Between Indians and "Cowboys": The Role of ICT in the Management of Contradictory Self-images and the Production of Carbon Credits in the Brazilian Amazon

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Research Article

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Abstract

In this paper, we draw upon Goffman's symbolic interactionism to analyze the ways in which new users in developing countries have adopted ICT to present and manage contradictory self-images to different groups of the public. In particular, we show that the Acapú, an indigenous group in the Amazon, present themselves through online videos and websites as ideal Indians: innate forest stewards aiming to mitigate climate change and ensure the planet's environmental sustainability. At the same time, the Acapú are also represented through a complex computer simulation model as destructive "cowboys": farmers and ranchers who are willing to develop by clearing their forests in the absence of financial compensation. This research shows that these two opposing self-images, while contradictory, are necessary for the implementation of REDD projects (a payment mechanism for reducing greenhouse emissions from deforestation). In order to obtain carbon credits from avoided deforestation, the project relies on the difference between deforestation measurements and high levels of predicted deforestation, which in turn, depend on the presentation of destructive self-images through the use of a complex computer simulation. But to sell these credits on a voluntary carbon market, it is necessary for the Acapú to openly market a self-image through the Internet which is attractive to corporate buyers willing to boost their eco-friendly profile. Based on this analysis, the paper challenges the narrative whereby Southern ICT users are passive receivers of technological black boxes. In contrast, it shows that in some cases these new users may participate in the creation of ICT artifacts to manage the impressions of distant audiences. Furthermore, the paper calls attention to the role of computer simulations and other ICT applications in concealing the paradoxes of neoliberal environmental management practices.
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Introduction

During the 20th century, the use of advanced information and communication (ICT) technologies was mostly a reserve of organizations and citizens from developed countries. However, with the radical drop in prices in the last decades, and the rapid expansion of the Internet and mobile phone infrastructures in developing countries,

ICT has become a global phenomena. As ICT went South, new applications and uses also emerged, and with them novel intellectual and practical challenges. In the meantime, the introduction of ICT in developing countries has been increasingly trumpeted by aid agencies and multilateral organizations as a necessary (and sometimes sufficient) step towards development, a set of initiatives also known by the acronym IT4D (Cherlet, 2014; World Bank, 2012). While the global expansion of ICT has brought important benefits, the many implementation failures, cultural clashes, and frustrations have led scholars from different areas to reconsider the deterministic assumptions behind the role of ICT in promoting development goals. In particular, the critical IT4D literature has indicated that the mainstream perspective on ICT "tends to dichotomize developed and developing countries and treats ICTs as a black box that is taken from one context and 'dropped into' another" (Sahay and Avgerou, 2002: 71).

As an alternative to this view, a growing body of research has shown that the assumptions embedded by Northern engineers can contrast with the practices and institutional contexts of developing countries. In particular, these studies have shown that ICT may end up disrupting long-established institutions and cultural patterns, rather than promoting the results envisioned by its proponents (e.g., Heeks, 2002; Puri, 2006; Walsham and Sahay, 1999). Similarly, some authors have also scrutinized the notion of "development" and challenged the apparent neutrality of goals fostered by IT4D initiatives. In particular, these studies have showed that ICTs often have inscribed into them specific (Northern) visions of what constitutes development (e.g., modern science, environmentalism, democracy, consumer society), neglecting in this way (Southern) social diversity and continuously evolving historical contexts (e.g., Avgerou, 2010; Hayes and Rajão, 2011; Thompson, 2008; Zheng, 2009). Simultaneously, different studies have also shown the ways in which ICT users in the Global South have shaped and sometimes even subverted initial aims inscribed into technological artifacts developed elsewhere (Noir and Walsham, 2007; Puri, 2006; Walsham and Sahay, 1999). In the specific case of the role of ICT in the Brazilian Amazon, particular studies have described: how forest rangers have adopted and adapted geographic information systems to issue fines for illegal deforestation (Rajão and Vurdubakis, 2013); the interplay between deforestation monitoring systems and the country's institutional context (Hayes and Rajão, 2011; Rajão and Hayes, 2009); the role of these systems in political disputes concerning the blame for increases in deforestation in the region (Rajão and Georgiadou, 2014).

The present study aims to expand on this literature by analyzing the ways in which new users in developing countries use ICT to broadcast or render opaque particular self-images. With this purpose in mind, we will explore the role of ICT in the implementation of a REDD project by the Acapú[1] (from now on called A-REDD for brevity), an indigenous group from the Amazon rainforest. REDD stands for "reduced greenhouse gas emissions from deforestation and degradation" and is often implemented by providing financial incentives for conservation endeavors. The payments arising from REDD are usually calculated by comparing the deforestation rates and related emissions of

an area during a given period with a baseline that represents what would have happened in its absence of the project. These reductions are then converted in carbon credits which can be acquired by companies and individuals as to offset their own greenhouse gas emissions (Moutinho et al., 2005). A closer look at the ways in which the leaders of the Acapú (and the consultants working on their behalf) have used ICT has revealed how they have been able to inscribe and present multiple and contradictory self-images to an audience of REDD project certifiers, carbon credit buyers and consumers of ecofriendly products. On the one hand, the Acapú uses YouTube, Facebook and other social media to present themselves as ideal Indians striving to save the rainforest, while on the other, they have influenced the creation of a complex computer model where they have appeared as rational economic agents with a behavior akin to "cowboys" in the absence of financial incentives from the REDD project. In order to understand the ways in which the Acapú use ICT to inscribe and manage these contradictory development goals, this paper draws upon symbolic interactionism, with particular attention being paid to Goffman's notion of impression management strategies (Goffman, 1956). From this examination, it will be argued that particular new users in the Global South are able to use ICT to render some goals transparent while hiding others in "black boxes"; in this way they construct barriers to prevent the identification of contradictory goals by different audiences. The remainder of this article is structured as follows. First, there is a brief literature review on symbolic interactionism, impression management, and the role of ICT in promoting transparency or opacity. This will be followed by an analysis of the presentation strategies adopted by the Acapú through the use of ICT. Finally, the article concludes with a discussion about the theoretical and practical implications of the study.

Impression management strategies and ICT

Taking their cue from American pragmatism, the proponents of symbolic interactionism have made detailed studies of how social order emerges from everyday interaction. From this conceptualization, they have proposed that all social acts and gestures are based on the ways in which we fulfill each others' goals (e.g., by asking what time it is, one person expects that the other will look at his watch and tell the time). In addition to performing acts that point to present and future intentions, the people involved also adopt historically established roles which contain a series of assumptions about the interaction. This then facilitates the articulation of the acts of both participants (e.g., when ordering a meal at a restaurant, one person assumes the role of the "waiter" while the other becomes the "client," so creating a series of expectations about who is going to bring the food and pay the bill). Following this tradition, Goffman (1956) proposes a dramaturgical conceptualization of social life. Here, participants are seen either as performers striving to give certain impressions, or as members of the audience interpreting and reacting to the performers theatrical actions. Since the performers are judged on the basis of the kind of impression they leave, they do their best to present a self-image to the audience that fits in with the latter's expectations. To this

end, the actors adopt "impression management strategies" and attempt to highlight the desired features of their performance while hiding any inconsistencies. This involves careful information control through the adoption of an appropriate setting (e.g., home, office), appearance (e.g., dress code, body posture) or manners (e.g., gestures and the acts performed). As Goffman (1956: 30) explains:

> A performer tends to conceal or underplay those activities, facts, and motives which are incompatible with an idealized version of himself and his products. In addition, a performer often engenders in his audience the belief that he is related to them in a more ideal way than is always the case.

In order to successfully impress their audiences, performers usually create a distinction between the front stage, in which they present their idealized selves, and the backstage, where they relax or prepare themselves for their next performance without running the risk of being misjudged. In addition to this separation, performers have to deal with multiple front stages which often have contrasting demands (Hayes and Walsham, 2000). For instance, a performer must strive to present an austere and professional self-image to his boss at work, but a few moments later, in the evening, he or she may have to be a playful host to childhood friends at home. Since the performances given on one front may not be appropriate for another, Goffman (1956) describes how the performer must endeavor to control the access to the different stages, usually by creating bounded regions of face-to-face interaction and controlling the access to his or her performances (e.g., not working with close friends or inviting the boss to an intimate party). Goffman is sometimes described as perpetrating a view where individuals execute Machiavellian strategies on their front stages to deceive their peers, and hide their "true" selves on the backstage. However, in line with the tradition of symbolic interactionism, for Goffman personal identity is not an abstract entity related to someone's psyche or personal character that can be shown or hidden; rather it is a product of social interaction and the assumption of multiple roles in society (Blumer, 1986). Therefore, identity as well as the self-images presented on the front/back stage should always be considered as being related to the specific situation in which the individual is found. Similarly, the fact that individuals behave differently in different circumstances and for different audiences should not always be seen as a sign of cynicism. Instead, Goffman points out that these changes are often simply the manifestation of a type of "socially situated intelligence [...necessary to individuals to] audit and monitor the flow of information about [the] self in [an] interaction" (Smith, 2006: 46).

Although the original focus of symbolic interactionism and Goffman's work is on face-to-face interaction (with a few discussions about radio-talk and television), different studies have drawn inspiration from this approach to study the ways in which individuals and organizations attempt to control how they and their goals are perceived by others through written reports, video recordings, and social media. Closely connected with the focus of this article, some studies have looked into how large corporations use carefully crafted annual reports to portray themselves as socially and environmentally responsible entities, aiming to ensure the well-being of their communities and clients (Pratima Bansal and Clelland, 2004; P. Bansal and Roth, 2000; Cho and Roberts, 2010; Laufer, 2003; Neu et al., 1998). For this purpose, they select and highlight the aspects of their activities that resonate with the idealized expectations of the shareholders, auditors, and consumers, while omitting the actions and goals that might contradict this environmental friendly self-image. In order to make this image convincing, in addition to using advertisements and other forms of self-promotion which can be easily dismissed as biased, environmental statements are usually placed inside annual reports which are written with (the appearance of) accounting and scientific rigor. In Goffman's terms, these companies strategically adopt a setting, appearance and manners which allow them to convincingly manage the environmental impression they intend to convey. Here, Neu et al. (1998: 279) state that:

> Textually-mediated discourses decouple organizational methods of operations from the values of external publics in that words come to signify organizational action. Further, narrative disclosures in annual reports are preferred to other forms of textually-mediated communication because they are targeted toward the organization's relevant publics (as opposed to the general public as is the case with other forms of organizational advertising) and because their proximity to the audited financial statements provide them with a measure of credibility not afforded to other forms of organizational communication.

A similar process of impression management has also been observed in relation to the way indigenous groups present themselves to external publics. While not drawing explicitly on Goffman's work, these studies show how these groups learn from external audiences about the roles they are expected to take on in order to produce a convincing performance that would help them to achieve their own objectives. In this sense, the images of an indigenous identity emerge not only from the inner dynamics of these groups but also from the idealized visions of what an Indian ought to be in the eyes of outsiders (Bunten, 2010; Moraga, 2010). For instance, Turner (1992) and Veber (1992) report that at first both the Kayapó and Ashéninka adopted Western dress codes in order to be seen as "civilized" by the external audiences they interacted and engaged in power games. However, with the emergence of transnational human rights and environmental activism, some groups have changed their impression management strategies and have returned to their indigenous clothing, as Conklin (1997: 712) remarks:

> As some native South Americans have learned to speak the language of Western environmentalism and reframe their cosmological and ecological systems in terms of Western concepts like "respect for Mother Earth," "being close to nature," and "protecting biosphere diversity," so some also have learned to use Western visual codes to position themselves politically.

A key aspect of the impression management strategies adopted by both large corporations and indigenous groups in the examples above is the separation of the different audiences through the creation of bounded regions of interaction. Thus, when telling employees to ignore a small

leakage in order to continue production or to grant access to loggers to their lands, managers and native Indians do not have to worry about the possibility of contradicting the performances given to external audiences through their annual reports and video recordings. Yet some studies suggest that the introduction and widespread use of information and communications technologies (ICTs) has severely hampered the possibility of using time and space to maintain a strict separation between audiences. Starting at the societal level, Castells (1996) suggests that the introduction of ICT fosters the replacement of traditional boundaries – state-nation, corporation, and community – by a new type of networked society in which spatial distance is increasingly irrelevant. Giddens (1990) takes this point to the level of social relations in his analysis of the role of ICT as part of a set of globalizing tendencies. He argues that while in prior eras most interactions, related practices and intuitions took place in a specific time and physical location (e.g., a family conversation over dinner), social relations are increasingly rearticulated across time–space spans (e.g., sending an email that will be read in another country at a different time) (Barrett and Walsham, 1999). In this context, the performance of social identities is increasingly being mediated by ICTs which while allowing for greater flexibility in terms of time–space limitations also reframe the way in which regions are bounded and front stage areas are managed.

More recently, this argument has been taken further by researchers in the field of media studies who have looked at the consequences of social networking sites for the performance of personal identities (Baym and Boyd, 2012; Hogan, 2010; Litt, 2012; Lyon, 2003; Pearson, 2009). One of the key features of social network sites and other forms of social media is the possibility of creating transparent windows into someone's self-image by broadcasting performances to wide and often unpredictable audiences. Thus, with a few clicks, it is possible to post pictures of an intimate party or to express a strong political opinion to all your online "friends" at once. However, as an increasing number of people from different circles get mixed up in online social networking services such as Facebook, the same party picture will be seen not only by old-time friends but also by work colleagues, parents and other audiences for whom the performance was not meant originally. In this way, it is argued that ICT-mediated interaction may result in "collapsed contexts," in which back and front stages, as well the presentation of goals meant for different audiences are mixed-up and compromise the effectiveness of impression management strategies (Baym and Boyd, 2012: 323).

However, while research on online social networking tend to suggest that the introduction of ICT leads to transparency, other empirical studies have reached the opposite conclusion. In particular, research in the field of information and communication technology in developing countries has shown that the mere introduction of new artifacts and systems does not lead deterministically to their adoption and impact. Therefore, the so-called "digital divide" is not composed of the presence/absence of computers and Internet connectivity, but rather the presence/absence of the skills required to understand and use this technology (James, 2004; Norris, 2001). In a similar vein, other scholars have used the notion of "black boxes" to describe the ways in which users are prevented from understanding and engaging with the contents of technological artifacts. While the digital divide

implies that some people are prevented from using ICT, the notion of black boxes indicates the instances in which users engage with technological artifacts while ignoring their inner workings. In this way, the developers of ICT are able to embed specific values and goals and hide them away from their users as they become taken for granted aspects of technology (Akrich, 1992; Heeks, 2002; Latour, 1987; Pinch, 1992; Walsham and Sahay, 2006). Hence, it is suggested that ICT, rather than offering direct transparent windows into contents such as online identities, can also be used as blinders, preventing certain types of audiences from seeing inconvenient gestures and acts through technological artifacts.

While these opposing aspects of ICT have been identified in the literature, it is still unclear how social actors explore these possibilities in their attempt to present themselves to multiple audiences in increasingly technologically-mediated and geographically dispersed contexts. Here, it is important to understand if and when these "black boxes" and "transparent windows" may actually be instrumental towards utilizing specific presentational strategies rather than simply excluding/including new users in the global South or North. In order to address this question, the current study looks in detail at the ways in which the leaders of the Acapú people have attempted to manage the impressions about the group by using ICT to present certain performances on their front stage, while maintaining other performances on a backstage which is accessible only to specific audiences.

Interpreting the ICT-mediated self-images of the Acapú

In order to understand the self-images that the Acapú conveyed through ICT, this study has adopted an interpretive methodology. This combines and compares the results of internet-based research, semi-structured interviews and participant observation (Hine, 2000; Neyland, 2008; Walsham, 1993). As a starting point for this research, we have analyzed the online material that appeared to be directly or indirectly curated by the Acapú. This includes the website of their association, the Facebook profile of Cairú, the group's leader, and a You Tube channel called "Acapú Tribe." The websites of certification companies, environmental non-governmental organizations (NGOs), and a carbon credit selling platform featuring the Acapú REDD project (A-REDD) were also analyzed. The search was then expanded to non-official sources which also contained material about the Acapú. This included a sample selected from more than 500 thousand websites and almost 10 thousand videos found on Google and You Tube which mention the group's name. The content concerning the Acapú self-images was transcribed (for the videos), coded and organized into a spreadsheet up to the point of theoretical saturation where adding new material to the research corpus did not provide original themes, but merely confirmed previously analyzed data (Auerbach and Silverstein, 2003). In total, this phase of the research consisted of the detailed analysis of more than 50 webpages and the transcription and analysis of over 200 min of video footage. Since these websites and videos can easily be accessed and understood by members of the general public, as well as companies interested in knowing more about carbon credits and indigenous populations in the Amazon, we have considered these sources as one of the front stages where the Acapú present their self-images (Goffman, 1956).

An important limitation of Internet-based research is that it tells us very little about how these self-images were constructed on the backstage and for what purposes (Goffman, 1956; Hine, 2000). Therefore, in order to deal with this issue, we have conducted semi-structured interviews with individuals directly involved in the creation of the A-REDD. In particular, we have interviewed: (1) a geoprocessing expert who worked extensively with the Acapú in the creation of the A-REDD; (2) the president of an environmental NGO which provided technical support to the Acapú; (3) the representative of a large cosmetics company responsible for the acquisition of carbon credits from the A-REDD; (4) a prominent environmental activist who was one of the creators of the concept of REDD and who followed the creation of the A-REDD project from the outset; and (5) the scientist who created one of the geoprocessing tools used to create the Acapú REDD project. Through the interviews with the experts who interacted with Cairú during the elaboration of the A-REDD, it was possible to obtain some insights on the level of understanding and participation of some members of the Acapú in the design of the project. In addition, these interviews also offered insights into the political struggles within the Acapú group and the actual level of acceptance of the project. Where possible, the interviews were recorded and then transcribed, and in the other cases detailed notes were taken instead.

Finally, as explained below, the use of advanced computer models plays a central role in the calculation of Acapú's carbon credits. However, to understand the images embedded by the Acapú, it is necessary to have specific technical knowledge that is not readily available to the general public. Hence, the second author of this study has undertaken a semester-long participant observation in a course on spatial modeling with the developer of one of the geoprocessing tools used to create the A-REDD (Neyland, 2008). In addition to this, she also participated in a course organized by the Brazilian National Institute of Amazonian Research (INPA) to learn how to design REDD projects. This included a month-long fieldwork in the Amazon rainforest and the use of methodologies similar to the ones adopted by the A-REDD. The contextual knowledge gained through the participant observation in these courses combined with interviews with the developers revealed an image of the Acapú that is only available to those with access to the backstage of the A-REDD.

During the data analysis, it became apparent that one of the most prominent aspects of the A-REDD was the presence of multiple and contradictory self-images of the Acapú in different digital media. In this context, Goffman's (1956) approach was identified as the most suitable theoretical perspective. Within this scope, the data analysis was further refined in order to identify three key aspects of their impression management strategy: (1) the setting – the characteristics of the technological medium adopted by the Acapú; (2) appearance – the way in which the Acapú represent themselves through ICT; and (3) manners – the gestures and acts performed by the Acapú to impress the audience and convincingly present a specific role.

An important limitation of this research was its inability to interview the members from the Acapú group directly despite numerous attempts to contact them. We believe this lack of success is partially due to the fact that Cairú, the Acapú

leader, came to know about this research and may have wanted to avoid exposing the backstage of the A-REDD further. This interpretation was more recently confirmed by one of the developers of the A-REDD who approached one of the authors of this study during an event, and showed a clear concern about the possible negative consequences of this research for the reputation of the A-REDD. We tried to reassure the developer by emphasizing that all the data presented in this study would be anonym zed in order to avoid the identification of the project, but he was not convinced and seemed very defensive during the conversation. While this limitation renders impossible a detailed description of Acapú's inner social dynamics, we believe that this drawback does not prevent the analysis of the images that were projected and managed through ICT, this being the main focus of this study. Finally, it should also be highlighted that this study aims to provide a theoretically informed interpretation of the contradictory self-images of the Acapú as conveyed through ICT, and not a description of the local identities, intentions and social dynamics of this group (Walsham, 1993).

The contradictory self-images of Acapú

REDD stands for "reduced emissions from deforestation and forest degradation." The basic idea behind REDD is that the preservation of forests should have an economic value and, for this reason, efforts to reduce deforestation levels should be financially compensated. Based on this premise, REDD has evolved from an initial idea that was presented at the meetings of the United Nations Framework Convention on Climate Change (UNFCCC) by a group of Brazilian and North-American scientists (Moutinho et al., 2005) into a family of mechanisms based on international agreements (e.g., UNFCCC's Warsaw Framework), international donations (e.g., Amazon Fund) and initiatives from the private sector (e.g., voluntary carbon markets) (van der Hoff et al., 2015). The implementation of REDD projects for voluntary markets is a complex endeavor that involves professionals from different areas and the use of a wide variety of technologies. Geographic information systems (GIS), spatial modeling and remote sensing are required to calculate the levels of expected deforestation to establish priority areas for REDD. They are also required to measure carbon emissions related to land-use change and to verify the reductions achieved (Kintisch, 2007; Leeuw et al., 2010; Nepstad et al., 2009). In addition to these highly advanced technologies, the selling of carbon credits on the voluntary market requires user-friendly technology such as HTML (e.g., websites), streaming videos (e.g., You Tube) and social media (e.g., Facebook, Twitter) to carry out the marketing of these projects for potential buyers. At first, REDD carbon credits from voluntary markets were acquired solely through corporations interested in improving their environmental profile. But more recently, initiatives such as "Stand For Trees" created platforms that allow individuals to acquire carbon credits from REDD projects using their credit cards. In both cases, ICTs are used to create representations of key aspects of REDD (forest dwellers, biodiversity, deforestation, etc.) in order to make the Amazon "present" to buyers who have never been to the region and probably never will visit it.

Given the complexity of REDD projects and the need to engage with multiple ICTs, it is not surprising that different studies have indicated that a lack of technical expertise is one of the main obstacles for the implementation of REDD and other schemes offering payments for environmental services (Bond *et al.*, 2009; Sanz-Sanchez *et al.*, 2013). Most projects of this kind are developed and proposed by governments, non-governmental organizations (NGOs) and private corporations. In this regard, the Acapú REDD project (A-REDD) is unusual since it was an initiative led by the local community with the leadership of Cairú Acapú, the group's *cacique* (i.e., chief). The Acapú are an indigenous nation of the Brazilian Amazon which until recently largely lived in isolation from Western society. However, the expansion of rubber extraction and gold mining in the 1940s and 1950s, and the implementation of large colonization projects in the Amazon led to forced migration and conflicts involving the Acapú, settlers and other indigenous groups. These conflicts were partially settled in the early 1980s with the creation of an indigenous reserve that legitimized the ownership of the land by the Acapú. Cairú became the leader and spokesperson of the Acapú at an early age, probably due to his active role in developing partnerships with NGOs, private companies and governmental bodies in order to foster conservation initiatives in the indigenous reserve. These include the mapping of the reserve's biodiversity and cultural heritage using geographic information systems and GPS devices with the support of a multinational software company. This and other engagements with advanced technologies have made Acapú well known in the national and international press as the most technology-savvy tribe in the Amazon.

The involvement of the Acapú with REDD can be seen as a continuation of Cairú's adoption of advanced ICT devices to foster conservationist projects within Acapú's reserve. In particular, the online presence of the Acapú and the accounts from the experts involved in the design of the project suggest that Cairú and other members had reached a good level of understanding of the ICT applications needed to successfully implement the project. However, while the "digital divide" was not a problem in this case, it was possible to observe a much deeper issue related to the multiple and contradictory self-images of the Acapú that were projected through the use of different ICTs. Therefore, while the Acapú were presented through YouTube, Facebook, and other social media as ideal Indians, they were also represented as economically rational cattle ranchers in the computer model described in the REDD project documents. Most importantly, instead of preserving the forest, the Acapú are presented in this model as "cowboys" who are ready to rapidly destroy the forest in the absence of the REDD project. Accounts from the interviewees who have been in direct contact with the Acapú suggest that they are neither the destructive "cowboys" depicted by the A-REDD model nor the idealized Indians that Westerners would like them to be. Instead, they are a heterogeneous group where some members clearly support Cairú in his attempts to bring external financial sources to foster the conservation of the reserve while others from both inside and outside the group have opposed Cairú and even threatened his life. Nevertheless, what is of particular interest in this research are the ways in which the Acapú are represented through a series of ICT applications over the Internet, and the role of these contradictory self-images in

the implementation of the A-REDD. In this context, it becomes important to ask: how can the images of the Acapú as both "cowboys" and Indians be sustained without contradicting each other, since both are publicly available on the Internet? Moreover, in this kind of situation, what is the role of ICT in managing these different images?

Front staging the sustainable Indian

One of the most striking aspects of the Acapú is their overwhelming online presence. The web pages, documents, and videos mentioning the Acapú are in part hosted on the You Tube channel, the Facebook profile and the official webpage of their association. In addition newspapers, TV channels, private corporations and bloggers interested in environmental and indigenous issues generate the most material, usually in the form of interviews with Cairú and the members from the NGOs who have been hired to support the development of the A-REDD. Overall, it is possible to see that the vast majority of Acapú's online presence attempts to reach as many people as possible. This is particularly clear in the use of social medial platforms which not only have a large degree of visibility, but also have interfaces that can easily be understood and accessed by anyone with an Internet connection. Furthermore, this material is usually presented in plain Portuguese (sometimes with subtitles in English) and as such does not require specific knowledge about REDD or indigenous languages. In addition, the Acapú's webpage has versions in Portuguese, English, and French in order to reach a broad national and international audience. Hence, they use ICT to create the setting for an open spectacle, a sort of transparent window available to anyone who happens to browse on the Internet for topics such as the Amazon, deforestation, indigenous communities or carbon markets.

In addition to the openness of the performances put together by the Acapú and their allies, it is possible to observe that these online sources present them as ideal Indians: forest guardians willing to protect the Amazon and fight against global warming. In order to accomplish this, the Acapú strive to convey two key impressions: the affirmation of the Acapú as authentic Indians, and the presentation of the A-REDD as an effective way to reduce deforestation, mitigate climate change and to attain the sustainable development of the region. In relation to the first point, the Acapú take special care of their appearances in front of the camera lenses. In particular, they appear in pictures and online videos in ways that reinforce their stereotypes as native Indians, untainted by the sins of Western civilization. For instance, while being shown using high-tech devices such as laptops and handheld devices, Cairú and other representatives of the Acapú are often shirtless and invariably adorn themselves with a traditional *cocar* (feathered headdress) and necklaces. Similarly, many videos show the Acapú walking in the middle of the jungle alongside theatrical scenes of the Amazonian fauna and flora. When taken together, these websites and videos perform a self-image of the Acapú as authentic Indians living in an earthly paradise.

The second key impression that the Acapú attempt to convey is related to their values and objectives. In a variety of interviews and on their web page they present a narrative that represents the Acapú's past, present, and future in specific ways. According to this storyline, before their contact with

Western civilization, the Acapú were an indigenous population living in harmony with nature. At that time, the Acapú nation relied directly on hunting, planting manioc, and gathering products from the forest for their survival. In the words of the leader of the Acapú: "Our economic and subsistence practices were based on a harmonious coexistence with nature" (You Tube Video #4). "Our people cannot stay isolated from the environment because our culture and our religion are linked to the forest" (You Tube Video #5)

In contrast to this harmonious past, in recent decades the tribe has been under increasing pressure from external forces. According to this narrative, the arrival of non-indigenous peoples into their lands resulted in an intense fight to regain their territory which led them nearly to the point of extinction. Even though the Acapú were able to expel the invaders from their territory and obtain the demarcation of their ancestral lands, the close contact with the white man has modified their economic structure (You Tube Video #6). As explained by Cairú during an interview:

> We've had our territory invaded by loggers, fishermen and hunters, who in addition to developing predatory activities within the boundaries of our land, also decreased the potential of natural forest resources, [and] in many situations, enticed some of our people to act against the tribes interests and in favor of their own desires (You Tube Video #7) […] Despite everything that has negatively impacted the lives of our people… [we] seek to establish a harmonious and healthy relationship with all the people around us and we care about the future, not only of our people, but also of all mankind (You Tube Video #9).

The excerpt above suggests that the Acapú do recognize that they contributed, to some extent, to the recent degradation of the forest. However, they emphasize that this only took place because of the corrupting effects of Western civilization which led some Indians to abandon their culture. Notwithstanding this, the Acapú attempts to present themselves mainly as inherent forest guardians. It is on this claim that the Acapú make the argument that they deserve to be paid through the A-REDD for the service they are providing to the planet. "Today it [the market] pays […] those who destroy the forest and not the caretakers. Those who protect the forest should be rewarded, not those who are destroying it," argued Cairú in a video promoting their REDD project (You Tube Video #11).

The self-image of the Acapú as ideal Indians and of the A-REDD as a sustainable development initiative reached a wide audience. Since this performance is openly available through the Internet Cairú received invitations to travel around the world promoting the project and was placed on a list of the 100 most creative entrepreneurs by an influential international magazine (Webpage #1). More importantly, it was due to the image of the Acapú as forest guardians that they were able to sell the carbon credits obtained through the A-REDD. The first 125,000 tons of carbon generated by the project were sold to ECOsmetics, a large Brazilian cosmetics company. Since sustainability is one of the most marketed feature of ECOsmetics products and a central aspect of the company's mission, the company is keen to emphasize their environmental profile by supporting projects that help to mitigate climate change and preserve the Amazon rainforest.

According to the director of one of the NGOs supporting the Acapú, it is very important for this company and other potential buyers to acquire "not only carbon credits," but also support projects that are able to demonstrate a strong commitment to the environment (Interview #1). In the case of ECOsmetics, a senior manager explained that the company was able to acquire carbon credits from the Acapú only because:

> It was the positive image of the Acapú with the pro-activity of the boss Cairú, that allowed the project to sell carbon credits in the voluntary market. The Acapú met all the requirements to get a partnership with our cosmetics company, and among these requirements was a concern and zeal for environmental causes (Interview #2).

The statement suggests that ECOsmetics would never have allied its image to the Acapú if they had not been able to present themselves through ICT as ideal Indians committed to environmental sustainability. Therefore, what is being bought and sold in this case is not only carbon but also the environmentally friendly self-image of the Acapú.

Back staging the destructive "cowboys"

While the Acapú are presented as ideal Indians, as shown in the websites and online videos, the computer simulation model described in the Project Design Documents (PDD) from the Acapú REDD project (A-REDD) depict their behavior in very different terms. In a similar vein to the narrative presented above, the PDD emphasize how the Acapú dramatically transformed their lifestyle following their contact with Westerners. This cultural shift changed the very way the Indians used and interacted with their land, leading to an increase in logging and substituting the forest with pasture for cattle ranching. According to one of the experts involved in the deforestation prediction model, it was owing to this transformation that he and his team "modeled the Acapú as traditional farmers from the socioeconomic point." That is, the romantic view of Indians as lovers and saviors of the forest was practically nonexistent in the computer model of the A-REDD project.

A close interpretation of the assumptions embedded into the computer simulation model from the A-REDD's Project Design Documents reveals how the Acapú are conceived as rational economic agents who aim to maximize their income. Here, the Acapú were divided into three economic profiles: that of subsidence farmers who deforest small areas to rotate their crops; coffee farmers who live in the eastern part of the indigenous reserve and who could expand their crop areas in the future; and ranchers who clear large patches of forest to raise cattle. In the case of the latter group, their destructive effects are amplified due to their tendency to lease their lands to non-indigenous rangers in exchange for the creation of pasture in those areas. All the groups modeled in the computer simulation indicate that the Acapú have an intrinsic need to obtain consumer goods (as expressed in Reais, the Brazilian currency), contradicting the view of the authentic Indian who can make his living exclusively from the forest. Most importantly, it is indicated in the model that any income not spent on consumer goods will be "invested" into clearing the forest to make room for further farming and

ranching areas. Given the perspective of the growing population and consumer needs in the following years, this model show deforestation rates at levels well above the historical average (see Figure 1). In other words, this model predicts that the Acapú will clear a substantial portion their lands in the near future if the A-REDD project is not able to provide the same level of income offered by destructive practices. Therefore, in radical opposition to the narrative of the Acapú as nature loving Indians, the computer simulation model suggests that the group's values have become similar to the Western invaders who reached their lands a few decades ago.

While the presentation of the Acapú as Western farmers strongly contradicts their presentation as forest guardians, this self-image has a central role in enabling the financial feasibility of the A-REDD. The main purpose of REDD projects is to sell carbon credits which are generated through avoided greenhouse gas emissions from deforestation. Hence, in order to calculate how much deforestation has been avoided, the project must establish a baseline; namely, a computer-based scenario indicating how much forest would be cleared in the absence of the project. Based on this scenario it is then calculated the difference between the predicted deforestation and the measured deforestation so that it is possible to establish the "additionality" of the project, and to work out how many carbon credits it has yielded in a given period. In this context, it is clear that the higher the baseline, the more carbon credits the Acapú would be able to produce and sell.

The accounts of different interviewees indicate that the Acapú were well aware of the importance of obtaining a baseline which predicted high levels of deforestation in order to turn the A-REDD into a lucrative endeavor. For instance, the scientist who developed one of the ICT tools used by the A-REDD to simulate the deforestation dynamics recalled a discussion that he had with Cairú, the groups' chief. Following a formal presentation of a Amazon-wide model

he and his team had developed to an audience of scientists, policy makers and local stakeholders, Cairú astonished the researcher by declaring: "I do not like your model!" When asked why this was so, Cairú replied: "Because it shows too little deforestation in our indigenous reserve." Similarly, when questioned about the challenges of working with the Acapú on the creation of the deforestation model, an expert that participated in the construction of the A-REDD reported that many members of the group knew that if they overestimated how much forest they were clearing annually, they might be able to obtain a higher financial yield of the REDD project in the future (Interview #1):

> This was a major difficulty at the time because we could not play with the model and design the rate that they wanted. So whenever this happened [overestimation of deforestation] we needed to calibrate [the data input], trying to moderate. When we had questions [about the data], I had to ask the Indians for proof. How can you start with a clearing rate of 50 hectares [per year] and then suddenly jump to 5,000 hectares?'

The excerpt above suggests that the Acapú were not only well aware of the way in which complex deforestation modeling impacted on their future income, but were also directly intervening in the use of this ICT in order to increase the baseline and obtain more carbon credits. While the experts involved in the process claimed they had countered any form of "bias" introduced by members of the Acapú, in other instances it seems that they were willing to cooperate with their goals. In an unusual methodological option, one of the A-REDD designers chose the years 2004–2009 instead of the whole period, starting with 2001, to perform the calibration of the microeconomic model. A closer look at this choice reveals that these years also presented the highest deforestation rates in the period, which inevitably leads to an inflated predictive model (See Figure 1). At a presentation of
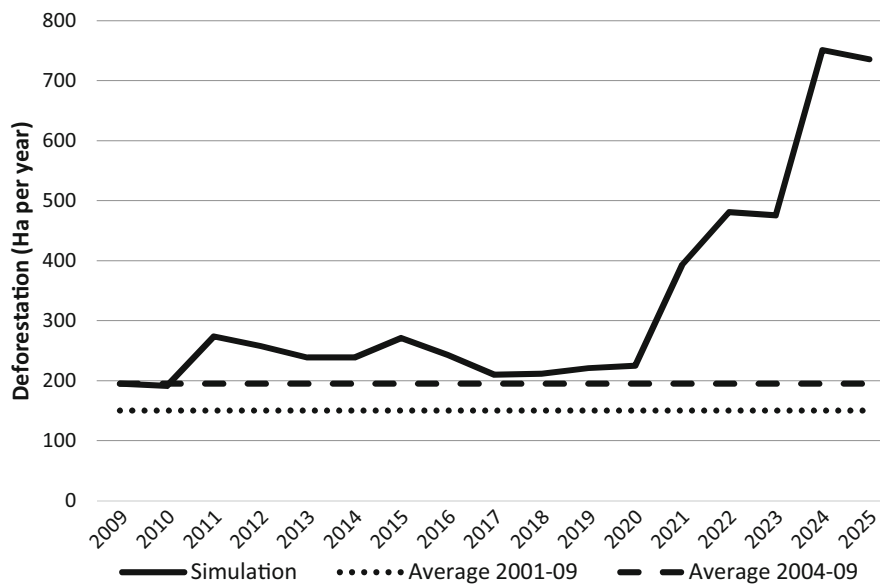

Figure 1 Deforestation predicted by the microeconomic model until 2025 (*solid line*) and the deforestation average between 2001 and 2009 (*dotted line*) and between 2004 and 2009 (*dashed line*).
Source: Online Document #3.

the Acapú project to a group of students by one of the experts involved one of the authors of this article was able to ask him directly about this methodological choice. The expert replied that "the period 2000–2003 was deleted because the methodology allowed it to be deleted." This pragmatic yet questionable answer left the audience with the idea that A-REDD's deforestation model was purposefully built to forecast high deforestation rates and provide more carbon credits to the Acapú.

The examination of the deforestation model used in the A-REDD project and the many websites and online videos of the Acapú reveals that the indigenous group has two contradictory online images. In the online documents describing the computer model developed to substantiate A-REDD's carbon credit claims, the Acapú are presented as greedy "cowboys" who would deforest a substantial part of the reserve in the absence of project payments. At the same time, in many websites and videos on the Internet they are presented as forest guardians protecting the Amazon at all costs. The existence of these contradictory self-images is a serious problem for the Acapú, since exposure to both performances to the same audience would give the impression that they are trying to deceive potential buyers into purchasing carbon credits. However, since both presentations are equally available on the Internet, how did the Acapú still manage to successfully implement the A-REDD and sell carbon credits? In order to understand this achievement, the relative openness of the A-REDD deforestation model in relation to the other online sources concerning the Acapú should be noted. As mentioned above, the presentations of the Acapú in social media and video streaming websites can easily be found and understood. However, the online documents concerning A-REDD's computer simulation model can only be found if the user searches in Google for a specific set of technical keywords, namely, the full name of the project and "project design document." Furthermore, even though this document is available in English and Portuguese, knowledge of one of these languages is insufficient to comprehend its contents. The 120-page document describes the technical procedures used by the technical team which was hired by the Acapú to implement the A-REDD. This was done according to a set of standards established by an international accreditation organization. Such procedures involved: the establishment of a methodology to obtain data concerning the Acapú economic and land-use dynamics; the use of deforestation data obtained through the interpretation of satellite imagery; the construction of a microeconomic model which integrates the data collected using questionnaires with remote sensing; and the use of a geoprocessing tool to simulate the distribution of future deforestation on the territory in relation to spatial determinants (e.g., distance from roads, previous clearings, cities, and vegetation type).

For the authors of this study it was not an easy task to grasp the highly technical language of the A-REDD online documents. The first author has a major in computer science while the second was trained as a biologist for her undergraduate and master's degrees and took a semester-long course with the creator of the computer simulation tool used by the A-REDD. She also spent a month in the middle of the Amazon forest doing a course on the creation of REDD projects similar to the A-REDD. Finally, both authors engaged with the scientific literature on the topic and conducted interviews with GIS experts and the technical staff responsible for the A-REDD. This was done in order to understand the structure and underlying assumptions of the model described in the Project Design Document that is available online as a PDF file. The barriers to the understanding of these online sources concerning the Acapú suggest that while these documents are available on the Internet they are de-facto black boxes which contents are only understandable by a select group of individuals who have the necessary knowledge to unlock their contents.

The achievement of the A-REDD project in selling carbon credits suggests that so far the Acapú have been successful in keeping their self-images as deforesters hidden from the general public. Three years after the publication of the A-REDD online documents, the Acapú are still depicted by the mass media, online websites, and governmental and non-governmental organizations as good examples to be followed by other indigenous communities. Even some of the actors with direct access to the project documents seem to ignore the images that the deforestation model convey. For instance, a senior manager from ECOsmetics reported during her interview that the use of a certified deforestation model was as important as the environmentally friendly image of the Acapú for the successful conclusion of a transaction, suggesting that she and other buyers were unaware of the image of the indigenous group embedded in this model. This indicates that while the presentation of the Acapú as sustainable Indians was successfully shown in the front stage, their image as destructive "cowboys" has remained hidden behind technological black boxes in the backstage.

Discussion and conclusion

During the creation of the A-REDD and the sale of carbon credits, the Acapú assumed a variety of roles, presenting different identities, values, and intentions to their audiences. On the one hand, in order to sell carbon credits they presented themselves as ideal Indians striving to attain the sustainable development of their lands, and confirmed the romanticized image of the good savages saving the rainforest. However, simultaneously and in order to produce those credits, the Acapú assumed a destructive image which made them look more akin to "cowboys" than Indians. In parallel to these two opposing self-images, it is also possible to see the mobilization of different sets of impression management strategies. For the Acapú to convincingly present themselves as Indians they wore traditional clothes and adopted an eco-friendly discourse. Similarly, to convince the REDD project auditors that their predictions about future deforestation were valid, they emphasized the scientific rigor and mathematical complexity of their microeconomic model. Most importantly for the aims of this paper, the ways in which ICT has been involved in the performance and the separation of these roles should be noticed.

It is difficult to assert with any certainty whether this outcome was intentional or incidental. However, the high level of technological engagement of Cairú, the Acapú leader, and the accounts from the developers of the A-REDD simulation model all indicate how some members of the Acapú had a clear understanding of the contradictory expectations that REDD projects and future buyers of carbon credits have in relation to the Acapú. Given the importance

of the resources from the A-REDD for the future of the Acapú, it is reasonable to contend that they have played a decisive role in using ICT to manage their own contradictory self-images. Thus, in contrast to the commonly held view that native Indians are averse and unable to master Northern technologies, this study suggests that the Acapú not only understood the inner logic of REDD's complex deforestation models, but were also able to selectively embed and hide their own contradictory images within this ICT application. While not many indigenous groups have been able to engage to this extent with ICTs, the active role of the Acapú provides important insights into the novel and unexpected ways new users have applied ICT in developing countries.

This study also demonstrated the strategic use of ICT as transparent windows or black boxes. As mentioned above, one of the key aims of impression management is to devise strategies that are able to guarantee that specific performances can be seen only by their intended audiences (Goffman, 1956). In the case of the Acapú, this need has been made even more urgent since the presentation of the Acapú exclusively as idealistic Indians would undermine their ability to generate carbon credits in the eyes of project auditors; this would imply the production of a very little future deforestation and hence, a small volume of carbon credits would be traded in voluntary markets. Similarly, the group's presentation as "cowboys" would have ruined its chances of selling those credits due to its lack of proper green credentials. It is at this point that the strategic use of ICT plays a key role in keeping separate these audiences. From this it is possible to conclude that the effects of ICT as an opaque "black box" or "transparent window" are related not only to the specific technological application being analyzed, but also to the practices and intentions of their creators and the abilities and interests of their audiences. Therefore, online digital media, rather than being an inherently open space, may be used to convey different representations to different audiences.

The ways in which the Acapú have used ICT can easily be interpreted as a case of the instrumental use of technology to hide the seller's "real" identities and to deceive innocent buyers of carbon credits. It should be noticed, however, that impression management strategies emerge first and foremost as response to the expectations and conventions of outside audiences (Goffman, 1956; Smith, 2006). Thus, contradictory self-images of the Acapú are largely a consequence of the contradictions embedded in voluntary carbon markets which require them to be simultaneously large deforesters (to generate substantial reductions) and worthy forest guardians (to deserve the payments). In this context, Cairú and the members of the Acapú group have merely acted in a socially intelligent manner in order to obtain financial resources to foster the conservation of their reserve and the strengthening of their traditions. Therefore, what is particularly disturbingly in this case is not so much that ICT applications have been used to manage the contradictory self-images of the Acapú, but that these technologies are being mobilized to conceal some of the paradoxes of neoliberal environmental management practices.

Acknowledgements

Note

1 All names related to this REDD project have been changed in order to preserve their anonymity.

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