LSE Research Online

Article (refereed)

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With increasing emphasis on the informational aspects of the economy, there are calls for the reform of existing institutions and related policy changes to maximize economic efficiency and to foster equitable distribution of the benefits of "knowledge economies." Frequently those who propose new institutional solutions are fascinated by the pace of technological innovation, so much so that they fail to heed lessons that can be drawn from the various and rich strands of twentieth century institutional economics.

In this paper, the focus is on the lacunae in our understanding of the emergence of new institutions for governing the provision of Internet-based business services. The specific services of interest in this paper are those arising from initiatives that seek to develop large-scale distributed open source software applications for use by small and medium–sized enterprises (SME). Although considerable attention is being given to the micro-level practices of communities of software developers in the open source movement in the research literature, insufficient attention is being given to how these actors develop and maintain sustainable relationships with other actors with whom they must interact to introduce viable service innovations. As these relationships develop, new institutions or "working rules"—as John R. Commons might have designated them—begin to emerge to manage the governance requirements for such initiatives.

In this paper Commons' perspective on the origins of "working rules" is employed as a complement to more situated accounts of the emergent practices of actors involved in a European Commission–supported project aimed at creating a sustainable open source Internet-based platform for SME business services. The case is of particular inter-

est because there are no "off-the-shelf" templates from which effective "working rules" can be taken to assist in building governance institutions.

Working Rules and Institutions

Commons' (1924, 1934) work on collective action provides particularly helpful insights into the evolution of institutions of governance in part because his analysis does not rely on strong rationalist assumptions such as those underpinning the theory of collective action developed by Mancur Olson.[1] Commons defined institutions as "collective action in control, liberation and expansion of individual action" (1931, 1). He treated institutions as "negotiated orders" and observed that emerging institutions involve new forms of collective action because they link individuals together within new constellations of relationships.

If collective action is to occur and be sustained, Commons argued that the different actors involved must negotiate "working rules" to govern their actions. It is through these negotiations, he suggested, that any form of collective action is feasible at all.[2] He regarded scarcity and conflict as social phenomena that create a need for institutions. When scarce resources lead to conflict and competition, these can be mediated by institutions that foster cooperation. Cooperation was seen as arising, not from a convergence or harmony of individual interests or harmony within social groups as social capital theorists often suggest (Puttman 1993), but from the intentional decisions of the actors involved. Thus, cooperation "involves the gradual discovery that social co-operation rests, not upon a divinely appointed or 'natural' harmony of interests, but upon a state of order that men learn to establish among themselves" (Commons in Mitchell 1935, 651). Co-operation is best regarded therefore as learned behavior arising out of social interaction.

The establishment of "working rules" was seen as the result of learning. Transactions were understood as being rich and complex relationships involving intersubjective experience that shapes ideas and outcomes among individuals with different understandings, goals, preferences, and, importantly in the present context, access to various bodies of knowledge. "Working rules" define what "the individual can, cannot, must, must not, may or may not do" (Commons 1934, 17). Such rules constrain and facilitate actions, offering a framework within which individuals embedded in an institution acquire a sense of reciprocity and security of expectations. Out of deliberation about working rules comes the resolution of differences and the potential for sustained patterns of collective interaction. From an empirical standpoint, Commons' insights suggest that in order to understand a new context for interaction such as Internet-based open source business services, we need to examine the negotiations, expectations, conflicts, and interdependencies that are characteristic of that institutional environment.

Regional Dynamics and ICT Potential

A sizable body of work has been produced in an attempt to understand the growth and development of regional innovation systems, often designated as learning regions, in which firms of all sizes both cooperate and compete.[3] There have been numerous initiatives in Europe aimed at stimulating European leadership in the production of innovative technologies and at developing socially cohesive and equitable markets that are competitive on a world scale (Mansell and Steinmueller 2000). Many of these initiatives focus on specific regions within Europe. The potential of information and communication technologies (ICTs) has been examined as a means of providing new sources of regional competitive advantage, especially for smaller firms (Castells and Hall 1994). It has been argued that the use of advanced ICTs to enhance the prospects for the codification of knowledge (Cohendet and Steinmueller 2000) is providing a new basis for strengthening the performance of SMEs.

Much of the existing empirical work on the role of ICTs in "learning regions" focuses primarily on the way ICT use may foster the exchange of tacit knowledge. It examines how this knowledge becomes embedded within various communities or networks of practice.[4] Learning is seen as a product of the new meanings and emergent structures that arise from the sharing of common experiences. From this vantage point, knowledge emerges from routines, conversations, stories, and repeated interactions, rather than being embedded in formal rules (Ancori et al. 2000).

The communities or networks of practice perspective emphasizes the importance of culture and context in understanding what occurs in any given set of actor relationships.[5] The analysis of the practices of actors within regions is helpful in understanding the synergies that give rise to cooperation. However, until recently, this approach had not been applied to examine the emergence of working rules that may sustain cooperation in the context of Internet-based business services that employ open source software to support regional development (Berdou and Dini 2005).

The development of commercially viable Internet-based business services for use by SMEs has employed proprietary software code for some time. The European Commission has fostered these developments through its succession of Framework Programmes on Research, Technology, and Development of Information Society Technologies. The European Commission is now also supporting an innovative project that has the goal of establishing a sustainable Internet-based business service creation environment employing open source software. The Digital Business Ecosystem (DBE) project is an Integrated Project under the European Commission's Framework Programme VI.[6] One objective is to provide Europe with an advantage in innovative software applications development by its software producer SMEs. [7] An output of the project is an open source software infrastructure to support the evolution of services for SMEs.

As this publicly supported experimental project nears its conclusion, a significant barrier to its continuation as an economically viable service platform is the absence of a set of working rules that would enable the software producer SMEs and other partici-

pants in the project to sustain the software platform that will have been created over a three-year period.

Practice of DBE Institution Builders

The notion that the Internet and open source software development practices provide a foundation for innovative forms of collective action between widely dispersed individuals and firms is influenced by research in the communities of practice tradition. Micro-level studies in this tradition attempt to uncover the self-generative properties of ICT-based service development. In the case of the DBE project there are several interdependent communities of actors: the free/open source software community, the software producer firms (large and small), higher education institutions, and European policy makers at local, regional, and European community levels (Berdou and Dini 2005). The economic sustainability of the DBE infrastructure platform depends on the relationships that are evolving between these groups and the choices they make about institutions of governance. The emergence of "working rules" that will enable intentional collective actions in these Internet-based environments is crucial to the long-term sustainability of the DBE platform.

Within the DBE project an initial attempt to address these issues has been funded, focusing primarily on the views of local "drivers" of the DBE platform. During 2005 representatives of twenty-two software producer SMEs, local government authorities, and those responsible for regional development were interviewed. The aim was to understand some of their concerns and interests (Gow et al. 2005; Darking and Whitley 2005).[8]

In the interviews concerns were expressed about how the DBE would be defined in terms of its legal identity in the future. From one interviewee's perspective, "the amount of legal bindings among the partners is going to grow exponentially . . . and . . . it is something that would probably benefit quite a lot if there would be some common framework" (Gow et al. 2005, 14). Other concerns revolved around the development and sharing of knowledge within the open source DBE environment. One interviewee said that "I am a bit concerned because at the moment the community is not that big around the actual DBE project and many parts of the system are still closed" (15), indicating a potential point of conflict between the larger and smaller participants in the project.

On the question of whether the software producer SMEs can be expected to work alongside the large software firms, there were signs of tensions between the desirability of open source and the need to commercialize the DBE platform. As another interviewee put it, "you've got to be careful there; the only reason open source is commercial and making money for people out there is that someone is getting a benefit" (Gow et al. 2005, 15). In terms of ensuring that the DBE platform incorporates functionality at the leading edge of technological innovation, another source of tension appears with respect to the willingness of different participants to deploy innovative software code at

the speed desired by the SMEs. An interviewee observed that "a bigger player might not have the urgency for it to happen; a smaller player might have more urgency. There might be a conflict there; these kinds of issues about where the focus will be placed need to be handled" (15). This clearly suggests the need for a framework or "working rules" within which to negotiate such decisions.

Learning to Govern

On the issue of institutions of governance for the DBE, interviewees cited the need to build trust in a collaborative open source software environment and to intentionally negotiate new models of working rules. One interviewee noted the need to preserve variety and openness and to adopt common rules or standards only to a limited extent, mainly with respect to technical interfaces between components of the DBE (Gow et al. 2005, 16).

In a large project of this kind with organizations from the public and private sectors involved, there are substantial challenges in negotiating outcomes that benefit from cooperation. At the outset of the DBE project it was unclear what the SME software developer firms should contribute or what the benefits of the new platform would be for them. The software producer SMEs were simply invited to participate in a process of innovation (Darking and Whitley 2005, 40). Some interviewees were concerned that although they had contributed their scarce time and knowledge, without a sustainable plan, they would have "wasted [their] effort."

The firms involved in the DBE project range from very small enterprises to the largest ICT-producing companies based in Europe. Some interviewees saw the presence of large firms as indicative of stability. However, others were concerned about these companies, referring to them as "gorillas" (Darking and Whitley 2005, 41–2). There were differences of opinion with respect to whether the large firms would behave as "good citizens" although the predominant view was one of tolerance—"if they can't be good citizens, we don't need them."

In December 2005 the DBE project had ten months to run until completion as a publicly funded initiative. As the participants in the various communities of practitioners consider the sustainability of the initiative and its governance arrangements, this is giving rise to a complex set of discussions around core issues.[9] Constituting a governing body with legal status was seen as a very challenging task. This may be attributed to the fact that ideas on governance mechanisms for the DBE were perceived as being developed initially by the larger firms that are "vying for power" (Darking and Whitley 2005, 50). The problem of mobilizing collective action through intentional measures to resolve conflicts over existing or future scarce resources through the creation of working rules is presenting itself as a serious one, and one that will require innovative institutional arrangements.

Resolving Conflict over Scarce Resources

By December 2005 a first draft of an explicit set of working rules establishing future governance arrangements for the DBE had been circulated by one of the larger partners in the DBE project. This action was regarded as falling outside the remit of that partner by some DBE participants. A new draft was then released by one of the core partners in the project. Negotiations among all the participants about how best to balance the potentially conflicting interests of the communities involved are likely to continue throughout the remaining months of the project. Interestingly, the potential SME service-using firms have become invisible as the DBE project progresses.

In light of Commons' emphasis on the analysis of the negotiations that occur to resolve conflicts over scarce resources, there is evidence that these are underway. In the case of the DBE project, one area of conflict arises as a result of the interdependencies among the members of the respective communities. Each of the actors embodies sets of key practices (or skills) and knowledge bases that need to be shared across organizational boundaries if the DBE platform is to retain its innovative character. However, the time and economic resources of the SME software producer firms are relatively scarce as compared with the large participating firms. For the former firms, sustainable participation will require a flow of revenues in the near term. This will bring differences in the expectations of these firms as compared with the large firms to the fore as the latter may see continuing investment in the technology as part of a much wider research and development strategy that will not yield economic rewards for some time. In addition, the open source software community participants may not be influenced by the commercial aspects of this innovation process. They may seek rewards for their efforts through recognition and peer esteem, with little regard for the timing or scale of financial reward.

Another scarce resource within the DBE project is a common language that can be used to enable learning and knowledge accumulation about governance mechanisms for managing distributed networks of practice aimed at producing leading edge technological innovations. Only a minority of the participants in the project have the expertise required to devise a set of working rules or to translate the meaning and implications of such rules for all the participants in the project. Although it is clear that the micro-practices of all the participants will become embedded in any emergent working rules, it is not clear whether these rules will sustain collective action by the existing participants in the longer term.

The learning that occurs also will need to be codified at least in part to enable new participants to join without prior knowledge of the initial phase of the work. The complexity of the DBE platform initiative (organizationally and technically) means that the translation of generic institutional mechanisms or working rules that enable learning through collective action into this new online and geographically dispersed context is likely to remain an elusive goal for some time. It is not feasible to predict the future of the DBE platform, but the most likely outcome may be a fragmentation of innovative

effort within a set of partly overlapping "networks of practice" in which there is suffi-
cient capacity to resolve conflicts as they arise.

Conclusion

Whether an effective set of working rules can emerge in the case of the DBE initia-
tive will depend on the situated knowledge bases and practices of the communities of
actors and their capacity to learn through their repeated transactions with each other.
Whether this will lead to collective action will depend on ongoing decision making
about working rules during the lead-up to the termination of this project.

Considerably greater attention needs to be given to how appropriate working rules
can be fostered to sustain collective action in the specific context of distributed
Internet-based innovative services activity. The nature of the negotiations between the
participants and the contested issues involved need to be much more clearly understood
if a sustainable endeavor is to emerge.

Notes

1. The contributions of Mancur Olson (1995) to the theory of collective action must be acknowl-
   edged, but the differences in approaches are not addressed here. The author acknowledges
   Ammon Salter (1998) for his review of John R. Commons' work and its application in a differ-
   ent regional context.
2. Other institutional economists have made similar observations (see Mitchell 1935;
   Rutherford 1994; and Samuels 1995).
3. See, for instance, Storper 1995, Best 1990, and Cooke 1997. Research on regional innova-
   tion systems is broadly located within the wider field of systems of innovation research (see
   Braczyk et al. 1997; Nelson 1992; Freeman and Louçã 2001).
4. Communities of practice resemble groups involved in coordination games where members
   engage in collective efforts to pursue common goals (see Cowhey 1990 for a related discussion
   on epistemic communities).
5. See Wenger and Lave 1991 and Brown and Duguid 1991 and 2001. Work in this tradition
   has been extended to consider the economic significance of communities of practice with
   contributions in the knowledge management literature (Lesser and Storck 2001; Wenger et
   al. 2002) and in studies of science and technology innovation (Steinmueller 2003).
6. The project started in November 2003 and runs for three years, receiving 10,500,000 € from
   the European Commission. Four areas of research are encompassed: ICT transfer and adop-
   tion, training, ethnography; business modelling; computer science, software engineering, and
   enabling technologies (Web services, software agents, distributed architectures, ontologies,
   etc.); and models (math, physics, biology, artificial intelligence). Parts of the science and social
   science components of the project are based at the London School of Economics.
7. See http://www.digital-ecosystems.org/de/refs/ref_dbe.html and http://www.lse.ac.uk/col-
   lections/media@lse/pdf/DBE_Summary_cc1.pdf for an overview of the project.
8. The SMEs and other interviewees were based in central England; Tampere, Finland; and the
   Aragon region in Spain. They were involved in open source software applications develop-
   ment for electronic commerce of various kinds, and their primary focus was on services for

SMEs. Interviews were conducted by research teams based at London School of Economics under the direction of Paolo Dini.

9.   These include ownership of the intellectual property (software code) generated by the project, management of data flows among participants in the project, and data security, especially where commercial business services are developed, the specific nature of open source licensing arrangements, and the constitutional and organizational mechanisms necessary to support the transition from project to commercially viable initiative.

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