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# 2

## Structurational Explication of Technology Adoption in ICT4D: A Throwback to Giddens

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### **Introduction**

Adoption of ICT for development (ICT4D) has received much political attention particularly after being linked to the Millennium Development Goals. It has also received corporate attention with several bottom-of-the-pyramid initiatives by corporates. It has consequently been of high research interest in the Information Systems (IS) management field. In turn, research in the IS field has taken various theoretical perspectives to explicate the process of ICT introduction and adoption aimed at economic development in underprivileged communities (cf. Avgerou, 2008; Heeks, 2008). A theoretical perspective prominently embraced by this research stream is Anthony Giddens' social theory of structuration (Giddens, 1976, 1979, 1982, 1984). In this engagement, IS research has not only embraced but also modified Giddens' theory of structuration, deploying it to understand how technology evolved in the hands of the user (Donner, 2007; Orlikowski, 1992, 2000), resulting in the propounding of Adaptive Structuration Theory (AST) (DeSanctis and Poole, 1994). Perhaps the choice of structuration theory to understand development processes is apt since development of a community is to a large extent social in nature, that is, social interaction forms the cornerstone and the platform on which community development plays out. In the wake of a technology push worldwide, however, much of the structurational explication of technology evolution seems to leave a gap in the socialised understanding of processes involved in ICT4D. This gap arises from centring explanations for ICT4D on the technology evolution aspects while insufficiently capturing the importance of the agent or user in the technology-user engagement. It is reflected in what has been called ICT4D 2.0 by Heeks (2008) and in the social embeddedness research

stream in ICT diffusion (Avgerou, 2008) that suggest a ‘productivity paradox’, that is, a lack of productivity increases despite apparent ICT diffusion (Mann, 2004). It has also shown up in the scepticism of some research accounts about the developed world’s ability to contribute meaningfully to ICT4D in developing societies (Brewer et al., 2005) due to the failures of several ICT4D interventions (Heeks, 2008).

This gap in understanding stands out when examining what is not explained by the current positions taken by the structuration view of technology in IS literature. For instance, why does a practice that the designer-manufacturer-supplier of a technology expects to set in – introduced through specific features of the technological product – not get adopted? Social processes are central to ICT adoption and are also at the centre of structuration, and hence, application of the social theory of structuration to understand ICT4D seems appropriate. However, Giddens’ own criticism of the applications of structuration theory and particularly of empirical enquiries that have drawn on and extended the conceptual framework of structuration theory, often aggressively, is pertinent: ‘... on the whole I do not feel overly sympathetic towards the ways in which most authors have employed my concepts in their work’; he further emphasises in *The Constitution of Society* that ‘the (structuration) theory should be utilised only in a selective way in empirical work and should be seen more as a sensitising device’ (Giddens, 1989, p. 294).<sup>1</sup> This chapter employs a faithful interpretation of Giddens’ structuration theory to better understand the conceptual gap in the ICT4D literature mentioned above.

### **A return to Giddens’ social theory of structuration**

The process of new technology adoption has generally been well researched (Baron et al., 2006; Davis, 1989; Venkatesh et al., 2003). When examining technology adoption in less-developed markets, one finds, more often than not, the introduction of western concepts, practices and technologies into a non-western milieu. In recognising an interactive structure for the bottom-of-the-pyramid market (Pralhad, 2006), the ICT4D social embeddedness literature focuses on how technology evolves as the user adapts to it. The co-creation literature that emerged from development agnostic discourse (Grönroos, 2011; Prahalad and Ramaswamy, 2004) was more vigorously applied to the development arena with contextualised data (Dahan et al., 2010; Donner, 2006). The primary concern in much of the literature of ICT4D was on how

suppliers of technology could modify their technology and products to suit the 'needs' of the user market. However, suppliers of the technology/products as well as the socially embedded discourse in the literature still worked from the premise of being in a superior position vis-a-vis the user – as being knowledgeable in the technology/functionality – and so more effective in deciding what the users' needs were with western-style development as the goal. Thus technology appropriateness was of central concern. The emphasis on the evolution of the technology as structure in the ICT4D discussion, thus, largely missed the importance of the user-agent's role in the direction the interaction and, hence, the 'development' would take. Structural explanation extended to this process focused on technology as structure, necessitating a decentring of the agent, and reflected a turning away from Giddens.

### **Putting the agent back in focus**

There is ample disagreement on what constitutes development, particularly whether economic improvement alone could be considered the development goal. This is a narrow view of development that subsumes into an economic straitjacket the complex emotion of ontological security that Giddens posits as being threatened in the modern world through 'manufactured risks'. The ontological security needs to be 'actively regrounded' by the agent in personal ties with others by actively building trust (Giddens, 1989). This necessitates fuller attention to the importance of the social agent in the development–technology interaction.

In structuration, structure exists as 'instantiated in (agentic) action' (Giddens, 1984, p. 377). The agent has a lot to do with the interaction as some of the extant literature in the ICT4D arena also presents (Donner, 2008). However, the structural explanation in IS that is adopted in the ICT4D literature underemphasises the role of the user-agent by underestimating what Giddens calls 'power' in structuration. To appreciate 'power' in the Giddensian sense, it is necessary to appreciate the nuances of the 'duality of structure' and the 'knowledgeability' of the agent in structuration. The following sections briefly outline the Giddensian concepts of the duality of structure, agency and knowledgeability, as also the concept of unintended consequences, and then the aspect of power in structuration theory, to explicate why ICT4D failures might be anticipated and, indeed, a productivity paradox may occur, by a structuration perspective using a straightforward Giddensian interpretation.

## **Duality of structure, agency and knowledgeability, and unintended consequences in structuration**

The central concept in Giddens' structuration theory is the 'duality of structure', that structure is both enabling and constraining (Giddens, 1976, 1979, 1984). Fundamentally, this means people make and remake or confirm social rules and norms (structure) with what they do by using those norms in their action. Human agency and structure are inextricably linked with each other. Thus, Giddens emphasised the enabling aspect of structure, that it 'is not to be conceptualised as a barrier to action, but as essentially involved in its production' (Giddens, 1979).

### **Rules-resources framework**

Giddens likens this interpretation of the structure of a social system to the rules and syntax of language which agents reproduce as the language structure just by using those rules/syntax of language while communicating meaning. The agent thus reproduces the rules and syntax of language unintentionally, that is, the structure of language gets reproduced or affirmed as an unintended consequence of conveying meaning through the use of the language. This is the recursive quality of language (Giddens and Pierson, 1998). Similarly, an individual recursively reproduces social structural rules while carrying out a social act. In Giddens' words:

When I utter a sentence I draw upon various syntactical rules (sedimented in my practical consciousness of the language) in order to do so. The structural features of the language are the medium whereby I generate the utterance. But in producing a syntactically correct utterance I simultaneously contribute to the reproduction of the language as a whole. This view rejects the identification of structure as a constraint: structure is both enabling and constraining. (Giddens, 1982, p. 37)

The path dependence operates through the agent's 'knowledgeability'. Even if an actor or agent is taken as initiating interaction or engagement, 'at the same time all action exists in continuity with the past, which supplies the means of its initiation' (Giddens, 1979, p. 70), as structure encompasses the rules of engagement that sediment as memory traces the agent draws upon. The ability of the agent to engage with structure through action is due to what Giddens calls the knowledgeability of the agent/actor, the 'tacit and discursively available knowledge' that actors have (or believe in) about the circumstances of their action

and draw upon in action (Giddens, 1979, 1984). Simply said, according to Giddens, every human agent is knowledgeable in the practical consciousness and has a 'vast variety of tacit modes of knowing how to "go on" in the contexts of social life' (Giddens, 1976, 1982).

In the structuration context of ICT4D, the agent in a less-developed society is knowledgeable in the social interaction within his/her setting, and the agent's knowledgeability is indeed instrumental in his/her ability to recursively produce and reproduce the 'structure' as an ongoing process, even though it is reproduced as an unintended consequence of the action, reflexively. The agent acts through those rules and resources, that is, the structure, in everyday social interaction.

Decentering the ICT4D effort from a technology evolution perspective enables us to appreciate this aspect of agentic knowledgeability in structural terms and how this knowledgeability would be instrumental in a community's social practices and in adapting to the introduction of any new gadget or technology. The power of the agency in having a choice of using a newly introduced artefact is tempered by his ability for continuous reproduction of existing norms. However, the agent's power also has the dimension of transformative capacity as Giddens reiterates in structuration theory.

### **Power as transformative capacity in structuration**

Structuration involves knowledgeability of agents and reproduction of structural principles as unintended consequences of action by the knowledgeable agent. However, in the agent-structure interaction, the agent does not have to yield (to structure) as her/his knowledgeability incorporates choice in the ability to act otherwise. Giddens expounds on this in relation to power in structuration theory. He explicates power as the third element of structuration and elaborates as follows:

I . . . see power as an elemental part of the logic of the social sciences . . . So it is agency, structure and power . . . It is the capability to do otherwise and that is the basis of power. (Giddens in: Giddens and Pierson, 1998, p. 84)

Power is often seen as related closely to conflict. Giddens argues that the concept of action is logically tied to that of power, where power is defined as 'transformative capacity', and relates power to interaction. While Giddens takes the conception of power as domination, he does not agree that it is necessarily bound with conflict. This has relevance

in the case of the resource-poor rural farmer negotiating the season's produce. Structurally, power is seen both as transformative capacity and as domination, as a relational concept but only operating as such through the utilisation of the transformative capacity as generated by structures of domination (Giddens, 1979, p. 92). "The interplay of the two, i.e., 'domination' as a structure and 'transformative capacity' as agency, implies that power is understood as 'interaction where transformative capacity is harnessed to actors' attempts to get others to comply with their wants. Power, in this relational sense, concerns the capability of actors to secure outcomes where the realisation of these outcomes depends on the agency of others" (Giddens, 1979, p. 93). Power relations, according to Giddens, are always two-way, as 'involving reproduced relations of autonomy and of dependence' (Giddens, 1979, p. 93) with neither side entirely autonomous nor entirely dominated. Giddens calls this the 'dialectic of control', that is built into the very nature of social systems (Giddens, 1982). In the less-developed country, the rural farmer is knowledgeable about the dialectical relationship with the traditional middleman broker/buyer of the produce, and a new technology introduced that is alien to or ignorant of that knowledgeability suffers from correspondingly slow acceptance/adoption. That may well be because it is more likely a symbiotic and generative two-way interaction, rather than a 'successful adoption'.

### **ICT4D through a Giddensian lens**

The rural farmer-agent in a less-developed community acts in his own social structure, that is, by the rules and resources that have been the environment of his daily life and that forms his social structure woven into what Giddens calls the 'longue duree' of institutional time (Giddens, 1979, 1984). The agent operates in keeping with memory traces of historically long association with this social structure. The introduction of a new medium in the interaction, that is, a technological gadget, may put a new degree of power in the hands of the agent. This new power as transformative capacity with the agent faces the established social structure that has been reproduced over time every time the agent (and other agents) has acted according to that structure of existing rules with existing resources. How a practice or social structure starts to form and, by extension, how changes in structure occur is under-researched in the structuration theory. Giddens leaves this question with merely elaborating agentic power as transformative capacity, discussing it in the context of the reproduction of the ongoing structure

or practice and in the context of modernity with social movements acting as 'levers of social change' (Giddens, 1989, p. 278). However, in the context of individual transformative capacity, Giddens discusses power more as the capacity of the agent to choose 'to do otherwise' – ostensibly while facing the more powerful – and to keep his existing rules of engagement, thus reproducing the existing social structure. While agentic power may be used 'to do otherwise' in resisting the new technology, it is when the agent chooses 'to do otherwise' using her/his power as transformative capacity and going against the established social structure that the question of change would arise.

## **Modernity and change**

The duality of structure is manifested in the social practices of knowledgeable agents that recursively organise the structured properties of the social systems they populate, not only within the existing rules–resources framework but often modifying them with alternative rules and resources (Whittington, 1992). Structure, that is, the rules of engagement sediments through action over time. The structure, instantiated in action, thus is enabling or constraining with the individual agent acting with or against it. When the agent acts along established rules with existing resources, the structure is reproduced as an unintended consequence of agentic action. When agents act against the established rules/norms, over time, the rules of engagement could change and a new social structure could be produced and then get reproduced as that is repeated, again as an unintended consequence of action.

It is social interaction rather than interaction with artefacts – technological gadgets or technology – that is the source of the reproduction of the Giddensian structure. An artefact/technology being modified by the supplier to goad the user-agent to ostensibly use enhanced power to change his/her social structure and give rise to new rules of engagement in their social life is a strategy emanating from the seller's own social structure dictating the selling action. The user-agent may use the new artefact to reproduce the existing structure or break from it to transform it. This is the power as transformative capacity (of the knowledgeable agent) that structuration theory points to, and this is the fountainhead of change in social practice, that is, through the choice the agent has. Although not elaborated in structuration theory, Giddens offers power as the transformative capacity of the agent, rather than reproduction of the structural properties of the environment, as the clear route to change. However, Giddens discusses change in structuration in the

context of large scale movements or evolutionary social movements, as levers of change as mentioned above. In that sense, a Giddensian interaction by way of structuration that brings about change is not an individual effort of one but continued agentic action over time that produces and reproduces a modified social practice as a new structure. This may relate to the long time that seems to be needed for the adoption of change to new technologies and products and even from development schemes by development agencies introduced in 'less-developed' regions. The lack of long-term sustainability of development initiatives observed only evidences the strength of the social structures sedimented over time, a confirmation of Giddensian social structuration. However, with change being seen more rapidly in the world, a consequence of modernity over the last three centuries, social structures are becoming less stable with heightened aspects of danger and risk and threats to life's ontological security and to trust in social interaction (Giddens, 1990; Giddens and Pierson, 1998). With modernity's edge being felt through the threat to a secure life, generally, economic security has become a matter of singular concern to the poor. In this present day, environment of uncertainty, wider democratic institutions and social equity awareness, economic incentive is therefore more likely to engender a change in agentic action that encourages a reorganisation of existing social practice today more than in earlier times. In this context, it is telling that a change of an ICT initiative from the Internet-mediated scheme to an SMS-based mobile phone system (insightfully called Warana Un-wired) found much greater uptake among farmers of a sugar cooperative in Warana in Western India because the lower cost and the higher convenience was seen as less invasive to the community's social practice (Veeraraghavan et al., 2007).

### **The centrality of the 'social'**

Lasting changes to structures of social interaction required for economic development need long-time horizons. The Indian multinational ITC's 'e-choupal' initiative conceived in the late 1990s is a case in point. Though it started small, it had a synergy with the company's strategy of diversifying into hotels and foods and FMCG (fast moving consumer goods, e.g., personal hygiene products), away from its mainstay businesses – tobacco, a sunset sector, and paper, a traditional sector, subject to commodity cycles. Much has been written about ITC's e-choupal initiative bringing latest market information and crop advice to farmers through a computer and internet connection at a kiosk to empower

farmers who traditionally sold their produce through an agent-led auction at the nearest 'mandi' (wholesale/market yard). In terms of the sociology, it is of fundamental importance to note that the kiosks were run by chosen educated and trusted opinion leaders and mostly housed at their homes. This substantially preserved the village social structure. Further, the erstwhile middleman between the farmers' produce and the market was also retained as a commission agent with incentives for his income as the company used the channels set up for taking farm produce from the villages to markets to also supply consumer goods (from tooth paste to tractors) to the villages in a reverse flow. Over the 15 years since the inception of e-choupal to the present, the company set up large retail-cum-storage warehouses for the two-way trade, that is, for the farmers to sell through and the various agricultural and non-agricultural consumables for the farmers to buy at. A fundamental synergy also operated in that suitable farm food produce was directed to the company's motels and hotels for consumption. While it is difficult to gauge if this initiative, as part of the company's overall activities, has reached economic break-even, the company's new FMCG initiative that is tied to this effort is expected to break even earlier than envisaged in 2017 (Mukherjee, 2012). However, in sociological terms, it is pertinent that the company had taken a 20-year horizon for the e-choupal initiative and also synergistically tied it to other related business initiatives. The penetration and coverage of the e-choupal initiative – 40,000 villages in 16 states in India as of December 2011 (TNN, 2011) – is indicative of the possible success the company could derive in business terms. The success, however, rests on the furtherance of endogenous change in social structure defining the village communities' interaction with the world, and the long-time horizon afforded could well be the key to delivering ICT4D. It is the village communities' actions to pursue economic stability for themselves, within the existing social structures and perhaps often in the face of clashing norms, and using agentic power as transformative capacity that will shape the new social fabric with new social and economic interdependencies in a structural way over time.

In theorising structure further, Giddens elaborates on the signification, legitimation and domination structures that are present in social interaction (Giddens, 1982). In terms of behaviour in civil society (not concerning law and order or military struggle), the higher the legitimation and signification aspect of the social structure, the less is the possibility or, indeed, the need for a structure to evolve as one of domination. Therefore, development initiatives through new-for-the-community

technology need to interact with existing signification and legitimation structures adopting high interactive communication strategies to encourage adoption. In this respect, for instance, the poor and near absurd translation of words into the local language (e.g., in offering local Bangla language functionality on mobile phones in Bangladesh by some hand set manufacturers) reflected a dissonance with the signification structures of the Bangladeshi farmer community and fared poorly in the legitimation dimension as reported by Dey et al. (2013). The e-choupal initiative of ITC with important local participation helped score highly in the existing signification and legitimation structures in the village communities. Along with the freedom given to farmers to sell their produce anywhere, with incentives to sell to ITC, it concurrently allowed for a structure of low domination, building the trust that is usually deficient in the investment-profit-investment cycle of today's commercialised social structure that a corporate initiative implies.

In the light of Giddensian structuration, the question then is, how and over how much time must ICT4D designers of a new technology adapt the technology to user needs or follow users as they either change their own social structure or change the technology/artefact to suit existing social structures? In most cases of ICT4D interventions, it is a mix of all these processes. The way users change the intended use to suit their practice is most contextually visible as several empirical research accounts have shown, for example, Dey et al. (2013) and Donner and Tellez (2008). In any case, rather than the artefact being the structure in interaction, it introduces potential for agents to shape new structure or rules of practice in society that in turn shape agentic action and the interaction in a structurational way. The agent acting within the existing structure and, with altered resources – perhaps with a new artefact – transforms the immediate transaction rules, thus making a dent in the existing social structure. Over time with others following suit, that structure is modified. The technology, like any artefact, forms part of the resource environment and is a characteristic of modernity (Giddens and Pierson, 1998). The social interaction, rather than the technology artefact or the gadget is the instrumental aspect of ICT4D initiatives, and impact and adoption of such initiatives will depend upon the focus on the social rather than the technical. An exploration based on the original structuration theory helps simplify the understanding of technology uptake in ICT4D through an appreciation of the capabilities that the user world brings.

An interesting perspective emerges when we remind ourselves that the technology product designer-seller community also interacts in a

social milieu within the investment-profit-investment social structure of modern times (Giddens, 1990) There is likely much scope, beyond this piece, to explore the interaction of the two sub-cultures. This may also bring suppliers looking for smoother adoption of technological artefacts to explore ways to match their innovations to – or, indeed, be led by – an understanding of the users’ social norms that have sedimented over time.

## Concluding remarks

This chapter did not purport to evaluate the effectiveness of ICT initiatives for development. The objective of this chapter was to enhance understanding of the structurational explication of ICT4D, which often is subsumed in a technocentric discourse on the one hand and results in a rejigging of the social theory of structuration on the other. Bringing society and social interaction back in focus in the discourse and calling on an original Giddensian understanding of social structuration obviate the need for the theoretical adaptation of the concept to study ICT4D or, in fact, technology adoption in general. The social theory of structuration in large part explores universal social structures and movements. Positioned in context, it can yet guide the understanding of ICT4D processes through the concepts of duality of the social structures that enable as well as constrain agentic action in an autonomy–dependence dialectic. The continuity of traditional social structures and, hence, a rejection of a change, can ensue depending on the way the dialectic moves with the introduction of a technology artefact. On the other hand, the understanding of change is suggested through the agent’s power as transformative capacity to initiate change in the traditional social structures of the agent’s past or mould the newly introduced technology into the fold of the traditional social structures.

## Note

- 1 The use of structuration theory in accounting, for instance, where Macintosh and Scapens (1990) and Scapens and Macintosh (1996) interpret structure as the accounting practice rules was stoutly challenged by Boland (1993, 1996) as taking artefacts as Giddensian structure. Aggressive modifications in interpreting structuration theory may be because Giddens’ ‘vast output is not easily summarised’ (Whittington, 1992, p. 694). To understand text messaging language structurally in IS, for instance, would be to consider the technology that enables text messaging as an artefact, and the (English) language syntax and usage as forming the structure that enables the users to communicate, on the one hand, and also constrains use (i.e., unintelligible grouping of

words or grouping of words contrary to current usage) on the other. However, the users' making of new shorthand expressions such as gr8 for 'great' or ttyl for 'talk to you later' constitute new rules of engagement that produce a new structure and, when followed by several people over time, change the (English) language structure to reproduce the new structure of phone texting language (started due to imposed character limit but now widely used as a new medium of expression).

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