Digital imagination in the Global South: Bottom-up conceptualization of the mobile phone in Myanmar and in rural China

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Abstract

In the realm of digital technologies, imagination is often evoked to describe the creative quality possessed by visionary technology developers. In contrast, we describe the idea of gaining a "digital imagination" as a process through which the non-elite, here potential and new users of digital technologies in Myanmar and rural China, envision something that is not yet part of their lives and thus begin appropriating it. The digital imagination is a framing that prefigures everyday uses of technology and is shaped by individual aspirations, the organization of society and images of digital media that exist in the surrounding environment. A locally grounded imagination can provide locally appropriated innovation that is often lacking in digital technologies developed in urban areas.

Keywords

Digital technologies; appropriation; marginal users; Global South; Myanmar; China.

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Imagination is the ability to conceive of non-existent or un-experienced phenomena. In the realm of digital technologies, imagination is often evoked to describe the creative process used by technologists as they invent the technological future (Balsamo, 2011; Flichy, 2007) While not necessarily being monolithic, these techno-elites are seen as having the gift of conceiving the design and development of technology—or, as Steve Jobs pithily put it, "people don't know what they want until you show it to them" (Reinhardt, 1998). While there is a tradition of studying the interaction between technology producers and consumers (Pinch & Bijker, 1984; Silverstone & Haddon, 1996), the trait of being able to imagine something that does not exist is most often attributed to the visionary creators of technology.

In contrast to Jobs, we propose the idea of bottom-up "digital imagination" as a process through which the non-techno-elite, both individually and collectively, learn to envision technology that may not yet be a part of their lives. We define digital imagination as the process by which individuals within a society develop an understanding of the potentials, the limitations, and eventually the threats of digital technology. It is a framing that often prefigures the everyday use of such technologies. It is shaped by individual aspirations, the organization of society, and a country's ambient stock of images and descriptions of digital devices. It is a mental matching by the non-techno-elite of their contextualized needs with the envisaged potentials of the technology. It is, ultimately, a complement to the elite's imagination that creates new technologies, as it is what makes them workable in everyday life. We use the heuristic of digital imagination to examine how people in Myanmar and China conceptualize mobile communication, often before they have had any direct contact with the technology. While even non-techno-elite users in the developed world operate in a society infused with the technologies, here we discuss people who do not live in

environments that are saturated with technologies, and who in many cases had not even seen a mobile phone first-hand. Given this lack of direct exposure, how did they imagine the experience of becoming a user? What were their conceptualizations of mobiles' eventual uses, benefits or problems?

Our paper examines the first indirect discourses of such non-elite, marginal users with mobile communication, and later the experiences of watching others use mobile phones or beginning to use one's own. Given their peripheral position in society, their acts of imagining were necessarily more incomplete and fragmented than non-techno-elite users in the Global North. Further, their conceptualizations of mobile communication illuminate their aspirations, needs, limitations and fears. While techno-elites' imaginations can be heterogeneous and contradictory, they are well documented and assert the primacy of their position, as illustrated by Jobs' comment and his ability to act on his vision. The imaginations of non-elite users in the Global South exist at the margins, often unseen by the center, and thus unexamined. Our bottom-up focus on digital imagination is therefore a type of 'people's history of technology.'

Our purpose in this paper is two-fold. First, we outline the components of the digital imagination displayed by people and communities who come late to the use of otherwise well-established digital technologies. We examine how imagination is a driving force for adopting/rejecting digital technologies, and how its disposition is particularly important before such technologies come into people's lives and foreclose some of the imagined uses, benefits, and downsides—even as they open new ones. Second, we examine how the digital imagination is actually developed. To do so, we draw on existing research on digital technologies in the Global South, and on our own ethnographic research in Myanmar, where mobile phones became accessible to ordinary citizens only around 2014, and in rural China

(first author), where digital technologies have been around for longer, but in common use only among specific segments of the population.[1]

Imagination and Digital Technologies

"Imagination"—the impalpable element that synthesizes disparate facts, skills, knowledge, aspirations, to create something that transcends their sum—has a long history. James Mill (1869) noted that "an imagination" is seen in what he called "trains of thought:" He noted "Imagination is not a name of any one idea. I am not said to imagine, unless I combine ideas successively in a less or greater number... I am said to have an imagination when I have a train of ideas" (p. 239). Mill described, perhaps agentically, imagination as the ability of the individual to refocus their mind and to envisage an alternative approach from hidden connections in the fabric of the present. Lederach's (2005) notion of "moral imagination" shares this idea in seeing imagination as the ability to "recognize turning points and possibilities in order to venture down unknown paths… [that are] captured in an 'ha-ha' moment." (p. 29). In both Mill and Lederach, imagination might be seen as an internal rumination, the working of the mind that weighs different futures.

A more explicit connection between internal processes and external/social stimuli is made by C. Wright Mills, whose "sociological imagination" is often evoked in descriptions of technological imaginations (Balsamo, 2011; Mills, 1959). Mills' sociological imagination is the quality of mind that sociologists must use to connect the lives of the individuals they study with the larger historical context (Mills, 1959). Among the elites—the sociologists of Mills, or the technology developers and designers of Balsamo and others—imagination is

[1] While we recognize its inadequacy, we use the term "Global South" to indicate non-Western countries whose economic and/or political situations have meant that their lower-income citizens have only recently become able to afford digital technologies, in particular mobile phones. These countries share specific patters of use which justify the use of such an umbrella term. These might include the use of cheap smartphones as the first digital tool, the bypassing of written text in favor of communication done through voice (calls and instant messages) and images, internet use that is exclusively through apps (typically Facebook), issues with local language support on both mobile phones and computers, etc.

deployed within a specific community that shares a specific set of ideals/goals or professional interest. The professional community, therefore, provides as much or more of a social influence in shaping their imagination than does society at large. Kelty (2008), for example, describes the social practices and material tools through which distributed communities of Free Software geeks imagine (and try to create) an alternative internet, whereas Murphy (2004) describes how the individual imagination of architects is produced socially, through (face-to-face) communication and physical interactions around a shared project, and in the context of shared professional backgrounds. Thus, among the elite of technology developers, there are specific common goals and ideals, and/or a specific community that serves as a strong influence on individuals' imaginaries. The professional imagination, as opposed to the popular one upon which we focus below, is centered on the values and the work identities of technologists. Indeed, these are the main workings of the elite imagination.

The social influences that shape the popular digital imagination we focus on are, on the other hand, the traditional effects that arise from the individuals' family and community. There is no professional community, nor values centered around the technology, as in elites' imaginations. Rather there are the values that arise from being part of the same family, village, or community in a cultural sense. Taylor (2002) defines such influences as *social imaginary*, or "the ways in which people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper normative notions and images that underlie these expectations." That is, they use their common understanding of the local sphere that will perhaps, in due course, encompass the new digital technologies and determine, for example, who is a legitimate user of a mobile phone. Thus, individuals are left to negotiate between their sense of the common social norms and mores, and their own sense of what is appropriate or desirable. The tension that arises from this constant negotiation results in different outcomes

for different individuals who have the same initial inputs—e.g. young women accepting to not own a smartphone, according to their families' wishes, while the son is encouraged to have one. Thus, imagination includes the individual's capacity to integrate experiences and expectations of family and community their inner beliefs, values and aspirations.

The situation of non-elite users in the Global South is of course different from the Jobsian, technology creator's imagination.[2] The Jobsian techno-elites who develop new technologies deploy an imagination that is influenced by the zeitgeist of their (often financially driven, often professional) communities (Flichy, 2007). Their imagination is typically seen as the primary engine of innovation, and as "a mindset that enables people to think with technology, to transform what is known into what is possible. This imagination is performative: it improvises within constraints to create something new…" (Balsamo, 2011, p. 6). It is also often attributed to the individual technology producers alone, invariably located in the "Global North." It is they who are seen as the ones who can imagine. It is also this group that has the financial/technical resources with which to build the technological future.

The implication is that ordinary users of digital technologies are reactive. Enmeshed as they are in their social context, they decide to use a mobile phone, a computer, the internet, a specific app; or they do not. They may use them as developers imagined (Donner, 2015), or in ways that subvert the prescribed uses (Bar, Weber, & Pisani, 2016). Alternatively, they might negotiate the inscribed values and uses in ways that are aligned with local conditions in the Global South (Burrell, 2012; Donner, 2015; Hahn & Kibora, 2008; Horst & Miller, 2006; Qiu, 2009; Wallis, 2013). These studies are centered on the post adoption phase of digital technologies, when devices are available, more or less attainable, and adapted by users.

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[2] The paper is focused on mobile phones, rather than other digital devices such as computers, because it reflects the current status of digital technology diffusion among the populations we studied (see also Donner, 2015 for a thorough description of mobile-first/only digital access). But the traits we describe can be and are deployed towards other digital devices, e.g. computers, as they become available for these users.

However, they tend to ignore the previous phase, the "making of users" period when people deploy their imagination to start imagining their own relationship with technology. This is where our approach differs, as we probe this earlier period to understand how it prefigures and creates the conditions for the adoption of new digital technologies. Returning to our opening question, how are digital technologies conceptualized before potential/future users encounter the materiality of the digital objects? Domestication theory suggests the concept of imagined consumption (Silverstone, 1994, p. 125). For Silverstone, this is related to notions of Baudrillard's idea of an insatiable desire for objects that can never be quenched. Potential users develop images of how technology can enter their lives "prior to any loss of illusion that comes with ownership" (Silverstone & Haddon, 1996, p. 63). The tension between the imagined object and its concrete post-purchase embodiment is the gap into which the consumer generates either their celebration of the object/service's fulfillment of its functionality/identity goals, and/or frustration at its failure. However, domestication theory—developed to understand consumers in a fully capitalistic context—does not often consider how objects can enter a household through more oblique non-market routes. That is how the "seduction of and through the image" (Silverstone & Haddon, 1996, p. 63) operates when the advertising and market systems are far removed from their end receivers, as is often the case in rural areas (or entire countries) in the Global South. And yet, as Appadurai theorized, imagination as a quality attached to and exercised by regular people, caught in a whirlwind of global media, is a key component of modernity (Appadurai, 1996). Whereas he describes regular people's uses of new media, rather than the techno-elite's, as what "impel and sometimes compel" (Appadurai, 1996, p. 4) the work of their imagination, we reverse his approach. We look at the role of imagination in understanding digital media/devices before (and as) they are experienced first-hand. People in the Global South, who are late-comers in the use of digital technologies, are ideal subjects through whom we can explore imagination

because they have been indirectly exposed to the digital world through mass media and second-hand accounts of people who already use them. This indirect exposure fuels their imagination, as they consider the possibilities, the opportunities, and also discover the threats, and the limitations that are embodied in these tools.

Methods

We base this paper on qualitative research carried out in rural China and peri-urban and rural Myanmar. The first author, who speaks Chinese, carried out ethnographic field work between 2010 and 2017 in urban and rural China, doing semi-structured interviews and participant observation. In rural China, the author lived with research participants and their families, who gave access to other villagers. Both authors did field work in Myanmar to explore the consequences of the opening up of the mobile phone market in the summer of 2014. In Myanmar, we carried out several rounds of interviews and participant observation in the course of 2014-15 (Ling, Oreglia, Aricat, Panchapakesan, & O'Lwin, 2015). The first author returned to her field site in summer 2015 and 2016. While the authors had some training in Burmese, many of the interviews were carried out with the help of local translators, and a number directly in English or in Chinese, a language spoken by many people in the north of the country. Access was gained through introductions made by local research assistants and translators, visits to internet cafes and mobile phone shops, and casual conversations started in public places such as markets and tea houses. Early interviewees then introduced the researchers to their contacts, increasing the number and diversity of informants.

Through constant iteration, and the sharing of interview transcripts, we attempted to reach a wide diversity of interviewees in terms of gender, age, ethnicity, income, and the familiarity with digital technologies, moving from urban to increasingly rural areas in order to find villages where mobile phones were not available. All the interviews were transcribed and

translated. We also collected and systematically analyzed printed ads related to mobile phones and mobile operators, especially in Myanmar.

Transcripts, translations, and field notes were coded using Dedoose, a qualitative data analysis software, to work out the themes that emerged across the material. The themes presented in this paper emerged from a discussion of the Myanmar findings by both authors. As the theorization proceeded, the first author brought in examples from Chinese field sites, which confirmed/modified and sometimes contradicted the ideas that we were developing. This iterative process increased the robustness and geographical relevance of the ideas we present here. It proceeded alongside repeated visits and long-term engagement with both field sites and interviewees to follow-up as their engagement with digital technologies, especially smartphones, went from imagined to real.

Elements of the Digital Imagination

As we introduce above, digital imagination, or those mental and social processes that people use to understand the potentials and the limitations of digital media, is shaped by aspirations, the organization of the society in which people live (e.g. families, social networks, institutions, etc.), and by depictions of digital media in the surrounding environment. Individuals draw on their personal and social understandings to imagine how digital technologies can be made part of their lives, and such imaginings are shared with or challenged by the views of others in their communities (e.g. "imagination as social practice" described by Appadurai, 1990, p. 5). At this point, an element of collective storytelling emerges, both preceding and accompanying the adoption of technology, as noted by Nye (2007):

> Ultimately, the meaning of a tool is inseparable from the stories that surround it. Composing a narrative and using a tool are not identical processes, but they have

> affinities. Each requires the imagination of altered circumstances […] to tell a story or to make a tool is to adopt an imaginary position outside immediate sensory experience. In each case, one imagines how present circumstances might be made different […] To improvise with tools or to tell stories requires the ability to imagine not just one outcome but several." (p. 3)

As we will see below, collective storytelling is seen in the individuals weaving together their separate understandings regarding the potentials and the issues experienced with the adoption of mobile communication. In the preliminary stages this is mostly a patching together of impressions gleaned from the media and from distanced observations of use. Later, it also includes more direct experience with the technology.

In the following material we seek to illuminate how individual aspirations and socially constructed conceptions meet with newly available digital devices. We seek to understand how and why some people become digital users and some do not, why some use digital technologies to uphold the views of society, and some to challenge them, and how collective storytelling can become highly individual meaning-making (Nye, 2007). In the next sections, we will explore: 1) the existent media context; 2) individual aspirations and their interaction with the social context in which people live; and 3) the role of migrants in shaping the understanding, and subsequently the use, of the technology. We will then discuss negative articulations of the digital imagination, that is what happens when people fail to imagine a place for the technology in their own lives, or start to actually use it but encounter experiences or features they had not imagined and which turn out to be negative or incomprehensible.

Ambient insights: television, radio, film, advertising.

Perhaps the earliest contribution to the formation of the digital imagination is the media environment in which people are immersed. In both countries, people had seen digital technologies on television, films, radio, advertising, whose images propose digital values, behaviors, and skills, and show the social status that digital media can afford to their owners. Further, these images begin to illuminate the structure, logic, and functioning of the digital system. Such "old" media have been long recognized as bridges between local realities and the possibilities offered by the outside world (Appadurai, 1990; Burrell, 2012). Radio, in particular, is an important source of information in the Global South, given its diffusion even among poorer households, and can give listeners who have not experienced the internet an idea of what it is (Wyche & Baumer, 2016). Television is equally important.

In Myanmar, people's first exposure to digital technologies often came via television and DVDs. The military dictatorship that ruled the country until 2011 exercised strict control over the internet and mobile telephony, so these were available only to a small elite, unlike television and DVD players, which could be found even in places without mains electricity. Local tea houses, for example, often had diesel generators to provide communal TV-watching for their clients. Details about mobile phones, tablets, and other ICTs sported by "fashionable people" could be gathered from Thai, Korean, Chinese, Hollywood and Bollywood movies and TV programs (Hjorth & Khoo, 2015). These offered rather cursory depictions of mobile communication as there were not specific pragmatic clues on cost, the ease with which handsets can be damaged or ruined, normal use situations, etiquette of use, etc. However, they provided viewers with a course-grained sense of the technology. Beyond this, the programs also burnished the role of mobile phones as objects of desire. As our interviewee Moe observed:

> In this country, there is both money and an extreme hunger for buying goods that show status. We've been closed off for 20-30 years, and now people are very anxious to join in and buy all these things that they've seen on TV all these years.

Perhaps the strongest media-based influence comes from television series from the surrounding region, in particular from Korea, a powerhouse in the production of pop culture (*hallyu*, or Korean wave) since the early 2000s. In rural China, mobile phones started to appear in the mid-2000s, soon after they became popular in urban areas. But in Myanmar the delay between when people saw mobile phones in television and other media and when they encountered them in their physical world was very short, so television programs did not feature so prominently in how people recalled seeing their first mobile phone. For both young Burmese and Chinese people, however, Korean media was important as a source of inspiration regarding popular culture.

The regional dimension in shaping the digital imagination is often overlooked. However, it is key in framing what is deemed fashionable, as well as who is, and who is not, counted as a prescribed user. This prescription work in Myanmar was strengthened by billboards and marketing campaigns by the mobile operators, which were explicitly focused on consumption (Image 1). Billboards by the two private mobile operators that entered the marked in 2014, Telenor and Ooredoo, covered entire buildings (Image 2 and 3), with an emphasis on colors and images to communicate their messages. Text was typically missing or only descriptive of specific offers. The operators' strong visual identity included images of typically young, urban, sophisticated users (e.g. wearing traditional clothes but with affluent cosmopolitan

details such a wrist-watch, or a handbag). They were often engaged with the screen of their smartphones, sometimes with logos of popular apps around the image (image 4 and 6).[3]

Such social displays are key in establishing imaginaries at individual, social, and national levels, particularly in markets that have been peripheral to the machinery of global marketing. Despite the pervasiveness and visual impact of billboards and other marketing tools in framing uses and users, few authors have studied these vectors in the context of digital technologies in the Global South (for notable exceptions, see Horst, 2014; Horst & Miller, 2006; Tuwei & Tully, 2017; Wang, 2010). But looking at marketing strategies can provide useful insights. For example, Tuwei and Tully (2017) in their analysis of the video ads of mobile operator Safaricom in Kenya, show how the commercial company's "reimagining of national identity" (Tuwei & Tully, 2017, p. 29) is parallel to individual users' reimagining of their role as successful and upwardly-mobile consumers, who inhabit a world of (economic) opportunity. Similar messages are commonly deployed in the commercial strategies of mobile phone operators in a variety of countries. Looking at marketing material from the perspective of both the digital imagination and common storytelling highlights how visual symbolism occupies public spaces accessible to everyone, and broadcasts messages about prescribed uses and targeted users. It contributes at once to creating and excluding potential consumers. While there is careful attention to the portrayal of all people as potential users/consumers, without distinction between rich and poor (Hahn & Kibora, 2008; Kuriyan, Nafus, & Mainwaring, 2012), there is also a clear distinction between who does what with a mobile. In Myanmar, ads featuring older people, for example a grandfather speaking on a mobile with a granddaughter, stands in contrast with those featuring young people and highlighting data-oriented apps used on smartphones (Image 5). This plays through to the

[3] We focus specifically on mobile operators' ads because they were ubiquitous and uniform in their messages in both countries. This was particularly visible in Myanmar, where outdoor ads of any kind were still rather limited, especially in 2014-15.

frequent claim that surveys show elderly or rural users as not having mobile phones because they are too complicated or not of interest.[4] These can be face-saving responses to hide the fact that the interviewee was too poor to afford one, but can also reflect an acceptance of the notion that the interviewee may not be the target audience for digital technologies; indeed, that they have not been able to imagine the role of the technology in their lives.

Not seeing oneself as the targeted user at the point of departure is however not necessarily an impediment to deploying one's digital imagination, or to eventually starting to use a digital device. This was indeed the case in rural China, where follow-up visits through the years showed that many of the older women who were not the focus of network operator advertising did in fact start using both mobiles and computer-based internet (Oreglia, 2014). Despite their co-villagers' shared view that mobile phones were not for older women (a view which they sometimes held themselves, in word if not in action), the combination of their imagination and their practice allowed older women to challenge this specific aspect of the collective story-telling, and to start using mobile phones.

The media context in which people live their lives is an important early input in the development of the digital imagination, as it lays out appropriate users (young people), and desirable uses (e.g. music, social media, and instant messaging). Thus, people gleaned impressions of what a mobile phone was and could be used for from watching films, TV, and direct advertising. These sources helped them frame whether they were "appropriate" users, and framed their understanding of the device, and the role it could play in their lives.

[4] See for example (CNNIC, 2015; Zainudeen & Galpaya, 2015)

Observing others' use: Individual aspirations and social influences.

In both countries, wealthier people such as traders and government officials had acquired feature phones and then smartphones as these technologies were coming to the global market. These people provided a more concrete glimpse into the reality of digital technologies: how they actually looked from up-close vs. on a screen or a billboard. The higher status of these adopters connected phone ownership with prestige, as shown in the words of Siddhiya, a young Buddhist monk who did not own a mobile phone:

> If Buddha were alive today, he'd have a mobile phone, to stay in touch with the people… Actually, no, he wouldn't have a mobile phone, his body-guards would, just like important businessmen. You know, they never have their own phone; someone else answers for them.

Siddhiya saw the mobile phone as a status symbol that only the very poor or the very rich could do without it: poor people[5] because they couldn't afford it, and very rich people because they had servants who could answer it on their behalf, giving them the advantage of owning a mobile without the hassle of having to operate it. The attribution of status has accompanied the introduction of mobiles everywhere, as remarked by studies in Western countries first, and then in the Global South (Wallis 2011; Horst and Miller 2005; Nordal, 2000; Zainudeen and Galpaya 2015; Porter et al. 2012).

For traders and shop owners, it was easy enough to justify their "need" to own a mobile, even if it were just to imitate wealthier people: "All other traders had a mobile, so I had to get one too," said Aye, a wholesale pineapple seller in Myanmar who had acquired her phone in early 2010. At this point both SIM cards and mobiles were extremely expensive and not common

[5] He considered himself poor, since his parents could not afford to buy him a phone and he could not, as a monk, earn money directly to buy one.

at all, even among traders (she reported paying MMK500,000 to buy her SIM card alone, more than USD500 at the time). In her case, the "all other traders" was an exaggeration, as noted by both our translator and Aye's business partner, who suggested that she was in fact one of the first traders in the town to have gotten one. But the business case was, so to speak, clear.

However, not everyone had such an obvious motivation for purchasing this expensive item. Buddhist monks, for example, are highly respected and extremely influential in Burmese culture, and were among the early (and extremely visible) adopters of mobile phones. Monks with high public profile received them as gifts from patrons seeking a merit-making action. The prestige of both the high-ranking monk and the mobile phone merged together to create a very powerful object of desire, as the young monk Siddhiya noted in the quote above. The complexity of this is seen when he was asked about the contradiction between attachment to mundane objects and the rigors of the spiritual life. He first noted that mobiles were a tool used by monks to stay in touch with the faithful. At the same time, he highlighted the complexity of trade-offs around such objects: "Well, if my slipper breaks, I need a new one, no? … but a slipper and a robe are needs. A mobile and a camera are wants." Siddhiya's musings about wants and needs frame ideas of utility and desire that are important elements of the digital imagination.

Siddhiya's comments also illuminate the evolving sense of legitimate users and uses we introduced above. Within a small community, the first people who buy any digital technology have a disproportionate influence on how these are subsequently conceptualized and discussed. In villages, it is common for people to know the identity of the first person who bought a mobile phone, as seen in these comments from a married couple in a village north of Mandalay:

(Interviewer): Who was the first person in the village to have a mobile phone?

(Husband): A carpenter.

(Wife): Ko Myint Aung.

(Husband): It was worth 2,100,000 (approx. USD 2,100).

(Wife): He bought the first mobile phone here. He has a big business.

(Husband): He owns many buildings.

As the prices of buying SIM cards and handsets fell (to as low as MMK1500 or USD1.50 for a SIM card), seeing local traders use a phone allowed others to concretize and demystify the prestige attached to the mobile phone, while still underscoring social divides. In the quote above, the cost of the phone served as a description of a social boundary: the message was that mobiles were for important business people. The couple did not have the same justification. It came out in the interview that the woman would have liked a mobile phone to talk to distant relatives, but this was not seen as a priority for the household budget, compared to 'business uses.' This hierarchy of legitimate mobile use was repeated (and respected) throughout the village, where the few mobiles that existed were owned mostly by men.[6] One woman, a teahouse owner, had one, but just because she had to use it to contact her suppliers. However, the apparent social agreement on what mobiles were for was not necessarily borne out by actual behaviors, as phones allegedly used only for business showed clear traces of non-business use, with a multitude of games and other entertainment apps; nor was this view

[6] The gender aspects of the development of a digital imagination (influenced as it is by social interactions, which in places like Myanmar are still quite segregated by gender), and of mobile phone ownership and use, deserve a much more detailed description and discussion than we have place for in this paper. It is worthwhile to point out, however, that both countries are characterized by patriarchal societies where women are still discriminated against, (where, for example, in families with limited resources, mobile phones would be purchased for the man, regardless of actual need), but also by increasing opportunities for female economic independence that are challenging existing power relations. This does not mean that mobile phones are "empowering," as a certain rhetoric would have it, but rather that they introduce a further element in the constant negotiation of gender and social roles. In this case, the women's digital imagination is a powerful tool to challenge and upend the shared of the (patriarchal) society's understanding as to who should own and use a mobile phone.

shared by young people, who all saw very clearly the entertainment opportunities offered by this technology.

So, are digital technologies instrumental tools? Are they an expressive channel through which one maintains social contact? Are they objects of desire? It is the labor of the digital imagination to navigate this terrain. Multiple discourses are woven into notions of who should own a mobile phone or a computer. Their proper uses intersect in small communities, and reflect local hierarchies of power (including gender relations) and external influences from media, early adopters, and migrants, as we will see in the next section.

Becoming a user: Access, tools, and migrants' help.

Long-term engagement in our field sites allowed us to track the path of several users going from observers of digital technologies to more or less fully-fledged users. A number of them had parts, but not all, of the technical "kit" they needed: in Myanmar, many had rushed to buy the newly available cheap SIM cards in August 2014, even if they could not yet afford to buy a mobile handset or lived outside mobile network coverage: the SIM itself was a symbol of the future to come. There were also people with smartphones but without SIM cards. They lived outside the footprint of mobile operators, or could not afford to pay for the connection so simply used their mobiles as offline entertainment devices on which to play games, listen to music and watch movies downloaded at specialized shops. These were often young people, both male and female, who claimed a somewhat remote membership in the globalized world of digital technologies.

Migrants were important in allowing people "back home" in villages to bridge between the immaterial media portrayals of digital technologies, and the reality of use in specific, local conditions. They carried out what Nguyen (2016, p. 648) calls "infrastructural action," that is,

a constant and active creation and maintenance of the social and technical connections that are necessary to use digital devices "at the margins of global modernity".

In both rural China and rural Myanmar, people who had migrated were among the first to have access to digital technologies. They had experienced urban internet cafes in the case of rural-to-urban internal migrants in China (Qiu, 2009; Oreglia, 2014), or mobile phones in the case of the Burmese diaspora of laborers whose primary destinations were Thailand, Malaysia, Singapore and South Korea. They would send back home not only money and goods, but also what Peggy Levitt calls social remittances, that is "the ideas, behaviors, and social capital that flow from receiving to sending communities. They are the tools with which ordinary individuals create global culture at the local level" (Levitt, 2001, p. 11). In the case of digital technologies, migrants brought back (or sent back) the actual hardware/software, and also ideas on how to use them, helping to fill in the digital imagination. Thus, the devices and behaviors maintain a trace of their places of origins even when they end up in a rural village in China or in a small town in Myanmar—an aspect of the regional influence we mentioned above.

In northern Myanmar, many people traveled or migrated to China and thus used the popular Chinese instant messaging app WeChat as their default messaging vector due to its translation function and ability to transfer money. By contrast, in the south of the country Viber was much more common, reflecting its popularity in Malaysia, a country where many Burmese go to work. In rural China, rural-to-urban migrants gifted their old phones to family members in the countryside, together with the music, photos and videos that they had downloaded in urban areas (Oreglia & Kaye, 2012). In these ways, migrants become the lubricant between non-use and use, imbuing devices with social prestige, as we saw above. Thus, those who cannot afford smartphones still imagine them as both a cause and a consequence of benefits ranging from prestige to tangible income.

Migrants are often also the "warm experts" described by Bakardjieva (2005): not necessarily experts in any extended sense of the word, but with sufficient knowledge to help others over the threshold from non-use to use. Experts can help novices to map the functionality of the device/system onto their particular set of needs and their life situation. This is a role that is typically played by young people, who do the heavy work of figuring out the relationship between new technologies and local settings, and then teach it to their family and friends. The warm experts' own path to use is often also a matter of combining moments of imagining what the technology can do together with moments of actual usage.

In China in the mid-2000s, many rural-to-urban migrants purchased their first mobile phone after a few months of living and working in cities, and after having observed the mobile phone use of co-workers and people around them. A combination of help from their more experienced colleagues, and other experts such as mobile phone sellers, contributed to turning such migrants into quasi-competent users. They then started to describe their newly-found competence to their families and friends back home—for example by calling from their mobile phone or showing the different features of their phones when they visited, though often without letting anyone touch the actual phone. The urban use of such phones, embodied by photos taken in urban settings, or music, videos and games popular among urban youth, fed the rural imagination, especially of both young and older people back in villages. The former identified the devices as tools to escape the countryside and enter what was perceived as a more sophisticated world; the latter connected mobile phones with youth, white collar work, and urban living, thus often concluding that it was not a tool appropriate for them (Oreglia, 2014).

Both these kinds of imaginations had different consequences on subsequent use (or lack thereof), and were heavily influenced not only by age and geographical location, but also by cultural practices at large, influencing what people imagine mobiles can do, and subsequently

what people actually try to do when they become mobile users. They also influence cultural appropriation of technology that represents both resistance to, and participation in the global dimension of digital technologies (Nguyen, 2016; Wyche & Grinter, 2012). The "material and cultural aspects" (Hahn & Kibora, 2008, p. 91) of mobile phones are merged to give form to practices that are global in their technical underpinnings (e.g. apps, or streaming videos, or instant messaging programs that work because of software and hardware developed in a few places), but have local imagined meanings. For example, the cultural importance of Buddhism in Myanmar is seen physically in a landscape dotted with temples, inhabited by large numbers of monks and nuns, and punctuated by public daily rituals involving religion. But people also imagine an important function of digital technologies is to support and underpin religious rituals, through apps that recite sutras, through viewing videos of famous preachers (who are sometimes fervently nationalist), or listening to broadcasts of specific ceremonies. Monks and nuns often have mobiles without SIM cards and/or without airtime, but are nevertheless heavy users of (offline) Buddhist apps, just as lay people who do not have a TV might have a CD player on their home altar, to play Buddhist chants. This religious use of digital technologies is largely absent in China, with its decades of communism and constant repression of on- and off-line religious manifestations. However, in China the combination of online censorship of political and other sensitive topics, internal mass migration, and a type of sociability heavily orientated towards group interactions have combined to create a "Chinese" digital world that is extremely social, and is used to make sense, socially, morally, and economically, of a rapidly changing society (McDonald, 2016; X. Wang, 2016).

Thus, digital imagination reconciles individual aspirations, economic/logistical access, social expectations, power hierarchies, the migratory experience, and socio-cultural practices. As

people acquire and use digital technologies, they confront the narratives and imaginings they have developed *about* them: digital imagination is recalibrated around the concrete object.

Negative articulations of the digital imagination: Failure, misunderstanding, and exclusion.

The path of the digital imagination is not necessarily aimed at a specific goal, and its development does not necessarily resolve into using technology. Indeed, the idea of trajectory, with its technologically deterministic undertones, might not be the appropriate word at all. Rather, the digital imagination is something that meanders, absorbing different inputs before processing, accruing, discarding, and mixing them. There are many dead ends, where technology is rejected, or mismatches between what the user thinks the technology can do and what it actually does.

The relationship between individuals—with their particular motivations and circumstances—and digital technologies, are also in constant flux, so people might become users of the internet through an internet café and then stop when they no longer have access. They may buy a phone and then sell it if a more pressing financial need arises. They might not be able to create a coherent narrative of the technology that fits their life situation. In such cases non-use is not an explicit refusal implying a consideration (albeit with perhaps limited understanding) and a decision to exclude/limit the technology, as shown in cases of resistance, regimented use, or non-use (Baumer, et al., 2015; Umble, 1992). Non-use, in our meaning, may be the perception that the technology does not solve a compelling need, does not fit into one's life (Schweizer, 1993), is too expensive, would require an additional cumbersome infrastructure (e.g. access to electrical mains for charging), is too difficult to use, or some combination of these. For example, an older rickshaw driver in southern Myanmar got his customers by hanging around the local tea shop. When asked if he planned

on getting a mobile phone, he responded that he did not want to, since it represented an additional expense, and it was anyway difficult to understand and use (Ling, Oreglia, Aricat, Panchapakesan, & O'Lwin, 2015). At the time, in 2014, this was a viable way for him to operate. He always had, and he still could get enough business. As time went by, however, his position was becoming more tenuous since other drivers were expanding their customer base by using mobile phones.

As economic activities and social interactions move towards digitization, different ways of communicating and/or doing business emerge that nudge and then coerce people into either technology adoption, or marginalization. In similar situations, proactively imagining different narratives of the role that a digital technology might play can mean the difference between continuing to make a living from one's occupation or being pushed out of it altogether. Speaking to the point of this article, even non-users are often pushed to have some understanding of digitally-mediated interactions, even if it is only leads to rejection of the broader drift of the society around them.

Imagining alternative futures afforded by technology can include uses that contradict entrenched cultural norms and self-image. For example, in rural China, older women often said they did not use mobile phones or computers, but in fact used both. When queried, they said that they did not think their own use amounted to 'proper' use which was considered the purview of younger, urban, and educated people, as discussed above (Ling, Oreglia, Aricat, Panchapakesan, & O'Lwin, 2015). A more threatening situation is when imagined uses challenge power positions. Gendered hierarchies of control, for example, can be upset by women using mobiles since they are seen as a threat to patriarchy (Cohen, Lemish, & Schejter, 2008). Women might hide their expertise or even not let their husbands see that "they know too much" (Kumar, 2015). They may hide usage that doesn't match external expectations behind acceptable sentences like "I don't understand" or "I am not interested in

technology." Women might want to avoid digital technologies because their friends and relatives had told them about "bad things" happening online. These activities ranged from husbands leaving their wives for women they met on Facebook, to the site being a repository for "pornography and Satanism," as reported in rural Zambia (Wyche & Baumer, 2016, p. 12), and Cote d'Ivoire (Djane & Ling, 2015).

Alternatively, (potential) users might not suspect problems when there is a justified need for concern. In Myanmar, new users could imagine mobile phones as magical tools that would open up new opportunities which can then fail to materialize because of technological limits, such as low connectivity or older devices that cannot support more advanced features. Sometimes, however, there are misunderstandings based on the clash between global digital cultures and local realities. In Myanmar, an interviewee asked a colleague on our project how to withdraw money from a British bank account. A "friend," he said, needed his help to do so and invest in a new business with him. When asked about this friend, our interviewee said it was someone he had "met" online, who said that she was studying to be a doctor in South Africa, and had inherited a lot of money from her deceased father, but could access it only once she turned 30—hence the request for help from our colleague. An experienced internet user immediately recognizes in this the outlines of the well-known "Nigerian bank" scam, but this was not apparent to a new user in Myanmar. A naïve digital imagination that had been deployed assuming the potentials in mobile phone use fell short by not imagining these possible negative consequences. Our colleague explained that it was a scam, but the interviewee was not at all convinced, as his digital imagination had prepared him for meeting strangers online and gaining from it. This story underscores the mismatch not only between how new users imagine the potential of the technology and its actual features, but also between the type of victim that scammers imagine and the actual people who receive scam emails. Burrell's investigation of the motives of online scammers (or aspiring scammers) in

Ghana shows how they imagine their targets as rich Westerners (Burrell, 2008). This is the flipside of universal connectivity: people from very different socio-cultural contexts connect with each other, and a scam targeted at wealth(ier) people in the West found a more credulous audience among new internet users of modest means in Myanmar.

Conclusion

The digital imagination of non-techno-elite users in the Global South, grounded as it is in the local context, is a bottom-up approach to understanding how people conceptualize and make sense of technology even before they have seen it. The concept describes an early imagining of use as well as a mapping of the potentials of digital technologies onto everyday individual needs that precedes actual adoption. Indeed, we suggest that it is through the application of digital imagination that people develop their "stories" (Nye, 2007) that then play through and shape adoption.

The promise of this approach is that it provides a heuristic framing that is more attuned to the local needs and perspectives of non-elite, marginal users of digital technologies. Firstly, taking the perspective of users who do not share the same cultural contexts and references of the techno-elites helps us understand how the same smartphone can be interpreted as a symbol of social prestige by being skillfully tucked into a man's traditional *longyi* in rural Myanmar, or as a religious tool in the form of an offline sutra chant player for a Buddhist monk. Understanding these different contexts and how local cultures and traditions interact with the materiality of mobiles and the internet can provide a schema for analyzing future digital technologies and the environment into which they are adopted, adapted, reimagined, or rejected—but also for incorporating such meanings into future iterations of technology design, as opposed to a techno-centric approach to the development of technology. The bottom-up digital imagination perspective challenges the epistemology—the "way of

knowing about"—of technical innovation. As noted, this has been the remit of global design and technology elites. Rather than the visionary "Jobsian" notion that people do not know what they want, however, in this paper we show how people on the fringe actively engage in their own pre-framing of technology and develop their sense of how the technology will fit into their lives, the available infrastructure, etc., by using a variety of inputs. While there have been attempts to blend the design initiatives of techno-elites with the needs of those on the periphery, the results have been mixed (Pal, 2017), and we suggest that there is the need to adopt an expanded perspective when framing the needs, uses and understandings of technology by users at the margin.

Secondly, in tandem with making different meanings of technology visible, the notion of digital imagination can help reveal the culturally situated meanings of the negative sides of these technologies when popularized in different countries. The use of social networking sites in Myanmar to support and indeed encourage poisonous nationalism stoked by the military is an example of this (Clark, 2016). Thus, understanding the deployment of the digital imagination among non-techno elites, especially in the Global South, will help us make sense of behaviors that are labeled as beneficial (e.g. greater coordination of work), as somewhat deviant (e.g. the Nigerian scams), or as clearly antisocial (e.g. anti-Muslim hate speech fomented by Buddhist monks in Myanmar, or the use of social media by ISIS).

The limitation of the digital imagination approach, and of this paper in particular, is that it focuses on the social and cultural interactions of individuals and communities, to the detriment of the political/policy perspective, such as legislation, administrative policies, or infrastructure that can hinder or facilitate the diffusion of digital technologies, or favor certain patterns of use. Myanmar is a clear example of a place where the digital imagination had been very vivid for years, but could not encounter the object of its workings—i.e. physical mobile phones—until a change of government/ regulatory environment opened up to allow

for new operators and a fall in prices. In contrast, rural China greatly benefited from government policies that began in the 1990s to promote the build up of infrastructure, and so created the conditions for an easy diffusion of digital technologies. Ultimately, the political economy and historical legacies of a country might be what makes a significant difference as to whether the right conditions exist for the creation and adoption of new technologies (see Abbate, 1999; John, 2010 for insightful accounts of both in a US context), as well as for their spread. At the same time, given the attention that has been paid to the institutional aspects of innovation and creativity, we believe it is time to rebalance the discussion and shine some light on the creative lives of people at the margins of mainstream technological innovation.

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