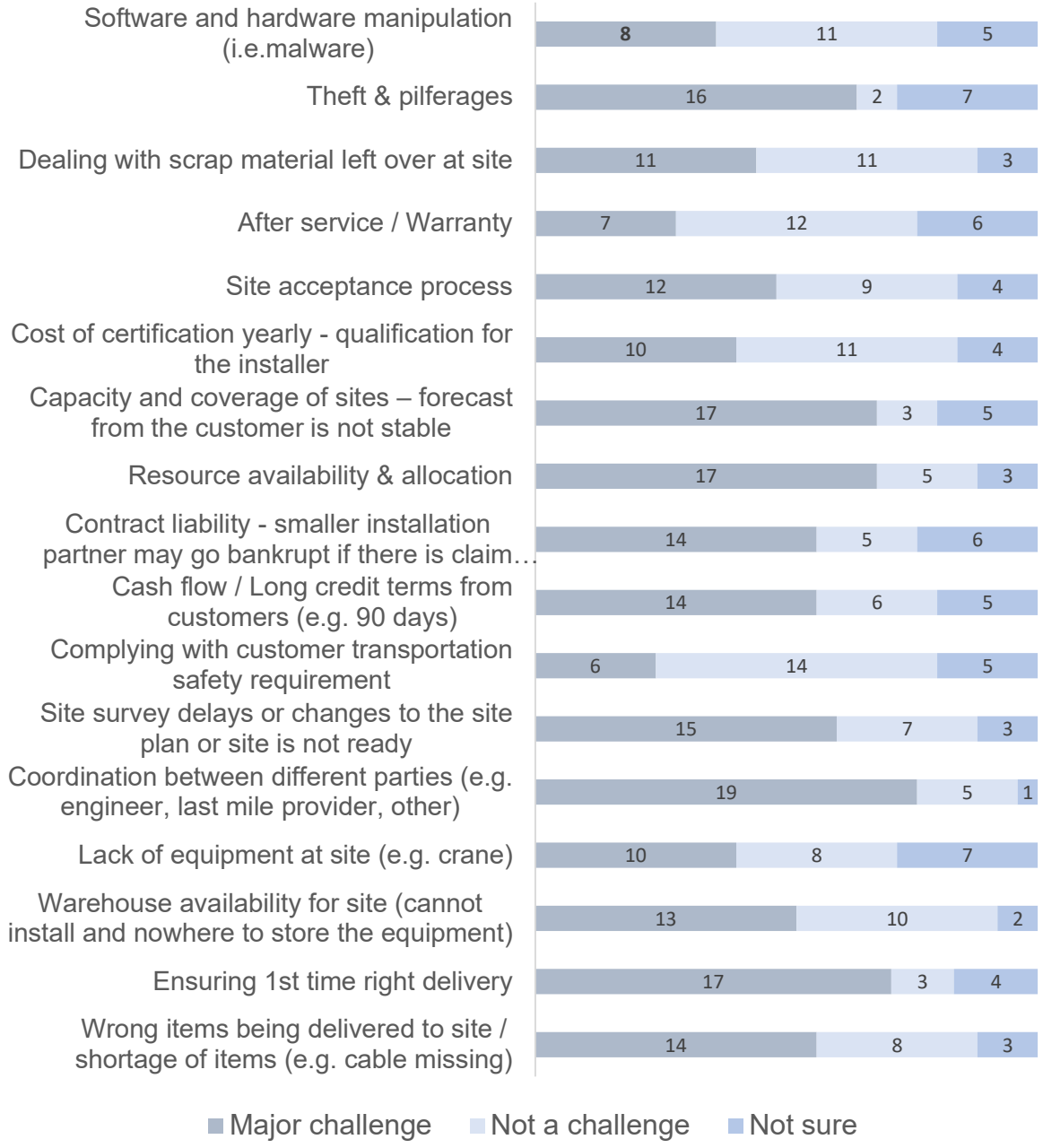
Key finding 2: There are a myriad of challenges still to resolve, but site selection and logistics are the principal challenges. Other challenges identified include site readiness, regulatory and legislative challenges and fears of equipment theft.



Key finding 3: From the perspective of network providers, the major challenges include material shortage, contract liability, finding capacity and coverage of sites, 5G installation quality and the risk of using a smaller installation company.

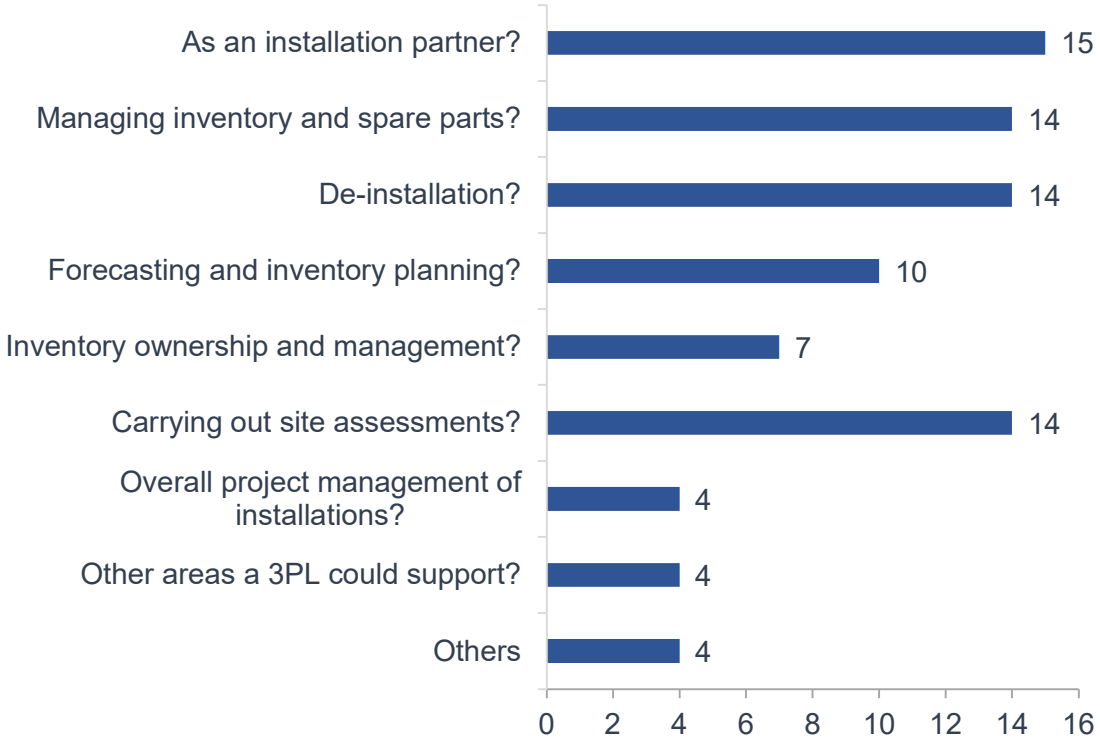


Key finding 4: For installation companies, the top three challenges are collaboration across multiple companies, resource availability, coverage of sites and first-time-right delivery.



Key finding 5: For 3PL companies, there are a number of additional services, including installation services, that 3PLs could provide to assist with the 5G roll out in Brazil.

Respondents were asked what other services 3PLs could provide to assist with the 5G roll out in Brazil



Want to know more?

If you are interested to find out more about this research or about DSV's services and capabilities in the Telecoms industry in Brazil or in other countries around the world, you can read more here and contact us at LMSTeam@dsv.com.

You can also access additional research produced by the PARC Institute, an industry and academic partnership focused on supply chain research and insight at www.cardiff.ac.uk/parc

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