Industry 4.0, connectivity investments: Brazilian case

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Abstract

The increasingly fierce competitiveness in the global economy, increasing productivity and reducing costs become increasingly relevant. Technological advancement can lead to optimization of productive resources by generating a larger amount of data, which through connectivity can be transformed into information, aiming to analyze the investment capacity and connectivity for the development of the automotive supply chain. The methodology used is exploratory, qualitative and quantitative. Sixty questionnaires were addressed, through a survey research, which were about the ability of investments, the importance of using technology for the industry 4.0 for connectivity between the chain of the automotive supplies industry, and which related gains and impediments to connectivity. In the data analysis was found that, for the Brazilian automotive industry, the level of investment made is still low, as well as the level of connectivity. For the next few years small investments are planned that can improve connectivity.

Keywords
Connectivity, Productivity, Investment. (10 font)

The increasingly fierce competitiveness in the global economy points to the need for industries to increase productivity while reducing costs. Technological advancement can lead to optimization of productive resources by generating a larger amount of data, which through connectivity can be transformed into information. The fourth industrial revolution presents industry 4.0 as a new manufacturing model based on the intensive use of new technologies to

improve industrial value chain processes (PILLONI, 2018), providing a concrete opportunity for both gains. as for competitiveness and sustainable development of the Brazilian automotive industry.
Industry 4.0 is based on nine pillars: big data, autonomous robots, simulation, vertical and horizontal integration systems, internet of things, cyber-physical systems, cloud, additive manufacturing or 3D printing and augmented reality (MOTYL et.al, 2017)
In Brazil, although there are still obstacles to the transition from industries to Industry 4.0, this transition enables synergy of different technologies, enabling smarter and more efficient factories that can foster economic growth and development (BRETTEL et al., 2014). In this sense, making investments emerges as an important necessity for the possibility of infrastructure adaptation and qualification of manpower for this passage (LORENZ et. Al, 2016).
The question to be studied in this article is: how important is data connectivity for the automotive industry in Brazil to make the transition to industry 4.0? Its objective is to analyze the investment capacity, and connectivity to the development of the supply chain in the automotive sector.
The methodology used in this research is exploratory, qualitative and quantitative. To collect the primary data, 60 questionnaires were addressed, through a survey, to the managers of the industrial area of companies in the automotive segment. The survey comprised 5 questions that addressed investment capacity, the importance of using industry-related technologies 4.0 for automotive supply chain connectivity, and the gains and impediments related to connectivity. Answers were obtained from 51 questionnaires.
From the surveyed sample 65% of the respondents belong to the auto parts segment, 25% from automakers and 10% metallurgical.
Regarding investment capacity in the last two years, 73% of companies indicate that they have not made any investments, 25% large investments and 2% no investments. Over the next 5 years, 80% point to small investments, 16% large investments and 4% of companies no investments. Noting that the major investments made and to be made refer to those of the automakers.
Regarding the level of data connectivity between your company, suppliers, customers and partners 94% of companies indicate that the level is low, and only 6% consider it high. When asked what level of connectivity is appropriate, 84% indicate that it should be partial, 10% total, and 6% do not consider it necessary to establish connectivity.
In the data analysis it was found that, for the Brazilian automotive industry, the level of investment made is still low, as well as the level of connectivity. For the next few years small investments are planned that can improve connectivity.
Future research suggests deepening the theme in relation to investments and the need for business connectivity for the transition to industry 4.0.

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References

BRETTEL, M. et al. How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective. International Journal of Mechanical, Aerospace, Industrial, Mechatronic and Manufacturing Engineering, v. 8, n. 1, p. 37-44, Novembro 2014.
FERREIRA, M.; MARTINS, H.; MOREIRA, A. A informalidade como estratégia competitiva no mercado de autopeças. Amazônia, Organizações e Sustentabilidade, v. 1, n. 2, 2012.
LORENZ, M.; KÜPPER, D.; RÜBMANN, M., HEIDEMANN, A. and BAUSE, A. Time to Accelerate in the Race Toward Industry 4.0, Boston Consulting Group, 2016.
MOTYL B., BARONIO, G., UBERTI, S., SPERANZA D., FILIPPI, S. How will Change Engineer's Skills in the Industry 4.0 Framework? A questionnaire Survey, Procedia Manuf. 11 (2017).
PILLONI, Virginia. How Data Will Transform Industrial Processes: Crowdsensing, Crowdsourcing and Big Data as Pillars of Industry 4.0. Future Internet, 2018.

Biography

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