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ICT in Developing Context(s)

Completed Research Paper

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Abstract

This paper seeks to develop a theoretical contribution to studies in the areas of ICT in developing contexts by reviewing how the notion of context has been understood to date, before offering a rethinking of how it is handled in the IS and development studies literature. To do this we draw a case study of M-PESA a mobile banking initiative in Kenya, on science and technology studies ideas and specifically Cooper and Law's (1995) distal and proximal perspectives, to argue that we need to better attend to the multiplicity of practices which take place within development arenas, and also to better consider the processes by which context is represented. The paper concludes by addressing some of the implications for information systems research and development.

Keywords: Context, developing countries, information systems, representation

1 Introduction

Analyses of information systems research in ‘*global, international or cross-cultural context[s]*’ invite an appraisal of what is understood as similar in these settings and what differs. It is widely argued that information systems are constitutive elements of processes that link together different entities and locations, leading to compression of space, coordination in time, and globalization (Castells, 2000; Sahay et al., 2003). This paper seeks to develop a theoretical contribution to studies in this area by rethinking the notion of context and how it is handled in the IS, information technology for development and development studies literatures (see Avgerou 2008: Avgerou & Madon 2004; Walsham 2001). The contention of this paper is that rethinking the notion of context has important consequences for methodology and conceptualising future studies of information technology for development.

The paper proposes that context is most fruitfully understood as dependent on the processes of development and that the representation of context is a provisional outcome of seeking to order and create connections between development projects and ‘the social and the cultural’ (Lewis and Mosse 2006) which they seek to influence. Research strategies in this area need to be sensitive to these aspects of development processes as well as the outcomes of development. Drawing on Cooper and Law (2005) the paper suggests that research approaches can benefit through recognizing two complementary understandings of research practice. The first focuses on how processes of ordering take place and how categories and concepts are defined and redefined. This is a *proximal* account having many similarities to forms of ethnography and its focus on the micro and what is at hand. The second takes how categories (or the macro), for example social capital, are used, applied and understood. This is a *distal* account using the outcomes of the categorisation of technologies, development projects and the ‘social and cultural’ into concepts such as content and context. Rather than relying on either distal or proximal accounts this paper proposes that is fruitful to use both by focusing on how distal categories are applied, reinterpreted or produced in proximal accounts and how distal categories are constructed, used and engaged in design, policy and development. Interpreting technology and development projects in this way often shows how provisional and contingent such projects are and how innovative the processes of implementation may become. To illustrate this argument the well known case of M-PESA in Kenya, generally regarded as an exemplar of m-banking, is reinterpreted and shown to have a changing conception of context which was instrumental in M-PESA becoming an m-banking application whilst avoiding most banking regulations. M-PESA illustrates how content and context are entangled in the processes of development. The paper suggests that successes such as M-PESA are difficult to replicate and that the issue of scaling up from specific exemplars of success needs to pay close attention to the processes of how content and context of development are connected. This cannot simply be read off from specific examples of success (or failure).

While there has been a paucity of accounts of context in relation to information and communication technology for development (ICT4D), they are interesting as they exemplify a diversity of perspectives and suggest a growing realization of the significance of how the concept of context is to be understood (see Avgerou 2008). In research on information systems and development context is more complex and more contentious than in IS studies more generally. Frequently complexity derives from recognizing the engagement of a multiplicity of agencies ranging from nongovernmental organizations, both national and international, governments, multinational or local companies, civic society and so on. Context too can be contentious when groups hold differing perspectives on what the context is and how it should be considered. Such complexity is captured by Rossi (2004 cited in Lewis and Mosse 2006) who contends that development exhibits an ‘... *apparent increasing order which characterises the expansion of developmental rationales [and] conceal [an] increasing disjuncture between normative expectations and the multiplicity of practices which take place within development arenas.*’ Within the IS literature, this disjuncture is often referred to as a ‘design reality’ gap in which the design of information systems fail to recognize the complexity of the contexts in which they are to be implemented (Heeks, 2002). A contrast between order and disjuncture implies that issues of IS systems and their context are not simply one of the adequacy of the representation of context but have to consider the *processes* by which context is represented. It draws attention to questions of methodology – how can research address these issues – and of related questions of conceptualisation – what is represented and its significance. The analysis in this paper seeks to develop this insight in three ways. First, by arguing that language, formalism or theory used to represent context is important in setting out the possibilities of engagement with context and how it is to be perceived and recognised. Second, the processes of representation are also issues of power relations and how context is represented provides a reflexive understanding of the scope and

manner of information systems provision and the expectations and benefits that technologies and their social assemblages are expected to produce. Finally, context is always more than its representations and the use of information systems is argued to be one of unexpected consequences and innovation in which multiple and divergent appropriations of these systems take place.

The paper begins by reviewing research using three partially overlapping yet divergent frameworks which serve to illustrate issues in the literature and the difficulty in accounting for context in any single conceptual schema. The next section argues that this difficulty parallels problems in understanding context which reflects tensions in formulating ‘the social and the cultural’ (Lewis and Mosse 2006) in either unitary or non instrumental terms. Alerting researchers to multiple orderings in the relationship between development and its object or content and context signals the importance of the means of investigation and the paper makes proposals in this area. The paper concludes by addressing some of the implications for information systems research and development.

2. Addressing Context

It is possible to identify three different frameworks that help situate the research literature and represent how context is or can be understood in information systems and, more specifically, in information systems research in development. These approaches overlap and frame context in partially divergent ways. Table (1) summarises these perspectives. The first framework presents the case that understanding and representing context has become more complex as the interconnection between studies of information systems and a wider environment are recognised. This move presents initial studies as a-contextual and subsequent work as a continuing trend to recognise, represent and account for a richer and dynamic context for information systems research. A second approach that has emerged in the literature identifies different discourses of information systems research and sets out their contrasting positions on context. Again, these studies highlight a trend from a restricted to a richer representation of context. A third approach, drawn from the development studies literature, frames development in terms of order and disjuncture; order largely deriving from development projects and disjuncture as outcome and consequence of the practices of development. It is this approach which provides the basis for subsequent analysis of context in terms of the processes of development; the representation of context; and of innovation in the use of information systems. All three perspectives are connected as each approach seeks to explain and order the context while connecting it to the content of development. However, the third approach is the most useful as it moves the focus of analysis from ‘better’ representations of context or identifying philosophical assumptions to the focus of analysis being on the practices of developing information systems. Such a focus can offer specific proposals on what to look for in researching such projects. Nonetheless the paper begins by detailing the first two frameworks as both are highly significant in research in ICT4D to date.

Framework	Details
Out-contextualisation	An increasing attention and sophistication in the representation of context. Context can always be repositioned and displaced by further representations of context.
Context as Discourse	Context can be framed as a consequence of discourse or philosophical commitments Language and representation is important in setting out the possibilities of engagement with context and how it is to be recognised.
Order and Disjuncture	Context as consequent upon the processes of development

Table 1 Three Frameworks for Understanding Context

2.1 Out-contextualisation

The first framework addresses context as a series of moves in information systems research studies from an a-contextual application of technology towards an increasing recognition of context enabling a richer understanding. The starting point is technological determinism which remains an important expectation of information systems for development. Technologies are seen as ‘carriers’ of best practice and development and are often viewed as the means to leapfrog stages in development. (see Toyama and Dias 2008) For example an UNCTAD report in 2004 is an example of this commonly encountered position:

‘Information and communication technologies (ICTs) offer unique opportunities for developing countries to narrow the development gap with industrialized countries. They have the potential to assist developing countries “leap frog” entire stages of development. However, despite the potential benefits offered by ICTs, significant barriers to their effective use exist in both developed and developing countries. These barriers must be addressed to allow the realization of the full potential of ICTs’. Some barriers may be endemic (e.g. the generation gap, learning processes and gaining experience in ICTs).’ (p. iii).

Technologies are conceived as diffusing or applied according to models such as the technology acceptance model or Roger’s model of diffusion (Rogers 1995; Davis 1989). This stance is widespread in the information systems research and is often considered as atheoretic or descriptive and generates calls for more theorization in research in this area. (Raiti, 2006; see also Avgerou, 2008: 134). However, interpretative studies in information systems research are critical of such accounts as they lack depth in their understandings of context. An influential example has been Andrew Pettigrew. Pettigrew (1987: 655) critiqued theories of organizational change which he argued were ‘*ahistorical, aprocessual, and acontextual in character.*’ Rather than focusing on change most studies he suggested focused on episodes of change neglecting their interconnections with other issues. He proposed that a process of change is better understood by describing it as unfolding on a horizontal axis of time complemented by a vertical axis of levels of context that identify an interconnectedness to higher levels of analysis such as a changing socio-economic context. The use of two axes creates a two dimensional mapping of a process of change that can be used as a comparative methodology of analysis.

Pettigrew’s approach has been important in information and development research (Avgerou and Walsham 2000; Braa *et al.* 2007; Madon 1993; Walsham 1993) and has led to important studies of the long term development of information systems in specific settings (see Madon 2010). Since the early 1990’s information systems research has employed and developed a number of theoretical constructs to represent context. Different theories represent context in new ways which seek to supplement or displace prior understandings leading to a deepening or broadening of understanding. Huen (2009) refers to this as a process of out-contextualisation and points out that a process of context displacement could potentially continue indefinitely as another context is identified which can include the prior context and so on. For example understanding context as culture or as institutions have been prominent in research in the past decade.

A consequence of a process of out-contextualisation is that new approaches could either be seen as teleological leading to a certain richer theory of context or new approaches could exhibit a certain fashionableness or less charitably be seen as fads (Harriss, 2004: 39). Another way to understanding context is to address theoretical differences as consequences and constructive of different discourses which is the approach of the next framework.

2.2 Discourses and context

A major theme and development in information systems research has been to classify and identify different research approaches using ontological and epistemological criteria. This philosophical stance has produced two significant classification schemas which adapt concepts in the social sciences to information systems research and set out positions on what context is and how it can be apprehended. Drawing on the work of Burrell and Morgan (1979) the classification of the epistemological bases of information systems research has been influential (Hirschheim and Klein 1989). Their well known two by two matrix identifies four incommensurable paradigms which each represent context differently as either productive of order or disorder and to be appraised as either independent entities or interpretative constructs. Using Chua (1986) Orlikowski and Baroudi (1989) identify three dominant research approaches: a dominant positivist approach which can either be descriptive or theoretically informed; an interpretivist approach and a critical approach. Understanding context differs in each approach: the positivist

approach treats context as tangible and usually measurable entities; the interpretive position posits a constructive and, in their reading, a subjective understanding of context; whilst the critical approach is argued to understand context as *'produced and reproduced by humans, but also as possessing objective properties which tend to dominate human experience.'* (ibid p19).

Chrisanthi Avgerou (2008; 2009) draws on this tradition in her major review of information systems research on development. Avgerou (2008) distinguishes between three different development discourses that have characterized the literature, each of which attend to the issue of context differently. In Avgerou (2009) she refines the final discourse to produce a four-fold classification discussed later.

Avgerou's (2008) first discourse argues that there is a "technology transfer and diffusion" discourse which emphasizes good practice models, diffusion models, acceptance models and methods (Davis, 1989; Rogers, 1995). As this discourse is technological deterministic it does not consider context as problematic. Here authors tend to assume that the development of the right technology will be able to solve similar problems in many different contexts. This discourse is analogous to the starting point of the out-contextualisation framework discussed above.

Avgerou (2008) identifies the second discourse as pertaining to the "socio-organizational conditions of developing countries" and the ways in which the use of technologies are changed and adapted accordingly. This discourse Avgerou (2008; 135) suggests challenges *"the feasibility of 'transferring' generic technical know-how into developing countries organizations with the expectation that it will result in the same organizational practices and outcomes as in their context of origin."* Instead technology should not be treated as being neutral and intrinsically useful, but as already embedding design decisions that emerged from a specific environment and history. Such design decisions shape the sense making processes and practices of those implicated (Akrich, 1992). Consequently, Avgerou (2008: 135) notes that this discourse *"arises from local problematizations and its course is determined [sic] by the way local actors make sense of it and accommodate it in their lives."* She highlights how such studies have drawn on a variety of social theories such as actor network theory (ANT) and structuration theory to develop their context specific analysis.

Avgerou's (2008: 136) final discourse is the "transformative ISDC discourse" concerned with *"the way that ICT is implicated in the dynamics of their change."* She cites Ciborra (2005) to explain that the local e-government project he reported on was shaped in part due to the *"complex network of state government controlling mechanisms."* She suggests this and other IS implementation projects place their emphasis on "macro level political and economic concerns" rather than technology per se or a specific local context. She explains that this discourse shares similar theoretical underpinnings to the socio embeddedness discourse. Thus, we can surmise that context for the "technology transfer and diffusion" discourse is unproblematic, while for the latter two discourses, context is separated by attending to either micro or macro issues.

In Avgerou (2009) this threefold classification is elaborated into a fourfold one implicit in the original framework (Avgerou 2008: 136) (see figure 1)

This framework shows how context is produced from the assumptions of different discourses: contexts can either accord with or disrupt transformation *qua* development and it can be understood as either predominantly a-contextual in orientation or concerned with adaption to local circumstances.

Avgerou's attentiveness to issues of the macro and micro develop notions of context that resonate with the vertical ontology of Pettigrew's contextualism, but though Avgerou deploys the concept of discourse the ramifications of a Foucauldian reading of discourse with its focus on power/knowledge remains underexplored. Similarly issues of how contexts of macro and micro are mobilized could be further developed. The final framework takes the notions of order and disjuncture to address some of these issues.

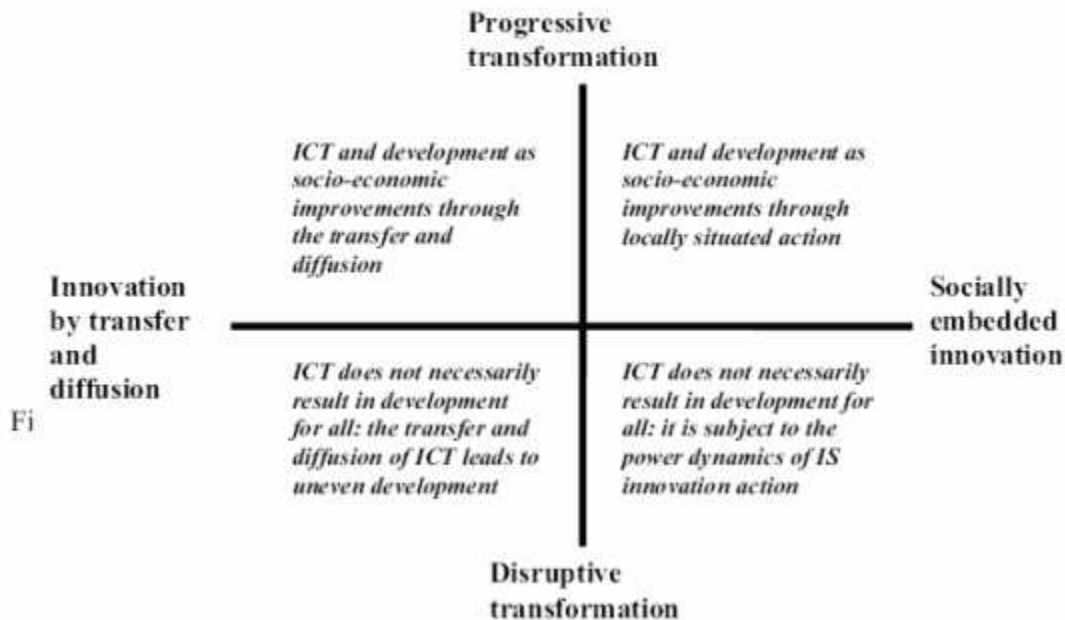


Figure 1: A Framework of Discourses in Information Systems and Development (Avgerou 2009)

2.3 Context as Order and Disjuncture

Lewis and Mosse (2006) address context tangentially through a framing of the organisation of development. Their concern is how to explicate frameworks of order and disjuncture which ethnographic accounts in the anthropology of development draw on. Unsurprisingly the issues and problems discussed have similarities to those in information systems research and development. Their first framework is that of the order of managerial and technical development and the disjunctures that arise as a gap between those ‘ideal worlds’ and the social realities they have to relate to. As discussed earlier this parallels concerns in the IS literature as a design/reality gap (Heeks 2002). Two management strategies can be discerned here. One is to seek to reduce the gap through the development of ‘best practices’ and improvements in design and better implementation approaches while the second is to seek to further understand the social realities of context and how they work so as to recast designs as ‘ideal worlds’ that are capable of being realised. If the former is mainly the domain of development specialists in which information systems design may play an important role the latter is the work of ethnography and anthropology in general in providing detailed understandings of the context(s) of development.¹ The question here is how to bring an understanding of the ‘social and the cultural’ – the context - into policy prescriptions and whether or how the complexity and relationality (Rao and Walton 2004) of this context is to be instrumentalised. This instrumentality can either be methodological by applying a specific model of development such as participatory rural appraisal (PRA) (Chambers, 1983) or conceptual, for example, by reifying context as ‘social capital’, ‘cultural heritage’ or ‘indigenous knowledge’. If instrumentality prevails then both participation and/or critique must of necessity operate in a dominant discourse of development aid (Ferguson 1994). Put differently development takes place in an economic and political consensus – the order of managerial and technical development – which reflects and reproduces a certain logic of political and economic relations. In the last twenty years the Washington Consensus is a convenient shorthand to characterise this position which emphasises market based development, freedom of capital movement, protection of intellectual property rights, and a limited role for the state (Gore 2000).

Their second approach takes the first position as the starting point for critique. Drawing on Marx (and Foucault) the ordering of discourse is in itself seen as one of exploitation and control which conceals the political relations of

development. Conceptualising context as, for example, social capital, or prioritizing methods, such as PRA, are viewed with suspicion as techniques of control and normalisation (see Escobar 1995). They quote Escobar (2004) as summarising these outcomes as *'the collapse of social emancipation into social control'*. The questioning here is of the process of development and how representations of context are represented in ways that allow them to be instrumentalised at least to some degree.ⁱⁱ²

Their third approach which we wish to build upon is suspicious of a unitary order and a specific factor acting as a logic of development be it capitalism, globalisation, a Washington Consensus or modernity. The procedures of development are themselves to be studied through ethnographic and other approaches and evidence of a multiplicity of agency and the presence of contingent practices questions the logic of development on the one hand and unitary representations of context on the other. As support for this position Lewis and Mosse refer, amongst others, to studies influenced by ANT and the work of Timothy Mitchell (2002).

Lewis and Mosse's framing of the practice of development augments the understandings in two other frameworks of context as either a process of out-contextualisation or primarily a product of ontological and epistemological commitments. They show that context must be understood in relation to the processes of development and all work of development includes conceptualising and connecting with the social and cultural to create contexts of engagement. They demonstrate the necessity of continuing care in handling expertise which is always inflected with questions of power and knowledge, but rather than stopping at this point they point to the contingency of practice and the multiple and unexpected ways in which apparently unitary projects are enacted.

3 Contexts of development

As discussed above in the majority of information systems research context is considered as the other of a binary category of content and context. Latour (1993) argues conceptual schema typically operate with pure either/or binary categories or black-and-white distinctions such as social/organizational versus technical, macro and micro – while what is involved in undertaking tasks is a hybrid mixture of many different influences or what he refers to as trans-categorical hybrids. In this sense Latour (1993: 50) argues that while our conceptual schemes are binary, the practices of the world are not, and this leads us to misconceptions. A binary conceptualisation suggests that the representation of context is highly dependent on the uses to which context is to be put. For instance, viewed as social capital context becomes a site to be mobilised as entrepreneurship; whereas context viewed as culture proposes approaches to adapt and ameliorate the implementation of systems. Furthermore, content viewed as unitary invites a view that context too is both different and capable of being expressed in a specific form. For example, expressing development as a unitary logic suggests either that context is either a logic of progressive improvement or one of control or exploitation. Drawing on Strathern (2004) and Lewis and Mosse we propose that unitary logics should be viewed with suspicion. The representation of context is one of connection to content but it is always one of partial connections and fragmentary logics which may rub against each other in unexpected ways. An expectation of multiple orderings and disorders suggests that the methods of research require rethinking too.

Returning to Cooper and Law (1995) they propose two understandings of organisations and, as a consequence, their contexts. A distal representation sets up entities such as organisations as discrete with clear cut boundaries. In contrast a proximal representation seeks to understand how organising is established whose consequences are organisations. Distal understanding identifies boundaries between content and context and focuses on stability whilst proximal understanding focuses on processes that (re)produce ordering (and disordering). Both understandings are necessary and complementary to each other. Context for Cooper and Law is a provisional consequence of a process of ordering between what is focused on as content and what is demarcated as context. Distal and proximal oppositions such as macro and micro context then need to be conceived of as being complementary to each other. It is these conceptualisations that we will draw upon to develop our discussion of the case example below both to illustrate their applicability and show that their usefulness in providing new interpretations of this case.

4 M-PESA

The rapid adoption of mobiles (or cell phones) in Kenya has led to almost 100% adoption in less than 10 years with 17 million subscribers (Jack and Suri 2009). M-PESA is recognised as an innovative mobile banking application which uses mobile phones as a means to bank and transfer money in Kenya (see Camner & Sjöblom 2009; Morawczynski 2008). It was introduced by the mobile phone operator Safaricom, a telecom operator part owned by Vodaphone, in March 2007. By 2010 M-PESA has gained 9.5 million customers in Kenya and has a network of 17,500 agents, who are also airtime resellers, spread throughout the country (Safaricom 2010). It is claimed to be *'the most successful mobile phone-based financial service in the developing world'* (Jack and Suri, 2009: 5) Most recently M-PESA accounts can now be used via ATMs and money transferred to M-PESA from outside the country (M-PESA 2010). The network of agents began as airtime resellers for mobile phones but as M-PESA agents they handle cash transactions and customers of M-PESA can deposit or withdraw money from their M-PESA accounts. To register for M-PESA a person provides photo identification such as a drivers licence to an agent which they check and register an electronic account linked to the mobile phone number. The account is activated when money is deposited with the agent (Morawczynski 2008). Mobile phones are used to handle the account and their main functions are to transfer money to other accounts, buy airtime and check their account balance. M-PESA is becoming cited as an exemplar of bankless banking (Lüftenecker et al. 2010) and attempts to replicate its success have begun in other countries such as neighbouring Tanzania (Camner & Sjöblom 2009).

At the outset it was proposed that M-PESA agents would use Point of Sale (POS) devices and customers would have magnetic striped cards but it was quickly realised that the costs for the airtime resellers would be prohibitive (Hughes and Lonie 2007: 70). Instead agents were given a mobile phone costing \$40 which had a different menu to customers allowing them to contact M-PESA by SMS. Handsets used for M-PESA had to be re-organised to provide both English and Swahili alternative menus and SMS applications. The processing of the M-PESA is run by a UK company Sagentia. At first Sagentia attempted to run the service using servers in Nairobi but the processing times were too slow and so the servers were sited in the UK. Currently all the processing of M-PESA takes place in the UK. From the start care was taken not to organise M-PESA as a bank and the Central Bank of Kenya (CBK) has allowed Safaricom to operate M-PESA outside banking regulations. In 2008 a number of banks in Kenya sought to have M-PESA closed down and, in response, the CBK imposed further conditions of M-PESA. The details of how the M-PESA money transfer system works since 2007 is shown as Figure 2.

The M-PESA interface is easy to use and runs from an application on the user's mobile phone. The service is launched from the phone's main menu and it loads quickly because the application resides on the mobile phone rather than on the network. The user is prompted by the menu, one prompt at a time. For a transaction all the processing including entering in a personal identification number (PIN) is done by the mobile phone and when the user has confirmed that the transaction is correct, it is encrypted as a single SMS message to Safaricom's M-PESA server (Mas and Radcliffe 2010).

M-PESA began as a research project jointly funded by Vodaphone and U.K. government's DFID e-Financial Deepening Challenge Fund. An early aim was to create a faster way of providing microcredit to people in rural Kenya and a partnership was formed with a microcredit agency Faulu Kenya and a commercial bank (Hughes and Lonie 2007). Nick Hughes, the instigator of the project within Vodaphone, saw M-PESA as a means of reducing poverty as a way to meet this Millennium Development Goal through the provision of microcredit and the engagement of the private sector (ibid: 65). His initial understanding of context was of the rural poor in Kenya lacking access to capital whilst it was readily available in Nairobi. M-PESA was to be the conduit providing microcredit and processing loans as they became due. DFID, it appears, understood the project as one of number of jointly funded development projects with a commercial partner. The funded project ended in March 2006. Vodaphone were surprised to find the number of uses that M-PESA was being used for: so much so that they hired researchers to investigate what activities the users of M-PESA were engaged in. At this time the context of M-PESA was being rethought. Safaricom who ran the mobile network (Vodaphone has a 35% stake in Safaricom) began to see M-PESA as a payment service, a revenue stream, and a means to increase customer retention whilst Vodaphone recognised it as a potential competitive international payment system. Both began to view users of M-PESA as customers and in 2009 M-PESA began to be profitable with new services being developed for M-PESA (Safaricom 2010).

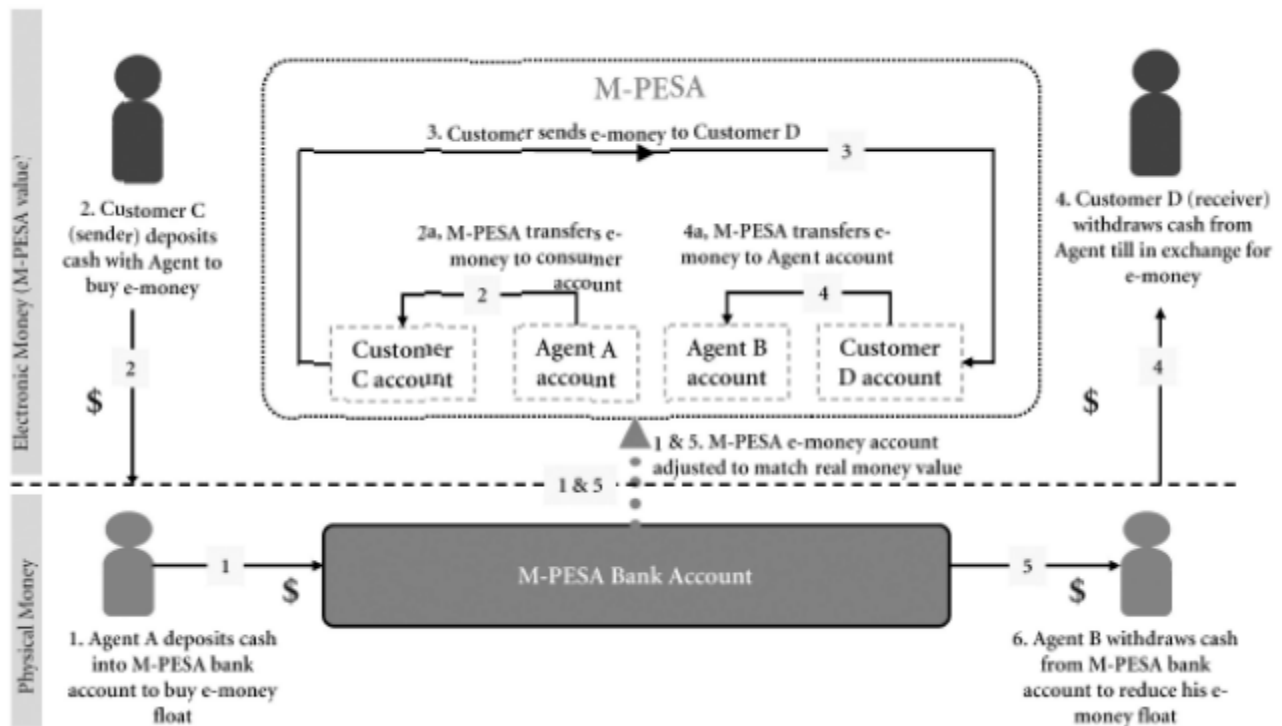


Figure 2: Overview of the M-PESA Service (Hughes and Lonie 2007:75)

This brief case study illustrates how the context and content of M-PESA shifted as the unintended consequences of the rapid uptake of M-PESA began to show that now the context is primarily viewed as one of market 'at the base of the pyramid' rather than facilitating microcredit (Mas & Radcliffe 2010). In M-PESA it is difficult to discern a unitary logic of development as different agencies coalesced around different agendas. It appears that the early understanding of context as facilitating microcredit has become more complex as the ordering and reordering of the project led to disjunctures being recognized and responded to.ⁱⁱⁱ For example the research project brought together different agencies with the aim to create a system facilitating microcredit but the actual uses of the system primarily for moving money was unexpected and led to research to see what was happening. Jack and Suri (2009) show users have multiple uses for M-PESA. For example, it is widely used for sending remittances but it is also used by many as a safe way of keeping money especially on journeys. Clearly a secondary literature offers limited insights into how contexts were understood and the scope is high for what we can call rational reconstruction. Arguably proximal accounts would be useful in identifying the framing and reframing of context amongst different agencies. Camner & Sjöblom (2009) and Morawczynski (2008) have conducted detailed research which goes some way towards furnishing proximal accounts but, as is discussed below, proximal accounts are conceptually more robust if they consider how distal perspectives and categories are constructed and enacted.

5 Discussion: ICT in developing context(s)

This penultimate section will discuss the notion of context, and specifically, the importance of viewing context as being inextricably interlinked with the working out of power relations. On the one hand technologies are frequently thought of as changing and stabilizing social relations and yet on the other technologies are themselves seen as changing and changeable. Here we first discuss the ways in which ICTs are implicated in stabilising context, second the ways in which the fluidity of ICTs may allow for change, and finally with regard to some methodological implications

Stability

The M-PESA case highlighted the importance of understanding the ways in which contexts are *stabilised* and changed and how ICTs are implicated in this. Akrich (1992), for example, used cases of technology transfer in Africa to argue that technologies based on the logic of designers carried scripts determining the roles of users. With regard to M-PESA, stability was achieved through the pervasiveness of the m-banking system's technology. The fact that access for agents was relatively inexpensive, that the technology was familiar, that there was an already existing mobile infrastructure in Kenya, and that it was also available in Swahili, all contributed to the wide scale rollout and the establishment of a critical mass of users. Such stability then was an outcome of an alignment of power relations and was fundamental for the intersection of the different contexts in relation to the m-banking system.

Further, there was a strong alignment between public and private organisations such as Vodafone and Sagentia internationally, and also with Safaricom and the Bank of Kenya nationally. From a distal perspective, this success could be seen as a way to stabilize and channel these relationships between all the different groups involved. The contexts became stable in part due to the political strength of the various networks of relationships and the design of the m-banking system itself. This strength to a great degree thus relates to the ways in which the visions of the designers of a technology, a distal perspective, are compatible with the specific context of use, a proximal perspective (Akrich, 1992). What is remarkable is the alignment of such a multiplicity of governmental, non governmental and private sector agencies that are involved in development projects. With regard to the proximal perspective, we know much less of the actual tasks performed by those involved in putting together both on the ground and from a distance. Such a view resonates with both Heeks (2002) and with Rossi (2004) who argue that what we often fail to attend to in our research is what Heeks might call the complexity of contexts or Rossi might see as the importance of disjuncture in the implementation of information systems for development. Thus distal categories are not only often unable to capture the complexity of the actually practices, but the scripts that they provide for their users come to shape the possibilities of what people are able to do. Indeed, while valuable, we claim there is, at times, an overemphasis on distal accounts of ICTs in developing contexts such as social capital. Distal views thus may tend to privilege stability. What we suggest is thus required is that as the distal and proximal are inextricably interlinked, this distal perspective could be further refined by a better understanding of the everyday activities of those involved.

Importantly, distal perspectives take M-PESA as descriptive of the success of m-banking or as showing the importance of mobile technologies in accessing social capital and developing markets and entrepreneurship. A critical, yet still distal positioning, could point to the dependencies in using technology for development (see Wade 2002). For example, Sagentia, a UK company, processes all the transactions for M-PESA by routing them through servers in the UK not to mention the ongoing investment of Vodafone and any specific requirements of donors such as DFID. The assumptions captured within such a distal view may contribute to the ongoing dependency of developing countries on funding by donor organisations, expertise, management frameworks and information technologies. Thus we contend that it is crucial to critically attend to distal categories if we are to better understand development. This will require future studies to question the sometimes political nature of distal representations of the impact and success of specific ICT4D projects, which may be more closely aligned to the upstream donor expectations (often captured in management terminology and through management frameworks) than the actual practices, requirements and issues in specific development contexts. Importantly, such a dependency is likely to be crucial to better understanding the fundamental basis of the "design reality gap."

Fluidity

The case example also highlighted that it is the same technology can be *fluid* enough to be made to work for different groups over time. Indeed more recently assumptions of the stability of technologies have become more nuanced. Much of this literature has come to emphasize the ways in which contexts can become destabilised. The M-PESA case example perhaps most fundamentally highlights the fluidity of ICTs as shown by de Laet and Mol's (2000) case of the working of the Zimbabwe bush pump. They sought to understand the influence this simple technology has in shaping the socio-technical landscape of Zimbabwe. They argue that the bush pump can be understood as a fluid object, as it could simultaneously be a tool to provide water, it was a way to provide health through clean water, and it was also a way to develop community as villagers gathered around it. This refers to what de Laet and Mol (2000:252) refer to by noting: "In each of its identities the bush pump contains a variant of its environment." de Laet and Mol propose that the bush pump has fluid boundaries due to the different roles that it enacts as a provider of water, provider of health or community builder. With regard to the ongoing proximal operation of the pump itself, de Laet and Mol (2000), with echoes of Schumacher's notion of appropriate technologies, note how this fluid object was specifically designed to allow the pump's parts to be substituted with materials that were easily available. M-PESA can be conceived of as being similarly fluid. For example, in the later stages, Safaricom viewed it as a payment service and Vodafone as a potentially competitive international payment system. DFID viewed it as a way to assist people in rural Kenya through micro-credit and some at Vodaphone, at least in the early stages, saw M-PESA both as a development environment from mobiles and a Millennium development project providing micro-credit. The mobile banking system did not determine the practices of those using the system, and thus it came to be used in many unanticipated and unexpected ways. It highlighted that the same technology was thus able to be used in different ways depending on the framing within the different context of use over time. What we know less about in relation to M-PESA were local assumptions and practices that emerged and were changed and sustained around this payment system or how the distal concepts of funders were interpreted and managed in the implementation of M-PESA. In this sense the context for M-PESA can best be conceived of as simultaneously distal and proximal and deriving from and shaping the content of M-PESA.

Methodology

Methodologically, one of the interesting outcomes of social science of technology studies was an early recognition that all information systems suppose a context of their use (Akrich, 1992; Woolgar 1991). Put more strongly designs of technologies set up ideal worlds of what is important, what is to be done and how control is to be exercised. Recovering changing design expectations in the M-PESA case helps us to better understand the contexts shaped by and shaping the initial development of M-PESA, and helps us to notice differences between actors, and how rationalities were negotiated and introduced.

In other words, a proximal perspective of M-PESA, informed by a *changing* distal categorisation and design drawn on by participants, provides an understanding of the unintended consequences and innovative practices arising from content and context that could shed light on issues of pertaining to the important debate on the possibility of being able to replicate the successes of local ICT4D projects on a larger scale (and generalisation more broadly). Our analysis also highlights how the processes of design and implementation are theoretically loaded and important. This inherent bias of specific frameworks, not to mention the broader political context (such as donors) that shape the selection of a theoretical framework, is thus also crucial if we are to understand why and how specific ICT4D projects are first identified as being successful and then how they are to be replicated on a wider scale.

A distal reading of technological implementation will tend to view success or failure through the lens of a specific theoretical position. A proximal perspective emphasises the importance of an ethnography of design and implementation that enable insights into how content and context are made and remade and how boundaries are set out in relation to each other. However, as the concept of out-contextualisation indicates, multiple orderings make it impossible to produce definitive accounts even through proximal understandings. Proximal accounts can be helpful in discerning the presence of instrumentality describing contexts in specific ways.

However what is crucial in understanding context, especially so with regard to ICTs and development, is to recognise that conceptual schema remain partial in their representation and perhaps instrumental in their mobilisation of context. A binary conceptualisation suggests that the representation of context is highly dependent on the uses to which context is to be put. There is a danger then that the conceptual schema frames context in a particular way which reflects the schema rather than the practices that shape and are shaped by the specific context.

M-PESA highlights that context was viewed (and enacted) differently by the multiplicity of agencies informed by distal conceptualisations such as markets, social capital, development, and yet attentive to the specific day to day contingencies of deployment. This, we suggest, folds 'macro' categories into 'micro' activities and calls into question such categorization. In its place, methodologies should be preferred that use proximal perspectives from close engagement with the practices of development coupled with an attentiveness to how distal concepts are employed and adapted. This can give insights into how projects are innovative and yet difficult to scale up from a specific entangling of content and context.

6 Conclusion and Implications

This paper has sought to provide a theoretical contribution to information systems research in global, international and cross cultural contexts. It argues that the theoretical understanding of context needs rethinking in the light of developments in the anthropology of development and social studies of technologies. The paper presented three related, though divergent, frameworks for understanding context in ICT4D. First, developments in the theorisation of context can be viewed as an increasing attention and sophistication in the representation of context. Drawing on Huen (2009) this is a framework of out-contextualisation which has no endpoint as each new rendering of context can always be repositioned and displaced by further representations of context. Second, context can be framed as a consequence of discourse or philosophical commitments (see Avgerou, 2008, 2009). Both frameworks point to divergent representations of context and demonstrate that language and representation is important in setting out the possibilities of engagement with context and how it is to be recognised. Arguably neither draws sufficient attention to the processes of development. Drawing on Lewis and Mosse (2006) a third framework considers context as consequent upon the processes of development as one of ordering and disjuncture and it is this insight that is developed further in this paper. The paper challenges ideas of a unitary logic of development and thus of content and proposes that both content and context are more fruitfully understood as multiple and provisional orderings which are, at best, partially connected. A research issue is how to provide accounts that both give voice to these partial orderings and can show the processes of re-ordering that occur to produce unitary accounts of development commonly encountered and required by development agencies (Lewis and Mosse 2006). The proposal set out here draws on Cooper and Law (2005) and argues for a combination of proximal (of the processes of development) and distal accounts (using the categories of development) that illustrate how content and context are outcomes of multiple (and often partial) reordering that combine elements of stability and fluidity. The consequences of this theoretical rethinking of context are fourfold for studies of information systems research in global, international and cross cultural contexts.

First, 'the social and the cultural' are always actively reworked in development to provide representations of context. These representations provide partial connections and shape the content of IS development projects and may be used instrumentally. For instance, representing the poor as potential entrepreneurs reinforces ideas of social capital and the role of markets. They are though only partial representations. The M-PESA example shows that even though M-PESA is now considered as providing m-banking for the unbanked; its customers are drawn from the better educated and wealthier elements of rural Kenya (Mas and Radcliffe 2010). Second, how context (and content) is partially ordered requires a *reflexive* understanding of the processes of development. The framing of context derives both from the theoretical categories applied in development and the processes of that development. Third, as out-contextualisation alerts us to, there is no unitary position or representation available that will provide a definitive understanding of context (or of content). The framing of context is always partial and provisional and this conceptualisation shows the importance of looking for and recognising innovation and unintended consequences in every application of information systems in these settings. Such an understanding suggests that the scaling up from specific success projects is potentially much more complex than is sometimes thought. Finally, this rethinking of context has implications for research. Close ethnographic or detailed engagement is necessary to retrieve proximal accounts but they are more interesting if they pay attention to how distal concepts (such as social capital) are adapted, used and reinterpreted in the implementation of projects. In this way concepts that are sometimes treated as of different orderings (as in the first framework) or different philosophical positions (as in the second framework) can be found together in the ordering and disjuncture of information technologies for development.

7 References

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ⁱ The demands of evidence based policy appraisal are evident in this approach as the outcomes of specific programmes of development and information systems implementation are checked against pre defined criteria.

ⁱⁱ Space does not permit the complete development of their argument here but Lewis and Mosse also elaborate a Foucauldian position of governmentality drawing on Foucault's concept of positive or pastoral power. However, this technique may easily be realigned as one of disciplinary power (Lewis and Mosse 2006: 3)

ⁱⁱⁱ We are grateful to a reviewer for making this point clear.