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Governance, Leadership, And Management In Adaptive And Inventive Digital Communities: A Research Agenda To Reduce Waste In Graduate Education

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Abstract

Building on transaction cost economics, this work describes the four different forms of communities and introduces transaction benefits as a means of explaining their existence. A research project to investigate governance, leadership, and management in two of the four forms of communities, adaptive and inventive, is described. It is argued that these digital communities are a way of engaging graduate students in wealth creation and thus 'waste' in graduate education can be reduced.

1 Introduction

Market economies center their activities on wealth creation, and foster governance mechanisms (primarily markets and hierarchies) that are efficient wealth builders. The success of market economies depends on their ability to continue to create customer value in a competitive global environment. A major source of the talent that they need in order to remain successful is the higher education system. Ironically, most of what students produce while in graduate school is 'thrown away.' Assignments are usually discarded once completed, with the exception of the doctoral thesis. In effect, society discards much of the work of its most important next generation of wealth creators. We believe that one of the reasons for this 'waste' is the lack of deployment of a governance mechanism that can harness the economic value of graduate student work.

In this paper, we analyze the different forms of a new governance structure, the community, and discuss its potential to create wealth. We describe two projects in different types of communities that are the focus of our research effort to understand digital community success and their potential for wealth creation.

2 Communities As Creators Of Economic Wealth

A **community** is an organizational form for economic value creation that is characterized by voluntary membership, high autonomy, and whose members receive little or no financial rewards (Watson, Boudreau et al. 2004). Communities are open to all, and with the spread of the Internet, they are becoming more common. As long as a person has Internet access and a certain level of education, he or she can participate in such communities. Interest in studying these communities has surfaced, but researchers have adopted different terms to refer to them: virtual communities (Shumar and Renninger 2002; Lee, Vogel, and Limayem 2003), Internet communities (King 1996), online communities (Williams and Cothrel 2000; Lutters, Ackerman, and Linn 2003), digital communities (Ormerod 1999), and community networks (Carroll and Rosson 1996; Schuler 1996). The significance of these terms varies slightly, but the underlying concept is that these communities differ from co-located communities by offering a wider range of options for participation and by allowing community size to grow, unconstrained by physical space. These communities also have tremendous potential to influence economic development, education, and knowledge transfer.

The community is a potentially superior method to hierarchies and markets for the identification and allocation of creativity (Benkler 2002; Roberts 2003). Creative individuals are free to add their ideas and skills to the communal production (Fielding 1999). Those communities that can recruit members from a wide range of cultures and countries might be particularly well positioned for creative growth because they can tap a diverse set of values, perspectives, and knowledge. Because they will have more sensors in the global environment, they should also be more able to sense and react to change. In a post-industrial society, where knowledge and creativity are the foundation of economic well being, it is imperative that we learn more about communities and investigate the circumstances under which they thrive. Accordingly, we have started a research project to identify successful governance mechanisms, leadership styles, and management practices (GL&M) in two particular types of communities (later discussed). More specifically, we propose that governance, leadership, and management individually influence community success. Also, given the predominance of leadership, we also suggest that this factor has an influence on the governance mechanisms and management practices that will be selected (Figure 1).

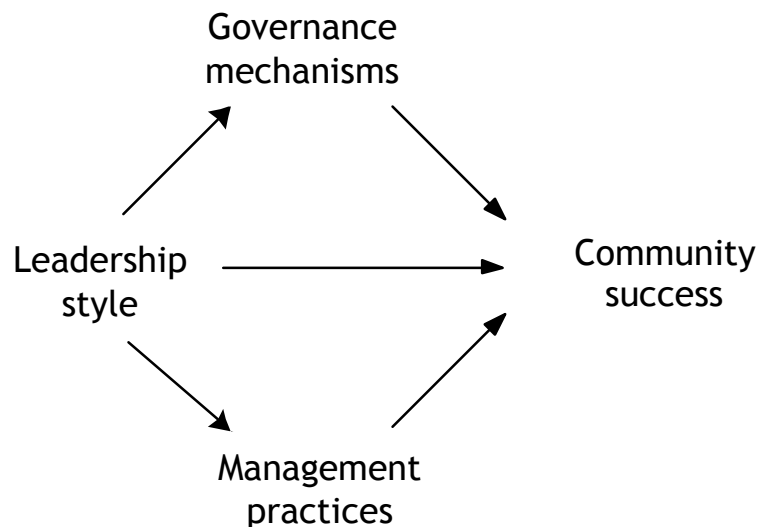


Figure 1: General Conceptual Model

3 Conceptual Foundations

We start by examining transaction cost economics, a well-accepted theory for explaining organizational form. After reviewing several communities, we then introduce the concept of transaction benefits, which we use to develop a taxonomy of communities. Then, in order to discuss and undertake research about successful GL&M, the concepts of governance, leadership, and management are clearly distinguished and defined prior to outlining the research project.

3.1 Transaction Cost Economics

Transaction cost economics (TCE) asserts that the transaction is the basic unit of economic activity, where a transaction cost is a cost incurred in making an economic exchange. Transaction costs are those over and beyond the price of the product or service procured. TCE maintains that firms and markets are alternative approaches to organizing economic activity (Arrow 1974) and that firms need to align governance structure and transaction characteristics (Williamson 1985).

Transaction costs depend on how the transaction is organized. Hierarchies bear the costs of managing and monitoring personnel and purchasing inputs. Market-based costs include source selection, contract management, and performance monitoring. TCE also recognizes the network, distinguished by strong personal ties among the participants, as a third governance structure. We capture the essence of TCE in Figure 2..

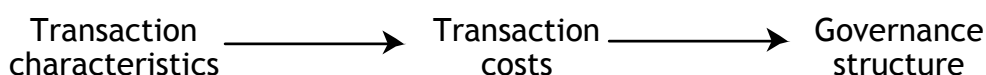


Figure 2: Transaction Cost Economics Model

TCE has been extended to include communities by adding a fourth form to the existing three governance structures (Demil and Lecocq 2003) (see Figure 3). The key discriminating dimensions are incentives and control. Incentives motivate agents to be effective producers. Control is the capacity of a governance structure to contain opportunistic behaviors and to align the behavior of agents implicated in a transaction.

		Intensity of incentives	
		Low	High
Control	High	Hierarchy	Network
	Low	Community	Market

Figure 2: Governance Structures

3.2 Examples Of Communities

Communal production is not necessarily a recent phenomenon. By examining some other community projects, we can gain some general insights into the nature of this governance structure.

3.2.1 The Oxford English Dictionary

An early form of community is the *Oxford English Dictionary (OED)*. In 1857, the Philological Society of London decided to create a new dictionary that would record the history of each word. The project called for volunteers to read certain publications, make word lists, and look specifically for certain words in which the dictionary's team was interested. Volunteers were required to submit a slip of paper identifying where they found a particular word and a sentence illustrating its use. The first editor estimated he would receive 60-100,000 slips of paper. Eventually, the project received six million slips from tens of thousands of volunteers (Winchester 1998).

3.2.2 Academic Journals

Scientific societies first appeared in the 16th and 17th centuries in Europe. Scientific societies facilitate academic communication through their journals and conferences. The intellectual work of reputable academic journals and conferences is almost always handled by academics. The editor, editorial board, and reviewers are usually scholars or highly experienced practitioners. Most receive no payment for their work.

3.2.3 Open Source Software

While programmers have shared software from the early beginnings of programming, the foundation of the open source movement was the decision of Richard Stallman in 1985 to create the Free Software Foundation and GNU General Public License (GPL). The movement gained considerable momentum in 1991 when Linus Torvalds released on the Internet the core source code for Linux (Demil and Lecocq 2003).

Typically, developers work without financial remuneration; they are self-organizing entities that coalesce around the production of a software product (Stewart and Gosain 2001). Open source development is seemingly chaotic and anarchistic (Kuwabara 2000), but looking at successful open source communities like Apache, Linux, etc., it is apparent that some have strong GL&M (Fielding 1999; Bretthauer 2002).

3.2.4 Wikipedia

Wikipedia ^{<en2.wikipedia.org>} is a multilingual free online encyclopedia established in January 2001. The English version now contains more than 250,000 articles¹. Wikipedia is an open collaborative effort written and edited by its readers. Any entry can be edited by anyone. If we examine the entry for "transaction cost," we see that the original entry

¹ As of April 2004.

was made on November 8 2002, and there have been six amendments since then. Thus, no one person is associated with the authorship of an entry, and, furthermore, there might not be an editor-in-chief. Any reader can also participate in a discussion of a page's content and request new topics.

3.3 Transaction Benefits

The focus of TCE is on transactions costs, but transactions also have benefits. In a manner analogous to transaction costs, *transaction benefits* are the benefits incurred in making an economic exchange. Transaction benefits are above and beyond those benefits of direct financial return (Watson, Boudreau et al. 2004). Thus, a person employed by a firm gets direct benefits of a salary, health insurance, and so forth. The same person might gain transaction benefits of reputation, collegiality, intellectual challenge, skill development, and enhanced self-esteem. In the case of a community, the transaction benefits are all that most participants gain. Thus, the TCE model (see Figure 2) needs to be extended, particularly to account for communities, by including transaction benefits (see Figure 4).

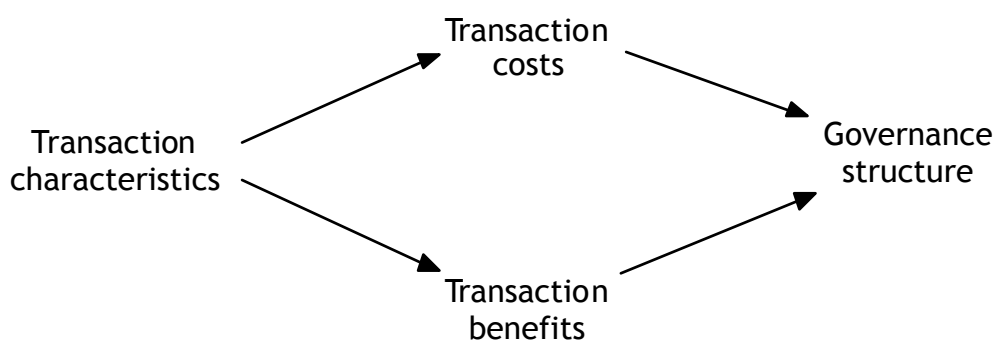


Figure 3: Transaction Governance Relationship

Consider an entrepreneur entering the software business by hiring programmers. The entrepreneur encounters all the traditional transaction costs (e.g., monitoring performance) and major direct costs of paying the programmers. Thus, it is not surprising that the governance structure is a hierarchy with high control mechanisms to motivate employees and coordinate their work

Another entrepreneur might take the approach of recruiting volunteers to work on writing the same software. In this case, the transaction costs are much lower, but not zero (Demil and Lecocq 2003). However, in order to accomplish the project's goals, the entrepreneur must find a way of creating transaction benefits in order to motivate the programmers.

3.4 Forms Of Global Communities

Communities come in a variety of forms, as the preceding cases illustrate. We can gain some further insight into these variations by analyzing the key characteristics of each type. As a starting point, we review a model explaining diversity in global firms. Bartlett and Ghoshal (1987) propose four strategies emerging from the combination of two

criteria regarding (1) the need to be responsive (i.e., to accommodate different local preferences), and (2) the need to reduce costs (i.e., to benefit from economies of scale and standardization). Depending on the importance of each criterion a firm wants to emphasize to achieve greater effectiveness, it should choose one of four strategies: global, multinational, international, or transnational.

The corporate strategies identified by Bartlett and Ghoshal (1987) relate to one governance structure, the hierarchy. If we conduct a similar analysis for the community governance structure, we can also identify four forms (see Figure 5). In this case, the horizontal dimension is responsiveness, as communities must be responsive to their consumers' needs. The second dimension is transaction benefits. A community is reliant for its continuity on the transaction benefits that members derive. If members' transaction benefits are too low, then members will drop out and new recruits will not be forthcoming. Accordingly, based on the importance of each criterion a community wants to emphasize, it will settle on one of four types (Watson, Boudreau et al. 2004).

		Responsiveness	
		Low	High
Transaction benefits	High	Diffusive	Inventive
	Low	Restrictive	Adaptive

Figure 4: Typology Of Communities

- **Restrictive** communities focus on producing and maintaining one product, which indicates low responsiveness, and the majority of participants receive few transaction benefits. The *OED* is a good example of a restrictive community project.
- **Diffusive** communities concentrate on the diffusion of knowledge to a specific audience. The production of academic journals is an exemplar of such a community. Journals are diffusive in two ways. First, the journal is a medium for disseminating information, and second, it is a way of developing skills within the community. The contributors to journals (e.g., authors, editors, and reviewers) gain high transaction benefits because their work is often recognized, helps them to learn their discipline, advances their career, or builds their reputation. Responsiveness is low, as journals are targeted to a specific readership.
- An **adaptive** community, Wikipedia for example, is one where the central goal of the community is quite fixed, and many work on creating and modifying the community's service. The operations of the community are relatively autonomous and transaction benefits are low, but responsiveness is high. For example, the French Wikipedia has the same look and feel as the English version, but, other than sharing the base software and dominant goal, it is quite independent.
- **Inventive** describes those communities where transaction benefits and local responsiveness are high. The community is efficient, because there is a broad based market for ideas and the egalitarian nature of the community means innovative products will stand or fall on their merit (Roberts 2003). In an open source project, programmers can adapt the code to local conditions, and thus the community is responsive to varying environments. Furthermore, participants can learn from each other, because they can see the architecture of the system and the code for any modules. They can also receive benefits from the community,

through the improvement of their programming skills and a potential boost on their self-esteem and reputation.

From our perspective, the last two types of communities, adaptive and inventive, are the most interesting as they are fairly recent organizational inventions forged from the Internet crucible. Restrictive and diffusive communities have operated for some years, and more is known about them. Adaptive and inventive communities are newer, and are likely to have a great impact on wealth creation. Because of their almost total reliance on digital interaction, we refer to these two types of communities as “digital communities”.

3.5 Governance Mechanisms

Governance establishes a coordination mechanism, applies to the community as a whole, and involves some kind of rules. Governance refers to the means to direct and control the community beyond solely the power of only a few people. Thus, the basic intent of governance is to establish how the members and working efforts of the community can be coordinated. Although the importance of governance is apparent in the open source literature, there is no consensus about what governance structure is the most appropriate, and how to distinguish governance from other operational related concepts.

Transaction cost economics [29], along with agency theory [6], have traditionally been leveraged to better understand governance structures between different parties involved in a transaction. However, given our focus on benefits rather than costs, the ideas of property rights (related to TCE) and principal-agency (related to agency theory) are of limited use to the study of governance structures within communities. Accordingly, we elect to focus on social aspects of governance, rather than economic ones. Governance thus includes policy setting, rules and institutions, membership management, monitoring, sanctioning and rewarding, licensing, shared decision-making, and conflict resolution. The following working definition for governance, within the context of communities, is proposed:

Governance constitutes the organization of the community. It includes the rules that describe the community, its institutions, and its written and unwritten laws governing the community internally and externally.

The underlying governance mechanisms supporting a community, and more specifically its mode of coordination and control, remain to be understood (Benkler 2002; Lakhani and Hippel 2003). Alternative perspectives on governance in open source, for instance, are inconsistent. One perspective argues that open source communities function like clans, in which trust is the central coordination mechanism (Stewart and Gosain 2001). Another view suggests that governance does not necessitate trust as a key element for coordination (Gallivan 2001). Rather, control is the alternative to coordination, so that the existence of control mechanisms may reduce the need for coordination mechanisms (Das and Teng 1998). Yet another analysis claims that the organizational structure sustaining OSM is one of a “bazaar” (Demil and Lecocq 2003; Raymond and Tompa 1988). There is a need for research to investigate community governance structures and to resolve existing inconsistencies.

3.6 Management

Before proceeding, we need to distinguish between management and leadership. Management copes with the complexity of the work within an organization and has the objective to “produce a degree of predictability and order” (Kotter 1990). In contrast, leadership focuses on a longer time frame, on strategy, and on change. Thus, management can be seen as the implementation whereas leadership as the direction-setting part. Thus, our working definition for management is:

Management is the planning, organizing, and controlling of the work of individuals and groups within the community.

Although there is most often a leader or leadership team for a community, even the existence of a “manager” cannot be guaranteed from project to project; many communities are “self-managed” or “self-organized.” However, the overall management responsibilities for planning, organizing, and controlling people must exist within each of these communities regardless of structure.

What research is available on community management practices is scattered among a number of research articles and intertwined within discussions of other constructs. There are significant gaps in the scholarly analysis of management within communities. Existing management systems need to be analyzed alongside the existing body of management research to determine if they fit within existing theoretical bases. If not, new theory should be proposed and validated to explain management within communities.

3.7 Leadership

Leadership is a very broad and multidimensional concept, with many definitions and overlapping borders to management (Yukl 2002). Discussions of leadership in open source communities, for example, concentrates mostly on the influence of a salient leader like Linus Torvald, on the role of the project leader or administrator, and on leadership as the decision-making process.

Leadership is the inspiring and influencing act in order to direct, align, and motivate people towards a common goal.

Power is a central component of leadership, because different kinds of social powers can be used to influence and direct people within an organization (French and Raven 1960). The open source literature suggests that power based on technical expertise (expert power) or reputation (referent power) may be the important power bases in the communities whereas exercising power based on pressure (coercive power) may only have limited or no success at all (Butler, Sproul, and al 2002; Sharma, Sugumaran, and Rajagopalan 2002). Although the distinct characteristics of a community are likely to change how leadership is typically exercised, little is known about how, exactly, this leadership occurs and is executed.

4 Framework And Research Questions

Our research plans to address three major questions related to GL&M:

1. *What are the governance mechanisms necessary for community success?*

2. *What are the leadership styles necessary for community project success?*
3. *What are the management practices necessary for community success?*

In each case, we will consider multiple measures of success, but our major focus will be on wealth creation, which is the accepted prime measure of achievement of other governance structures. More specifically, we are interested in wealth creation in the context of graduate education, as this is the area where we readily witness how intellectual products resulting from academic efforts are too frequently discarded. We propose the reversal of this trend within academic digital communities by adopting governance, leadership, and management structures more suitable to this type of community.

4.1 Methodology

Our attention is centered on digital communities, which include both adaptive and inventive communities. A four-pronged approach to learning about GL&M in adaptive and inventive communities is planned. These elements will be overlapping and some will occur concurrently and iteratively. *First*, we have to develop definitions of the key concepts (e.g., community success) and determine methods for operationalizing them. *Second*, we will interview community contributors. *Third*, we will conduct a structured analysis of community projects. Through these second and third phases, our goal is to discover the GL&M structures underlying communities. *Fourth*, we will participate in the GL&M of two community projects (one adaptive, the other inventive) as action researchers. The main objective of this phase is to implement and study the most successful GL&M structures uncovered in the preceding phases.

Action research, which typically falls into the realm of qualitative research approaches, aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework (Rapoport 1970). This research method has been used in the social and medical sciences since the mid-twentieth century, and has increased in importance for IS towards the end of the 1990s. When theory seeks to be applied to practice, as is the case within this fourth element, the action research methodology is apt. The two community projects initiated by this action research methodology are now described.

4.2 The Adaptive Project

In January 2004, an adaptive project to create an open XML textbook < wikibooks.org/wiki/XML > based on Wiki software (Leuf and Cunningham 2001) commenced. Using a graduate class as the catalyst, the goal is to engage other professors and students in developing the text in English and Chinese, and possibly Turkish, in 2004. Later this year, we plan to publicize the project to other scholars so that their students might build upon it. The students' efforts will not only benefit them, but all future readers.

4.3 The Inventive Project

In the first half of 2003, the open tourism consortium (OTC) <www.opentourism.org > was created. Its goal is to establish an organization to participate in the open development of publicly available standards and software to support tourism (Watson, Akselsen et al. 2004). OTC's goals are to support information services for the three phases of tourism: pre-tour (planning), touring, and post-tour (reminiscing). OTC plans to develop:

- TourDM—a standard data model for tourism objects and events;
- TourML—an XML based data exchange language for objects and events of interest to tourists;
- TourML parser—an open source program to parse TourML files and insert the data into a relational database based on the standard data model;
- TourStyle—a set of stylesheets for transforming output to a device's characteristics;
- TourCMS—a content management system for tourism authorities;
- TourImplement—guidelines and tools to assist implementation.

By January 2004, OTC has grown to around 100 members, mainly university faculty, from more than a dozen countries. As many of the university faculty members intend that their students participate in projects related to OTC, the potential participant pool is in the thousands.

5 Contribution

The community is a disruptive governance structure that has already had a significant impact on the development of software. There is potential to transfer the knowledge gained from studying how community projects are managed to other information-oriented organizations to improve their performance. Thus, there are four major contributions. *First*, because little beyond the anecdotal has been researched on digital communities and their collective dynamics (Dempsey et al. 2002), an important knowledge gap will be addressed. *Second*, as knowledge becomes increasingly important to our economy, we should expect communities to proliferate. For example, business involvement with OSM has resulted in open source becoming a multi-billion dollar industry (Feller and Fitzgerald 2000). Developing knowledge about a key factor, GL&M, for community success can have a significant impact on productivity. *Third*, the community model can be potentially used for a vast array of transactions that create economic wealth (Demil and Lecocq 2003; Benkler 2002). It has already been applied to law (Torvalds and Diamond 2001), investment (Schmerken 2000), and virtual organizations (Gallivan 2001). The findings will shed light on a very important phenomenon affecting the way knowledge workers collaborate within an Internet economy to create wealth. *Fourth*, the project will create knowledge about an approach to education that is based on recognizing that graduate students can participate in wealth creation and that their assignments should not be scrapped once completed. In both projects describe earlier, community participants, mainly graduate students, will create wealth because their deliverables will not be disposed of when the class completes. Rather, their assignments will become the starting point for other classes to build upon. We posit that such an approach to education, if supported by the appropriate GL&M, can be an essential element of a continuing, accumulative economic value formation effort.

6 Conclusion

New ITs create opportunities for society to redesign its wealth creation mechanisms. Open communities, once quite rare but now flourishing because of the Internet and associated technologies, have already transformed the creation of some information services and products. We will not realize the full power of this new type of organizing until we thoroughly identify appropriate governance mechanisms, understand which leadership styles are effective, and what management practices are necessary. Organizations have gained much from intensive and prolonged investigation of the other governance structures (hierarchies, markets, and networks) and most would concede that this work has greatly improved performance of these organizational forms. It is time to begin rigorous and ongoing studies of the fourth form of organizing wealth creation.

There is much waste in education that could be avoided. Student projects should not be automatically written-off when completed. Wasting wealth creating intellectual resources can be reduced if we create GL&M infrastructures to support international community projects that simultaneously support learning, wealth creation, and development of cross-cultural skills. It is our intention, through this research project, to demonstrate an innovative infrastructure for education and to learn successful GL&M practices to support this infrastructure.

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