LAN House Implementation and Sustainability in Brazil: An Actor-Network Theory Perspective

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Abstract. LAN Houses have featured as key locations for thousands of Brazilians who otherwise have no access to the Internet. Thus, the scope of this study is to investigate the implementation and sustainability trajectory of a LAN House from an Actor-Network Theory perspective. In order to achieve this, single case study methodology was adopted to address the implementation and sustainability of a LAN House in Jardim Catarina, city of São Gonçalo in the State of Rio de Janeiro, Brazil. The result of this investigation supports the importance of government programs and actions as key actors to implement and sustain these endeavors. Lastly, it becomes clear that a LAN House is not actually a digital inclusion agent, despite its relevance to regions with lower rates of income, since the owner performs the role of "digital broker," whereby most of LAN House users are denied full digital inclusion.

Keywords: LAN House, Actor-Network Theory, Digital Inclusion, Digital Exclusion, Brazil.

1 Introduction

In recent years, Brazil has expended considerable efforts to provide its citizens with access to information, digital technology and other benefits generated by Information and Communication Technologies (ICT), with the objective of enhancing the social and economic development of the country [1]. In partnership with the private sector, this movement has relied on initiatives such as tax deductions to reduce the cost of

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[*] In Brazil, LAN House is the expression assigned to a Paid Internet Access Center

computers, investments in Internet cafes, the deployment of ICT laboratories in public schools, among other measures instituted through public policies and by NGOs [1].

It is also a fact that access to digital information and technology has grown and is on the increase in Brazil, especially in underprivileged areas, by means of the deployment of LAN Houses, according to data from the Brazilian Internet Steering Committee [2]. Moreover, 49% of the Brazilian population had some form of Internet access in 2012 and of these 49%, 19% gained access via LAN Houses [3].

Despite the recent decline in the number of users accessing the Internet via LAN Houses, this type of establishment is still the second largest provider of public access to ICTs in the country, after the main provider, namely home access. Moreover, there are around 100,000 LAN Houses in the country, with 87% of users belonging to lower income classes, i.e. people who would not have access to the World Wide Web if it were not for the existence of this type of commercial institution [3-4].

Notwithstanding their apparent importance, there are few studies on the success of LAN Houses in Brazil, in terms of their implementation and sustainability in the national context. Thus, the research question of this work is: "How have the implementation and sustainability trajectories of LAN Houses been in Brazil, from an Actor-Network Theory (ANT) perspective?"

2   Theoretical References

2.1   LAN Houses

LAN Houses first appeared in South Korea in 1996 as an entertainment option. They were net gaming houses using LAN (Local Area Network) technology, which included an in-series linkup of computers to exchange information.

In Brazil, the first LAN House opened in São Paulo in 1998, using the same business format proposed by the LAN Houses in Korea. However, the format experienced changes over the years, as the gaming entertainment house lost ground to access to information via the Internet for work, study, relationships and the practice of online and network gaming.

There are around 100,000 LAN Houses in Brazil, generating about 250,000 direct jobs [5]. However, of these estimated 100,000 establishments, only five thousand of them are formally registered [5]. According to the Brazilian Internet Steering Committee (CGI.br), over 85% of LAN Houses have not been formally registered because the legislation does not recognize the activity [6]. Nonetheless, LAN Houses are the main point of access to the Internet for lower income classes. Approximately 80% of Brazilians of these classes access the Internet through paid access centers. These paid centers cater to 47% of the population, who pay between US$0.50 and US$1.00 per hour for Internet access use. In this portion of the population, about 80% of users frequent centers as they do not have a computer at home [6].

The concentration of these paid access centers occurs not only in the outskirts of large cities – in underprivileged communities – but also in inland cities far from the major urban centers [6]. They are usually simple but adequate facilities to provide the intended service. Besides access to the Internet, the LAN Houses offer other additional services, including games, communication apps (Skype, MSN, etc.), electronic/digital

copying and printing, computer courses, etc. They also provide electronic commerce via the Internet and the purchase of products through the supply of credit from the owner of the establishment [6].

2.2   Actor-Network Theory

The Actor-Network Theory – also called the sociology of translation – has been a popular approach in the Information Systems (IS) literature, due to its conceptualization of technology as one of the 'actors' in any Actor-Network analysis [7]. Thus, this approach has been used by several IS researchers to study the complex repertoire of actions associated with the implementation of technologies [8-10].

Technologies are heterogeneous artifacts that embody trade-offs and compromises [11]. In particular, technologies can embody social, political, psychological, economic and professional commitments, skills, prejudices, possibilities and constraints, being continuously shaped and reshaped by the interplay of a range of heterogeneous forces within the networks [11-12].

In particular, the Actor-Network Theory, or ANT, does not acknowledge differences between people on the one hand and objects on the other [13]. For instance, for ANT objects might authorize, allow, afford, encourage, permit, influence, block, prohibit and so on [14]. In effect, this approach portrays society as a socio-technical web where technical objects participate in building heterogeneous networks that bring together both human and non-human actors of all types [15].

In addition to this, ANT is highly appropriate when actors negotiate interests and try to gain influence in complex IS implementations [10, 16]. Therefore, many researchers believe that ANT has much to offer to IS research [9, 17-18], as ANT seems suitable for examining contradictory group formation processes associated with actor-networks related to IS implementation. For instance, ANT was used to examine the implementation of Geographical Information Systems in India [8] and the assessment of digital inclusion in a Brazilian municipality [19], to name only a few applications of ANT in IS research.

The dynamics associated with the formation of an actor-network accrues primarily from the process called translation. Translation means offering new interpretations of interests and channeling people in different directions [12-13]. The results of such translations are a slow movement from one place to another [14]. Hence, translation is the strategy by which the actor-network renders itself indispensable in the network building process. Thus, translation is the mechanism by which actors recruit other actors and ensure their faithful allegiance [18]. The strategies used in translation will depend on the circumstances, including negotiation, persuasion, seduction, simple bargaining, and even coercion [16]. Finally, it is worth mentioning that it is impossible to revert to a point at which a certain translation once was [13]. In other words, one cannot reverse a translation, which leads to the concept of irreversibility [14].

In order to illustrate the concept of translation clearly, an approach that distinguishes four interrelated moments of translation was proposed, namely: problematization, interessement, enrolment and mobilization [13]. These four moments are neither linear nor broadly inseparable [15].

The first moment, namely problematization, is the process by which actors position their project as indispensable to others. Interessement, in turn, involves a group of actions by which an entity attempts to impose and stabilize the identity of the other actors. In the enrolment phase, a black box effect is created, which involves enrolling and controlling other actors. Indeed, interessement achieves enrolment if it is successful in creating alliances, while mobilization represents the successful alignment of actors [13].

Other concepts related to the formation of actor-networks include both the obligatory passage point (OPP) and inscriptions. OPP refers to a situation that must occur for all the actors to achieve their interests when a change in a network is introduced [13]. Inscription, in turn, refers to the way technical artifacts embody patterns of use [20].

Lastly, it can be argued that ANT does not seek to uncover causes and effects in an endeavor so much as unveil the dynamic processes of collective actions reflected in the life cycle of an actor-network, which is the aspect to be further analyzed in this work [21].

Based on what has been presented about Actor-Network Theory, one can perceive that this approach is applicable in Information Systems research. This being the case, the aforementioned concepts associated with ANT might be useful for understanding LAN House implementation and sustainability processes in Brazil.

3   Research Method

This work adopts the case study method in conjunction with ANT to analyze the implementation and sustainability of a LAN House in a Brazilian municipality. As mentioned above, ANT is an approach for analysis of longitudinal and complex scenarios. Therefore, it was decided to analyze the case trajectory, involving many actors, such as entrepreneurs, frequenters, technical artifacts, local infrastructures, public policies, who interacted with the LAN House.

Case study methodology has been used in a positivist perspective in Information Systems research since the 1980s [22], becoming an important method for research in this knowledge field in the past 30 years [23]. However, this investigation is closer to a critical interpretative perspective [24-27], as ANT was the theoretical background for this work.

Critical interpretative case studies need to follow criteria to assess their quality and soundness. Four criteria are singled out for evaluating critical interpretative research regarding its ontological and epistemological assumptions, namely authenticity, plausibility, criticality, and reflexivity [25]. Thus, this investigation followed these criteria in order to ensure the quality of data collection and analysis.

This work sought to support its authenticity by using multiple sources of evidence collected throughout the year 2012. These included informal interviews with the LAN House owner and frequenters, as well as participant and direct observations undertaken in meetings and activities related to the operation of the LAN House. It also included a broad collection of documents related to the enterprise under analysis.

The plausibility of the work was accomplished via data analysis supported by the adopted literature review and comparison with results found in previous studies. Thus, a

case that took place in a LAN House similar to the majority of same in Brazil was analyzed. Yet, as interpretative research, this work did not pursue an objective truth that could be generalized. It sought instead to understand how actor interactions influenced the implementation and sustainability of the LAN House.

Besides, this research sought to be critical when it unveiled the controversies associated with the implementation and sustainability of a LAN House. In the case under analysis, these controversies arose from diverse interests between the LAN House owner and the frequenters, as well as inscriptions in technical artifacts. Thus, this investigation tried to depict reality, leading readers to reflection.

Lastly, reflexivity is associated with the personal bias of the researchers. Therefore, the authors disclosed their role in this investigation. One of the authors worked actively in the data collection, interacting with the owner and frequenters of the LAN House under analysis. Furthermore, the other author, who was not involved in the data survey, sought to remove eventual biases perceived in the description of the case.

4 Case Description

4.1 The Jardim Catarina Suburb

This research was conducted in the Jardim Catarina suburb, located in the city of São Gonçalo in the Metropolitan Region of the State of Rio de Janeiro. The city of São Gonçalo has the second largest population of the State of Rio de Janeiro (999,728 inhabitants) [28]. Moreover, the Jardim Catarina suburb has a total area of approximately seven square kilometers, with 176 streets and avenues, and about 23,000 households with approximately 73,000 inhabitants [29].

The economically active resident population in this neighborhood consists of a small percentage of the middle class and a majority of low-income earners, underemployed and self-employed. About 11.5% of the heads of households are in the 20 to 30-year-old bracket, having no education, and 70% of these have a maximum of three years of schooling, which highlights the precariousness of the educational status of its residents [30].

The monthly income of the heads of households in Jardim Catarina is on average US$970.00. However, radical differences are found in the older areas of the suburb, constrained in environmental and social terms. The households in these areas have an average monthly income of US$540.00, well below the average for the suburb [31].

Thus, based on information about the Jardim Catarina suburb – its demographic and social aspects, its size and characteristics of an outlying suburb, in addition to the dearth of studies on this suburb – this setting was considered a relevant choice for carrying out this research.

4.2 Fox Video Rental Store and LAN House

Fox Video Rental Store and LAN House, hereinafter called Fox, located on one of the main streets of Jardim Catarina suburb, started operating in 2003 as a video rental store. In 2007, it became a LAN House with good customer turnover throughout the day (about 30 people). However, the most intense number of people in the establishment begins

after 5 p.m. when young people return from school or work and go to the LAN House. On weekends, movement increases after 2 p.m. The majority of users are young people from 14 to 20 years old, seeking a place to meet friends, play games, access the social network and listen to music. Some students also go to the LAN House to do their homework, some of which is done by the owner of the establishment himself. Nevertheless, the LAN House also has patrons of other age groups, such as adults between the ages of 30 and 55 and children aged 10 to 14. The group aged over 30 usually goes to the LAN House in search of other services such as consulting e-government websites, printing of bank payment slips, preparing curriculum vitaes and checking e-mail, rarely accessing the Internet themselves.

Some users say they go to Fox because they have no Internet access at home, but contend that even if they did they would still continue to frequent the location because it is a nice place to meet up with friends.

According to the owner, in the early days of Fox, between 2006 and 2007, the store was always full with all the computer workstations busy. The turnover of the business was basically distributed as follows: 80% from hours of Internet access and the remainder derived from other services such as CD copying, faxing, and printing. Currently (circa 2013), Fox has an average of 100 active clients and Internet access no longer contributes so much to the turnover of the store, accounting for a mere 20% of total sales.

5   LAN House Implementation and Sustainability Trajectories

By using the owner of the LAN House as a point of reference, it was possible to identify the actors involved in the trajectory of the implementation of the paid access center. It was also possible to understand the applications and two relevant translation processes that occurred during the formation of the network of actors, namely the setting up of the LAN House and the sustainability of same via introduction of electronic government services.

The setting up of the LAN House is considered a moment of relevant translation as it marks the implementation of the paid access center, i.e. how this network was formed with its associations and interactions. The second moment of translation, namely the sustainability of the LAN House via introduction of e-government services is also relevant as it ensured the continued existence of the paid access center, offering new service options, both for the community and for the owner, who assumed a new role as will be seen below, namely that of digital broker.

5.1   The First Translation Process: Implementing the LAN House

The first four moments of this translation process are detailed below, namely problematization, interessement, enrolment and mobilization.

Problematization
The problematization phase occurs from the moment the owner decides to open the paid access center as a solution to compensate for the loss of revenue of the video rental store. Therefore, this actor – the owner – identifies and defines the role of other actors required

for the formation of this heterogeneous network. The elements that are identified as relevant actors are the technical artifacts (equipment and software), local infrastructure and the young patrons of the rental store, in addition to the owner.

Interessement

With the actors identified in the problematization stage, the LAN House was set up as a circumscribed network in an environment focused on technical artifacts and with the commitment of the lead actor, the owner, having all the actors aligned to his purpose. To achieve this, the owner took some steps to become indispensable and stabilize the roles of the other actors in the formation of the network.

The technical artifacts were purchased and installed with the help of a computer technician, who temporarily allied with the interests of the principal actor to instruct him how to install the software. However, this human actor did not join the network, distancing himself before its materialization.

With respect to the young patrons, the owner encouraged them to acquaint themselves with the LAN House. Once he had attracted the interested parties, the owner consolidated the alignment of their interests to evaluate the participation of (human and non-human) actors necessary for the setting up of the LAN House, in a heterogeneous network, focused on an obligatory point of passage, namely the establishment of the new undertaking.

Enrolment

After the interessement stage comes the enrolment phase, in which the main actor, i.e. the owner of the LAN House, effectively defines the roles. At this point, this actor establishes and coordinates the roles of all actors who will represent his interests in the network of stable alliances, namely:
–   Performance of the chosen computers and installed software.
–   Layout of the physical space of the store divided between the video rental area and the LAN House.
–   Performance of the broadband provider.
–   The role of the young people who frequented the rental store, not only as patrons of the paid access center, but also as its promoters to the local community.

Mobilization

The translation is completed with the mobilization in which the main actor, after garnering the widespread acceptance and involvement of his interests, mobilizes all stakeholders and can therefore speak on behalf of a group of heterogeneous actors with sundry interests in a single network mobilized by them [13].

In this context, the entities involved have acquiesced to unforeseen mobility, in which the initially dispersed actors were regrouped in a given time and place. This occurred when the owner became the representative of all concerned – users of his video rental store and part of the neighborhood – with the material and technical artifacts converging to create a network of access to ICT.

Once all the elements involved in the trajectory of the implementation of the LAN House were aligned in accordance with their prescribed roles, these agreements should be incorporated in a material medium, which, according to the Actor-Network Theory is defined as inscription. Thus, by means of various inscriptions that occurred

during the trajectory of the implementation of the LAN House, the creation of the paid access center was achieved.

However, when analyzing the implementation of the first LAN House translation process, the existence of another actor is detected. In the perspective of ANT, this actor, namely the "Computers for All" program of the Federal Government is a key player, though not mentioned by the LAN House owner. This actor was included in the network by an event independent of its intentions, since it was the result of the action of another actor, such that the owner benefited from the reduction in prices of computers to create the LAN House. Thus, the Federal Government played an important role in reducing the cost of computers, facilitating their acquisition, not only by people with low purchasing power but also by the owner of the LAN House, who benefited from the reduced price and the financing terms offered by retail stores.

Another fact worthy of note from the perspective of the Actor-Network Theory is the degree of irreversibility that this network has acquired as the inscriptions were established. The bonds formed between the (human and non-human) elements over the course of the implementation of the LAN House established a significant degree of convergence and coordination of the network. Accordingly, the number of elements incorporated into the new establishment – adaptation of space, installation of equipment, increased demand among young people for Internet access, and increase in the profitability of the business – prevented the disruption of this relationship. Thus, thinking of dismantling the LAN House and returning it to its original state, i.e. only a video rental store, consequently becomes unviable, which strengthens the state of irreversibility of the first translation process of this network.

5.2 The Second Translation Process: Sustaining the LAN House via Electronic Government Services

The second translation process occurred after the establishment and operation of the LAN House, with the introduction of a new actor in the network: e-Government services.

This artifact appears as an important actor for the LAN House leading to a transformation and shift in interests, artifacts, people and enrolments [13], appropriated by the lead actor in order to achieve his own goals.

To understand the importance of the role of this new actor and its interactions with other elements associated with the network, the four moments of this second translation process were analyzed, also describing this new actor.

Problematization

With the increase in the number of computers and access to the Internet in the underprivileged communities, the number of hours of Internet access in the LAN House is on the decline. The owner detects a reduction in revenue. In the meantime, the search for electronic public services that the state promotes for citizens begins to emerge. Thus, a relevant actor is identified: e-Government services.

With the goal of providing public services to the population via the Internet, the Federal Government developed actions of the e-government program, prioritizing the use of ICT to democratize access to information. However, actions related to e-government services have not reached those lacking access to ICTs, namely the

underprivileged population who need to have access to the provision of public services by electronic means. Thus, e-government, even unintentionally, becomes a relevant actor to the LAN House, which, through its owner, shall provide such services to the community in which it operates.

Thus, according to the owner of the LAN House, there appears a new user profile: adults, over the age of 24 to 26, who do not have access to a connected computer and/or printer, and who have the LAN House as a point of reference for the services offered by government agencies through access to ICTs. From the perspective of ANT, this new actor joins the network, proposing and demanding new enrolment and interactions between the human and non-human elements, such as availability of a quality printer and knowledge on the part of the main actor about the use of online services offered by the government and his own services.

Interessement

The owner of the LAN House promotes the possibility of access to e-government services for this new user profile. Thus, he aligns his interests with those of the people who wish to take advantage of this type of service.

Enrolment

Users of e-government services frequent the property while the owner assumes a new role, serving as an intermediary to assist their access to these e-government services.

Mobilization

The translation is completed with the continuity of the LAN House in the community. Therefore, once again, the LAN House becomes an obligatory point of passage for these actors, who need to go to the LAN House to access online public services. The main actor (the owner) thus offers this type of service in the LAN House, always with a view to increase his billing.

Therefore, with the actors mobilized around the interests of the principal actor, the inscription of e-government services occurs, with the owner buying a new printer and registering for credit protection service, entering into an agreement with the neighboring real estate broker to offer digital services, conducting enquiries, printing dockets, among other digital services.

In addition to this, the users of the LAN House come to consider it as a digital convenience center with the owner providing online services in addition to e-government services. These include copying digital media, checking e-mail, doing homework and online research, developing curriculum on the Internet, among others. The owner, therefore, assumes the role of digital broker with the responsibility of sending, preparing and registering documents online, hampering most LAN House users from achieving full digital inclusion.

As demonstrated in the two previous cases of translation, there is no pre-defined, structured and established social order in the ANT approach, but actors associating and disassociating in a permanent dynamic of relationships. For this reason, new negotiation processes and inscriptions are made and new networks are formed.

6   Final Remarks

This research presented two relevant translation processes as well as the four associated moments in which the actors had different levels of interest and alignment. From the analysis of these translations, it was seen that although the LAN House does not promote effective digital inclusion, it is important to highlight the relevance of this type of establishment in low-income areas, which consequently have restricted access to computers and the Internet such as the Jardim Catarina suburb in São Gonçalo.

In this sense, it should be stressed that the power to democratize access to the Internet exercised by thousands of LAN Houses spread around the country gives them a social function, as in addition to access to ICT, they promote the access of the underprivileged to a range of important community services hitherto inaccessible to them. This scenario demonstrates the extent to which the paid access centers serve the environment in which they operate, either by facilitating access to the World Wide Web or as online service providers. In this way, they respond to the dynamics of ICTs via the expansion of computer use by individuals and the dissemination of public services via the Internet offered by the State to its citizens.

In this context, it can be claimed that the LAN House currently plays a new role, namely that of a digital convenience agent. Consequently, the owner also has a new attribute, i.e. that of digital dispatcher, promoting and exercising the role of processing, expediting and sending documents of its users by digital means. This fact hampers LAN House users from pursuing effective digital inclusion, especially those who resort to it with a view to the use of the available e-government services, as there is a person who can do that on behalf of them, as was set forth before. These findings indicate the need to redesign or re-evaluate public policies, so that LAN House users can feel fully digitally included, eliminating the owner's role as digital dispatcher.

Finally, to understand the importance of this subject not only for Academia but also for the Government – through public policies aimed at reducing the number of digitally excluded people in the country – new research is required, as also supported by other researchers [32-33]. This includes case studies in LAN Houses located in other outlying suburbs from the perspective of ANT, to verify the possible existence of other actors in the constitution of the network, as well as analyze the availability of online e-government public services and the extent to which they can influence the sustainability of LAN House business. In addition, more research should be conducted into the role of the LAN House owner as a digital broker, identifying to what extent old practices are merely presented in a new guise.

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