Propelled by new philanthropists, mHealth programmes recreate old paths of dependency and contribute to the influence of the North American and European digital industry by creating new markets in the Global South. By focusing on individual solutions to address structural issues, these initiatives displace and reinforce multiple inequalities. Indeed, mobile technology introduces technical and commercial criteria that condition access to healthcare, thus transforming mechanisms of inclusion and exclusion of individuals. This Element focuses on the way in which these technical objects modify power relations at both international and local levels. It invites us to examine how mobile technology is contributing to the emergence of new forms of power, to the reconfiguration of social roles, to the globalisation of devices, to the datafication of health and to the transformation of healthcare and health practices.

The Element uses the case study of the Mobile Technology for Community Health (Motech) mobile platform – today one of the most widely used in the Global South – to analyse the particular ways in which this mobile health technology sets out to influence and organise others, as well as the discourses of promise or fear mobilised to achieve these goals. Through a multi-sited ethnography of Motech in Ghana and India, this Element provides a first-hand look at initiatives that promise to improve health in the Global South through the use of mobile phones. From the Gates Foundation offices to community health centres in the villages of India and Ghana, this investigation clarifies the sociotechnical assemblages and datafication processes specific to mHealth in a globalised biomedical field and analyses the consequences of mobile technologies on the delivery of care and on the health of the women enrolled in the Motech programme.

The Motech case study shows how, with targeted funding, influential players are defining the mobile phone as a relevant solution to meet development and health challenges. This Element discusses the way mHealth intervenes in care practices, and questions its role in recent transformations of healthcare and administration aimed at reducing expenses and optimising resources. The Element examines the forms of healthcare management, outsourcing and empowerment proposed by Motech, which reflect a determination to use mobile technology as a means of delegating care to responsible patients and digital healthcare workers. It shows that mHealth devices that seek to substitute digitised information for hands-on healthcare practice meet with strong resistance in the field, and result in deterioration of care and of the healthcare system in general. mHealth technologies have significant implications for social
inequalities: this Element studies the gender relations at work in Motech and the way in which the device proposes new reassignments by positioning the mobile phone as a means of empowerment and a way of compensating for gender inequalities. It shows, through comparative analysis, how this mHealth programme confirms, amplifies or mitigates forms of domination and inequality. The Element combines the analysis of technical devices proposed by science and technology studies (STS) with a sociological analysis of health inequalities, showing that while mobile tools may be conditioned by unequal relationships, their presence and the ways in which they are used alter these relationships in return.

1 Mobile Health: A ‘Simply Brilliant’ Innovation

This introductory section explores the origins and growth of mobile technologies in health and development. Information and communication technologies (ICTs) only represent one of the most recent sets of technologies in an already long history of innovations, tools and strategies for development.¹ At the same time, ICTs, with the mobile phone as their flagship, tend to take so much importance in development policies that one could frame the last decade as the period during which a ‘digital turn’ took place in development policies (Al Dahdah and Quet, 2020). mHealth programmes also align with new international public health standards described as ‘global health’ (Adams, Novotny and Leslie, 2008; Gaudillière et al., 2020); they are utilised by global players, respond to global challenges, mobilise surveillance and quantification technologies and engage strong participation by private actors. Indeed, the dynamics of globalisation and commodification associated with global health encourage the spread of technical devices such as mHealth in the Global South (Al Dahdah, 2019a; Sawadogo et al., 2021). The innovative and transformative component of mHealth constitutes a central argument to promote its spreading in the developing world. This first section sets out the ‘promising communication’ rationale in mHealth discourses, which contributes to the promotion of the mobile phone as a ‘simply brilliant’ innovation for health.² Indeed, for its

¹ ICTs have been associated with promises of development for a long time. For instance, the Okinawa Charter in 2001 or the Millenium Development Goals in 2000 already gave ICTs an important role. Not to mention the longer tradition of mass media communication for development in the 1960s and 1970s.

² This section is based on a qualitative discourse analysis of four textual corpora compiled using Factiva software. The first Factiva corpus, called ‘Worldwide General Press’, comprised 446 articles published between 2011 and 2013, in English and French, with ‘mobile AND health’ as the key topic. The second Factiva corpus, ‘Techno and Health Specialized Press’, focused only on the four most mentioned regions in the general press (Africa, India, the United Kingdom and the United States) and comprised 581 articles published between 2011 and 2013 in the specialist technical and health press, with ‘mobile AND health’ as the key topic. The third corpus,
promoters mHealth is much more than just a phone (Section 1.1) or just healthcare (Section 1.2). From 2010 onwards, the private sector has been investing substantial sums in mHealth projects to improve women’s health, and several international initiatives have proposed using mobile phones to accelerate improvements in maternal health (Section 1.3). The field of maternal health is therefore particularly relevant to explore the development of mHealth and the associated public health transformations.

‘Using mobile phones to access and relay health information in developing countries is the topic everyone in health and technology is talking about right now. There’s a reason for that, of course. It’s one of those ‘simply brilliant’ innovations that seems to make perfect sense’.

(Bill & Melinda Gates Foundation blog, published on 3 October 2011)

Access to mobile phones is becoming increasingly common worldwide, and is driving access to the internet, especially in the developing world (ITU, 2019). Mobile health projects and applications emerged at the beginning of the 2000s, and have mushroomed in developing countries over the last decade (Chib, van Velthoven and Car, 2015). Aware of the increasing deployment of mobile technology, international health actors have sought to characterise this phenomenon more precisely. In 2011, the World Health Organization (WHO) first defined mHealth as the practice of medicine and public health assisted by mobile technologies, such as mobile phones, patient-monitoring devices, ‘personal digital assistants’ and other wireless technologies (WHO, 2011).

The WHO segments mHealth according to a typology of projects that include the following:

1. Communication from individuals to health services (call centres, helplines or hotlines)
2. Communication from health services to individuals (appointment or treatment reminders, awareness and mobilisation campaigns on health issues)
3. Communication between health professionals (mobile telemedicine, patient monitoring, diagnostic and decision aids).

‘Scientific Press’, was compiled using PubMed; it comprised 213 articles published between 2010 and 2014, with ‘mobile AND health’ as the key topic. The fourth corpus, ‘International Reports’, comprised some twenty reports from international and UN agencies (UN, EU, World Bank, WHO, UNDP, ITU, UNICEF, OECD, US FDA, Indian Government, Institute for Healthcare Informatics) published between 2010 and 2014 on information and communication technologies (ICTs) for development or on mHealth, as well as fifty reports from the GSM Association and twenty from the mHealth Alliance, the two major international organisations that promote mHealth worldwide. I have already published a detailed analysis on these promises in two articles ‘Mobile health and maternal care: a winning combination for healthcare in the developing world?’ M Al Dahdah et al., (2015) and ‘mHealth: The ubiquitous source of health information?’ M Al Dahdah Le Temps des medias, 5, 2–65, 2014.
Today, mHealth figures come mainly from mobile operators and mobile technology providers. They estimate the size of the global mHealth market at USD 45.7 billion in 2020 and expect it to grow at a compound annual growth rate of 17.6 per cent from 2021 to 2028, a rather approximate estimate that focuses mostly on applications and services that are accessible in rich countries. Most of these services are smartphone-based and thus currently still beyond the reach of much of the developing world. Consequently, most of the projects deployed in resource-poor settings over the past decade have been SMS-based or voice services, which can be used on a classic handset. Even with a relatively low-tech profile, the innovative and transformative component of mHealth constitutes a central argument for promoting its spread in the developing world: ‘Mobile phones and wireless internet end isolation, and will therefore prove to be the most transformative technology of economic development of our time’ (Jeffrey Sachs, 2008 quoted in World Bank, 2012, 1). Such call for technological change and the futures and promises it conveys are structuring the field of mHealth for developing countries. Indeed, for its advocates, mHealth is much more than just a phone or just healthcare.

1.1 More Than Just a Phone

STS scholars have already identified these dynamics as characteristic of many innovative devices. In line with the work of Pierre-Benoît Joly on the economy of technoscientific promises, or Patrice Flichy on imaginaries of innovation or Kaushik Sunder Rajan on promises as a symptom of technoscientific capitalism (Flichy, 2003; Joly, Rip and Callon, 2013; Rajan, 2012), my analysis points to a clear form of ‘promise-based communication’ at play in discourses around mHealth (Quet, 2012). All these promises help to promote the mobile phone as a ‘simply brilliant’ innovation for health. Some of them – unrelated to health – are fed by the general hopes and hypes associated with the mobile phone. According to mHealth promoters, the ubiquity and accessibility of mobile phones allow everybody to be easily connected with anybody, anywhere, at any time, making this technology both omnipotent and universal. Moreover, according to several UN agencies and international organisations, mobile phones are central to the economic growth of developing countries: ‘[increased mobile ownership is] likely to have twice as large an impact on economic growth than any other investment in health’ (Kaushik Sunder Rajan, 2012, 4).

3 See for example: mHealth Market Size, Share & Trends Report: www.grandviewresearch.com/industry-analysis/mhealth-market

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growth in developing countries as in developed ones because the starting point of infrastructure in poorer countries is so much lower in terms of landlines and broadband access’ (UNDP, 2012, 10). These devices also serve as substitutes for many useful tools that are rarely found in the poorest countries, such as cameras, debit cards or voice recorders (World Bank, 2012, 4). Coming on top of such ‘mobile promises’, promises about healthcare further inflate the general tendency of these discourses to keep on promising.

1.2 More Than Just Healthcare

The use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery across the globe. (WHO, 2011, 9)

Mobile applications can lower costs and improve the quality of healthcare as well as shift behaviour to strengthen prevention, all of which can improve health outcomes over the long term. (World Bank, 2011, 9)

Three major promises – effectiveness, cost-efficiency and empowerment – are constantly used to promote mHealth as a transformative healthcare device. These three promises are foundational to mHealth. They give content and credit to this new field, but also raise expectations that may not be fulfilled, or inspire dreams that may not come true. The effectiveness of healthcare and efficiency of health workers are improved, it is suggested, by using mobile and digital health data. Instantly updated data, collected on-site, facilitates emergency and crisis management (Callaway et al., 2012; Case, Morrison and Vuylsteke, 2012; Massey and Gao, 2010). Mobile apps are reported to improve the quality and accuracy of diagnosis by compiling ‘good practices’, disseminating international protocols, analysing personal health records and offering personalised treatments in accordance with these indicators (Alepis and Lambrinidis, 2013; Yu, Li and Liu, 2013). mHealth can reach the patient wherever he or she is, even if there are no health facilities in the vicinity. In developed countries, isolated patients can call and exchange health data directly with health professionals through mobile apps (Sankaranarayanan and Sallach, 2013). This new connectivity can emerge even without widespread mobile phone ownership, through community health workers (CHWs) sent to isolated communities to collect health data on their mobiles, evaluate needs and connect the local populations instantly to health facilities (Källander et al., 2013; Mahmud, Rodriguez and Nesbit, 2010).

Moreover, mHealth is also presented as a low-cost means of rationalising health expenses and even as a way of streamlining health expenditure.
According to its promoters, mHealth reduces health costs by optimising medical time, by avoiding unnecessary hospitalisations, redundant exams or superfluous medicines, and by preventing missed appointments or interruption of treatment. Furthermore, when combined with mBanking, mHealth ensures security of out-of-pocket payments even for patients without bank accounts, and enables uninsured patients to apply for micro-insurance schemes to cover their health expenses (mHealth Alliance and World Economic Forum, 2011; mHealth Alliance, 2012; World Bank, 2012).

Finally, the promise of ‘empowerment’ is crucial as it is the only ‘human’ or ‘patient-centred’ justification for these devices: the only one focused on the individual and not only on the optimisation of healthcare services. Far from its original meaning of a grassroots acquisition or reinforcement of power, ‘empowerment’ in the case of mHealth largely boils down to giving patients a limited degree of autonomy and accountability. This promise echoes the individualistic and liberal vision of empowerment adopted by international aid agencies at the beginning of 2000 and critiqued by several scholars (Calvès, 2009; Parpart et al., 2003; Sardenberg, 2008). The empowering effect of mHealth serves to justify the idea of increased patient autonomy with regard to the healthcare system, and also the vision of shared accountability. Health cannot be fully delegated to health professionals; patients have to shoulder their share of responsibility too. For mHealth advocates, mobile phones play a key role in this empowerment through the optimisation of prevention and treatments. Firstly, easy access to health information via mobile devices will lead to healthy behaviours. By improving the understanding of preventive actions, risky behaviours will be avoided and healthier ones adopted. These ‘positive health-seeking behaviours’ will in the long run improve the health of whole populations. Secondly, a better understanding of treatments will improve compliance with medical instructions and prescriptions. Studies have already been conducted on treatment adherence for chronic diseases in Western countries to show that alerts, reminders and follow-ups sent by mobile phones help patients to follow instructions and treatments (Cocosila and Archer, 2005; Lester et al., 2010; Stoner and Hendershot, 2012), thus ‘empowered chronic patients’ no longer need to visit the health facility so often and are more in charge of their own health. Closer to a liberal than a liberating vision of empowerment, the technological empowerment of mHealth maximises individual interest and should thereby ensure efficient healthcare delivery. Maternal mHealth projects deployed in the developing world provide telling illustrations of this techno-liberal vision of empowerment (Al Dahdah, 2019b).
1.3 Maternal Health, a Productive Sector for mHealth

Half a million women die every year worldwide as a result of pregnancy or childbirth, almost all (99 per cent) in developing countries. Millions of women experience pregnancy-related morbidity, sometimes with severe consequences that could be avoided through better information and better monitoring of expectant mothers (WHO et al., 2012). Clinicians report that late arrival at a health facility is the main cause of death for women in labour. Among the multiple reasons for this delayed care are distance, lack of transport, poor quality of primary healthcare services, poverty, lack of information or education and women’s social status (Ronsmans and Graham, 2006). Large disparities remain worldwide in terms of prenatal care coverage and skilled attendance during childbirth. Poor women living in remote areas are less likely to receive adequate care. This is especially true in areas where the number of qualified health workers is low, especially in sub-Saharan Africa, Southeast Asia and Oceania. Improving maternal health has been one of the Millennium Development Goals set by the United Nations (MDG5) for the past two decades and is now part of Sustainable Development Goal 3. The objective of reducing maternal mortality rates by three quarters between 1990 and 2015 proved difficult to attain, and some actors have sought new dynamics to meet this target. Since 2010, the private sector (mobile operators, pharmaceutical firms, philanthropic foundations, etc.) has invested massively in ‘mHealth’ projects involving the use of mobile technologies to improve women’s health, and several international initiatives have advocated using mobile phones to make up ground in addressing maternal health issues (mHealth Alliance and UN Foundation, 2013; Weil et al., 2013).

The field of maternal health is therefore particularly relevant for exploring the development of mHealth and the associated public health transformations (institutional overhaul, transnationalisation, the increasing role of communication technologies, gender relationships and expertise), but has not been widely researched to date. The available articles on the subject consist of literature reviews of existing projects (Noordam et al., 2011; Tamrat and Kachnowski, 2011), or reports on the use of mobile phones by a group of midwives in Northern Indonesia (Chib, 2010) and in Thai border areas (Kaewkungwal et al., 2010) or the use of persuasive messages addressed to women in rural India (Ramachandran and Goswami, 2010). The rapid development of mobile health projects addressing maternal health can be explained in part by the supposedly widespread access to mobile phones by women; gender differences in accessing new technologies are much smaller when it comes to mobile phone access.
Several gender studies have shown that access to ICT is (or has long been, in developed countries) generally more difficult for women, who are less well equipped – the computer, for example, remains the property of the husband – and therefore less accustomed to ICT (Wyatt, 2005). The presence and dominant position of males in the construction of ICT technologies may also explain why women struggle to find their place in these same technologies (Gurumurthy, 2004; Henwood and Wyatt, 2000). Sociology – and feminist sociology in particular – has provided ample insights into the distribution of social roles within ICT, gender inequalities in professional practices, the impact of ICT on socialisation (or indeed on the dissolution of social bonds) and its dominance effects (Gardey, 2003; Haraway et al., 2007). Certain studies have focused specifically on internet applications (Suchman, 2008; Wajcman, 2000).

Mobile phones, however, hold a special place in the world of ICT: women are 21 per cent less likely than men to own a mobile phone; gender differences do exist, therefore, but mobile phones are a more ‘egalitarian technology’ than the computer or internet because their cost is lower and they require little training to operate (GSMA, 2013).

This Element contributes to an understanding of gender relations in the context of mobile tools developed specifically for women’s health. It offers to study both how mobile technologies shape ‘gendered’ relationships and how gender relationships have an impact on the actual construction of technological projects, a point that will be studied in depth in Section 6. This research draws on a wide literature combining Science, Technology and Society studies and Information and Communication Sciences to reveal the transformations, power issues and inequalities at work in these new socio-technical artefacts. It is based on empirical data collected between 2014 and 2019 in Ghana and India and focuses particularly on the case study of Motech. A brief overview of the concepts and methods employed for this research project is required here in order to understand how mHealth is deployed in development contexts.

2 Key Concepts and Methods for Studying mHealth

This section describes how this research approaches mHealth as a new object of study in the social sciences, describing the disciplinary and methodological frameworks as well as the material and logistical contingencies of fieldwork that both enabled and conditioned this work. It describes the precise form of the object of study: the Motech health initiative rolled out in Ghana and in India, detailing the approach, the method, the fieldwork areas and the tools adopted in order to study it. This research is interdisciplinary, combining approaches from...
the sociology and anthropology of science, technology and health, the sociology of usage and media and discourse analysis.

2.1 STS, Usage and Discourse Analysis

This work adopts three main theoretical orientations. The first approach is that of ‘Science, Technology and Society’ studies, which analyses the intertwining of the social and the technical within scientific or technological systems and artefacts. The studies of artefacts undertaken in the context of techno-social innovation (Bijker and Law, 1992; MacKenzie and Wajcman, 1999) and Actor-Network Theory, which identifies the sociotechnical networks that lie at the heart of the construction of technical objects (Akrich and Méadel, 2007, 2010; Cassier, 2002; Epstein, 2007; Gaudillière, 2002) and key STS concepts applied to the countries of the South and to the context of globalisation (Anderson, 2009; Arvanitis et al., 2008; de Laet and Mol, 2000; Shrum, 2000) are of particular importance for this research and are fully mobilised in Section 3 on global dependencies and Section 4 on datafication.

The second approach, which can be seen as an STS subfield, is that of the study of ICT usage, focusing on how communication technologies in practice impact women’s health and healthcare. This field lies at the crossroads between the analysis of media communication, the social history of technology and the sociology of lifestyles. The observation of usage, that is what people actually do with these technical objects and devices, is a useful methodological entry point for understanding the impact of mHealth projects. The impact of objects on the social has been studied methodically by several colleagues (Conein, Dodier and Thévenot, 1993; Jouët, 2000; Proulx, 2005). The analysis proposed here is not restricted to innovative digital uses that concern a limited population of privileged women; it also addresses established uses of these technologies (Edgerton, 1998) as well as identifying non-users of the technologies and the reasons for their non-use (Wyatt, 2010). Both health workers and patients are users of mHealth programmes; the uses and impacts of such technologies are illustrated mainly in Section 5 on health worker performance and Section 6 on the technological inequalities faced by targeted patients. In Section 6, I also develop a gendered approach to mobile usage, as the patients targeted in the studied programme are pregnant women.

Finally, I propose to enrich the study of ICT usage with an analysis of the associated discourses, by building up a corpus of relevant texts produced on and by the devices under study, reflecting the various competing discourses (media, institutional, commercial, advertising, legal, financial, technical, etc.). This
qualitative and quantitative discourse analysis is further enriched by its juxta-position with user perceptions. The cross-comparison of usage studies with discourse analysis is a key element in the framing of this research. This threefold ‘STS-usage-discourse’ approach articulates the study of usage with sociopolitical and discursive approaches to shed light on the power issues that underlie how the uses of a technology develop in a particular social context.

2.2 Multi-Sited Investigation: Grasping the Dynamics and Anchorage Points of a ‘Global’ Object

This Element proposes to approach mobile health as a ‘global assemblage’, that is as a global form of technoscience that articulates technological, political and ethical questions within a single artefact (Ong and Collier, 2005). How can we write an ethnography of a global object? How can concrete, empirical practices and experiences help us to better understand processes that are by definition diffuse and composite? Following on from the work of Anna Tsing (Tsing, 2005), this research looks at how ‘global forces’ articulate with local sites. The idea is not to superimpose the ‘global’ on the ‘local’, any more than it is to compile a ‘global’ portrait by piecing together empirically observed ‘local’ particularities. Hitherto, studies of mHealth have typically been limited to a single geographic space of observation and a single mHealth application. However, multi-sited or transnational research into this topic seems relevant for several reasons. Multi-sited analysis – which emphasises fieldwork in multiple and heterogeneous spaces and was advocated by the anthropologist George Marcus (Marcus, 1995) before being taken up by numerous scholars (Fassin, 2006; Fischer, 2003; Jasanoﬀ, 2005; Rajan, 2008) – is especially conducive to the study of ICT in a globalised context. This analysis meets the new methodological requirements for the study of contemporary social reconfigurations; this type of inquiry is also well suited to the study of moving objects such as the universal symbol of mobility, the mobile phone.

The aim is not simply to compare two similar objects of research but to trace links, juxtapositions and connections between different objects and places. It is also to track the movements and developments of the people, objects, ideas, symbols, signs, tensions and conﬂicts embedded in these various projects, and this can only be done by diversifying the areas of ﬁeldwork. mHealth raises international issues: its ﬁnancing, technical implementation, infrastructures and ﬁelds of application are managed by different actors located around the globe. The underlying transnational mechanisms of these different applications can be brought to light only through an analysis that involves varied cultural areas and different socio-economic contexts. mHealth is not a ﬁnished product; no picture