

INSTITUTIONAL WORK AND TECHNOLOGY ARTIFACTS

Completed Research Paper

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Abstract

How artifacts come to persist is a neglected area in organizational theory. In IS, Lucas et al. (2007) stress implementation research that takes the long view, but little is known about maintenance practices. Using Lawrence et al. (2009) institutional work framework, we analyze stakeholder efforts to stabilize and now maintain the Urban-net, a broadband network. We track it from inception through design stabilization to post-stabilization. Empirically, we add to research on the neglected area of maintenance work. Re: theory, our contributions are two-fold. First, we distinguish artifact stabilization from maintenance, a distinction Lawrence et al. (2009) ignore. Bijker's (1997) idea of stabilization offers a way to think about the two. The temporal and relational scope of the effort involved, we show, can be different. Second, we adapt the term gardening from Olsen (2003) to characterize the multi-stranded nature of maintenance, involving efforts to preserve while also amending the Urban-net.

Keywords: Institutional Work, ICT Artifacts, Artifact Stabilization, Artifact Maintenance

Introduction

How do artifacts come to persist over time? The persistence of artifacts cannot be taken for granted. The emerging research on institutional work keys the importance of tracking artifacts and actions involved in creating, maintaining, and disrupting them. This research, specifically the part about maintenance work, is key to the present paper. Lawrence et al. (2001) note that even stable artifacts -- governance structures, technologies, rules -- “require the active involvement of individuals and organizations in order to maintain them over time”. Entropy, in other words, is always a threat and must be overcome by purposive action. However, empirical research on the work required to maintain artifacts is relatively scarce in sociological institutional and organization theorizing (Lawrence and Suddaby 2006). In the IS literature, Lucas et al. (2007) emphasize implementation research that takes the long view, “long after systems are first adopted and receive initial acceptance”, but little is known about maintenance work.

We present a close-to-the-ground look at the efforts of stakeholders first to stabilize and then to maintain the Urban-net, an advanced information and communications technology (ICT) community network. This longitudinal case study tracks Urban-net over many years, from inception through design stabilization in 2000 to the post-stabilization work of maintaining, which is ongoing in the Urban-net Board of Directors.

We review the sociological institutionalist and organizational theorizing on institutional work below. We then profile the project and analyze the social process of stabilization. Actions that stabilized the design - stabilization occurring when the technology for building Urban-net’s network infrastructure was specified and frozen from further major change - included actions (Lawrence and Suddaby 2006) call *institution-creating practices*. The middle section tracks the Board’s maintenance work. The concluding section pulls together our contributions to the institutional work literature. Empirically, we add to the sparse literature on the important but neglected area of maintenance work (Lawrence et al. 2009). On the theory front, we differentiate stabilization from maintenance. Maintenance must be “distinguished from simple stability”, assert (Lawrence and Suddaby 2006) without elaborating on the differences. We differentiate the two on the temporal and relational scope of the work involved, and offer *gardening* as a metaphor to characterize the multi-stranded nature of maintenance work.

Theorizing Institutions

Sociological institutional theory has “become a dominant explanatory mechanism for organizations” (Greenwood et al. 2008). In an influential edited book, DiMaggio and Powell (1991) described the “new” institutionalism (hereafter institutionalism) and its concern with “institutions as independent variables”. Institutions are cultural abstractions (values, rules) which underpin “visible structures and routines of organizations” (Scott 2001). As independent variables, they constitute organizations: their very identity and mission, approved practices. By embodying prevailing institutions, organizations gain legitimacy.

Every institution has a central logic that organizes its core principles (Friedland and Alford 1991). Logics link actors and principles by providing prescriptive “symbolic resources and material practices” to guide everyday cognition and action. Institutions like the market, state, Democracy have central logics, which

“(are) the socially constructed, historical patterns of material practices, assumptions, values... rules by which individuals produce and reproduce” social reality (Thornton and Ocasio 2008).

Institutions persist only through human action, and logics provide cultural resources to enable approved ways of thinking and acting. But logics can also constrain actors normatively, serving as a means of social control. Logics can become taken-for-granted over time, with actors routinely reproducing them -- and the organizations that embody them - without question or conscious thought (DiMaggio and Powell 1991).

Institutionalism's "theoretical distinctiveness" (Tolbert and Zucker 1983) stems from the key role given to culture in organizations. Logics do not merely influence, they *constitute* (Scott 2001). Institutional effects are constitutive, meaning that organizations' and individuals' interests, values, norms, their very identity as social operatives, these are all created by logics and institutionally-embedded. Logics are not *out there* but do their normative work from "within the human mind" in this sense, in the "subjective structure of consciousness" itself (Scott 1987). And because logics work at the level of consciousness, alternative ways of being are hard to imagine. Taken-for-granted logics are apt to be seen as objective and natural features of the social order. Their subjective origins in human action become obscured.

Institutionalists' understanding of institutions as "independent variables" constituting actors and actions stems from a structuralist view of social life, but it begs the question: if actors can only enact the status quo, how do organizations ever change? Are actors doomed to reproduce approved order-affirming action scripts, or do have the capacity to change scripts and *act* in order-challenging ways? DiMaggio (1988) saw the limitation, the "meta-physical pathos", of a stance "that denies the reality of purposive, interest-driven action". The institutional work literature is a development of the institutionalist recognition that actors, as adaptive, thinking beings, are capable of *acting* as well as *enacting*, of questioning and challenging taken-for-granted assumptions as much as reproducing them. But where does this capacity come from?

The impetus to question taken-for-granted assumptions can arise from internal contradictions in culture itself. Culture must be seen not as a coherent whole but as a repertoire, a "toolkit" that is not necessarily internally-consistent (DiMaggio 1997). Organizations are liable to be concurrently embedded in multiple logics and operate in diverse spheres of society, each of which may focalize a variety of values, norms and interests. Some of these logics may be industry-wide, and others organization-specific. Some of these may be primary, defining the core mission, and others not as definitive (McAdam and Scott 2005). These may co-exist harmoniously in times of equilibrium as a result of a truce among competing logics (Suddaby and Greenwood 2005). But the truce is provisional. Macro-social changes (societal-level transformation, new regulatory pressures, major market shifts) may highlight internal contradictions and provide the impetus to question taken-for-granted ways of being and acting. Even long-lived organizations can harbor internal cultural tensions that can trigger change (Seo and Creed 2002).

This would be true for individuals too. Actors are socialized in a plurality of logics from the variety of roles they take on - as manager, professional, Democrat. Even members of the same organization, congruently socialized in its primary logics, can differ from differences in their occupational socialization, for example. They may as a result host inconsistent sets of "symbolic constructions and material practices" (Friedland and Alford 1991). At times of organizational stress, "in response to particular contextual cues" (DiMaggio 1997), actors may abandon shared logics in favor of a hither-to secondary logic (McAdam and Scott 2005) in an effort at change. Contradictions "inherent in the differentiated set of logics" can provide the impetus, and the tool-kit the rhetorical and action resources, for effecting change (Thornton and Ocasio 2008).

The emerging theory of institutional work sees the link between institutional logic and action as *recursive*. Lawrence et al. (2009) elaborate:

"Most central to our definition of institutional work is its "direction". If one thinks of institutions and actions as existing in recursive relationship, in which institutions provide templates for action ...and action affects those templates, then we are centrally concerned...with the second arrow, that from action to institutions" (p. 7).

Institutional Work: Creating, Maintaining, Disrupting

Institutional work is “purposive action of individuals and organizations aimed at creating, maintaining, and disrupting institutions...(T)ogether these categories describe a rough life-cycle of institutional work...” (Lawrence and Suddaby 2006, p.2). The verb form (creating, maintaining, disrupting) is important to note, emphasizing material activities, not achieved states. This emphasis on what actors actually *do* is “at the core of the study of institutional work”(Lawrence et al. 2009). Institutions are seen as dependent variables subject to human action.

“This is an important shift for institutional studies of organizations because, despite the injection of actors and agency...relatively little is known about the concrete practices employed by actors in relation to institutions” (Lawrence et al. 2009, p.10).

This shift endows actors with “awareness, skill, and reflexivity”. Actors socialized in a plurality of logics are assumed to be “skilled users of culture” (Swidler 1986) with a capacity to match roles and situations to appropriate action scripts in their tool-kit. Emphasizing “choice within and among cultural models or rule systems suggests that actors... not be regarded as helpless puppets” (Scott 2001). If routine enactment of approved organizational scripts assumes a degree of automaticity and passivity, modeling actors as active and engaged assumes a “reflexive...self-controlled form of thought”(Lawrence and Suddaby 2006). Actors are far from being cultural dopes. Herein lies the possibility for organizational change.

Sociologists and organizational theorists have called for a nuanced appreciation of the contingent nature of human action (Battilana and D'Aunno 2009; Emirbayer and Mische 1998), and this research informs institutional work research. Some institutionalists (e.g., DiMaggio 1988), correcting for the “metaphysical pathos”, offered a conceptualization of the institutional entrepreneur -- a strategic, calculating actor who effectively mobilizes support for her (or allies’) interests. This was useful in the present case, as we show, where Urban-net stakeholders we call *entrepreneurs* successfully stabilized the network design in favor of certain stakeholders and against project aims by establishing a new defining logic for the project. But this conceptualization was less useful to describe the mundane work of maintenance. Institutional work, note Lawrence et al. (2009), could be

“highly visible and dramatic, as often illustrated in institutional entrepreneurship, but much of it nearly invisible and often mundane, as in the day-to-day adjustments, adaptations, and compromises of actors attempting to maintain institutional arrangements” (p. 9).

Table 1: Life Cycle of Institutional Work (Lawrence and Suddaby 2006)	
Institutional Work	Examples of Associated Practices
A. Creating Institutions	Rule constructing, Advocating, Defining, Vesting
B. Maintaining Institutions	Supporting rule compliance, Embedding/Routinizing, Valorizing
C. Disrupting Institutions	Rule repudiating

From a review of institutionalism and organization theory, Lawrence and Suddaby (2006) identify action types for creating, maintaining, and disrupting institutions (Table 1). Institution-creating actions include construction of rules. Maintenance work “involves supporting, repairing or recreating social mechanisms that ensure compliance” with rules. Actors disrupt institutions by rejecting rules and by not reproducing “previously legitimated or taken-for-granted... actions” (Oliver 1992). Taken together, actors’ purposive actions in creating, maintaining, and disrupting institutions describe a life-cycle of institutional work.

Empirically, the research on creating institutions (including institutional entrepreneurship) exceeds that on maintenance. Institutions are simply assumed to persist. The reality is that institutional persistence is not a given nor is reproduction automatic. Even established, long-lived institutions, like Democracy in the West, still requires occasional interventions to ensure that elections, for example, are conducted properly and that democratic norms are upheld by election officials, candidates, voters. The reproduction of those norms in the actual practices of these actors cannot be assumed. This powers the argument for studying, indeed for emphasizing, the work required to maintain artifacts:

“We clearly need to focus more attention on the ways in which institutions reproduce themselves. Indeed, this may be a more fundamental question for institutional research, in many respects, than the question of how institutions are created” (p. 45).

Maintenance is different from “simple stability”, argue Lawrence and Suddaby (2006) without elaborating on how they may be different. Theoretically, this remains a gray area in institutional work. We believe it is important to distinguish *stabilization* from the work of maintaining *that which has been stabilized*. What requires maintenance, and what motivates ongoing maintenance work, arguably, is some stabilized set of specifications that stakeholders have invested in and are interested in preserving against entropy: be it a network design, organizational by-laws and governance structures, service contracts, and the values and norms that these instruments embody. Based on the present research, which outlines the process leading to stabilization and provides an account of maintenance work, and drawing on the social construction of technology (SCOT) literature (Bijker 1997), we offer a theoretical differentiation of the two.

Bijker’s (1997) process model starts by assuming that artifacts are “interpretively flexible”. Different social groups may interpret the artifact according to their distinctive interests. At some point, though, one group (or some sub-set of groups) prevails and their interpretation becomes definitive. Stabilization, the point in time when a definitive interpretation emerges and is “frozen” from further major change, could stem from consensus (or acquiescence or coercion) among groups. At this point the artifact’s interpretive flexibility is reduced (Bijker 1997). The idea of “institutional settlement” (Zysman 1994), which is roughly analogous, refers to a negotiated agreement among contending parties (Levy and Scully 2007).

By definition, stabilization and settlement denote achieved states. We found the term *gardening*, adapted from Olsen’s work on political constitutions (2003), useful to describe maintenance work - work required to maintain the achieved state. Maintenance involves *ongoing work* (Jarzabkowski et al. 2009; Lawrence and Suddaby 2006). The *temporal scope of maintenance work* is ongoing; stabilization is an event. As on ongoing effort, gardening in the present case is about maintaining valued aspects of the stabilized artifact (Urban-net’s network infrastructure, built from design specifications stabilized in 2000) while amending others. Gardening is *amending while preserving*. Persistence cannot be assumed because user defections remain a possibility. Assuring persistence is therefore necessary, but Urban-net actors are also working to reactivate the project’s equity logic, a logic that was sidelined and deferred in the process of stabilization. Grammatically, echoing the verb form emphasized in Lawrence et al. (2009) conception of institutional work, the emphasis of *gardening* is on the activity, and the tense is *present continuous*.

The *relational scope of maintenance work* is also a point of difference. In the present case, stabilization resulted from mobilization of support *within* the committee for the consensus design, based on which the network infrastructure was built. Maintenance work involves construction of relational networks that are broader in scope and extend well beyond the Board. In their effort to honor equity and “serve the underserved”, actors are working to increase the range of interests shaping the work of the Board. In their effort to avert defection, actors are reaching out to Internet Service Providers and Telco rivals to increase Urban-net’s value to users. Both these efforts (serving the poor and averting defections) are occurring within the terms of Telco service contracts and involve no change to core infrastructure of Urban-net. These efforts, directed at preserving while amending, we see as part of gardening work.

As analysts are starting to note, maintenance work can include elements of *creating* and *disrupting work* (e.g., Hargrave and Van de Ven 2009). Verbs like *creating* and *disrupting*, we believe, may be too strong to accurately describe what we saw in the resent case, unwittingly suggesting heroic, de novo, whole-cloth interventions. Radical, out-of-the-box thinking is occurring on the Board. One option being deliberated on Urban-net’s future form, for example, is complete autonomy from Telco. But the bulk of the deliberations, however, have centered on two more proximate concerns: keeping users from defecting and “serving the under-served”. Even the second, which, if fully realized, would evolve Urban-net in a new direction, would not entail *any change* to service contracts or the infrastructure. Actors are working with a modest canvas, and the thinking is *inside-the-box*, maintaining while amending. Amending has not involved “creating” a logic but *reactivating* equity. *Gardening* more appropriately describes the evolutionary and conservative nature of much of the maintenance work now occurring in the Board.

Data Collection and Analysis

As befitting exploratory inquiry of an emerging new research area, the predominant research approach in (Lawrence et al. 2009) edited volume on institutional work is the richly-contextualized interpretive case study using qualitative analysis. Lawrence et al. (2009) highlight the value of the case study for inductive, empirically-grounded insights into “actions of individual and organizational actors attempting to create, maintain, and disrupt institutions”. Early empirical research on institutional theory, concerned with the effects of institutions on actions, also relied on case studies for similar reasons. The case method offers some benefits for investigating organizational phenomena *in situ*. First, it can facilitate understanding of complex social processes, relying on triangulation – using surveys, ethnography (participant observation), interviews, and documentary analysis – to construct richly-textured and nuanced accounts. Second, in emerging areas like institutional work where the research terrain is only now being explored and mapped (Lawrence et al. 2009), the case method “encourages an open ended and investigative approach toward observations and the nature of the relations that link them”(Poteete et al. 2010). Detailed documentation of observations from a case can help to refine concepts and develop theory. The longitudinal case, used in this case, provides the added advantage of examining evolving phenomena and facilitating exploration of “the content and context of change over time” (Pettigrew 1990). The work of “creating, maintaining, and disrupting”, highlighting the verb form of these activities occurring over time, calls for just such a focus.

Stabilization Process Dataset

The first author collected data on the network planning and design process leading to design stabilization. Data collection occurred over 43 months (1997-2000) and covered planning (requirements analysis) and design of Urban-net network infrastructure. Multiple collection methods were used, including a planning survey in 1997. We relied on the first author’s participant notes from 13 design meetings (from mid-1998 to May 2000, when design consensus emerged). Supplementing this data were interviews with 24 stakeholders and others. Some were interviewed more than once. Sixty documents were reviewed (Table 2).

Respondents and their Project Roles	# of Interviewees	# of Interviews
Entrepreneurs	2	4
Dissidents	3	6
Telco Designers	3	9
Selectors	6	6
MIS Managers	5	4 (3individual; 1group of two)
CBO Representatives	5	4 (3individual; 1group of two)
Total	24 interviewees	33 interviews

The first author used concurrent data collection and analysis (Barrett and Walsham 1999). As the meeting notes accumulated, he began looking for themes and thematic clusters. He (re)read his meeting notes and coded instances of emergent themes. The coded strips were cut out and organized into clusters of themes. This process was repeated with interview and documentary data. The process ended when no new themes emerged. Time-ordering the coded data allowed tracking of events and transitions in the narrative outline below on *how* design stabilization came about (see Pettigrew 1990).

Post-Stabilization Maintenance Dataset

A top officer of the Urban-net (Executive Director) resigned in 2006. The in-coming Executive Director interviewed all Board members that year to better understand their needs and ideas for the Urban-net. His interviews were structured by ten questions. Interviews lasted between 45 and 90 minutes and were audio-recorded; all 17 audio files were made available to the first author. The first author used the same questions to structure his interviews (conducted 2006-2008) with the outgoing Executive Director, the Board Chair and technical officer. The second author interviewed the current Executive Director. Overall, we had data from 21 interviews. Additionally, we obtained minutes from twenty Board meetings (Table 3), the Executive Director's audio recordings of these meetings, and the first author's notes from ten of these meetings he attended as an at-large Board member. We used the same methods as above for data analysis.

Table 3: Post-Stabilization Process Dataset	
Interview Data	
Total Number of Interviews	21 (17 board members + 4 officers of board)
Duration of each Interview (range)	45 – 90 minutes
Board Meetings (Aug '07 – Aug '10)	
Number of Audio Recordings	20
Number of Meeting Minutes	20
Periodicity of Meetings	every even month (except one in Nov '07)
Average Duration of Meetings	1h:21m:42s
Average Number of Participants	10 – 11 participants (Board size has ranged from 21 to 23 members over the period covered by dataset)

Urban-net: Project Background

Urban-net was funded by a New York state grant program. In a 1995 regulatory settlement with the state, Telco (pseudonymous broadband services provider) committed \$50 million for broadband infrastructure in economically poor neighborhoods. A state-sponsored selection panel solicited proposals from consortia of public organizations (e.g., public schools), community-based organizations or CBOs (which are smaller non-profits), and small businesses via a competitive request for proposals (RFP) process. Two rounds of grants resulted before program closure in 2000. In all twenty-two projects were funded.

Users of program-funded networks paid subsidized service charges and were eligible for additional funds for user training or ICT upgrades. Telco, the sole program-designated broadband service provider, got 80 per cent of every grant for infrastructure development. Telco would own the infrastructure. User sites got the remaining grant funds for ICT upgrades or training. User sites connected to the infrastructure, which would inter-connect them and also provide access to the Internet.

Program selection panel members (hereafter selectors) hoped that the grant opportunity would motivate diverse agencies to propose how they would use the grant to “make a difference ...in economic and social

terms” in poor neighborhoods. They saw program-funded networks as *community networks* promoting equity in Internet access in poor areas. Accordingly, the Urban-net project steering committee (which was later formalized in the Board of Directors) envisioned the Urban-net as an ICT-based community resource promoting equity and “serving the under-served”. A new collective actor emerged from the organizations (public organizations and CBOs) and (a small number of) private citizens who constituted the committee, a collective progressive change agent working to “rewire” social structure to promote equity and “serve the under-served”. The project proposal, submitted to the program’s second round, won \$3.8 million.

Design Stabilization

Design stabilization came about over three “transitions” – three major shifts in the social dynamics of the design process. The transitions occurred at design meetings 4, 6, and 8. Due to space restrictions we limit the discussion to the second and decisive third transitions (meetings 6 and 8).

Starting around meeting # 5, the general managers who had represented the public organizations on the committee from project outset had their MIS managers attend design meetings in their place. Most MIS managers, however, seemed unaware of the project’s equity aims and were more concerned with reducing their broadband costs. By the time they joined the committee, the broadband services market had become competitive with new firms challenging Telco and targeting large user sites, like the public organizations, for their business. The dot.com boom was gathering strength and the new firms, like Telco, were investing heavily in broadband. Every firm wanted their business, and they decided to be opportunistic.

The MIS managers were uninterested in the Asynchronous Transfer Mode (ATM) cell relay services that were eligible for the program’s subsidized pricing. They were not familiar with ATM and were concerned about added costs from ICT upgrades and support skills that would be necessary. They were looking for a backward-compatible broadband service that would cut (not raise) their costs.

The *second transition* was at meeting # 6, when the program notified the committee that gigabit Ethernet service too was eligible for the subsidized pricing. The announcement galvanized the MIS managers. They were now eager to sign up as Urban-net users. The service was perfect for linking their branch office LANs together, turning the Urban-net into a means for inter-connecting headquarters and branch locations and extending intra-organizational networks. One public organization estimated \$150,000 in annual savings. Gigabit Ethernet’s back-compatibility with their ICTs would further help their bottom-line.

The decisive *third transition* was at meeting # 8. The committee had received program notice that grants could be revoked if service contracts were not signed by early 2000. Reacting, some committee members (entrepreneurs) lobbied to stabilize the design by calling the notice a “crisis” that could only be averted with public organizations’ gigabit contracts. The equity aims highlighted in the proposal were sidelined.

A Tale of Two Logics

Equity in Internet access (computing access more generally) was a value that the Clinton Administration pursued in the 90s under its “Digital Divide” initiatives. In a series of reports, the government highlighted the gap between the digital haves and have-nots, and provided moral and financial support via programs to narrow the gap. Digital equity was framed as a “civil right”. The NY State grant program, established in the mid-nineties and influenced presumably by this rhetorical framing of equity as value and norm, made serving the under-served a critical “threshold factor” in evaluating proposals for funding. But then project delays began to mount during the design phase, and the program notified projects with the deadline.

The entrepreneurs interpreted the program notice thus:

“We cannot have the Urban-net with just the smaller players. If there are no customers for the... more expensive services, we can forget about the money. The smaller players have seemed reluctant to jump in. The larger players seem more keen right now”.

This rhetoric accomplished the following. First, it portrayed the notice as a crisis (“*we can forget about the money*”), a problem (the deadline) demanding immediate action. The project’s viability was at stake. This “crisis” characterization quickly became dominant, influencing subsequent committee deliberations. No one wished to abet grant revocation by second-guessing this portrayal. However, some members (here called dissidents) opposed the entrepreneurs’ solution to the crisis. They reactivated equity (“*You have to remember...it is the demographics of the city, its poor...that got us the grant in the first place. We cannot lose sight of that*”). Controversially, they proposed a “tax”, asking public organizations to aid CBOs. They argued that while the program deadline was tight, there might be way to honor equity and safeguard the grant from revocation. But their objections were never discussed, and the “tax” idea was rejected.

Second, it advocated a response. The crisis could only be averted by cashing in on MIS managers’ interest in gigabit Ethernet; Entrepreneurs argued that the public organizations “*are all coming around because of gigabit Ethernet. Without this they are asking, why do we need to be a part of this*”. Speedy action was critical: “*They want to move quickly on this. They cannot wait*”. MIS managers could abandon the project if the committee dithered on the entrepreneurs’ recommended response. Trying to include the CBOs was misplaced: contracts for cheap broadband services (services they could afford) would not avert revocation, and working with “reluctant” CBOs at this critical moment may time the grant out and kill the project.

The “crisis” portrayal amplified the MIS managers’ influence on the committee by casting them as project saviors. Facilitating access to CBOs and their services via Urban-net was vital for realizing equity. If public organizations sourced social services the poor depended on, CBOs were the sites where residents accessed these resources. It was critical therefore that both public organizations and CBOs were on the Urban-net. The “crisis” characterization, in contrast, graded them per the new viability calculus: as users of “*the more expensive services*” public organizations were crucial now for project survival. The CBOs were less crucial *right now*: they could not help avert the “crisis”.

A truce emerged. Entrepreneurs prevailed and dissidents acquiesced, only conditionally, to defer equity. The network design as stabilized in May 2000 privileges the MIS managers’ interest in a cheap solution for their intra-organizational connectivity needs. Thirteen public organizations currently use Urban-net, who use it to interconnect their head office and branch sites. There are over 200 network drops (network connections) across these 13 sites. CBOs are not on the Urban-net. Fiber optic lines connect sites to Telco switches via a point-to-point link, with Telco’s switching center (the Central Office) as the focal point and user site links radiating from it. As the sole service provider, Telco is the Urban-net’s center-piece.

The stabilized design is held in place by Telco service contracts. The contracts’ five year term “freeze” the design over the contract term. Any change is subject to Telco penalties. All contracts are bilateral and are executed directly by users with Telco. The Board in 2000, like now, comprised between 21 - 23 members, with MIS managers in the majority, up to six officers, and up to four private citizen at-large members.

The entrepreneurs exemplified certain “institution creating” actions (bolded) in Lawrence and Suddaby (2006). Portraying the notice as a “crisis”, they successfully **advocated** for the business logic of viability over the communitarian logic of equity and **defined** the committee’s response to the notice, thereby also defining who would be on (public organizations) and off the Urban-net (CBOs). The “crisis” frame defined a boundary in temporal terms: CBOs could get on later, after the “crisis” passed. Equity was merely being deferred, not repudiated. This reassured the dissidents: the public organizations got on *now*; beyond lay the *future*, when equity could be realized.

Entrepreneurs' actions also involved **identity construction** (Lawrence and Suddaby 2006). Crises, real or imagined, can sharpen identity contests (DiMaggio 1997), and effective entrepreneurs use them to push for identity change as part of the response (Fligstein 2001). Leveraging the "crisis" framing, entrepreneurs promoted sound project management practice to ensure viability over equity/change agency ("*We've got to start managing this like a project now to avoid revocation*"). This brief account of design stabilization is necessary background for making sense of maintenance work.

Is There Life After Stabilization? Maintenance Work

We pick up on the Urban-net in 2005. Shortly after design stabilization in 2000, negotiation of the first set of service contracts began. The process was staggered, with the first set of signatories being sites with little make-ready work to do. From the summer of 2005 until users renewed their first five-year contracts, Urban-net's survival was in doubt. In 2000, the program-subsidized price for gigabit Ethernet service was substantially lower than the market rate. But in 2005, with contract renewals looming, rumors abounded that Telco would raise the price and change other contract terms. The rumors rattled users and prompted bilateral discussions with Telco rivals. Users were also looking at leaving the Urban-net and building their own infrastructure to meet their needs. Technology changes, increased availability of optical fiber capacity in the area, and market competition made these options more affordable than they used to be. The Urban-net's top officers (the Board's Chair and Executive Director) in 2006, fearing the Urban-net's dissolution from user defections, started exploring ways to keep users in and avert defections. In the event, although Telco raised prices they were still substantially below the market rate, and all contracts were renewed for five years. However, users' frustration with Telco and the prospect of dissolution prompted discussions on Urban-net mission, governance, and future form. Today, one contract re-renewal later, these discussions are continuing in the Board.

With contracts renewed, the Urban-net's viability was extended by at least five years. But three issues that the Board had raised with Telco remained unresolved: freezing the subsidized pricing on gigabit Ethernet service, permitting users to move "drops" (network connections) within-site without change in subsidized pricing, and consolidation of bilateral service contracts under a master contract. A master contract would position the Board, as the Urban-net's fiduciary agent representing all users, to negotiate with Telco from a position of strength by leveraging group buying power. Despite assurances, Telco failed to address these issues. Beginning in 2007, these irritants prompted users to publicly question the value of continuing with Telco and the project, renewing top officers' dissolution fears when contracts expired in 2010-2011. So the first theme evident in Board meeting minutes we call "Keeping users in" (averting defections).

A second theme is equity ("Serving the under-served"). Urban-net's first Executive Director, who had held the position since project inception, stepped down in 2006. The incoming Executive Director, a veteran of the non-profit sector, was familiar with CBOs and the vital services they provided in poor neighborhoods. He was also committed to the project's equity logic. His resolve to reactivate the logic was a key reason for its emergence in Board discussions on governance. In 2008, "serving the under-served" started showing up as a standing item on the formal agenda at Board meetings.

Assuring Continued Viability

This theme, first seen in entrepreneurs' rhetoric in the design stabilization process, reemerged in 2005-2006 during the first contract renewal and Telco's unresponsiveness on the issues above. Urban-net's top officers began looking for ways to **embed and routinize** (Lawrence and Suddaby 2006) the Urban-net more deeply at user sites as insurance against defection. Embedding and routinizing involve tapping into the "stabilizing influence of embedded routines and repetitive practices" to assure on-going maintenance and reproduction (Lawrence and Suddaby 2006). Three such "insurance" strategies are being pursued.

User sites each have two interfaces to Urban-net: a VLAN connection and a community VLAN connection. Users use the VLAN connection to tie their branch and headquarter locations together. A virtual local area network (VLAN) interface emulates a direct LAN link between physically-remote users without going over a public network, thereby avoiding congestion and security challenges public networks can pose. Software switches at Telco Central Offices provide the emulation. The Urban-net's unique value-add is high-speed connectivity over the VLAN, which, as a "dedicated" link between remote sites, can move data quickly and securely. The second interface is a "community VLAN" connection that links user sites to one another and the Internet. Currently, however, the community VLAN is used almost exclusively for Internet access, not cross-site connectivity. Belying the high level of interest in cross-site connectivity at project outset, actual cross-site connectivity has historically been very low.

Consequently, top officers' efforts to embed and routinize Urban-net have targeted the community VLAN interface. Two strategies are being pursued. The first is to get users "to increase their Internet bandwidth" (August meeting, 2007). Because of demand aggregation over the community VLAN and bulk buying, the Urban-net has been able to negotiate highly competitive Internet access rates for users. If usage could be further increased, the bulk-discounted rates would be even lower all around.

A second strategy is to get users to use the community VLAN more for cross-site connectivity. Some users readily saw the community VLAN as Urban-net's unique value-add, something that no other network was equipped to provide: "our ability to connect other institutions into the Community VLAN and act as a hub to facilitate... (inter-connections) is really our key asset" (April meeting, 2010). Another member saw the value-add being community networking over "dedicated" high-speed linkages. Despite such sentiments, however, top officers have struggled to increase community VLAN use for cross-site connectivity. Users cite lack of resources to develop the necessary applications. One proposal that the Board has considered is for Urban-net to host widely-used office applications that users would access over the community VLAN. Another is to host and manage healthcare data-sets on behalf of hospitals and medical labs. To the extent that users came to depend on secure, high-speed access to critical resources that the Urban-net, by means of the community VLAN, was uniquely equipped to provide, defection was less likely.

A third strategy to embed and routinize Urban-net has been to persuade users to use their VLAN interface as transport for vital operations, like off-site, mission-critical data back-up and recovery. Institutionalists have used *contagion* as a metaphor to argue that artifacts that are embedded in institutionalized practices are likely themselves to become institutionalized as a consequence (Jepperson 1991). If Urban-net could be positioned as an indispensable fixture of users' on-site ICT infrastructure and work routines that relied heavily on access to mission-critical data, top officers reasoned, users were more likely to take Urban-net's ROI (return-on-investment) for granted. Eight years after design stabilization in 2000, the business value to users of being connected to Urban-net required clarification, as we show below; it did not yet have the taken-for-granted quality that institutionalized phenomena come to have (Jepperson 1991).

At the October 2008 meeting, a member asked what value users received from membership. The technical officer responded: "the real benefit...has come from participation in the (grant program) and the ability to save substantial money (sic) on network connections (and) Internet connectivity". The Executive Director highlighted the value "from group representation in negotiations with Telco, (and) collection and sharing of information and (collective) solutions to problems". The member argued that the "Board...needs to do a better job of explaining the value that members receive" in return for their "annual investment" – users' financial contribution to Urban-net over and above service charges (which are payable directly to Telco). This annual investment, originally called the *assessment fee*, is now called the *baseline fee*. Questions on the Urban-net's value proposition had come up previously too. The Executive Director described it thus in his 2007 annual report, highlighting the savings despite Telco's price hike at the first contract renewal:

“Currently each of the Urban-net participants (sic) are paying on average \$327 per month per location. The current Telco tariff (market rate) for a Gigabit Ethernet connection is \$2,500 per month per location. By participating in the Urban-net, members are paying on average \$3,924 annually per location. Without the (grant program), Urban-net members would pay \$30,000 annually per location”.

The report went on to note that Urban-net “took a major step toward long term financial stability and a fairer method of assessing participating members for support by moving from a Flat Rate Revenue Model to a Benefit Assessment Model”. The new model would take effect in 2009; 2008 was to be a “transitional year”. The financial officer elaborated on the value-add from the Benefit Assessment Model (August 2008 meeting), which would

“more fairly reflect the cost savings benefits received by individual members...(in 2009) Urban-net will move from a flat assessment model of \$4,000 per member to a flat assessment of \$2,500 plus \$20 monthly fee per Gig-E connection model in 2009 up to a maximum of 20 Gig-E connections, resulting in a more equitable assessment based on money saved by each member”.

The annual baseline fee, initially assessed at \$3,000 per user, subsequently went up to \$4,000 per year. In 2009 the fee dropped to \$2,500 annually as part of a “more equitable” assessment, under which users would only pay for 20 gigabit Ethernet connections; connections over and above this number would cost them nothing. This new scheme was intended to incentivize increased use of Urban-net while also helping users’ realize more value for their money. Efforts by top officers to highlight the benefits of membership – benefits that were not yet self-evident to members -- have a flavor of what Lawrence and Suddaby (2006) call *valorizing* actions necessary in maintenance work, with membership and the right to use Urban-net, a right tightly regulated via Telco service contracts and defined by the grant program rules, being the object valorized. It was critical to keep users in and assure continued viability in order “to do the things we really want to do: serve the under-served”, as the outgoing Executive Director put it in 2006, neatly linking the viability and equity logics in a policy guideline for the Board. He saw the need for the logics to co-exist.

Reactivating Equity

The assessment fee, adopted in 2005-2006 around the time of the first contract renewal, was an echo of the then controversial “tax” idea proposed by dissidents before design stabilization occurred in 2000. The assessment fee was intended partly to help “under-served” CBOs get connected. Interestingly, dissidents’ argument that the “tax” would only be a small fraction of what public organizations stood to save from the subsidized service charges finds an echo in the 2007 annual report, where the Executive Director noted:

“Under this (new) assessment model (referring to the Benefit Assessment Model above), each organization, based on their annual savings, would be asked to contribute a portion of those savings to the support of the Urban-net in order to ensure that the organization is able to achieve its goals...of using telecommunications to positively impact our community”.

The Executive Director has been a vocal champion on the Board pushing for equity as part of his vision of how Urban-net could “positively impact our community”. This is a recurring sentiment in Board meetings and is part of a complex set of strategies motivating a new Board membership structure and categories of membership intended to involve “a broader spectrum of representatives of the community...as we expand our efforts to assist the under-served” (April 2009 meeting).

In 2008, the Board started deliberating ways to address the Urban-net’s equity aims by effecting changes to the by-laws to double the number of at-large members; a second strategy was to constitute a new body,

the “community net committee”, as a “mechanism for involving the community and (sic) their interests”. These governance initiatives were intended to include hitherto unrepresented interests on the Board and were prompted by the strategically significant recognition that the Board, given the project’s equity aims, should hold itself *accountable to the community at large, not just to its membership*.

At the October 2008 meeting, the Executive Director reported on a previous Board discussion on getting “a broader base of individuals from the community involved in the Board”. The best way to do this was by doubling the at-large member positions from four to eight. Importantly, according to the by-laws, at-large members need not come from Urban-net user sites. Private citizens could be appointed to the Board; the four at-large members that have served on the Board so far have all been private citizens. The move now was to have up to eight private citizens as at-large members. Effecting this change would require a formal change to the by-laws. At the April 2009 meeting the proposed change was approved unanimously by the Board. This was a significant, even historic, change. At-large members would have the same voting rights as other members, who represent the user sites. If all eight at-large members (out of a total membership of around 27 with the four new positions added) voted as a bloc on policy issues of community-wide import, they could take Urban-net in a new direction.

A second, related strategy proposed is to expand membership categories in order to bring “a wide variety of organizations together for their... benefit and the benefit of the...community” (Executive Director at the February 2010 meeting). Crucial to this expansion is differentiating the Urban-net “corporation” from the Urban-net “organization”. Membership in the “corporation” is controlled by by-laws. The “organization” would offer “additional types of membership...and allow participation by and input from” diverse voices but without voting rights. How “organization” and “corporation” would relate legally is being worked out.

A third strategy to tap into a plurality of voices in governing Urban-net is the “community net committee”. A committee by this name was in fact set up by the Board in 2007 but had become inactive. The doubling of at-large members on the Board from four to eight was intended to increase community representation in the Urban-net “corporation”. The object behind reviving the “community net committee”, as envisioned in Board meetings in 2009-2010, was to provide an additional avenue for “under-served” interests via the Urban-net “organization”. The committee would be an independent entity, with its chair having a seat on the Urban-net Board as an at-large member to provide a link between the two bodies. The mission of the committee would be to identify and address community needs while helping to strengthen the Urban-net Board’s renewed focus on the “under-served” and its commitment to broader vision of accountability.

In its ongoing work on member rights, structure, and categories, the Board, with the Executive Director serving as the leading advocate for reactivating the equity logic in the Board deliberations, has gone much farther than the “tax” envisioned by the dissidents. The Board’s initiatives, if fully implemented, promise to bring under-represented interests directly into the Board’s policy-making processes. However, these initiatives would require no changes to the technology infrastructure or service contracts. Unlike these conservative moves aimed at preserving Urban-net while amending it, the two strategies discussed below to “reduce dependence on Telco” are far more radical in their envisioning of the Urban-net’s future form.

Looking for Ways to “Reduce Dependence on Telco”

As we noted earlier, the Board has unsuccessfully petitioned Telco to freeze prices, permit users to move drops, and to move to a master service contract. A recent resolution endorsed unanimously by the Board called attention to these still-unresolved issues and pushed for a vendor-independent and wholly-owned infrastructure. Over the two contract renewals thus far Telco had nearly doubled gigabit Ethernet service charges (these are still lower than market rates though), and restrictions against moving drops are still in place. In light of these unresolved irritants, and to give itself time to analyze alternative futures before the next round of contract renewals in 2015-2016, the Board resolved to continue to explore “creation of a...

telecommunications utility”, to be owned and run by Urban-net or other community entity, which would be “economically and functionally advantageous” to current users and the community at large.

The Chair called the resolution “historic”, but the seeds of a radical envisioning date back to 2005-2006 (to the first contract renewal) and have sprouted now and again since. At the October 2007 meeting, the Chair had announced, as a Board initiative for 2008, that

“drops that we had not taken advantage of under the (program-subsidized) pricing are no longer available and that is a key reason why the Urban-net, under our strategic planning initiative, is looking at ways of installing new and/or utilizing existing fiber in the future... while reducing our dependence on a single vendor (emphasis added)”.

The financial officer elaborated on this at the October 2009 meeting, laying out two future options: the “value-added reseller” model and a more radical model, where Urban-net would “own and manage” its own fiber network independent of Telco or other providers. The Board’s objective, he said,

“is to examine a number of different alternatives to arrive at a long term plan that is in the best interest of the community. The most ideal alternative would be for us to own and manage our own fiber network. Short of that, if we could become something like a value-added reseller... this would reduce the ongoing threat of significantly increased pricing every five years”.

The “value-added reseller” model would entail leveraging Urban-net’s “meet-me” switches. In the process of design stabilization in 2000, a new local broadband start-up (and Telco rival) persuaded the committee to allow it to bid to build Urban-net. What followed was unprecedented: Urban-net was the only project of the 22 projects funded state-wide to put out a request for proposals (RFP) from Telco and its competitors. Telco and the start-up’s bids were successful and each secured roughly 50% of the 13 user sites now on the Urban-net. The committee used grant money earmarked for ICT upgrades/user training to install a switch (the “meet-me” switch) where Telco’s half of Urban-net and the start-up’s half would inter-connect. The “meet-me” switch was located at a neutral site. Urban-net owned and managed the switch. But by the time design stabilization occurred in 2000, the start-up had gone bankrupt and its half of user sites returned to Telco. Now that Telco was the sole provider, the “meet-me” switch was little used. However, it emerged as a focus of renewed interest in the Board as a way to reduced dependence on Telco. The frustrations of the contract renewal process prompted in Board members the sentiment that “maybe we kiss Telco goodbye” and either replace Telco with another service provider or force Telco to compete with others for providing services through the “meet-me” switch. For various reasons, by 2007 there were three “meet-me” switches at different locations, and they were being used to connect Urban-net users over the community VLAN to back-up Internet service providers.

The “value -added reseller” model looks well beyond Internet service. The Board would leverage “meet me” switches to resell all services, using competition to drive down charges. For a fee payable to Urban-net, service providers would connect to the switches. Telco would cease to be the sole provider and would have to compete with rivals for the Urban-net’s business. Leveraging the “meet-me” switches in this way would radically shift the balance of power, locating them at the Urban-net’s very heart – its centerpiece – with the Board as the sole decision-maker. The Board would set policy, price points and, as Urban-net’s fiduciary agent, leverage group buying to negotiate the best terms from service providers.

Concurrent with the thinking on the “value-added reseller” model and consistent with “strategic planning initiative” to reduce dependence on Telco (the Executive Director described this as a “key initiative for the organization in 2008”), the Board in 2009 was strategizing to bring political pressure on Telco to resolve

the three outstanding irritants discussed earlier. That year, Telco was negotiating a franchise deal with the city to provide TV services. The Board seized this as an opportunity to pressure Telco through the Mayor's office. However, shortly after this meeting Telco decided to drop its franchise bid, so that point of leverage was no longer available. But the December meeting surfaced other ideas to bring pressure on Telco to be more responsive to Urban-net and resolve the outstanding issues, in particular service pricing. One was to "start negotiations with Telco by stating a price" users were willing to pay "rather than asking what it will cost". Another was to solicit a bid from a Telco competitor "to give us leverage in negotiations" with Telco. This idea had been suggested earlier, in August 2009, where one member suggested forming "*a working team of the top three or four users... to deal with Telco on behalf of all members. The next steps would be to... solicit competitive bids, develop a list of when all contracts are due to expire, then develop a strategy to bring Telco to the table and stress that we are looking for a solution now*". The recurring motif is "gaining leverage" to negotiate with Telco from a position of strength. Bypassing Telco entirely is the more radical option, as the financial officer had noted in the October 2009 meeting ("the most ideal alternative would be for us to own and manage our own fiber"). The unanimous passage of the "historic" resolution showed the appeal of this option on the Board. Irrespective of which of these options (the ownership option or the "value-added reseller" option) ends up being pursued, Urban-net will be radically different than it is today: in its technology infrastructure, governance structure, and the user populations it serves.

Discussion and Conclusion

We traced the Urban-net from the project's inception to design stabilization in 2000, and from then to the work now occurring on the Board to maintain the Urban-net while amending it. Through three transition points, in particular the second and the definitive third transitions, the project's equity logic got deferred in favor of project viability. If the network planning process (user requirements analysis) helped flesh out an inclusive image of Urban-net as a true community resource promoting equity and inter-organizational connectivity among large and small entities, the design specifications stabilized in 2000 fleshed out a very different, circumscribed image, with large entities (public organizations) as sole users using Urban-net for intra-organizational, not inter-organizational, connectivity, and excluding CBOs and their service areas.

The Board's initiatives to "keep users in" and realize equity were both seeded in 2005-2006, around the first contract renewal; the efforts to cut dependence on Telco also had their early origins in the frustration experienced by users at this time. We identified three strategies to assure Urban-net's continued viability by keeping users in: two involving the community VLAN interface and the third, the VLAN interface. We identified three strategies on the equity front as well, all focused on diversifying governance: doubling the number of at-large members, reactivating the "community net committee", and new member categories in the Urban-net "organization". Initiatives to reduce dependence on Telco are being explored on two fronts: complete independence via ownership, and the "value-added reseller" model. Our focus here has been on the "concrete practices" of actors doing institutional work, as recommended by Lawrence et al. (2009).

In their efforts to cut dependence on Telco, the Board is acting in order-challenging ways by envisioning radical alternatives to Urban-net's current form. The individual actors involved – the Executive Director, Financial Officer, the Board Chair, as well as several members – in this radical effort are entrepreneurs, leading deliberations on strategy. Like their forerunners in the stabilization process, these entrepreneurs have used **advocacy**, with the Chair, Executive Director, and Financial Officer favoring ownership and leading the effort to get the "historic" resolution passed and authorizing funds for the feasibility study. They **defined** the Board's response to Telco unresponsiveness, but agreed to look at the "value-added reseller" option in the study. As part of their groundwork on the resolution, the Chair and the Executive Director met with Telco rivals, community-owned community networks, institutional network operators, and experts, seeding a network of resource-persons and resources they could activate for the feasibility study and beyond. The Executive Director advocated inclusion of language on "serving the under-served" in the "historic" resolution.

As we noted earlier, the bulk of the maintenance work now occurring, however, is far more modest and is concerned with “amending while preserving” the Urban-net. It is *gardening* work. “Keeping users in” and “serving the under-served” account for the bulk of the deliberations. On the first, top officers and selected members are concerned with matters operational: cutting Internet costs, equipment upgrades, and service level agreements. On the second, it is administrative and concerns governance, legal, and budgets issues. In both cases, it is largely committee work. Entrepreneurs must work with the Board to gain concurrence on concrete action plans; consensus cannot be assumed and compromise is common. Maintenance work is difficult but mundane in a double sense: “keeping users in” is basically order-reproducing work. Even in the case of “serving the under-served”, the entrepreneurs, led by the Executive Director, were reactivating a deferred logic, not creating one. It is mundane in a second sense, involving “adjustments, adaptations, and compromises” (Lawrence et al. 2009) common in committee work. Focusing on the actual work that actors must do maintain artifacts, Lawrence and Suddaby (2006) rightly note, is to highlight actors’ skill and artfulness and also to the contingent and expedient nature of such work. The image of the actor here in hardly the “hyper-muscular” agent that Lawrence et al. (2009) caution against. *Gardening* assumes a purposeful actor who may guide thinking but who may not be in control of all the details (Olsen 2003).

The metaphor of *gardening* – amending while preserving – captures the conservative thrust of much of the maintenance work we report, as its concern is with preserving valued aspects of stabilized artifacts. Amending in this case involved reactivation (not creation), similar to Hargrave and van de Ven’s (2009) finding on actors “carry(ing) over norms from the previous regime into... the new institutional order”. Just as a gardener prunes, weeds, plants/re-plants to keep the garden in good order while amending it, maintenance workers may “creatively combine” (Jarzabkowski et al. 2009) attempts at innovation and also disruption. *Gardening* (Olsen 2003) elegantly captures the multi-stranded nature of maintenance.

We differentiated stabilization from maintenance on their temporal and relational scope. Temporally, stabilization is an event occurring at a point in time. There may be a process involved as we reported, but there comes a point when a set of design specifications emerges with a degree of concurrence from stakeholders, and this set then serves as the basis on which the system is built. In Bijker’s (1997) formulation, the plurality of interpretations of the artifact as entertained by stakeholders diminishes at this point and the artifact’s “interpretive flexibility” is reduced, and major change to specifications is unlikely to occur. In systems engineering practice, systems designers rely on user sign-offs on requirements to start specifying the design, and the stabilized set of specifications - traceable to the stabilized set of requirements - then drives system development. Freezing requirements and rapid applications development are among the IS practices used to stabilize a set of specification so the system can be built (Davidson 2002).

Temporally speaking, maintenance work, in contrast, is ongoing and concerned with maintaining that which has been stabilized (or aspects thereof). Relationally, as evidenced by the Board’s efforts to serve the “under-served”, actors are working with local groups, private citizens, non-profits, and institutional representatives and funding agencies to identify at-large members for the Board and fill seats on the other two bodies as well: the “community net committee” and the Urban-net “organization”. The Board is in the process of defining a broad-based relational network of new stakeholders, sources of funding, normative control, and public oversight and **monitoring** (Lawrence and Suddaby 2006) in line with an expansive new sense of accountability to the community. Efforts to keep users in have also entailed network-seeding parleys with Internet service providers and Telco rivals. Similar to **constructing normative networks** (Lawrence and Suddaby 2006), this is activity “through which practices become normatively sanctioned”. It also provides the Board social learning and business development opportunities. These networks could also be tapped if the (more radical) ownership or “value-added reseller” option is pursued, but right now, for the most part, these initiatives support the Board’s ongoing maintenance work, or gardening.

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