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ABSTRACT

This paper presents a framework to plan organizational incentives for aligning usage behavior with organizational objectives across various IT adoption stages. Our framework is motivated by the introduction of incentive alignment as another dimension in Information Systems design (Ba et al., 2001) and is based on technology diffusion models presented in the literature. We focus in particular on the usage of technology that is discretionary in nature. In addition, the user group is limited to internal users of the technology at the operational level. The framework integrates key issues on motivation and incentives in order to understand how organizations can induce desired user behaviors congruent with the goals of the organization. We conclude with the use of an illustrative example to show how the framework can be used in an academic environment. This framework will help researchers and practitioners understand how to better manage and align the incentive structures for internal users across IT adoption stages.

Keywords

organizational incentives, incentive alignment, diffusion of IT, IT adoption, change management, IT implementation

INTRODUCTION

Information technology (IT) diffusion in an organization has been a subject of research and various models have been developed over time to investigate this (e.g., Rogers, 1983; Brancheau and Wetherbe, 1990; Coopers and Zmud, 1990). A related dimension in IT adption that has received comparatively little exposure in the literature is the issue of incentive alignment. Ba et al., (2001) note that incentive issues have become important in many IS areas including knowledge management (e.g., Orlikowski 2000), e-business supply chain coordination (e.g., Simatupang and Sridharan 2002) and make the case for designing incentive-aligned information systems. By this, they refer to the degree to which organizational incentives, such as tangible social and financial gains or nurturing user creativity, result in user behaviors that align with the objectives of the firm.

Even if a system is designed appropriately, users may not bother to use the system if they have no incentive to do so. Ba et al. (2001) illustrate this point with the example of a knowledge management system in which consultants are asked to document their knowledge of projects in a knowledge repository. However, the consultants, lacking an appropriate incentive, do not take the time to contribute to the repository. Hence, incentive misalignment leads to sub-par usage of the system. Along a similar vein, Fan et al., (2003) discuss how incentive alignment is an important dimension in decentralized supply chain organizations. They show that managers may actually misrepresent information unless they have appropriate incentives congruent with the overall goal of the organization.

We adapt the incentive alignment concept presented in Ba et al. (2001) and define implementation success not only as end-users adopting the technology, but also that end-users use it in the way intended. In this paper, we introduce a novel approach in incentive alignment by looking at ways organizational incentives will vary across the adoption stages of a new technology or innovation. We investigate what the organization's incentives should be at various stages of technology

diffusion in order to influence internal operational users' behavior and achieve organizational goals. Our approach builds on the literature that studies how technology is adopted by individuals and organizations over time.

The paper is organized as follows: first, some background is provided in a review of the literature, which is followed by a description of the incentive alignment framework developed in this research. An illustrative example is then provided followed by our conclusions and directions for future work.

BACKGROUND AND LITERATURE REVIEW

The extensive body of research relating to implementation success of new IT reflects the importance of IT in organizations today. Several related streams of IT acceptance and IT usage research exist focusing on different aspects of the issue including: individual acceptance of IT (e.g., Companeau and Higgins 1995), implementation success at the organizational level (e.g., Leonard-Barton and Deschamps 1988) and the task-technology fit (e.g., Goodhue and Thompson 1995).

Many acceptance models have been proposed over the years including (1) the social psychology based, Theory of Reasoned Action (TRA) (see e.g., Fishbein and Ajzen 1975, and Ajzen and Fishbein 1980); (2) the Theory of Planned Behavior (TPB) which is an extension of TRA (see e.g., Ajzen 1991); (3) the psychology based Motivational Model (MM) adapted to user acceptance (see e.g., Davis et al., 1992, and Vallerand 1997); and probably the most well-established and influential (4) the Technology Acceptance Model (TAM), which predicts usage behavior based on perceived usefulness, ease of use and attitudes (Davis 1989 and Davis et al., 1989).

A recent paper (Venkatesh et al., 2003) provides an excellent summary and review of a total of eight of the leading models. They present a unified model, called the Unified Theory of Acceptance and use of Technology (UTAUT), which integrates elements from all eight earlier models. The authors propose UTAUT as a useful tool for managers to "assess the likelihood of success for new technology introductions" and to "proactively design interventions (including training, marketing, etc.,) targeted at populations of users that may be less inclined to adopt and use new systems."

Another aspect in IT acceptance and implementation is the notion of voluntary vs. mandated IT adoption. Hartwick and Barki (1994), for example, suggest that there may be a continuum of voluntariness and several authors present results showing a high variability in user perceptions of voluntariness (e.g., Agarwal and Prasad 1997, and Karahanna et al., 1999). Brown et al., (2002) provide an excellent discussion of the distinctions and overlaps in voluntary vs. mandatory IT adoption environments. Their paper also describes a field study in a banking center where they compared the TAM and TPB models and concluded that there are differences in the underlying relationships in mandatory use situations. Our research is consistent with most of the IT acceptance models in the literature in that we consider voluntary or discretionary technology adoption.

The framework that we develop in this paper is based on technology diffusion among internal operational level users in an organization and explores how organizational incentives vary across the different adoption stages of an innovation. We draw on the literature on IT diffusion that describes the different stages of IT adoption: Lewin's (1952) three-stage model (unfreezing, moving, and refreezing); Noland and Gibson's (1974) four-stage model (identification and investment, learning and adaptation, rationalization/management control, and widespread technology transfer), and Kwon and Zmud's (1987) six-stage model (initiation, adoption, adaptation, acceptance, routinization, and infusion).

At each stage of adoption, the users have different intrinsic motivations. Personal motivation can be defined as the individual's rationale behind any action or inaction that the person takes. Extensive research has been done since the 1940's to understand what motivates a person to voluntarily pursue a goal (see e.g., Maslow (1954), Herzberg (1959), McGregor (1960), McClelland (1961), Vroom (1964) and Locke and Lathan (1992).) While these theories help us understand the phenomenon of personal motivation, it is generally acknowledged that no existing theory provides a comprehensive explanation of what really generates personal motivation or how it can be managed. Indeed, a common thread across all theories is that each individual is unique and that different people react in extremely varied ways to an identical motivational factor or incentive.

Summarizing the past research studies, Kressler (2003) associates personal motivation with five different elements. First, an individual is motivated when the task on hand is a requirement to meet some personal goal, such as career advancement or job security. While this type of motivation is prevalent in mandatory adoption environments, it can also exist with discretionary IT adoptions. Second, if an individual has an involvement in an action and the action's result will have an impact on the individual, this individual will be motivated to act in order to influence the result. The action can include the possibility of taking no action in order to maintain the status quo or prevent change. Third, most people are motivated when promised rewards or recognition. This includes any type of financial remuneration as well as career development, increase of

knowledge, extension of responsibility, and inclusion in other decision-making roles. Fourth, motivation exists when individuals can integrate the activity with their personal lives and/or experiences, thereby acquiring independence and/or individuality. Finally, many people are motivated by their need for **self-actualization**, which can be defined as acquiring wisdom, utilizing creativity, and demonstrating independence. These individuals will be motivated when the work content and demands are challenging and fill a person's need for personal development.

Motivation will always exist in some form for an individual. Kressler (2003) states however that: "Motivation should not be confused with incentive. Incentive is specific, more short than long-term and is based largely on a specifically designated promise of reward for a level of performance that is just as specifically determined. It can also be a threatened punishment."

We, therefore, see that motivation is intrinsic in people, while incentives typically are employed by organizations as instruments to turn the motivation of its employees into actions for achieving organizational objectives. Appropriate incentives will help the organization to achieve its objectives while lack of appropriate incentives can be detrimental to the organization as it may inadvertently put barriers in the way of its employees and thus kill the intrinsic motivation instead of nurturing it. Incentive alignment, the matching of the organizational incentives with the motivation of the users, therefore is an important factor in achieving the objectives for adoption and implementation of information technology.

This, of course, begs an immediate question: What types of incentives should an organization use and how can the organization determine its appropriateness in various situations? Chen et al. (1999) look at incentive and reward structures and categorize them in multiple ways: intrinsic vs. extrinsic rewards, financial vs. social incentives, and positive vs. negative incentives**.** Simatupang and Sridharan (2002) extend these ideas by introducing the concept of process as an incentive where productive behavior is recognized and nurtured in the organization. In this case, the design and the delivery of the process adopted by the users are more important than the end results.

The different categorizations of incentives and rewards discussed above are not mutually exclusive. They are only different ways of looking at the same thing. For example, intrinsic incentives can often include social rewards such as special recognition, free use of a company car, availability of resources, an intellectually stimulating climate, and release time to pursue interesting tasks, as well as pay for performance. Extrinsic rewards, on the other hand, typically include financial gains in the form of bonuses or raises. Similarly, positive incentives can include extra pay, recognition, promotion, while negative incentives typically include penalties in the form of missed promotion, getting assigned to uninteresting work, and losing social status among coworkers, for not achieving at a certain level. In this paper, we use the idea of positive and negative incentives to classify the different types of incentive structures that can exist for various groups of users of IT in an organization. Within each category, we further subdivide the incentive structures along financial and social dimensions. We define three primary types of organizational incentives: *active-positive*, *passive-negative*, and *active-negative*.

Active-positive incentives result in a tangible or intangible financial or social gain for those users that actively pursue an organizational objective. The regular performance of users is not typically affected by this type of incentive. **Passive-negative** incentives, on the other hand, do not create any direct financial or social gains for the users, but create a negative effect if the users do not move towards achieving the organizational objectives. These are penalties for non-use or non-adoption. **Active-negative** incentives are the barriers that may exist in an organization which prevent users to achieve the organizational objectives of the systems even if the users are intrinsically motivated. Examples of this type of incentive are excessive bureaucracy, organizational politics, and lack of proper infrastructure and support.

Once we understand the incentive categories, it is easier to identify what incentive structures should be in place as the organization goes through the various adoption stages of information technology. The incentive structures need to be aligned with the organizational objectives as well as with the intrinsic motivations of the users at each of the stages of adoption. This would result in effective and sustained use of the information technology for organizational activities.

A FRAMEWORK FOR ORGANIZATIONAL INCENTIVE ALIGNMENT

The framework presented in Table 1 shows each adoption stage, the organizational goal of the adoption stage, the class of users targeted during that stage together with their associated desired usage behavior, intrinsic motivations associated with the users, and the nature of the organizational incentives. Our intent is to describe what organizational incentives will align with the organizational goal to achieve the desired usage behavior. We argue that each adoption stage is different, requiring a different type of organizational incentive, conducive to meeting the desired organizational goals and to inducing the desired usage behavior. Misalignment of the organizational incentive could result in an unsatisfactory result, and ultimately, failure of the technology.

Adoption Stage	**Organizational Goal**	**Users & Desired Usage Behavior**	**Intrinsic Motivation**	**Nature of Organizational Incentives**
Exploration	Identify organizational opportunities	Experimenters: Explore technology	Personal curiosity, need for self-actualization	Provide learning opportunities (*Active-positive*)
Investigation	Determine if system adds value	Early Adopters: Test and evaluate for usage and usefulness	Need for self-actualization, expectation of potential benefit and improved performance	Reward performance, ignore failure (*Active-positive*)
Deployment	Implement system; develop appropriate support systems and controls	Early Majority: Learn how to integrate technology into functional activity	Peer Pressure, expectation of personal benefit at low risk	i. Remove technical and support barriers (*Remove active-negative*) ii. Provide social recognition (*Active-positive*)
Widespread Use	Expand the use of the technology throughout the organization	Laggards: Learn how peers use technology	Conformity to organizational norm, peer pressure	Punish non-usage (*Passive-negative*)
Extension/ Extrapolation	Develop enhancements; develop integrated applications.	Functional Innovators: Discover new capabilities, enhance existing applications	Need for self-actualization, expectation of potential benefit and improved performance	Support innovative exploration (*Active-positive*)

Table 1: Alignment of Organizational Incentives Across IT Adoption Stages

The framework that we have developed employs a five-stage adoption model, similar to the models developed by Kwon and Zmud (1987) and Nolan and Gibson (1974). Our five-stage model corresponds roughly to Kwon and Zmud's six-stage model (initiation, adoption, adaptation, acceptance, routinization, and infusion), except that we have collapsed the acceptance and routinization stages into the **Widespread Use** stages. We have also redefined our stages so that they are more in keeping with the incentive alignment discussion that follows. The five stages, together with the organizational goal of each stage, are presented and described in the first two columns of Table 1.

Diffusion of innovation begins with the **Exploration** stage. This stage involves the identification of organizational opportunities, and scanning the environment for problems that the technology might address. The second stage is **Investigation**, in which the organization determines how the system might add value to the organization. These first two stages are characterized by considerable uncertainty in terms of both their costs and their stream of benefits. Nolan and Gibson (1974) characterize these stages as the innovation phase, during which considerable organizational learning and experimentation take place.

Implementation of the technology and the development of an appropriate IT support infrastructure characterize the third stage, **Deployment.** This stage is followed by **Widespread Use**, which involves expanding the technology to the greater population of users in the organization. The third and fourth stages correspond, roughly, to what Nolan and Gibson (1974) refer to as the "control" phase. During this phase, roles of the IT staff and the user are becoming clearer and the benefits to the organization are more predictable.

Our final stage is referred to as **Extension/Extrapolation.** For many organizations, an Information System may have been adopted by a great majority of the user population, but the users are still utilizing only a small fraction of the features—i.e., the system is still not being used to its fullest potential. The Extension/Extrapolation stage was added to address the stage in which an organization must continue to develop enhancements and learn about ways to extend and integrate the technology into the organization. Again, the users involved in this stage become exploratory and experimental. Like Exploration, this stage is characterized by a great deal of uncertainty.

A Description of the Users

In the remainder of this section, we focus on the five categories of users presented in Table 1. The different categories of users allow us to understand their intrinsic motivation and outline the organizational incentives that will motivate them to take the desired actions. This will result in the alignment of the usage behavior with the organizational goal.

Experimenters need self-actualization and are mostly motivated by intrinsic factors such as challenges, creativity, independence, and learning opportunities. In this stage, the organization should nurture the user's creativity by designing incentives that will support the Experimenter's intrinsic motivation. Active-positive incentives that provide learning opportunities, such as time release from routine responsibilities to pursue one's own ideas or to investigate a new technology as well as the assignment of challenging tasks, will encourage the Experimenters in their pursuit for new usage of information technology in the organization and therefore support the organizational objective of this adoption stage. Organizations must be willing to provide required resources to the Experimenters knowing that investments in those resources may not yield immediate returns. Indirect monetary rewards such as expense accounts and free travel that can be used as resources for tool development and learning can be strong incentives to the Experimenters for exploring new technologies.

Early Adopters are also highly motivated by their need for self-actualization but they do not exhibit quite as much personal curiosity as Experimenters. The fulfillment of a task and improved performance affords the most satisfaction to this type of person. Thus they are motivated by the possibility of identifying a technique that will assist them in better completion of their task. The Early Adopters, being more task-oriented than the Experimenters, will not continue to pursue their curiosity about the information technology unless there are some appreciable gains. They do not want their regular performance to be affected by their failure to make constructive use of the new technology, yet at the same time they want some recognition for their work when it succeeds. They also like to differentiate themselves from their peers and be acknowledged as pioneers. The organizational incentive structure for this group of users should still be active-positive with focus on tangible social and financial gains for the participants. Here the process should be rewarded and not just the outcome. Some examples of active-positive incentives for the group of users at this stage are time release from routine responsibilities to investigate, learn and test a new technology, acknowledgement of value for knowledge gained (good or bad), workshop allowances, software and hardware grants, free travel, and bonuses. These incentives support the intrinsic motivation of the Early Adopters while minimizing the risk of uncertainty on their performance and guide them to achieve the organizational objective of evaluating the usage and usefulness of the new technology. Since social visibility can be a driving factor for many Early Adopters, workshops or presentations by them will be another incentive as well as result in successful dissemination of the added value of the technology within the organization.

Early Majority users value being socially acknowledged as successful. They want to be considered as either a vital part of the team or as persons who can assume more responsibilities. They are motivated to keep up with the pioneers (Early Adopters) and take advantage of the technology's identified benefits yet do not want to assume much personal risk due to uncertainty. They are aware of the potential drawbacks and the problems identified by the Early Adopters and this can lead them to avoid the technology. These users, being very focused on their primary responsibilities, will lose motivation quickly if the new systems create any barrier to their regular performance. The new system should reflect clearly the added value to their current performance and should not be difficult to learn or use. They do not want to experiment with the technology as it would take time away from their regular job. It is thus very important for the organization to remove any active-negative incentive that may exist. Intrinsic incentives for the deployment stage therefore include focusing on the IT support to remove the identified technical and support barriers as well as offering early majority users some smaller amount of time release from routine responsibilities to learn the new technology. It is also important at this stage to encourage social exchange of knowledge. Incentives should be designed to support peer networking to disseminate knowledge. While extrinsic rewards such as direct monetary rewards (either as a bonus or part of performance evaluation) can be used to encourage collegiality and contribution to organizational knowledge, intrinsic incentives that focus on social recognition will stimulate the early majority's natural motivation the best. Examples of intrinsic rewards are considering the use of technology in career advancement decisions and future job assignments or assigning the user to teams and tasks with other technology users so that they are working with competent colleagues in an intellectually stimulating climate.

In most instances, **Laggards** are slow to adopt new technology due to lack of intrinsic positive motivation about the new systems. Models such as TAM and TPBM have attempted to explain why a user may be unmotivated. Whatever the reason, most of the incentives described for the first three stages will not encourage this user to learn how to use the technology from their peers. When it comes to technology, this type of user is motivated primarily by job security and physiological needs, which includes the desire to maintain the current level of income and avoid rejection, embarrassment and isolation. So while the user is not motivated to use the technology, incentives can still be designed to encourage certain levels of usage. In this stage, there should be a mix of passive-negative and active-positive incentives with an emphasis on the former one. Performance expectations based on the usage of the technology should to be a substantial part of the incentive plan where falling short of the goal results in the loss of a reward (a bonus or raise). Thus the incentive can be viewed as a threatened punishment. Even though the system is not mandated, the use of the system should become an expected norm in the organization and deviation from such norm should carry social and financial penalties. Intrinsic incentives that focus on social recognition may stimulate the laggards' motivation to avoid embarrassment or rejection. Social exchange of knowledge is still important and incentives should continue to support peer networking, especially continual exchange of information between the users of the previous stage, to disseminate knowledge. The main focus of the incentive structure at this stage is to help the users integrate the systems with their daily work. We assume that the technological barriers will not be too dominant at this stage as the system will have already been tested and refined in the previous adoption stage.

Functional Innovators once again are highly motivated by their need for self-actualization. The fulfillment of a task and improved performance affords satisfaction to this type of person. They are highly motivated by differentiating themselves from their peers and by being acknowledged as a pioneer or someone capable of more responsibilities. As a result, they respond well to the same incentive structure as the Early Adopters. In fact, quite often, Early Adopters assume the role of the functional innovators in an organization. These users respond well to active-positive incentives and lose some of their motivation in the presence of active-negative incentives. During the Extension/Extrapolation stage, intrinsic rewards such as time release from routine responsibilities to experiment with a technology in new ways, career advancement, and public acknowledgement of new capabilities done with the technology will result in organizations realizing their objective. Bonuses for the functional innovators that offer workshops or presentations for the organization will encourage dissemination about the new applications of the technology. Such a reward structure satisfies both the social and financial needs of the functional innovators. Financial incentives without any social recognition, such as direct monetary rewards that are tied to performance expectations, can be used but will in general not align well with the intrinsic motivation that exists in most individuals of this stage.

AN ILLUSTRATIVE EXAMPLE

To illustrate the different stages of diffusion described by the framework presented in the preceding section, we study the use of the web to support teaching activities of faculty at a private university where such usage has always been discretionary. Faculty at a university prove to be an interesting pool of users to study the role of incentive alignment. They are the potential internal operational users of this technology and usually have the academic freedom to decide the method and style of instruction. They can, therefore, decide to use IT applications based on the perceived value or intrinsic interest. Even when there is significant organizational pressure to use a particular IT application, it is possible for an individual faculty member to decide not to use that application. The choice to adopt is ultimately at the individual level. For such users, organizational support in the form of budgets, training time and technical support is usually an important factor that can aid in or detract from the adoption of the IT application.

The Experimenters and Early Adopters created web sites for classes without the help of any web editors and robust IT infrastructure and policies. Most of their actions resulted from their intrinsic motivation for self-actualization and performance improvement. The organization offered some active-positive incentives in forms of social recognition and acknowledgement of successes. Administrators also ignored most of the failures encountered by the Early Adopters and the Experimenters. However, the majority of the faculty did not incorporate the web into their teaching due to the hurdles faced by the Early Adopters, which included a steep learning curve, poor IT infrastructure, and ambiguous usage policies. These active-negative incentives prevented the technology from moving to the Deployment stage.

Blackboard was introduced during the Investigation stage as an organization-wide attempt to make use of the web to support teaching and overcome the learning curve difficulties experienced by the Early Adopters. Even then, there were several missteps in terms of technology infrastructure and user support that held back the adoption of this application. These missteps created active-negative incentives in the form of barriers to use. As Blackboard moved into the Deployment stage, the IT department of the university dedicated a lot of resources into reducing these barriers and increased the amount of training and support available to faculty. The training was targeted at initial and intermediate users. Furthermore, the organization also

created a set of active-positive incentives in forms of grants, workshops, and user-forums to encourage social exchange of knowledge.

At present web-based teaching is in the deployment stage, ready to enter the Widespread Use stage and the university is changing its incentive structure to passive-negative to achieve its objective of further dissemination. However, the remnants of some active-negative incentives may still prevent the maximum diffusion of this application.

While web-based teaching is entering the Widespread Use stage, the Functional Innovators in the organization are discovering advanced usages of this technology to improve their teaching performance. Currently, this effort is driven by the intrinsic motivation of this group of users. The university offers some grant money but does not have any formal incentive structure that will align the innovators' action with the goal of developing enhancements and integrated applications. Indeed, the university may be unaware of this stage and the need to support it with the appropriate incentive structure.

CONCLUSIONS AND FUTURE RESEARCH

The framework presented in this paper helps to understand what incentives are needed at different stages of IT diffusion to promote the usage behaviors that accomplish the organizational objectives. We identify three categories of incentives that can either help or hinder an organization in accomplishing the objectives expected from its investment in discretionary systems. As our illustrative example demonstrates, our proposed framework can be used to understand how incentive structures need to change over time in an organization.

While we used internal operational users as the basis of our framework, we believe that our framework can be applied to other types of users. Future research will involve validating our framework by conducting field studies in organizations, both non-profit and for-profit, across various industries. The framework also needs to be validated across users at strategic, tactical and operational levels as well as internal and external users of discretionary systems.

The application of the framework for all types of users involves a manager assessing where an information technology lies in the five stages of diffusion. Once the manager identifies the stage, he/she can decide what types of organizational incentives will help change the usage behavior in the intended direction. Therefore, it is important for managers to be able to assess the current level of IT diffusion in the organization. However, our framework currently does not provide any measurement instruments for this assessment. Extending our framework to include such assessment techniques is a topic for future research.

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