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Making Accountability Visible Using I.T.: From Command-and-Control to Bounded, Empowered Coordination

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MAKING ACCOUNTABILITY VISIBLE USING I.T.: FROM COMMAND-AND-CONTROL TO BOUNDED, EMPOWERED COORDINATION

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Summary

Empowerment is a key component of the Sense-and-Respond design for an adaptive enterprise. Within bounds set by the enterprise leadership, individuals are given the authority to choose the most appropriate means (procedure) for the situation at hand. This recognizes that the representative of the enterprise in direct contact with a specific customer, and individuals in the community supporting that representative, have the greatest understanding of the company's one-on-one relationship with that customer.

The rise in empowerment in the workplace has muddied accountabilities for outcomes. The industrial age model of work-as-procedure had clear accountabilities: the supervisor specified the procedure, and the worker executed it. In the knowledge economy, Haeckel and Scherr have observed, an empowerment model requires a shift from accountability for executing a procedure to accountability for producing an outcome. Accountabilities are negotiated between individuals their in roles as customer or supplier.

Accountability brings issues of explicitness — the need to write things down between the parties involved — and disambiguation — the need to become clear about a desired outcome, and any associated conditions of satisfaction. Within any enterprise of a scale beyond continually face-to-face communication, particularly where economies of scope are sought, information technology support for accountability is essential.

This paper explores how to design and deploy information technology support for accountability in general, and for the case of bounded empowerment in particular. Explicitness and disambiguation would both appear to be laudable goals. However, deeper accounts of the nature of organizational work and its computer-based support — such as Wenger's maxim that "practice is not the result of design but rather a response to it" — suggest that caution is appropriate. We review the literature on work practice, accounts and accountability, and "technologies of accountability" to suggest directions for the transformation of enterprise information technology support systems.

Keywords: Accountability, Business, Empowerment, Information Technology.

1. The Increasing Rate of Unpredictable Change Faced by Business Enterprises Leads to a Reevaluation of the Application of Information Technology

1.1. RAPID CHANGES IN CUSTOMER VALUE PERCEPTIONS FORCE ENTERPRISES TO BE ADAPTIVE

According to Haeckel (1999), the increasingly frequent unpredictable, discontinuous changes that occur in the environments in which enterprises operate are having a profound effect on their strategy formation processes. How many enterprises predicted the rise of the World Wide Web and e-commerce? How many *software* companies made this prediction?

The kinds of change observed by Haeckel and others are more than a temporary phenomenon. They are a consequence of the very moral foundations of commercial life. As Jane Jacobs has pointed out (Jacobs 1992), the moral precepts that govern commercial life require that commercial organizations use initiative and enterprise in promoting comfort and convenience for their customers, and that in doing so they be thrifty, efficient and industrious. In other words, they are morally driven to actively seek to change (improve) what they do for their customers and how they go about doing it. The commercial world has simply no choice but to drive and therefore live with change.

Above all else, frequent and disruptive technological, regulatory, political or competitive changes lead customers to reconsider just what they consider to be of value. As such they render traditional "predict and plan" approaches to business and information technology strategy not only inadequate, but downright dangerous to the long term health of any enterprise offering them products or services.

The only alternative, in Haeckel's opinion, is to focus strategic thinking on the design of an adaptive, learning organization. He suggests that organizational learning and adaptivity are optimized when they are focused on two things. Firstly, there should be constant inquiry into what customers consider to be of value. This requires that, at the very least, customer relationships be designed to ensure learning. Secondly, there should be constant inquiry into what organizational capabilities the enterprise must develop, informed by an understanding of what customers consider to be of value.

1.2. RESPONSIVENESS TO THESE CHANGES REQUIRES A FOCUS ON ENDS RATHER THAN MEANS

A company's basis for gaining profitable business can usefully be thought of as its "value proposition," defined in terms of the value that it creates for its customers and what it can gain from them in return.

Customers associate value with both the outcomes of their interactions with enterprises and with the means used to achieve these outcomes. Attributes of value associated with outcomes include: does the car they buy have appropriate comfort, economy, and

prestige? is the Roman statue aesthetically appealing? Questions of means include: does the auto-maker employ nonunion workers? is the car manufactured in a country that the customer approves of? do they offer reasonable financing arrangements? does the Roman statue depict a notorious slave owner?

Generally speaking, value is principally associated with outcomes with means playing a secondary role and leading to conditions of satisfaction.

A knowledgeable worker in direct contact with a customer is better able to determine what the customer considers to be valuable than business executives and centralized planning staffs who have neither the time or opportunity to meet all customers. This is particularly true of employees who are in direct contact with a particular customer over a protracted period of time. Customers and the technological means for satisfying them are become ever more sophisticated and diverse. As a consequence, the degree of technical understanding and understanding of the customer required to propose outcomes of truly high value becomes beyond what most senior managers and central staff have time to develop for each customer.

The consequences of changes in who knows best what the customer might wants are profound, providing a compelling argument for a move toward empowerment and away from hierarchical control of business. Providing ever higher value requires that the knowledge and creativity of customer-facing employees be enrolled in the determination of valuable outcomes as well as in the feasibility determination that means can be assembled to provide that outcome while meeting negotiated conditions of satisfaction.

1.3. INFORMATION TECHNOLOGY SUPPORT SHOULD BE RETARGETTED FOR BOUNDED EMPOWERMENT RATHER THAN MEANS ENFORCEMENT

The dominant paradigms for the design of information systems are still focused on prescribing, enforcing and accounting for means, and for supporting the offering of a limited number of centrally determined, predefined outcomes. They support "make-and-sell" organizations in which customer values are predicted, and means are prespecified. To respond to individual customer requests, individuals in the organizations need to sense what customers believe to be of value and then respond with customized, high value outcomes (Haeckel 1999). The focus on an enumerated set of ends and deliberate enforcement of means results in numerous pairs of metaphorical shackles on those seeking to negotiate ends that create high value in the eyes of specific customers. In so doing, they limit the ability of employees to generate more and better business for their own enterprise and breed cynicism amongst those employees.

The fact that most current information systems get in the way of empowerment is a systemic problem. The mess[1] in which this problem is buried includes: explicit decisions on behalf of those commissioning systems; implicit assumptions buried in the design methods used in their construction; false and implicit assumptions in some enabling technologies; lack of a deep understanding of what information technology can be used

for; lack of understanding by most involved of social processes of accountability and learning amongst the users of the proposed system; and so on.

The purpose of this paper is therefore to explore what it means to design information systems that support bounded empowerment rather than means enforcement.

2. The Enterprise Must be Reconceived as a Hierarchy Producing System Outcomes Rather than an Organizational Hierarchy of Authority

2.1. A HIERARCHY OF AUTHORITY CENTRALIZES CHOICES OF MEANS AND ENDS

Approaches to business management based upon a hierarchy of authority originated in an era where (i) most people were poorly educated, (ii) there was more demand for goods than businesses were able to supply; and (iii) there were few or no social safety nets for the unemployed.[2]

This era was production-driven. The challenge for society at large was that supply was heavily constrained. Business needed to become efficient and profitable at delivering basic products, services and amenities to satisfy basic human needs, and at a cost that allowed a relatively poor public to purchase these basic goods. They tackled this by developing central staffs focused on planning and control. Supervisors focused on the detailed design of production procedures and technologies and supervisory techniques for ensuring that workers diligently conformed to defined procedures. Employees were treated as replaceable cogs within enterprises conceived of as efficient machines. That business leaders could get away with doing this was a consequence of a ready supply of poorly educated workers and an absence of social safety nets for those unwilling to comply to defined practices.

This hierarchical, mechanistic view of enterprise was maintained even when the challenge became generating and competing for demand in an era of abundant supply. Once industrial efficiency reached a level where the vast majority had access to all basics and many previous luxuries (such as personal transportation), the enterprise's challenge became to differentiate its products from those of its competitors. The result was a larger central staff broadening its interests to mass-marketing including the development of strong brands. Employees were now more comfortably off, secure, and better educated yet nevertheless still treated as replaceable cogs in a company machine whose outcomes were defined by central staff.

While the discipline of marketing did steadily develop during this era, it was focused on testing company offerings on "focus groups" to focus the message and test the mass market appeal of each marketing campaign or product offering. The result is still a "make-and-sell" company making a limited range of offerings to a small number of market segments. At the same time — although secondarily from the perspective of this paper — there was a growing "work gap" company staff and management and the

employees whose work they defined. Their ability to successfully dictate value creating outcomes and procedures was steadily eroding.

Within a hierarchy or authority, employee accountability is achieved through a combination of plans, measurements and incentives. These are enforced through instruments such as sales and production quotas and organizations such as quality control, both of which link employee performance with ability to adhere to means and ends determined by others, typically those within central staffs. In this case it is the need for employees to adhere to defined procedures which is their main accountability to the enterprise. There is little notion of empowerment.

As we write, hierarchical authority is becoming increasingly problematic. In comes cases it leads to mutual suspicion and contempt between employees and management and this is often openly acknowledged.[3] More importantly, too often individuals are caught between doing "the thing right" as defined by the enterprise, and doing "the right thing" for the customer. What is required is a more appropriate balance between authority and accountability through empowerment.

2.2. EMPOWERMENT ENFRANCHISES INDIVIDUALS TO CONSTRUCT RESPONSES APPROPRIATE TO THE SITUATION

The increasing educational level of many workers has emerged hand-in-hand with a rise in knowledge work. Knowledge workers are distinguished in terms of the enterprise's trust in their education and experience. Knowledge work is less about following defined procedures than is typical white collar work.

The recent business process reengineering movement[4] sought to sweep aside waste inherent in procedures whose design had emerged and deteriorated over several decades. Reengineering involved the redefinition of jobs, the elimination of tasks that did not add either business or customer value, and the rolling in of quality assurance into production tasks. However, too often in this process accountability for outcomes was lost.[5] The procedural designs of work resulting from business process reengineering are shackled by its mind set of defined procedures and a corresponding accountability for adherence to procedure. In so doing it leaves open questions of who is accountable for outcomes and which outcomes are most valuable for specific customers. Once again, the result is a focus on "doing the thing right" rather than "doing the right thing" for the customer.

True empowerment requires that knowledge workers be accountable for determining what the right thing is for each customer. It requires knowledge workers to negotiate and achieve an outcome that provides real value in the eyes of the customer. It implies that they are both free to and accountable for selecting a viable means for achieving that outcome, and doing so in compliance with conditions of satisfaction.

In practice, the empowered employee makes choices about outcomes and conditions of satisfaction in negotiation with their customers and employers. They are held accountable to explicit statements of commitments which are the results of negotiations of outcomes

and conditions of satisfaction. Thus the accountabilities resulting from empowerment heighten issues of explicitness — the need to write things down between the parties involved — and ambiguity — the need to become clear about what an outcome is to be, and of any associated conditions of satisfaction.

2.3. ENTERPRISE COHERENCE REQUIRES BOUNDS ON EMPOWERMENT

Unbounded empowerment of employees results in an enterprise with no coherent purpose. With no overarching purpose the enterprise behaves and evolves as a purposeless ecology rather than as a purposeful whole social system.[6] It ceases to have a unifying identity and ceases to be a firm in anything but name.

Haeckel (1999) discusses the issue of achieving enterprise coherence in terms of a need for *bounded empowerment*. Enterprise leaders must occupy themselves with the long term health and coherence of the enterprise. This involves the production of a high-level design for the business that includes a system of modular capabilities that they believe necessary for delivering the range of outcomes that its customers might ask for. This design is informed by ongoing systemic inquiry into what customers consider to be valuable. They then identify key roles necessary for implementing this system of capabilities, identify people to fill those roles, and negotiate with them to fill the roles which may itself reshape role definitions and even the high-level business design.

Bounds on empowered employees consist of two things. Firstly, an overall purpose of the enterprise is clearly determined and communicated, articulated as the enterprise's reason-for-being. Secondly, bounds on legitimate behavior are defined. For example, an enterprise may be defined in terms of providing certain kinds of value to certain groups of customers, under the bounds that each customer relationship be profitable, and that the company must maintain a highly diverse workforce. Reason-for-being and bounds affect employees both as they negotiate unique outcomes in response to customer requests, and as they deliver those outcomes. To become an employee, a person must sign up to the purpose (and bounds) of the enterprise, and is likely to become uncomfortable if their own motivations become at odds with the purpose of the enterprise as a whole.

The result is a hierarchy of outcomes. Each lower level outcome contributes to the achievement of higher level outcomes. The enterprise's reason-for-being is the outcome of the enterprise as a whole. Enterprise leadership is responsible for the high-level business design that ensures that the enterprise satisfies its reason for being. The outcome of people playing roles in the high-level business design is to provide capabilities to the enterprise as a whole. Individual employees have dual accountabilities: firstly, to play particular roles within the organizations; and secondly, to provide specific deliverables to meet outcomes negotiated with customers.

2.4. EMPOWERMENT IS ESSENTIAL TO COMMERCIAL LIFE CENTERED ON KNOWLEDGE

It seems to us that the historical trend towards a better educated and otherwise more knowledgeable workforce described by a wide variety of authors mandates a shift towards empowerment. The more knowledgeable an employee, the more aware or opinionated they will be with respect to what is of value to their customers.

The difference, which comes down to matters of trust in employee competence rather than the use of power to dictate behavior through coercion, can be nicely summarized in terms of Jane Jacobs' (1992) discourse on the moral precepts governing commerce and politics.

When employees are considered as having low skill and low education, they are not trusted to make commitments on behalf of the enterprise. They are forced to adhere to traditions established by others, and if they disobey or attempt to innovate they are fired in an act of corporate vengeance. Dissent is not tolerated, leading to deceipt. Both managers and employees become exclusive and fatalistic, making rich use of their leisure time. These are the traits of what Jacobs calls the guardian syndrome, which has the morality of politics rather than commerce.

Full participation in the commercial syndrome implies a shunning of force in favor of voluntary agreements. It implies respect for contracts, easy collaboration with strangers, an openness to inventiveness and novelty, and the use of initiative and enterprise. It is focused on the promotion of comfort and convenience for others yet requires efficiency, thrift and industriousness by all.[7]

Jacobs describes the commercial and guardian moral syndromes as necessarily symbiotic, yet at the same time mutually corrupting, and in the broadest possible sense. This may occur when a commercial enterprise exerts force for example by relying upon slave or overly deskilled labor, or when it suppresses initiative and enterprise and fails to invest for productive purposes. A company that goes out of business is as corrupt a commercial form as rampant success derived from deliberate monopoly.

Should the executive of an enterprise act as a guardian for its shareholders, or engage in commercial relations with its customers? To the extent that they must do both, how do they avoid systemic corruption of their enterprise?

From this perspective, the historical progression towards a highly educated and secure population brings with it a moral imperative to achieve empowerment within the commercial world, while nevertheless keeping commercial principles out of government. Indeed the cases where empowerment is corrupting are precisely those of guardianship, including in the military, the legal system and policing. Empowerment in commercial organizations is about developing people and institutions so that the people instinctively

apply all precepts of the commercial moral syndrome, using the precepts of the guardian syndrome with extreme care principally for the protection of the inexperienced.

3. Information Systems Enforcing Procedures that are Natural for a Hierarchy of Authority Break Down when People Become Knowledgeable

The larger the scale at which enterprise takes place, and the more geographically dispersed it becomes, the more critical is communication and system in allowing it to happen.[8] This is as true for an enterprise embracing bounded empowerment as it is for the hierarchical organization.

Before we discuss information technology support for bounded empowerment we must describe the information technology needs and precepts of the hierarchical organization. It is our contention that many critical techniques and technologies for information system development are oriented towards the support of hierarchical control. We illustrate this with signs that this approach is corrupting for business conducted in the current climate.

3.1. HIERARCHY OF AUTHORITY LEADS TO LITERAL INCORPORATION OF SPECIFIED MEANS BOTH FOR GUIDANCE AND CONTROL

In theory at least, many software development methodologies advocate defining and specifying means including means for supervision and then giving the specifications to programmers who incorporate the means into the code of information systems. This approach to information technology is inherited from the hierarchical organization's hard won traditions of defining and handing down to employees defined means and ends. The resulting information systems dictate and enforce prescribed means, and incorporate facilities for monitoring means. No wonder that for so long I.T. was (and has been) managed as a staff function.

Correspondingly, these systems are limited in their capabilities for supporting novel outcomes. The corrupting consequences of this are particularly evident in financial institutions including insurance companies. The major bottleneck in developing and offering a new financial or insurance product is still usually the development of new, dedicated information technology support for the sale and administration of that product. Now that business people see the need to change to empowerment and rapid responses they are being held back by their own information technology![9]

In providing support for means rather than a broad and unforeseen range of possible outcomes, information systems not only prevent innovation in outcomes. They reinforce bureaucracy. Adherence to means is incorporated into the systems, meaning that while any employee wishing to satisfy unanticipated customer requests must show considerable initiative and enterprise, it is focused on achieving the outcome by any means rather thanon suggesting outcomes that generate value.

It is perhaps the very nature of computers as machines able to do nothing other than follow externally defined procedures that has too often blinkered information system developers to the true nature of human work. So the thinking goes, if it takes a procedure to define the "work" that the computer must do, then surely these same techniques must work for defining human work. It is perhaps this that has led them to fall behind in the drive to support empowered coordination

3.2. RESPONSES TO TECHNOLOGY SUGGEST THAT SPECIFICATION OF MEANS IS PROBLEMATIC

> "There is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it."[10]

Wenger's recent maxim summarizes in a rather understated way the complexity of conducting any form of design that may influence the behavior of people. This complexity has arguably been the key theme of the systems sciences since the Tavistock Institute's studies of coal mining as a socio-technical system in the 1950s and early 1960s (Trist *et al* 1963).

A wide variety of empirical studies and theoretical analyses of the use of information systems within specific work settings have highlighted many problems that result from the application of many currently available information system development techniques.[11]

Bowers, Button and Sharrock (1995) describe the considerable inefficiencies introduced into four print shops when an information system centered around a rigorously-defined workflow was introduced. The primary purpose of the system was to produce the detailed accounts of the conduct and associated required dictated in a governmental contract. The means for producing these accounts was to require that each aspect of each print job be logged, and in a designated order, within the information system. However, this rendered inappropriate many previous practices that had speeded work through the shop and ensured that copy machines were used to the fullest. Unhappy with the falloff in production the employees in each print shop developed strategies for beating the system, many of which involved "lying to" the system.

The authors of the print shop study explain this situation as resulting from a fundamental misunderstanding on behalf of the system designers standing "without" the print shop of the nature of work "within" the shop. Schmidt and Bannon (1992) point out that the production of accounts of work is itself a form of work ("articulation work") which typically requires additional work on behalf of the workers. In the case of the print shop, it was the organization of the articulation work that disrupted the work that was being articulated.

Suchman (1993a) points out that in general at least two kinds of accounts of work are needed: the first supporting coordination with fellow workers; and the second provides

visibility for supervisors including auditors. Too often technologists combine these two forms of accounting into a single facility of the information system.

Ultimately it must be recognized that human nature shuns procedure in favor of improvised action within the situation. Suchman (1987) established as a general principal for the design of human-machine interaction through her anthropological studies of people attempting to resolve problems with photocopier machines. She pointed out that however carefully phrased remedial procedural instructions were, users would inevitably start skipping steps, improvising their own solutions, and pressing buttons until the procedural instructions lost all relevance. She pointed out that all plans, of which procedures are a special case, are at best resources for situated action. What people need is resources to draw upon in each situation. To the extent that procedures are useful it is as resources in support of improvization.

These cases illustrate that it does not take much for defined means to break down. The more knowledgeable people become, the less tolerant they become of defined means (procedure) and the more confident they become in improvising in each given situation. Empowerment seeks to harness that motivation as a means both for improving the quality of the working life of employees and for generating more value for customers.

4. Bounded Empowerment Requires Radically Different Information Systems Designed to Support Communities and to be Steadily Adapted by Them

In systems of hierarchical authority, means are defined to predictably orchestrate both any necessary coordination between employees and the visibility to supervisors of progress and performance.

The move to bounded empowerment does not lesson the need for visibility either for coordination or accountability. However, it does necessarily change both the reasons for making things visible and the corresponding audiences of that visibility.

4.1. WHY FOCUS ON COMMUNITIES RATHER THAN INDIVIDUALS?

Recent accounts of organizational work emphasize the importance of communities of practice both in constituting the identity of each employee and in providing a locus of learning both for individuals and the organization as a whole.[12] A clear notion of personal identity within the organization is a key aspect of achieving a high quality of working life, and the dominant aspect of identity is a developed sense of legitimate membership within one or more communities of practice.

From the perspective of Sense-and-Respond, an organization is seen as a network of outcomes. Each outcome contributes toward the accomplishment of other outcomes within the network. Many personal outcomes of individual employees relate to their membership within communities of practice. Not least amongst these outcomes their sense of identity which is in part determined by their participation within the community.

Each community of practice is itself partially defined in terms of a shared enterprise which has its own outcomes. The outcomes of individuals and teams contribute both to the outcomes of the business enterprise as a whole and of each community to which they belong. For example, individual items of work provide opportunities for some individuals to learn more about the community's shared repertoire of practices. Other individuals may learn how to develop their less experienced colleagues within the community. And the community as a whole has the opportunity to enrich the shared repertoire.[13]

For natural learning to take place it is important that all work including the negotiation of outcomes with customers be visible for inspection to others within the community. Since an individual may belong to several communities, the work may need to be made visible in a different form within each community.

This visibility allowing coordination and mutual support within a community of practice needs to be complemented by limited visibility to others to whom the suppliers of an outcome are accountable. Limited visibility typically comes through visibility-creating articulation work.[14] Those requiring limited visibility include the customer for the outcome and, particularly while the outcome is negotiated, anyone concerned with the coherence of the enterprise as a whole. Unlimited visibility comes only when people know and understand each other extremely well and are physically co-present when work is being done. Thus unlimited visibility is rare indeed these days.

Note that an enterprise is a constellation of communities[15] with even enterprise leadership being just another community. Leadership is accountable to all members of the enterprise for the continued health and cohesion of the enterprise as a whole. Leadership presents an acute example for understanding that visibility should be carefully managed. Since the effects of leaders' negotiations may have a profound effect on the enterprise (for example, changing its composition through merger, acquisition or divestiture), even the existence of negotiations may only be revealed on a need to know basis. Another example where visibility needs to be carefully considered is the initiation of technical discussions across borders between newly merged companies.

4.2. HOW INFORMATION TECHNOLOGY CAN SUPPORT EMPOWERED COORDINATION IN CONSTELLATIONS OF COMMUNITIES

Winograd and Flores (1986) developed a technique for achieving coordination within human organizations that Haeckel (1999) characterizes as a commitment management protocol. This general purpose protocol imposes an order upon negotiations in which one person seeks to gain the commitment of one person towards an outcome. The 'customer' makes a request of the 'supplier,' who may respond with an 'offer.' The customer may 'accept' the offer or propose a 'counter-offer.' If and when a commitment is made the protocol goes on to define how the process may lead to completion through formal acceptance or rejection of the outcome, or to withdrawal by either party.

However the commitment management protocol may not be appropriate for all people in all situations. Although the commitment management protocol is presented by its authors

as a general purpose, naturally occurring (if socially constructed) means of human coordination, several authors disagree with its applicability. In particular, Suchman argues that like any formalization the protocol — indeed the very idea of formalizing commitments at all — serves the interests of some at the expense of others. It has its own politics, serving interests of authority and control.[16]

While there might be better means for managing commitments, it seems clear that true empowerment within the commercial syndrome does require that commitments be managed. The one proviso is that the negotiation of ends and means is a non-trivial skill which must be learnt. A business must therefore adopt something of a protective, guardian posture towards itself and its more junior employees by limiting the making of commitments of different kinds to limited groups of people. The existence of commercial law, and the reliance of all business enterprises on corporate lawyers for the making of most significant agreements, provides evidence for this. Even commitments made internally to an organization are non-trivial requiring support and learning within all communities whose members may be asked to make commitments. So while we might all be subjected to commitments of one sort or another, it is perhaps unreasonable to believe that a single protocol embodied in a single piece of software can be used by all for the making of commitments. Time will tell.

A reasonably compelling argument for a uniform commitment management protocol embodied in information technology relates to Haeckel's concern with dispatching. A large enterprise may have a considerable scope: a highly diverse set of capabilities that may be assembled in a large number of ways to create novel and valuable responses for individual customers. The larger the company and the more diverse the capabilities, the less likely it is that the employee assembling a response to a customer request will personally know the colleagues they must negotiate with to assemble the response. In this case the best means for locating other colleagues may be through information technologies, varying from formal directories with search facilities to support for more social network-oriented means for inquiry making. Lack of personal knowledge and trust argues for increased formality in dealings, and thus for a uniform protocol whose enforcement mechanisms are well known and respected throughout the enterprise.

Information technology can support accountability of other kinds than adherence to formal commitments. As hinted earlier, membership in communities of practice itself brings forms of accountability. And taking on a particular role within an organization brings forms of accountability.

Simply by making visible their activities to others within their communities of practice, participants engage in a form of double accountability to each other. In showing what they are up to, they: invite others to keep an eye on what they are doing; open themselves to advice should anything be amiss; and offer to the consideration of the community as a whole unusual situations that may lead to learning for the whole community, whether or not they notice themselves that the situations are unusual. By paying attention to the work of others they may absorb insights by following the expertise of their colleagues, offer advice and support when it is needed, and choose to devote their attention to the unusual.

Erickson *et al* (1999) describe prototype means for achieving through information technology a level of easy sharing and awareness similar to that which occurs within a shared physical space. They refer to the ability of people to determine a need to pay attention based upon peripheral awareness of what others are doing using the term "social translucence."

Levels of formality of commitments and accountability is a completely separate concern from scopes of visibility. Simply because a commitment is negotiated formally between comparative strangers is no reason for the negotiation to be visible to many others. Some business cultures separate formality and accountability from the formal writing down of commitments: the City of London's saying "My word is my bond" captures this point quite succinctly. Equally, even certain forms of commitment within a close-knit community of practice may best be handled formally — perhaps for reasons of efficiency.

4.3. ALLOWING COMMUNITIES TO INNOVATE IN HOW THEY ACHIEVE ACCOUNTABILITY

At this point it is worth repeating Wenger's maxim:

> "There is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it."[16]

This maxim applies to all aspects of practice including the very composition of a community and what enterprise — if any — keeps the community together. In particular the maxim applies to what might be the most appropriate way of managing accountability.

Since each commitment is made in a somewhat unique situation, the related demands of visibility and accountability may also be unique. Here we agree with Truex, Baskerville and Klein's (1999) call for information system development approaches that allow users to engage in continuous analysis and requirements negotiation. An information systems organization that optimizes for change should be able to each commitment with appropriate information technology means for ensuring appropriate visibility and this accountability.

4.4. EVEN WHEN A SHIFT TO EMPOWERMENT IS MANDATED, DETAILS MUST EMERGE WITHIN CONSTELLATIONS OF COMMUNITIES

While in principle the needs of visibility and accountability related to each commitment may be unique, in practice each community will include in its shared repertoire of practices a relatively small number of means for achieving accountability. The repertoire of accountability practices of a given community will be a response to demands placed upon it both by the rest of the enterprise and by its customers.

The move to bounded empowerment and other aspects of the Sense-and-Respond organization represents a radical transformation of an enterprise: a transformation which

can only be accomplished through deliberate acts of alignment. As such, enterprise leadership may choose a variety of means to shock and persuade members of the enterprise into becoming accountable for outcomes through the double-edged means of empowerment. As we have seen, while empowerment promises added freedom for individuals, it does this through the additional responsibilities of accountability for outcomes.

The top level consideration of leaders embracing Sense-and-Respond is to achieve the outcome of accountability for outcomes. While the recommended means is bounded empowerment, we have argued that empowerment is a considerable responsibility and that its precise meaning must be negotiated, like all other aspects of organizational life,[17] within communities of practice.

As such the precise form in which information technology might support accountability for outcome should not be mandated. Both information technology and any style of using it to support accountability are means relative to this end and thus fall within the realm of negotiable details.

We propose to offer a variety of means to support organizations moving towards empowered coordination. These may vary from the formalized commitment management protocol advocated by Haeckel (1999) to more general purpose toolkits in which issues of visibility and social translucence are central.[18] Such a spectrum will allow each community to determine its own way of making sense of the call for empowered coordination, and to negotiate its own information technology means the various constituencies to which its members are held accountable.

5. Understanding Information Technology Support for Bounded Empowerment is Part of a Larger Inquiry into Adaptable Software for the Adaptive Enterprise

The challenges of designing technologies for use in social settings are well known to the systems sciences and have lead to a variety of techniques under the banner of socio-technical design.

Our own interest comes from answering the rhetorical question: "Surely an adaptive enterprise will require adaptable software" (Simmonds and Ing, 2000a). In answering this question we are taking a systems approach based upon achieving a diversity of costs, scales and rates of change in system designs. Here we are concerned with three related forms of design: the design of two kinds of organizationl the functional design of software applications to support those organizations; and the implementation of those applications as software. The two relevant kinds of organization are large information systems services organizations, and the organizations that use their services. An adaptive enterprise is an organization that is designed to respond to change. Software so designed is called adaptable software.

In this paper we have focused on the specific issue of adaptive enterprise design which is the transformation of an enterprise from hierarchical authority with its accountability for means, to bounded empowerment with its accountability for outcomes.

We have already partly described the relationship between these two themes. We have pointed out that the means by which even the transformed enterprise achieves accountability for outcomes will by subject to change (across time) and variation (across communities and outcomes), and so will require adaptable software and an information systems development organization able to support the ever changing needs of empowered employees.

Not only must we produce systems that are usable to support the enterprise throughout a period of transformation, we acknowledge that the achievement of the goal of the transformation will remain a continuous accomplishment of the transformed enterprise. Any such form of cultural transformation — such as the shift to bounded empowerment and accountability for outcomes — must take place over a considerable period of time. We seek neither to: (i) guess what systems will ultimately prove to be useful or (ii) assume what systems could eventually work, and seek a staged strategy to steadily coax employees into ultimate compliance.

End Notes

1 The term "mess" comes from Ackoff, for example (Ackoff 1974, 1981).
2 Much of this historical account is taken from Ackoff, for example (Ackoff 1999).
3 In his account account of claims processing clerks in an insurance company, Wenger (1998) provides a rich discussion of procedurally-defined work, exploring issues such as mutual contempt between employees and management, and the role of production quotas.
4 Hammer and Champy (1993).
5 This argument comes from Haeckel (1999) and Scherr (1993).
6 We borrow definitions of various classes of purposeful systems from Ackoff (1999, p. 22ff).
7 Ackoff's advocacy of internal markets and organizational democracy (for example, in Ackoff 1999) are themselves consistent with this view, reinforcing the importance of applying commercial morals within an enterprise as well as without.
8 See, for example, JoAnne Yates (1989) account of the rise of system in American management as part of the emergence of large distributed enterprises such as railroads.
9 Baskerville (1996) describes a similar phenomenon that he calls "The Second Order Security Dilemma" in which security features of information systems get in the way of people trying to create novel value for customers. In his opinion the very means for achieving security is predictability of means, which of course inhibits innovation.
10 Wenger (1998), page 233.
11 It is beyond the scope of this paper to make the case that the problem here is not just inappropriate application of design methods but, rather, fundamental assumptions built

into those methods themselves. For an extended treatment of this issue see Hircsch-heim, Klein and Lyytinen (1995).

12 Wenger (1998).

13 The definition of communities of practice in terms of shared repertoire and joint enter-prise comes from Wenger (1998).

14 Schmidt and Bannon (1995).

15 Wenger (1998).

16 Suchman (1993b) is perhaps the most prominent critique of the commitment manage-ment protocol. Many authors have criticized the approach on both empirical and theo-retical grounds. Theoretical attacks take aim at Searle and Austin's work on speech acts as a foundation of human language — for example, Ljungberg and Helm (1997) — which Winograd and Flores (1986) used to justify the protocol. However, Suchman is on the whole rather equivocal. While complaining about the way that the protocol is justified by its authors and pointing out possible limits of its applicability, she has nev-ertheless praised the authors for broadening the debate over the uses of computers in support of social systems and presents the protocol, however flawed, as an exemplary attempt to innovate in the application of computer technology.

17 Wenger (1998).

18 Simmonds and Ing (2000b).

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