DYNAMICS OF CHANGE IN IMPLEMENTING ENTERPRISE SYSTEMS

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ABSTRACT

This study examined change in an Enterprise System implementation. Using the Motors of Change literature as a foundation, the underlying stimuli were examined in a qualitative study to clarify the change processes that occur as stimuli such as management strategies faced with forces such as user resistance. This study clarified the motors of change through a framework and analyzed the manner in which they surface through an Enterprise Systems implementation. Five of the six motors of change occurred throughout the implementation. The impact of these motors of change has been described and a resultant change model has been proposed based on the findings of the study. Furthermore, insight is provided for managers in understanding various motors of change in an implementation and addressing user resistance.

Keywords: Motors of Change, Enterprise Systems, User Resistance, Organizational Change

INTRODUCTION

Stimulus and response. It is a story that is old as life itself. Organisms react to changes in their environment. When new stimuli are dropped into the environment we can observe the resulting effects. Thus, scientists seek to understand these changes so that they can predict responses to specific stimuli. Similarly, managers seek to understand, predict, and enact change in their organizational environment. As a decision maker, a manager identifies specific goals for an organization, and needs to understand the stimuli that can be applied to achieve these desired outcomes.

The process of observing, predicting, and introducing changes can be straightforward when we isolate stimuli and identify specific changes that occur.

However, large transformations, such as for Enterprise Systems (ES) implementations, provide more complex sets of stimuli than we may find in a laboratory environment. This causes both understanding and prediction to become much more complex. ES result in some of the most complex adaptation patterns. By definition, these systems affect processes throughout the enterprise. Each person impacted by ES implementation creates their own ripple of adaptation. Some users faithfully adapt the system for its intended use in their job, while others outright resist the change or adapt the system to their job in a way that is not desired by top management [1]. As these ripples of adaptation spread, they interact, influencing other users' behaviors and perceptions of the system implementation. At times they reinforce one another and at other times they interfere with each other.

Since people are not homogeneous and can choose how to respond, a stimulus does not lead to identical responses. For example, positional differences related to organizational affinity or power can affect responses. As time passes, responses may evolve as entities mutually structure each other's response. There may even be natural processes of change and acceptance. Furthermore, an adaptation response may be driven by multiple factors. Each factor is a force that shapes the adaptation response, and the actual response is shaped by the mutual action and interference of all of these forces. When the actual response is not congruent with goals then implementation problems can occur. The literature is filled with examples of these implementation problems, such as articles that report implementations which failed to provide projected benefits [i.e., 2, 3, 4].

We have long understood that new information systems do not just modify the computer environment, but that they involve changes to the people and processes in an organization [5]. As employees encounter IT-enabled change, it can be difficult for employees who are forced to transform the routines they practiced under the previous system [6]. Readjustment can cause a temporary reduction in performance [7], but resistance that remains for long periods of time can cause a much greater problem [8]. Studies have examined the impact of technology on organizational structure [9] and the effect of an organization on technology usage [10]. However, the examination of motors of change in a large scale system implementation remains unstudied. Motors of Change is defined here as the underlying forces that generate organizational change. For example, as users interact with an enterprise system and management throughout the implementation, there are motors of change that work to shape the ultimate outcome of the implementation.

In this study of ES-enabled change, we address the research question: How do motors of change affect the changes that occur? We view the adaptation response as an outcome that is shaped by the interaction of motors of change. Analyzing the change process through this lens leads to several contributions for this paper. First, the change process and the mutual interaction between user resistance and management strategies is clarified. Second, it provides a fresh perspective on the motors of change literature through its application to the ES implementation context. Third, the study establishes a 'motors of change' framework that explains the components of change in ES implementations. This framework provides insight managers can apply to address user resistance. The following section examines the literature describing the basic building blocks in an organizational change. Following the literature review, the methodology of this qualitative study is described, the

results are described, and discussion addresses the results and its implications.

LITERATURE REVIEW

System Implementation Research Streams

The inherent complexity of large-scale system implementations has attracted many studies. The two major research streams will be described below, followed by the motors of change research stream which is used in this study.

One major research stream is the antecedents research which identifies specific factors which affect implementation success. Some of these factors include politics [11], user involvement [12-14], communications between developers and end users [15], end-users' expectations [16], and individual, system, organizational, or process issues [17]. Larsen [18] surveyed existing literature and identified several hundred antecedents of information system success. Furthermore, the critical success factors research has identified many different important issues [19-24]. The value of this research stream lies in the examination of specific antecedents to successful implementations.

A second major research stream revolves around implementation processes, examining activities that unfold during the change process. For example, Bostrom et al. [25] use Adaptive Structuration Theory to describe the mutual influences of organizational structures, social influences, and technology upon each other. Tyre and Orlikowski (1994) explains that organizations adapt over time. Organizations may reach temporary equilibrium points; however, subsequent events disrupt the equilibrium and lead to further change. Orlikowski [26] also addresses the complex issues of change, examining situated (context-specific) change and finds that organizational actors ultimately affect organizing structures, work practices, and coordination mechanisms. Fincham [27] highlights this complexity through two projects – one success and one failure – and explains the benefits reaped when employees find greater improvements in the changed work and use the system in advantageous, yet unanticipated ways.

These two research streams are valuable in finding antecedents to success and the succession of events during implementation. However, this study proposes that there also may be value in examining a third stream of research, which has only been examined minimally in IT settings. This third stream has been termed "motors of change" and addresses patterns of change which emerge. It is proposed that the motors of change literature is relevant and should be applied to

large-scale implementation research to further understand IT-enabled change.

The motors of change literature, which this study proposes will be useful in understanding IT-enabled change, essentially addresses the core, underlying change processes from which the second research stream described above is composed. The term "Motors of Change" refers to the basic building blocks from which change theories are derived [28, 29]. These are the underlying forces that generate change, described in further detail in Table 1. Change theories in disciplines from biological science to organizational behavior often use one or a combination of these motors to explain the change. Although these motors are distinct from one other, most change includes multiple motors, because of the complexity of change. Essentially, each of these motors is a lens by which to view stimuli and the response to the stimuli that is occurring throughout the change. Using these motors in examining the pattern of an ES-facilitated organizational change is valuable for four reasons: 1) they are the roots from which many change theories are based; 2) they can be used in building theory that can be used to explain the changes in an ES implementation; 3) they focus research towards understanding the motors of change which affect the organizational change; and 4) they address multiple types of change.

Motors of Change

The following paragraphs discuss the six motors of change identified in several publications. Van de Ven and Poole [28] and Rukanova et al. [30] addresses four motors of change: teleology, dialectics, life cycle, and evolution. Ford and Ford [29] discuss two other motors: trialectics and formal logic. Following the description of these six motors of change, principles are extracted from these six change processes. These principles address how the type of change affects resistance and the management strategies that would be most successful in the ES context.

The teleological view [28, 31] is that the organization is one discrete entity that shares a common goal. This entity may accept this goal either implicitly or explicitly but the process by which this is goal is set and its resulting conflict is clearly visible. Also, constraints and requirements exist in order for that entity to attain the goal. Therefore, the teleology motor shapes change based on the organization's constrained response to events. This view is useful as management sets goals for the ES and leads to a better understanding of how the development of management strategies, assessing outcomes such as user resistance, and reassessing goals ultimately affects the outcomes.

The dialectic viewpoint [28, 30] considers the activities of two or more entities that oppose one another. These opposing entities engage in some form of conflict, which leads to the creation of a new entity, the defeat of an existing entity, or a stalemate between entities. The dialectic motor starts with conflict and leads to a synthesis that forms out of this conflict. The dialectic approach can be used to examine the user resistance in an ES implementation causing conflict between management and users and the resulting synthesis that occurs.

The lifecycle approach [28, 30] views change as a predictable process that causes an entity to progress through distinguishable stages. There is some form of logic, rule, code, or a routine that determines the stages and the progression that occurs. For an organization, this would likely be processes and policies. The lifecycle motor suggests that an organization encounters change by going through a set of reoccurring processes, which could be processes from previous system implementations. Organizations implementing a new ES likely have previously implemented other systems within the organization, and build upon previous organizational knowledge of system implementation while simultaneously incorporating new ideas and strategies.

The evolution approach [28, 31] assumes selection from various options. Characteristics of these options vary and may evolve as options are removed or retained in the population. Periodic mutations will introduce new characteristics to the population and depending on the selection criteria, these mutations may spread through the population. To apply this concept to an ES implementation, system implementers may discuss various approaches to resolve issues with the best solution often (hopefully) winning out. Generally, the most successful adaptations will survive. Over time, new ideas will emerge and they may survive if they prove to be a better solution. The evolution motor helps to identify incremental changes that occur in the organization and highlights the adaptations of plans. Although initially the ES change tends to be more of a revolution to the organization, this plan slowly evolves as various issues and ideas arise.

The trialectics approach focuses on how an entity is attracted to one of multiple "material manifestation points", which are places of equilibrium until there is a stronger attraction to another "material manifestation point" [29]. The action of a trialectics motor can be observed when there are incentives to attract users to change. By providing appropriate incentives in an ES implementation as well as providing users with an understanding of why the ES implementation is important, users generally are more attracted to the change and will exhibit less user resistance.

Understanding this process can lead to an improved understanding of the operation of management interventions.

The formal logic approach [29] explains that some changes follow the formal logic of cause and effect. This motor assumes that specific outcomes will follow inevitably from specific occurrences. For example, old processes often need to change in order to use the processes that are part of the new enterprise system. Thus, the value of the formal logic motor in ES implementations is to highlight areas in which old processes and systems need to be discarded in order for the new ES structures to work.

Motors of change have been described in the non-IT literature for some time. Although not using the term "motors of change", Greiner [32] discusses the evolutionary nature of change. "Historical forces [organizational age, organizational size, stages of evolution, stages of revolution, and the growth rate of industry] do indeed shape the future growth of organizations" [32, p. 38]. Greiner [32] refers to evolution as the periods of time that no major upheaval occurs as opposed to the revolution which is the periods of time that organizations experience considerable turmoil. Cule and Robey [33] develops an organization change theory based on the teleological and dialectic motors. The teleological perspective is taken into account as this goal-oriented approach appears to be implicit to managers. The dialectic approach is taken into account as employees do not necessarily support the goals, and thus interplay exists between these opposing forces. Furthermore, Cule et al. [33] uses both an individual (teleological) and organizational (dialectic includes multiple individuals) level of analysis in order to increase explanatory power while maintaining consistency between the two levels.

Although they are few, several articles have addressed motors of change in examining IT-enabled change. Soh et al. [34] uses a dialectic perspective to explain the misalignment that occurs between an organization's structures and the structure that is embedded in the ES. Soh et al. [34] finds that one set of forces arose from the structures embedded in ES and another set of forces developed from the organization that had its set structures. The structures in ES may include decision-making, reports, processes, and organizational controls. On the other hand, organizational structures include shared norms, current processes, values and expectations, all of which have developed through the organization's history. These two different structures are often at odds with each other, leading to the dialectic nature that tends to be present in an ES implementation. Nordheim and Palvarinta [35] is another study which addresses motors of change as it uses the four motors identified by Van de Ven and Poole [28] in examining the implementation of an Enterprise Content Management System. This study suggests that four motors may be present in an Enterprise Content Management system implementation and may be helpful for better understanding the implementation process.

Table 1 is a framework that expands upon the work of Van de Ven et al. [28] and Ford et al. [29] as well as other publications that discuss or study these motors of change. The differing attributes of the six motors are pointed out and their applicability and usefulness to the ES environment is described.

Table 1: Six Basic Building Blocks in Explaining Change

	Teleology	Dialectic	Lifecycle	Evolution	Trialectic	Formal logic
Metaphor	Goal-oriented continuous improvement	Conflict Between Entities	Reoccurring Set Processes	Best option eventually succeeds	Employees attracted to best option	Replacement of old ideas/entities
Diagram	Van de Ven et al. [28, p. 520].	Van de Ven et al. [28, p. 520].	Van de Ven et al. [28, p. 520].	Van de Ven et al. [28, p. 520].	Ford et al. [29, p. 765]	Ford et al. [29, p. 759]
Progression	Iterative process of goal setting, implementation, reassessment	Recurring conflict between entities with eventual synthesis	A linear sequence exists that guides the change	There is recurring conflict until only the best option remains	Entity attracted to best option and remains until a better option exists	Removal of old process and replacement with new
Contributing Forces	Goals and the success of the implementation	Opposing entities and the level of conflict	Previous life cycles	Level of conflict	Level of attraction of options	New process is substituted
Assumptions about resistance	Those who do not support the goal are resistors	All conflict is because of resistance	The type of resistance that occurred in a previous lifecycle will occur again	Resistance is immaterial because the best option eventually succeeds over a long time period	Resistance does not exist; an entity does not embrace a change because it is not the best option	The old and the new cannot coexist, so resistance does not occur
IT-related Example	Incremental System development	Subordinates are forced to use a system	Software Development Waterfall Model	Multiple word processing packages in use until one option "wins"	Programmers attracted to most suitable programming language for the task	Direct cutover to new system
View on Change	Change occurs because of the goals that are set	Changes emerges from a synthesis of the conflict	Predictable, based on past change	Used in describing long periods of growth with no major upheavals	Entities embrace change that is attractive	Throws out old and replaces it with new (change through replacement)
Usefulness in Identifying Patterns in an ES Implementation	Management sets goals in an ES implementation	Useful lens in which to examine the conflict between management and users in an ES implementation	There are some processes that are consistent across organizations in an ES implementation	This applies to selecting a system and implementation strategy	Examination of *how* to make a change more attractive to users	Competing structures are destroyed prior to enacting new structures
Principle	Goal setting and potential conflict can occur throughout the implementation process	There is a struggle between management and users that eventually leads to some form of synthesis	There are repeated processes that occur from one ES to another	There are evolutionary aspects of the change which may affect the management strategies	There are attractive attributes of a change that draw users towards the change	There are structures that are discarded that may affect management strategy effectiveness
Areas to Examine	The nature of goal setting and the resulting conflict that occurs	The nature of the struggle as well as what leads to the synthesis of ideas	The nature of implementation processes and how they vary from one implementation to another	Evolutionary aspects of the change	What attractive attributes exist in an ES implementation that can guide management's decisions	The removal of organizational structures

METHODOLOGY

In order to better understand change in ES implementation, a qualitative case study was conducted at a large university with around in the 10,000 employees in the Southeast U.S.. Due to changing state regulations and to make processes more efficient, the ES was implemented, taking about 6 months for the training and conversion. The interviews were conducted approximately one year after the employees started training on the system. As a rich natural setting may be useful for generating theories [36], the location of the data collection was ideal for two reasons: 1) Being a government-run university, job stability was high, suggesting a higher degree of honesty among respondents who did not fear that their job would be in jeopardy for openly answering interview questions; and 2) The ES implementation was a major change for the university, affecting many employees.

Using the university employee listing, 200 users were selected (all unknown to the researchers) representing many different job positions and departments. These users were emailed to solicit interviewees. Twenty-three users agreed to participate in the semi-structured interviews and were interviewed over a period of a month with the interview length averaging 47 minutes. The following is a list of the job categories and the number of interviewees from each job category: Clerical Staff-5, Office Manager-4, Middle Management-4, Trainer-3, Non-IT Top Management-2, IT Professional-2, Purchaser-1, and Accountant-1.

The interviews were semi-structured, starting with some set questions inquiring about the user's experience with the ES change. This was followed by many follow-up questions to extract more information about interviewee's perspective of the ES change. Some questions were directly related to the interviewees' response to the system, while other questions were asked that required the interviewees' interpretation of events. Because these users experienced the implementation of the system and communicate with other users who experienced the implementation, both the experiences of the interviewee and the interviewee's interpretation of the implementation was sought. As, Robey and Boudreau [37] points out, multiple interpretations are useful in identifying patterns of influence and change. These interviews sought to obtain the interpretations of the interviewees in regard to the processes and events of system implementation, reflecting an external reality [38, 39].

All of the interviews were recorded and then transcribed. Following the transcription, a researcher and a research assistant independently read through the transcripts to highlight all interviewee comments that were addressing ES change. Next, each of these highlighted comments were classified by the researchers into one of seven categories (this was not done independently). Six of the categories were for each of the six motors of change addressed in Table 1. The seventh category was for comments describing ES change but not fitting into any of the six motors of change categories.

Validity

Validity was supported in several ways. First, since "every organizational situation is likely to be filled with multiple and frequently conflicting interpretations and meanings" [40, p. 1404], the data collection was triangulated to help establish validity. The comments of each interviewee were compared with the comments of others to see if there was any discrepancy between one person's perspective of the system implementation versus another. In addition, the researchers were given access to memos, emails, training manuals, and other written documentation concerning the project. Although interviewees experienced the implementation quite differently because of their position, there were no direct discrepancies that were found between users which indicate that any particular user was speaking dishonestly. Second, construct validity is supported through the use of multiple sources [36, 41, 42]. There was also an overview of the system provided for one of the researchers, which provided a better understanding of the processes through which users traverse to accomplish tasks in the new ES. Besides the diverse and differing opinions among the users, there were no discrepancies found among the sources that directly conflicted with information from a different source.

RESULTS

In the analysis of the transcripts, numerous comments were found that fit into five of the six motors of change categories. Table 2 below provides examples of quotes that fit into each of these six categories. The quotations not only demonstrate the multiple motors of change at work throughout the implementation, but also the changes that emerge. The life cycle motor was the only motor for which no quotations were identified from any of the users. This is likely because the users saw the ES implementation as a one-time change rather than looking at the change from the perspective of implementers which go through a process of facilitating change, then repeat similar processes with other systems. Consultants who work with various organizations to

facilitate ES implementations are likely to view implementation more from a lifecycle perspective because most organizations who use their consulting service are going through the process of implementing a new system or upgrading their system. It is likely that the life cycle motor would have been identified if these consultants had been interviewed. However, users do not deal with ES implementations regularly and thus do not see the life cycle motor as a force affecting the organizational change.

Table 2: Sample Quotations representing the motors of change

Motor of Change	Sample Quotations
Teleology	User4- There was a solution assessment paper produced and that became our guideline for the entire rest of our project. The second phase was the solution design and that's where we started having the solution design meetings that I mentioned and we had 30 or 40 of them for billing and accounts receivable to go into detail of the business of my two modules and what departments would be involved and what are their needs and so on, to try and make the product fit their needs within the scope of the solution assessment.
	User14- [Some trainers] were busy doing other things. I wanted to smack that person up aside the head. Because they couldn't do it without talking to us. They were given a document written by one of the consultants, which was a very vanilla, click this, click that, click that, without any real explanations…they used to have a lot of meetings and they'd come and tell us what their long-term goals were.
Dialectic	User17-They were negative, there was animosity pointed to me as the messenger, I mean indirectly, I mean I got the brunt of it, but it was really for the administration at the time…I was quite frankly floored that people didn't want to change, although there were some that did…I would talk with my groups anyway, really try more asking than telling them about the system.
	User15- At the beginning I'd have ladies crying on the phone with me. My boss is pressuring me to get this done; I just don't know what a stock card is…Now guys, we're totally different. Now when a guy doesn't understand obviously the guy is not going to cry, he's going to cuss and I learned a whole different way of dealing with these guys. But usually these guys I will give them at least a day to cool off or half a day to cool off and I will show up at their doorstep and say, hey what's the problem. Well this, this, this is. Okay. Follow my path. I'm not going to do it for you.
Evolution	User4- We didn't purchase order management and I'm just imagining why I really don't know, but I can see that we have maybe two hundred apartments on campus that produce billings from outside customers and they're all very different. The service or product they supply is very different. They have different ways of identifying their customers. Order management I think would have been very difficult to fit at two hundred very different business enterprises within the university. It's not like going to Dell, which is just one business. So we did not purchase the order management, we purchased billing and accounts receivable. We let the departments handle the order management their own way.
	User8-[In the new system] there's 12 ways to get the same information. Out of 12 reports, there's one that really has everything that you know…the community gets frustrated because they tried report number one through five and it just didn't give them the information, so they just forget it. Since I'm not going to get it though [the new system], I'll go to [a shadow system] or I'll just start keeping everything on an Excel spread sheet.
Trialectic	User20-One of the big benefits that we thought we would see was flexibility in getting information, better reporting, better methodologies for pulling information out of the system, increased information, those types of things. We just thought it would be a better system to manage the university.
	User10- [the new system was attractive because] the look and feel of it was going to be more aesthetic - it wasn't going to be this black screen with these blue letters and writing or something on it. And the fact that it would be more interactive in that I could go in and get reports and see really that day where, what was going on because things would be posted every night and the next day you would know just where you stand on everything. And you didn't have that with the old system - you would have to wait 2 or 3 days for everything to be processed to see where you stand budget wise.
Formal Logic	User18- …there was some retooling of job descriptions and retooling of job duties based on the fact that certain individuals in certain positions, either weren't willing to or weren't able to grasp the new technology and therefore weren't able to function in what would have been their current job under the new system, so their job descriptions had to be realigned or their job duties had to be realigned under their job.
	User1- I think some of the key people got more money to take on the extra burden of being key people. But I don't think other than that there was any. It was either learn it or leave…I mean you still have to order stuff and pay people and now you do it a different way.

For the teleology motor, although an initial plan and goals were setup for the system implementation, there were processes in place that led to continuous improvement of the goals. For example, one user mentioned how the goals were specific at the higher levels, but more vague and adaptable at the lower levels. Another user mentioned how a solution design team would help to facilitate the implementation by specifying and then completing smaller goals that fit within the framework of the higher-level goals. Although a structure was put in place for the implementation, there was an iterative process of goal setting which led to the adaptation of the original plan.

For the dialectic motor, there were a number of comments indicating the conflict between the implementers (including top management) and the users. The majority of interviewees voiced complaints about the implementers because of frustrations and problems they had encountered. In contrast, the top managers that were interviewed overall had a positive view on the system viewing the system much more favorably than most users. Because of low organizational power, most users expressed their perspective through voicing complaints to implementers and trainers as well as user resistance. Though this conflict occurred throughout the implementation, synthesis also occurred for much of this conflict. The synthesis often took place through the trainers, people at the help desk, using a shadow system, and the implementers reworking the processes in order to bring about solutions.

For the evolution motor, some of the interviewees indicated how several options were considered for implementation issues and how the best option was retained. Although an initial plan had to be setup by the implementers prior to the implementation, several interviewees indicated how the plan was improved based on choosing better alternatives throughout the rollout of the system. Sometimes the best option emerged through a structured process such as a team created to discuss issues. At other times the best option emerged over a longer period of time in which some users convinced others of why a certain option was actually better and thus users converted over to the better option.

The trialectic motor was also evident from the interviewee comments. Most of the users identified at least some benefits of the new system and were attracted to them even though there also was much complaining

about parts of the system implementation that did not work out well. Also, some users identified bonuses that were put in place to make the extra work of training other employees and performing other implementation tasks more attractive to employees. Thus, parts of the new system and the change management plan attracted users to follow through with the plan.

For the formal logic motor, there were a variety of comments from interviewees regarding how the old ideas and processes were replaced by new ones. For most users it was quite obvious that the old method of completing a task was going to be scrapped, requiring the new system in order to complete tasks. Since the jobs of users changed, many users clearly articulated how specific parts of their job were changed, replaced by new processes and requirements. For example, some of the secretaries not only needed to use the new system for all their purchasing, but also needed to learn SQL to conduct some queries. Thus many areas of the business related to the processes followed the way of the formal logic motor.

As mentioned in the methodology section, there were also quotations highlighted from the transcripts that did not fit into any of the six motors. These quotations dealt with change, yet an analysis of them did not yield any additional motor to add to the six motors. The quotations indicated that a variety of structures and support were helpful in enabling the change by making the motors of change more suitable for the organization. Users discussed formal or planned structures that were helpful which included support staff, solution labs, training courses, communication avenues, and help lines. Informal structures also were identified, which emerged throughout the implementation but were not planned, including message boards and self-appointed support staff, who were users wanting to help other users resolve their issues. These types of structures were very useful for enabling the change since they helped employees deal with each of the five identified motors. For example, they helped users in the replacing of ideas (formal logic motor), facilitating the synthesis of ideas (dialectic motor), facilitating the goal-oriented improvement (teleology motor), assisting employees in embracing the best option (trialectic motor), and helping the best option to succeed (evolution motor). Table 3 below identifies a sample of the quotes describing these support structures, followed by the discussion section which further elaborates on these support structures.

Table 3: Supporting Structures

Formal Structure	User21- They made people accessible if you had questions or needed help or if you needed one on one versus a group setting.
	User4- We had a phase called a solution design phase and I said that's when we were trying to investigate what was being done in the university, what kind of business is being conducted and how can we use [the system] to satisfy those. We did that in a classroom setting and we reached out to deans, directors, VPs, anyone that would listen and asked them to send representatives to these design classes and we wanted them to sit there and not just them listen, we were not trying to lecture them. We wanted their input on what they needed, what they liked, what they didn't like…
	User10- The management team listens to what the people have to say and their complaints and they try to address them to make sure that the training is available to those individuals so that they can learn how to do those tasks that they're having trouble with. I know that in some areas there has been a reassignment of responsibilities just because individuals just couldn't get it.
Informal Structure	User15-[Researcher comment: This user was interviewed after other users had commented on the help that this particular user provided] My motivation was personal. It wasn't the money. It was something that I also all of sudden realized that I like to do. So my motivation was self-motivation…I can freely now say and be honest with you, I was worried about the end user not knowing what to do. Not only because they were going to suffer through the process of learning a very robust system, but also knowing the consequences of where that mistake will come back to live and not knowing what to do with that as well and in the meantime dragging purchasing with it. It was more like a mission…
	User3- they kind of came in and met with us as a group, getting our concerns, what are you concerned about, what are you afraid of, what do you want to see happen, what don't want to see happen. So that started before I ever got taken into training. So yea, that was to try to get some of the feedback when the communications wasn't happening. And they would also try to communicate stuff to us, maybe you haven't heard about this, or maybe you didn't do, status and they would hand out a Gantt chart time line of when things were going to happen.

DISCUSSION

As described in the results section, five out of the six motors of change were evident throughout the implementation. To address the research question, the results indicate how various motors of change affect how the change plays out during the implementation. These results clearly indicate that ES implementation is complex, multifaceted, and cannot be easily mapped or described. Using motors of change as a lens offers an inside look into the complexity of the change by identifying various change forces. Understanding these motors of change can lead to more successful system implementations. These motors of change provide insight into the specific stimuli and responses that occur throughout an implementation. Researchers should consider the incorporation of these motors of change in theory development as theories could be built upon one or more of these motors of change.

Since user resistance is often a key factor in the outcome of a large-scale system implementation, understanding the motors of change can lead to a better understanding of the emergence of user resistance. For example, the dialectic motor is a change force that addresses conflict, synthesis, and conflict resolution. A better understanding of this change force can lead to appropriate mechanisms or structures used for the implementation to more quickly and completely resolve the conflict.

Based on the interview comments about the institutional properties, the management strategies, resistance, and technology characteristics, a model was developed from the data analysis. As shown in Figure 1 below, in the beginning stages of a large-scale system implementation, implementers plan a new organizational state which encompasses the new system and processes. However, in reality there are motors of change that affect the plans. These motors of change do not work in isolation. Rather, there are management strategies, resistant forces, supporting structures (formal and informal mechanisms that drive the change), and technology characteristics that affect the motors of change. Because of this change process, the resultant organizational state ends up being different from the originally planned organizational state. Thus this model expands on previous literature as it addresses forces that affect the cyclical change processes. In addition, the explanation of the six building blocks in Table 1 addresses the internal change processes that exist within the change that is occurring at the organization.
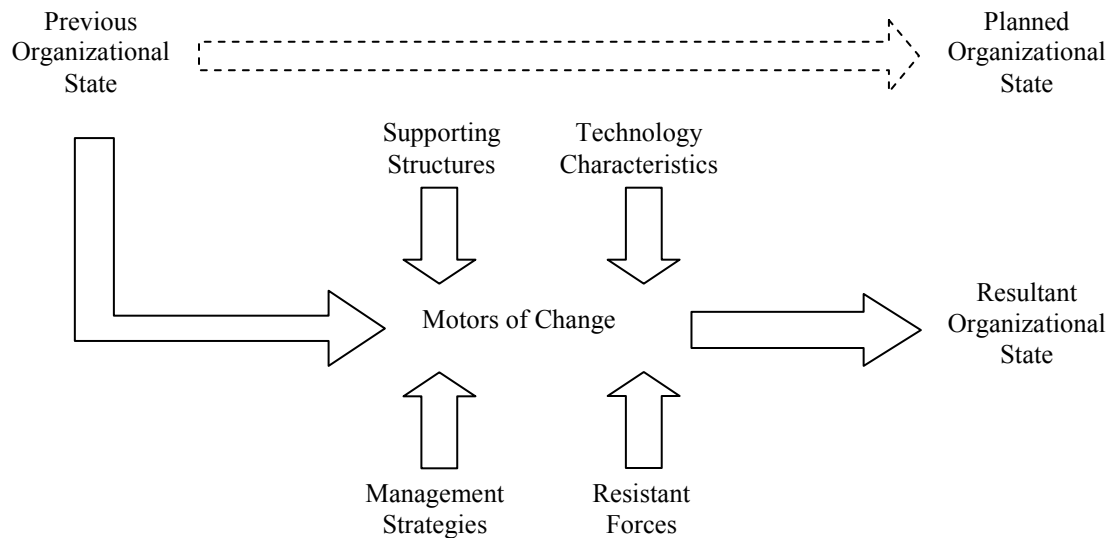
Figure 1: Resultant Change Model

There are several theoretical and practical implications of this model when examined in conjunction with the motors of change. This study points out that responses to motors of change are individually constructed as interviewees point out different responses to the same situation. Organizations should not be viewed as single entities that react in a monolithic manner to change, but as a collection of individuals whose overall response varies depending on the specific individual employees in the organization. This suggests that change research should pay special attention to the individual unit of analysis as these issues are examined.

The individual nature of change also explains the practical difficulty that some organizations have with managing change. IT often addresses change issues through one-size-fits-all programs, such as training classes and executive communication. When these programs treat every employee the same, they do not allow for the individual nature of change. Organizations need to consider more adaptable support structures for dealing with individual responses.

One way to add adaptability to a system is to replace standard rules and routines with human actors. Human actors can use their judgment to adapt to individual needs. In this case, one choice would be to use managers to adapt to idiosyncratic change responses. In order to facilitate this, managers can be trained on the motors of change framework so that they can recognize change behaviors and empowered so that they can react appropriately. At times this reaction may involve the minimization of user resistance. However, user resistance

is not necessarily a negative aspect of an implementation since it can surface potential problems of the implementation. The adaptability of this approach allows managers to handle both negative and positive reasons for user resistance so that appropriate strategies can be implemented. Of course, this does not mean that organizational-level interventions, such as systems training classes, are unnecessary. Some needs are so common that a mass approach will be the most efficient. However, it does suggest that these organizational programs be supplemented with more adaptable support structures.

Although the researchers strived to minimize potential limitations of the research, there are several limitations. Generalizability is an inherent limitation in most qualitative studies. To minimize the impact of this limitation, interviewees were sought out from a variety of positions within organizations. Another potential limitation for the study is the bias of interviewees and questionnaire respondents, which were reflecting on their own ES experiences. One aspect of this bias results from some respondents responding to questions about an experience they had a year previously. Even though respondents may be trying to provide accurate information, they may have a skewed view concerning what actually happened since the implementation started approximately one year previous to the interview and was completed within the previous year. Furthermore, as Lapointe and Rivard [43] found, resistance may change over time and thus it is possible that some respondents reflected on resistance at an early point while others

reflected on resistance at a later point. Another bias is social desirability, which may have occurred in the interviews and may have affected the responses of some of the interviewees. For example, interviewees may not have discussed their own resistance to the system in order to present a certain image about themselves. This impact of this limitation was minimized through the use of interviewing multiple people within the same organization.

As mentioned in the previous paragraph, resistance changes over time. One way to extend this research is to examine how user resistance and motors of change adapt throughout the implementation to the changing conditions. Also, as shown through our Resultant Change Model, there are various external forces and supporting structures that influence the change process that is occurring. It would be interesting to examine the supporting structures and external forces in more detail as well as how they change over time. For example, as an implementation progresses, management will often find problems with the original plan and implement some supporting structures to help facilitate the change. In addition, it would be interesting to examine if the supporting structures and external forces have a moderating effect on how the motors of change ultimately affect the employees and the resultant organizational state. This study also recommends more attention at the individual level of change. We could go beyond the diagnosis of motors of change to understand the types of change interventions that would be most effective given various forces at work. Furthermore, we could understand the interactions that occur when multiple motors of change are involved.

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