Technology usage as a way to increase safety and security in different geographies

Testimonials on the use of technology in Rio de Janeiro, Brazil

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Abstract — **This study follows an interpretivist approach and showcases five testimonials of technology usage in everyday life, in Rio de Janeiro, Brazil; the research also brings forward the perspectives of 31 other Brazilian citizens. The informants are Brazilian Master's level students who were on an exchange program to Portugal, at a major Portuguese university. Brazil, and in particular Rio de Janeiro, the focus of this study, are seen to have talented people and to be also open to technology – on the developing side as well as on the user side. Trust issues still exist – concerning e-commerce – and may indeed be pervasive in society. Brazil is currently undergoing a profound social and economic crisis, which it is trying to recover from. Indeed, the general lack of safety and security felt in Rio de Janeiro may even be a reason for the popularity of home and work deliveries – so that citizens will not have to travel – with travel constituting an additional risk which many may prefer to avoid. Thus, technology (a diverse set of apps) may be serving an additional purpose – that of ensuring security in daily life in Brazil.**

Keywords – technology, home deliveries, comfort, social and economic problems, safety, security.

I. INTRODUCTION

Why are citizens of Rio de Janeiro, Brazil, using technology so much in everyday life? This research question arose when the researchers realized that Brazil is actually very advanced in its daily use of technology, according to an international exchange program, where Master's students came from Brazil to Portugal to learn (and teach) about digital business and digital environments. Brazil, with its over 207 million inhabitants [1], also has the critical mass and business community to make possible the implementation of certain digital services – for example, home deliveries, or deliveries at work, of food and other necessities – necessities including medication from pharmacies, as we shall discuss herein [2]. This is especially applicable to larger cities, such as Rio de Janeiro (or neighbouring Niterói). Note that Rio de Janeiro is seen to be one of the most violent and dangerous cities in Brazil, and may have a subculture of its own, as a reaction to the need for safety. One of the study's respondents stated, on a social network, in February 2018, that: "Without words to describe all this disorder that Rio [de Janeiro] has become. They have broken the State. Whoever is in government is not worth the plate on which he/she eats […] We have no safety, health or education. In sum, RJ [Rio de Janeiro] is finished!!!".

The use of social networks, such as Instagram and Facebook, as well as the use of WhatsApp, for electronic commerce, is already widespread and ingrained in Brazilian culture, which quickly adapted to these new technological tools [3]. Comfort at a low cost is the great motivator.

Therefore, the article describes some technologies used in a specific context – Rio de Janeiro, Brazil – by Brazilians. These technologies were described in writing to the lecturer of a course on digital business, at a major university, in Portugal, with the purpose to discover how technology usage differs from country to country. Brazilian participants in the course described (including in person) how, for example, e-commerce has been subject to trust issues, in Brazil, having gathered a fair number of complaints from locals over the years; this generated new business opportunities for entrepreneurs who were able to

establish mechanisms for additional (dis)trust in certain websites and what they sell (products and services). Also, online language courses are seen to be an actual alternative to real life courses, hence such personally delivered services may need to revise their manner of functioning in order to add more value and to make themselves more worthwhile. FarmaZap is an example of how an app may appear to solve a specific problem, in society, at a specific moment in time, but which may soon become obsolete very quickly due to the pace of technology in everyday life. Finally, UberEATS is an app designed for locals who want food delivered, for example at home. This app was not available in Portugal, at the time of writing, and is an example of how even major multinational firms (such as Uber) adapt and launch their products according to local communities and their needs.

This exploratory study also takes into account the way technology may be saving citizens physical trips (for example, to shops, pharmacies and restaurants), and this may well be an additional driver behind its use.

A review of the literature follows below, and afterwards we present the methodology for the study, followed by a display of the field work; finally, we discuss the data and conclude, while also including suggestions for future research.

II. LITERATURE REVIEW

The global economy, now completely networked, is constantly changing due to the support given by Information and Communication Technologies (ICT). Thus, according to Haddad and Drexler [4] globalization requires people and institutions to continuously acquire new knowledge and skills to be able to keep up with change. Recent developments in business, science, education and public and private organizations can be carried out quickly only if ICTs are sufficiently robust, efficient, effective and, above all, reliable to accommodate this change effectively [5]. In this context, improvements in technology, whether through the invention of new techniques or through the adoption of better technologies that have been invented elsewhere, are fundamental to the process of growth and development. Thus, according to [6] any barriers that prevent such improvements are the focus of theories that attempt to explain why developing countries were unable to catch up to developed countries.

In developing countries, although only a few companies develop internal technology, through Research and Development (R&D) investments, most of them are involved in imitating and adapting existing technology to their production processes and products. This incremental innovation, according to [7], allows developing countries a chance to align more closely to the global technological frontier, since their contribution is minimal. As developed countries move to knowledge-based economic activities, information, technology, and learning play an increasingly important role [8]. The use and adoption of new technologies by companies and employees is a critical component of the process of diffusion and technological advancement.

According to [9], the rapid evolution of technologies led mobile devices, with emphasis on smartphones, to play a key role and resulted in significant social and economic impacts around the world. The prevalence of smartphones resulting from technological advances [10] has further reduced technological barriers between generations. For example, according to Bayerl et. al [11], the use of technology in groups is a collective action based on shared practices and interpretations between interdependent users [12]. This collective action also extends to the adoption of new technologies [13]. Initial attitudes towards new technologies can, for example, be influenced by subjective standards or regulatory pressures from colleagues, supervisors or subordinates [14], particularly taking into account the social and relational nature of technology adoption. Thus, differences in demographic, social and/or organizational contexts can affect experiences and expectations in the use of technologies [15], making it difficult to develop common interpretations and therefore negatively affecting the development of agreement in a group. If diversity and distribution come together, adoption can become even more complex, since distribution increases the likelihood of groups separating into subgroups [16].

According to Riddell and Song [8], training / education increases the use and adoption of technology. The social and particular benefits of education may be underestimated by standard outcome measures (e.g. individual gains). This result will especially be the case if an individual's education and the associated use of technology also influence the results of the employer and co-worker. In the study presented in [8], empirical evidence is provided that supports education as an effective means to improve the adoption and diffusion of technology and hence technological advancement and productivity growth.

In the results presented in [17], there was a strong positive relationship between openness and innovation, with the main transmission channels being export / import activities and foreign technology license. This author states that the incidence of innovation induced by globalization depends on the underlying characteristics of the country, the sector and the company. For example, she found that firms located in high and medium income countries benefit more from the process of globalization, than firms operating in lower income countries.

Ejiaku [18] discusses a set of challenges that both developing and developed countries face in transferring and adopting technology in developing countries. Some of these challenges include government policies, infrastructure, education and training, and the culture of beneficiary countries. The study highlights as a solution to these challenges the full involvement of the governments and peoples of developing countries and the international community.

Wang et al. [19] presents a study to understand the behaviour of the elderly in relation to the adoption of technology. In this study, the authors used the unified theory of acceptance and use of technology (UTAUT) [20] as a basis for the construction of a new model, the model for the adoption of technology by older adults (MATOA), to study their behaviour in adopting technology. The results show that MATOA can be used to provide the technological sector with recommendations and references for the future development of technological products that are more convenient for older adults to encourage the adoption of technological products. Some of the recommendations listed are usage costs, where they suggest that service fee plans for this market segment, which are similar to student-oriented service plans, be implemented to help older

adults realize that their use of the smartphone is not expensive, nor a waste. On the other hand, the industry must take into consideration the physiological conditions of the elderly as a starting point for the development of smartphones.

The effects of different technologies on inequality are evaluated in Santos et al. [21], taking into account the heterogeneity of the country, the dependence between countries, as well as the common factors. Consequently, technologies that are more conducive to equality have been identified, highlighting some new evidence. In particular, they evaluated the effect of adopting certain individual technologies (such as tractors, TV, aviation, railways, etc.). They were also able to embrace measures of adoption of aggregate technology by type of technology – modern ICTs, older technologies of ICT, production and transport. The main conclusions point to a positive effect of old ICT technologies (including radios, telephone lines, televisions, etc.) and transport technologies (aviation, railways, steamships, passenger cars and commercial vehicles) and smaller modern ICT technologies (computers, ATMs, Internet use and smartphones). The results indicate that the effects of technology adoption can be quite different from country to country.

The purpose of the study presented in [6] is to examine the implications of the concept of "appropriate technology", suggesting that a technology may not be "appropriate" in a country if the conditions necessary for its potential level of productivity are not achieved. For example, in the model proposed by Basu & Weil [22], the barrier to technology adoption arises because of the localized nature of learning-by-doing. Specifically, a developing country may adopt technology from a developed country, as long as the capital intensity of the new technology falls in a range that is close to the capital intensity of existing technologies in the developing country. In Acemoglu and Zilibotti [23], the reason for the productivity differences that occur when the same technology is used in different locations (for example, in developed and developing economies) is attributed to the scarcity of capacities in developing economies. This suggests, according to [24] a "bias skill" in the choice of technology, which may explain the slow diffusion of technologies in developing countries.

III. METHODOLOGY

This study followed an interpretivist approach whereby the authors looked "*beyond numerical representations of phenomena (to try) to explain and therefore understand issues underpinning or driving complex situations*" [25]. Furthermore, emphasis was placed "*on the need to take care with the meaning of words, actions and situations*" [25]. The lead author lectured a course on digital business, in September 2017, which involved an international exchange with 35 students from Brazil and one of the optional course assignments involved telling a real-life story of how technology was a major part of the student's life in Brazil. A number of the students answered the challenge and sent, via e-mail, their testimonials of how technology affected their daily lives, while also having the opportunity to share their experiences in class. Some of the testimonials, discussed herein, were quite surprising as, in fact, technology was being used equally or even to a greater extent than in Portugal, which is considered to be more advanced than Brazil, technology-wise.

The students were studying at a Master's degree level in the Rio de Janeiro geographic area and they responded well to the course format; the objectives of the international exchange were therefore reached (to exchange experiences and to create a network involving the university in Portugal and the university in Brazil).

According to Elharidy et al. [26] "*one of the key advantages of interpretive research lies in its investigation of real world problems and its search for new solutions to these problems. This is achieved by listening to the multiple voices in the data, rather than searching for abstract ways (or universal laws) to generate conclusions.*" Thus, what the students precisely said was taken into account, as well as what they did not say, but which revealed itself as being important without being stated. That is, a grounded theory approach was used to develop theory, "*grounded in everyday practices*" [26], in a process which is recognizably subjective. The experience of the researchers played an important role in the research study, and added to the creativity of the results.

IV. FIELD WORK

This section contains five in-depth testimonials concerning the use of technology in everyday life in Brazil. A number of other testimonials were also submitted to the lecturer, by the class of Brazilian Master's students attending lectures in Portugal, but these five were seen to be more illustrative of how Brazil is very active in the technology arena. "In situations of "cultural competence" (i.e. well-informed individuals in a homogeneous culture) as few as four respondents can produce a high level of accuracy" (Romney et al., 1986, p.326, cited in [27, p.195]).

The general sharing of experiences in class was also very positive and indicative of a nation closely linked to smartphones and apps and social networks, despite financial difficulties; the embracing of technology was quite straightforward for a nation where having an iPhone is seen to be prohibitively expensive (also due to tax added), as the class participants stated. Students approached the lecturer straight after the first class and asked for his Instagram account, which was rapidly shared amongst the class. Being digitally connected was seen to be a strong need and was deemed normal. In comparison, Portugal is more formal and a greater distance exists between higher education students and their lecturers.

A. In-depth experiences and testimonials involving digital business and digital environments

Testimonial 1: One Brazilian student participant stated that she enjoyed learning foreign languages and that her best experience to date was actually a course available on the Internet. Learning a new language is all about learning more about a certain national culture. Juliana Fernandes Pinto Martha has studied many languages, including the basics for tourism: namely, English and Spanish. However, Juliana Martha has also studied Mandarin, which is hard to learn, despite being a language of the future. Those classes did not go so well – the teacher was Chinese, and not many students were registered for the course; Juliana stated that she did not adapt very well. Afterwards, Juliana Martha started to learn German, as her English was already good. However, for German there were a

lot of people in each class, with about 30 students attending each session. The language itself was also difficult to learn, beyond the first year of lectures. It may have been a question of not having studied enough, Juliana Martha recognized, for she had also started to learn French at that time. The French language is charming, Juliana Martha stated, and she fell in love with it. However, the two courses Juliana Martha tried out did not go well. After a few years, with no language training, Juliana Martha tried learning French again, and even resorted to hiring a private teacher. This was fun for a while, but the learning stopped progressing. At that point, Juliana Martha decided to click on an online advert for online language courses: Babbel. What a finding on the Internet! Juliana Martha gets all the support she needs, she makes her own timetable, she is learning a lot, the lectures are interactive and if extra help is needed, it is provided within the hour! Juliana Martha has recommended the course to several people. Without a doubt, each student can dedicate him or herself as much as she or he likes, and can progress accordingly. Juliana Martha progressed so much that she felt prepared for an international exchange again.

Testimonial 2: According to Denise Calaço, another Brazilian student, some time ago her sister remarked that there were no apps available to show the geographical location of pharmacies and to give information on which pharmacy had the required medication and at the best price. In an emergency, this type of information would be helpful. However, very unexpectedly, in less than three months a local developed an app to do this – FarmaZap – which was really becoming popular. Once registered and logged in to FarmaZap and logging on you may name the medicine you need, as well as the substance, dosage and quantity. You may also indicate whether you prefer a specific brand or a generic brand. By way of geo-referencing the request is sent to pharmacies in the chosen region. The pharmacies then answer the request in real time. Additionally, the pharmacist may discuss the best conditions for a specific customer, as if he or she were at the counter. You can interact with dozens of pharmacies at the same time, without needing to physically go to the pharmacy or needing to waste time getting connected. The app also makes purchases by credit card possible, and oftentimes the order may be delivered at home (if no prescription is required and if the pharmacy does deliveries) (see also [28]). Therefore, in the field of technology things move so fast that something unique today may in a short time become obsolete. Denise uses technology, on a daily basis, in order to sell items, which is her job. WhatsApp is used to send photos of requests to Denise, her customers become her friends on Facebook, her teachers create online content – in sum, technology is everywhere in Denise's daily life.

Testimonial 3: According to Roberto Anderson de Oliveira, E-commerce in Brazil did not take off immediately, and Brazilian consumers resisted. This was due to a number of complaints, linked to various issues, and mainly to the degree of honesty regarding what was publicized on websites (about the products / services), all around the country. The wave of dissatisfaction was so strong that some entrepreneurs saw a business opportunity in it – they subsequently built websites focused on the niche of dissatisfied customers who could thus see their complaints listed and certain entities denounced. This is how a custom has evolved in Brazil, in so far as Brazilian

consumers interested in buying something on the Internet first go on websites with registered complaints and where organizations are denounced to get information about companies and to observe the negative rankings of certain firms. At the turn of the millennium, logistics complaints were the most popular: late deliveries, discrepancies between online adverts and the product delivered, wrong sizes being delivered, as well as the wrong colours and product formats, among others. The "Programa de Proteção e Defesa do Consumidor" – PROCON – or Program to Protect and Defend the Consumer – also gives a lot of advice to online consumers in Brazil. For example: search for online complaints related to the firm before buying from them - www.procon.sp.gov.br is valid for the state of São Paulo. Furthermore: be suspicious of products advertised at prices below the market average; visit the registro.br website for company data; be suspicious of websites that require certain types of bank deposit (such as to checking accounts of physical people, or to savings accounts); search online social networks for complaints; check the physical address of the firm as well as the complaints process and the warranty and return policies; save all purchase data – website name, items bought, price paid, and purchase number; always demand a fiscal note of the purchase.

Testimonial 4: The UberEATS app (linked to the original Uber app) has opened up new horizons in Brazil, despite the inexistence of a "Take Away" or "Grab and Go" culture in Brazil. However, a lot of people do order food to be delivered at work or at home, and the market is already significant and still growing. Technology has thus brought comfort and convenience to daily life, and a lot of restaurants offer delivery services. According to Talita Huguenin, apps in Brazil in the food delivery market include (restaurant apps aside): IFood, PedidosJá, SpoonRocket and, more recently, UberEats. The UberEATS app functions based on the users' Uber ("taxi") account. After installing the app and logging in, the app shows all of the restaurants in the area that are open and close by, filtering for prices, food and proximity, and with a fixed fee (10 Reais) for delivery. Upon confirming the delivery, the restaurant earns the order, which will be delivered on foot, by bicycle, or by Uber. In the case of an Uber car being necessary for the delivery, the customer will have no extra charge, and the driver will earn the value of the drive. To sum up, the technology was developed so that all of the stakeholders involved win; the restaurant diminishes its cost of delivery, Uber gets a fee, and the consumer receives a quality service, at a fixed price. The delivery may also be tracked. UberEATS is designed for locals who also appreciate paying with a credit card rather than with cash.

Testimonial 5: Cauê Issa brought attention to the following website, by a firm named Friday Acessórios - www.fridayacessorios.com.br. The firm is also available on the social networks Facebook, WhatsApp, and Instagram (the latter at: https://www.instagram.com/fridayacessorios/). Brazil is a country which consumes a lot of cosmetic and beauty products. Beauty salons, fashion and cosmetics shops, as well as shops selling accessories abound. Accessory shops, in particular, sell a large and diverse range of products, at different prices and of different styles. Some shops even sell items separately, so that consumers may create their own products. One shop in particular, due to the significant demand, decided to enter the

market with three differentiating points: service, price and sales platform (online). Thus, Friday Acessórios was born. The Instagram platform is used to post photos daily – of products and of people using the products. Consumers like seeing the photos and send messages to the inbox, with queries. Inhabitants of the cities Niterói and São Gonçalo (in Rio de Janeiro) may have their items delivered physically once a week. For other cities in Brazil, postage is charged, for deliveries. In Brazil, there is a State-owned monopoly for postage services, and the prices are high, which causes a lot of dissatisfaction. This monopoly works against the popularity of e-commerce deliveries. However, with Friday, as the items are small and light, this means that deliveries fit into envelopes, making for much cheaper postage prices. Friday thus works out to be much cheaper than major competing brands. A major brand might sell earrings for 39 Reais while Friday will sell the exact same product, from the same supplier, for 19 Reais. Curiously enough, Friday is a sustainable business with no physical structure or employees. Consumers are given discounts for their initial purchase; and for future purchases, if they send in videos speaking of products and materials (e.g. sizes and weights). Customers may also customize products online and receive their orders within a week. Friday has created its own blue ocean, bypassing much of the competition with its business model.

V.   DISCUSSION

In this study we have given an example of a locally developed Brazilian app (FarmaZap) as well as of an app developed internationally and launched in select cities (UberEATS), including in Brazil. In conclusion, we see a confirmation of the literature regarding the fact that some R&D development may take place in a developing country context as well as the use of internationally tested and developed technology.

Brazil is currently undergoing a profound social and economic crisis, which it is trying to recover from [29]. One testimonial narrated herein stated how a lot of distrust existed and may still exist as regards the e-commerce range of products available in Brazil. The political situation in Brazil is also alarming and has made international headlines [30], and one may in fact be tempted to conclude that Brazil has a trust issue that needs solving – starting at the top.

Severe economic difficulties, however, involving the access to basic items, such as food, make low-cost platforms such as Friday Acessórios popular. Activities are lacking which lead to development, such as a decent education; or which entitle people to live the lives which we all should be entitled to live, including access to health insurance, for millions of people; and this may mean that Brazil will be a problematic place to live in or to visit in the near future. Indeed, the general lack of safety and security felt in Rio de Janeiro may even be a reason for the popularity of home and work deliveries – so that citizens will not have to travel – travel constituting an additional risk which many may prefer to avoid. Consider the following passage, made public, on the Internet, by the government of the UK:

"There are very high levels of violent crime in shanty towns (favelas), which exist in all major Brazilian cities.

In Rio de Janeiro, any visit to a favela can be dangerous, even as part of an organised tour. Violence in Rio de Janeiro favelas increased in 2017. Armed clashes and shootouts between police forces and gangs are a regular and unpredictable occurrence, and in October 2017 a tourist on a favela tour in Rio de Janeiro was accidentally shot dead by police.

There is a risk of violence spilling over into nearby areas, including those popular with tourists. There have been injuries and deaths as a result of stray bullets in and near favelas.

Armed clashes between the police and gang members have also occurred on major thoroughfares, including the main highway to and from the international airport in Rio de Janeiro which runs alongside a large favela.

Take extra care in all Brazilian towns and cities, especially Rio de Janeiro." [31].

Thus, technology may be serving an additional purpose – that of ensuring security in daily life in Brazil. Maslow's [32] hierarchy of human needs asserted that security is a basic need in society and is very strong. Only our physical needs, such as access to food and water, are seen to be stronger. Therefore, on the one hand, we have many poor people living in favelas, who have no access to food and who are thus robbing other people in order to survive; on the other hand, we have the average citizen, who wants to stay safe and secure. This enables technology (apps, including WhatsApp and Instagram, but also apps such as FarmaZap and UberEATS, described herein) and certain online platforms (such as Friday Acessórios) to become more popular than in safer countries, this exploratory study has revealed, as it solves the problem of travel, which is unsafe at any time of day in major cities in Brazil.

VI.   CONCLUSION

In our study we saw no evidence of Brazil needing to catch up with more developed nations, as stated in the literature. The international exchange involving Brazilian students visiting Portugal, which originated the conundrum as to why Brazilian citizens were using technology so much, has led to the following conclusion, visible in figure 1. Apps such as FarmaZap, UberEATS, WhatsApp, Instagram, Facebook, among others, are used very extensively in Brazil. Why is this the case here, more so than in more developed countries such as Portugal? The answer lies in that there is a general lack of safety and security in Brazil which leads to the usage of apps to avoid travelling even short distances.

Figure 1.   Technology usage in Brazil linked to safety and security

Let it be said that the voices in the data led to this conclusion. The informants (students) themselves did not mention it, possibly because violent crime in Brazil is so ingrained in their

culture and the society they live in, that they take no note of it. The researchers involved in the study are however acquainted with Brazil and the Rio de Janeiro area and have travelled there several times. Thus, the conclusion arrived at was also dependent on previous experiences and encounters. Crossing the road with a backpack, in the Rio de Janeiro area, even at lunchtime and in broad daylight, may be a dangerous experience, as dangerous as driving home from work, for that matter. What is considered normal and acceptable, in terms of safety, has reached new levels of acceptance. Women have ceased using jewellery almost entirely as it is just too risky to be seen, in public, with anything valuable.

Portugal was, at the time of writing, one of the safest destinations in the world and this may also explain why the usage of apps such as FarmaZap are non-existent or not popular in Portugal. Travel is not seen to be problematic, in a society that has solved many of the major issues (extreme poverty, violent crime, access to health services for all, access to a good education) that trouble society in Brazil today.

Figure 2 shows the increasing role of technology as regards safety and security in society, especially in certain geographies [33].
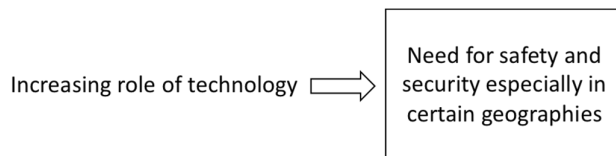

Figure 2.   Technology and safety and security

In the future the role of technology as a means to promote safety and security may evolve to other areas, such as tourism [34] "*Virtual experiences are being created that mimic the reality of tourism destinations and attractions, without requiring the tourists to leave their present location*" [35]. Technology will make immersive trips possible – without having to leave one's home town, where one feels safer. Terrorism and other ills of modern society should increase the use of technology to change lifestyles, and it would be interesting to measure, in future research efforts, just how fast and to what extent this is already currently occurring.

VII.   ACKNOWLEDGEMENTS

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