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Managing information technology project escalation and de-escalation: An approach-avoidance perspective

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Managing Information Technology Project Escalation and De-Escalation: An Approach-Avoidance Perspective

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***Abstract*—This paper presents an integrated theoretical process model for *identifying*, *describing*, and *analyzing* the complex escalation and de-escalation phenomena in software development projects. The approach-avoidance theory is used to integrate core elements of various escalation theories into a holistic, explanatory framework for the two phenomena. We use a process model to identify antecedent conditions, sequences of events, critical incidents, and outcomes over the course of a project. The analysis also operates at multiple levels: *project*, *work*, and *environment*. This highlights the recursive interactions between project, organizational work activities, and their contexts during the software project development process. By conceiving the processes of commitment escalation and de-escalation as sequences of events involving recurring approach-avoidance decision conflict, this research allows for a deeper understanding of the ambiguity and dilemma that decision makers face during project escalations and de-escalations. Our proposed model was both informed by a detailed case study that exhibits both project escalation and de-escalation conditions, and at the same time, illuminates the perspectives of various stakeholders.**

***Index Terms*—Approach-avoidance theory, case study, de-escalation, escalation, process theory.**

I. Introduction

ESCALATION of commitment is a common and costly problem among runaway information systems (IS) projects [20], [38]. According to Keil and Mann [21], at least 30% of all IS projects exhibit some degree of escalation. The alarming rate has attracted many IS researchers to examine major issues surrounding software project escalation and de-escalation [8], [18], [23], [43]. Despite the progress in software development methodologies over the years, this paper has identified three major issues that have so far been inadequately addressed in the escalation literature. First, there is an overdependence on simplistic stage models in past escalation and de-escalation research [49], [54]. Stage models can offer only limited insights into why and how escalation and de-escalation occur during project development. Indeed, they have been deemed mechanistic or idealistic in today's fast and turbulent organizational environments [55]. Second, even though several theories such as self-justification theory [12], prospect theory [57], agency theory [19], and others have been invoked individually to explain the escalation phenomenon [3], [57], there is no integrated theoretical framework for examining escalation of commitment. Indeed, Keil *et al.* [23, p. 656] expressed a need for future research to "attempt to combine elements of these theories to create a richer theory of this complex phenomenon." Third, there is lack of a multilevel analysis that not only provides analyses at separate distinct levels but also interactions between these levels. A multiple-level analysis would provide a thorough evaluation of the project and generate effective lessons learnt for future project development.

This paper aims to address the shortcomings that we have identified in past research on software project escalation and de-escalation. First, to overcome the limitations of staged-based models, we turn to punctuated equilibrium theory [15] for an analytical framework; the theory suggests that transformation is characterized by stable periods of evolutionary change that are punctuated or interrupted by short periods of rapid "revolutionary" change [15]. From the punctuated equilibrium perspective, IS development can be viewed as sequences of events over time that encompass evolutionary and revolutionary changes [37]. Second, heeding the call of Keil *et al.* [23], we combine elements of several theories into an integrated theoretical escalation model through the approach-avoidance theory. In addition, we extend the theories to examine the process of de-escalation. From the approach-avoidance theoretical perspective, escalation and de-escalation situations can be viewed as instances of approach-avoidance decision conflict that may result in decision dilemma over whether to persist or desist with the project [32]. The approach-avoidance theory encompasses attributes that encourage or discourage persistence with the project, including elements from several escalation theories (e.g., the sunk cost effect from the prospect theory and information asymmetry from the agency theory). Third, we attempt to develop a multilevel analytical framework that permits the tracing of linkages among causal influences that are crucial in extending escalation cycles or triggering de-escalation across multiple contextual levels.

The goal of this paper is, therefore, to formulate an integrated theoretical process model that can be used to *identify*, *describe*, and *analyze* escalation and de-escalation of commitment in IS projects. Our proposed model integrates three streams of psychological and organizational change literature: approach-avoidance theory, punctuated equilibrium theory, and

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TABLE I
SUMMARY OF DETERMINANTS AFFECTING ESCALATION OF COMMITMENT IN IS SETTINGS

Category	Determinant	Links to IS Literature
Project: Objective features of the project, reflecting costs and benefits	Large payoff	Keil, 1995; Newman and Sabherwal, 1996; Drummond, 1996; Pan et al., 2006
	Long-term payoff structure	Keil, 1995; Newman and Sabherwal, 1996
	High closing costs	Newman and Sabherwal, 1996
	Low salvage value	Newman and Sabherwal, 1996
Psychological: Attributes of the decision maker's relationship with the project	Personal responsibility for failure	Keil, 1995; Newman and Sabherwal, 1996
	Information processing errors	Keil, 1995; Newman and Sabherwal, 1996; Drummond, 1996; Mähring and Keil, 2003
	Framing	Newman and Sabherwal, 1996; Drummond, 1996; Mähring and Keil, 2003
	Sunk costs	Newman and Sabherwal, 1996
	Emotional attachment	Keil, 1995; Pan et al., 2004; Pan et al., 2006a
Social: Features of the social group surrounding each decision maker	Public identification with the project	Newman and Sabherwal, 1996; Drummond, 1996
	Responsibility for failure	Newman and Sabherwal, 1996
	Need for external justification	Keil, 1995
	Competitive/ political rivalry	Keil, 1995; Newman and Sabherwal, 1996; Drummond, 1996
Structural: Contextual conditions surrounding the project	Top management support	Keil, 1995; Newman and Sabherwal, 1996; Drummond, 1996; Pan et al., 2004; Pan et al., 2006a
	Slack resources	Keil, 1995
	Empire building	Keil, 1995
	Administrative inertia	Newman and Sabherwal, 1996

process theory. First, it draws on the approach-avoidance theory [50] to analyze the recursive decision conflict faced by decision makers over whether to persist with a project. Second, it draws on the punctuated equilibrium theory [15] that views the IS development process as a sequence of stable and evolutionary events (equilibria) that are punctuated by critical and revolutionary events (disequilibria). Third, it draws on process theories to explain how things evolve over time and why they evolve in a particular way [26], [45]. Particularly, the proposed model adopts narrative and visual mapping strategies [26] to make sense of the escalation and de-escalation phenomena.

The remainder of the paper is organized as follows. First, we explain the concepts of escalation and de-escalation of commitment and outline how the approach-avoidance theory can act as an integrating theoretical model that brings together several theories and creates richer escalation and de-escalation theories. Next, we explain the concepts of punctuated equilibrium, events, and critical incidents, which help analyze the IS development process. This is followed by the presentation of a specific case study conducted from 2002 to 2003, where we consider the development process of an IS project that initially went out of control, then drifted, was turned around but was eventually abandoned. We use a process model to identify and describe the periods of escalation and de-escalation and explain why they occurred. The model represents a powerful analytical framework that can organize project development into a series of events and critical incidents surrounded by ambiguity and decision conflict over whether to persist or desist with a troubled project.

II. PAST RESEARCH

A. Escalation of Commitment to IS Projects

Escalation of commitment is a phenomenon that refers to situations where decision makers commit additional resources to what appears to be a failing course of action [54]. Early escalation studies suggest that the escalation phenomenon represents a syndrome of decision errors that tend to lock decision makers into a course of action [54]. However, an alternative definition [2] suggests that escalation may result from the dilemma caused by the interplay between the degree of commitment to a course of action and the amount of equivocality perceived in feedback on prior investments and in expectations for the future. In this perspective, project escalation is said to occur when there is continued commitment and negative information [20]. Previous research has suggested that escalation is a complex phenomenon that may be influenced by many different factors. Staw and Ross [54] group these factors into four categories: project, psychological, social, and structural. These factors have been used widely in experimental based studies [52] and case studies [20], [38] to explain the escalation phenomenon in IS settings. Table I summarizes the determinants affecting project escalation that have been widely discussed in the IS literature.

While Staw and Ross's [54] escalation prototype provides a useful taxonomy of factors that could explain why projects escalate, little is known about the process of escalation and how the context of past behaviors and decisions are likely to affect the future trajectory of IS project development [30].

TABLE II
FOUR THEORIES OF ESCALATION AND THE KEY CONSTRUCTS DERIVED FROM EACH THEORY (EXTRACTED FROM [23])

Theory	How the Theory Explains Escalation	Key Construct(s) Derived from the Theory
Approach-avoidance theory	Managers commit resources to a failing project because the forces encouraging them to do so are stronger than those forces which suggest discontinuation. One of the key driving forces that can encourage escalation is the proximity to the goal, or the completion effect as perceived by the manager.	• Completion effect
Self-justification theory	Managers continue to commit resources to a failing course of action in order to self-justify the correctness of an earlier decision to pursue a particular course of action	• Psychological self-justification • Social self-justification
Prospect theory	Managers commit resources to a failing course of action because the decision is framed as a choice between losses which leads to risk seeking behavior. Rationally, Sunk Costs are irrelevant. In practice, they can be large and highly relevant in decision behavior.	• Sunk cost effect
Agency theory	Managers commit resources to a failing course of action because it is in their best interest to do so due to goal incongruency between the manager and his/her superior(s) and a condition of information asymmetry	• Goal incongruency • Information asymmetry

B. De-Escalation of Commitment to IS Projects

De-escalation of commitment is defined as the "reversal of escalating commitments to failing courses of action, either through project termination or redirection" [22, p. 65]. Our review of the de-escalation literature finds several triggering activities that can promote de-escalation of commitment in IS settings. For example, "Changes in the top management or project championship" [18], "Implementing early warning system" [8], [44], and "Awareness of unambiguously negative feedback" [22], etc. One should not assume that these de-escalation activities will be instantaneously carried out once unambiguous negative feedback is received [13]. According to Montealegre and Keil's [35] de-escalation model, a de-escalation process passes through four phases: 1) problem recognition; 2) reexamination of prior course of action; 3) search for alternative course of action; and 4) implementing an exit strategy. While Montealegre and Keil's [35] four-phase de-escalation model may fit well with large-scale IS project contexts and has provided useful insights on the de-escalation process, we view that an alternative explanatory model may be necessary to explain the de-escalation process in other types of IS projects (e.g., smaller scale projects). This is especially important in today's multidimensional project environments where contextual differences play an important role in determining the appropriateness of a particular model and processes may be more chaotic than previously believed.

C. Approach-Avoidance Theory

A review of the IS development literature suggests that researchers have used several different psychological and social theories to explain why individuals continue with failing courses of action [38]. Among the theories, Mann [31] and Keil *et al.* [23] have identified the approach-avoidance theory as a major theory that can predict escalation. In general, escalation of commitment has been viewed as instances of approach-avoidance conflict [50]. Approach-avoidance theory [27] captures the essence of complex situations that create conflict in the mind of a decision maker over whether to continue or withdraw [32]. The decision maker must weigh the positive and negative attributes in order to decide which is stronger—the need to approach or the need to avoid [8]. Under approach-avoidance theory, escalation is conceptualized as a behavior that results when driving forces that encourage persistence seem to outweigh restraining forces that encourage abandonment [50]. In Keil *et al.*'s [23] study of the four theories of escalation (see Table II), the authors indicate strong evidence of the approach-avoidance theory's ability to predict escalation. The approach-avoidance theory was found to have the strongest predictive power about project escalation among the four theories in their study.

Finally, Mann [32] developed an approach-avoidance escalation model that suggests that there are two types of attributes that influence project continuation decisions in escalation situations: attributes that encourage persistence and attributes that discourage it. Her model includes factors related to: 1) cost of withdrawal; 2) reward for success; 3) completion proximity; 4) cost of persistence; and 5) ambiguity about a project's future. In an earlier study, Mann [32] also tested four alternative theories (approach-avoidance, self-justification, agency, and prospect) against one another and found that these theories are much more intertwined than previously supposed. More importantly, the findings show that the escalation phenomenon in a single project can be explained by more than one theory. Subsequently, Keil *et al.* [23] conducted a study to test whether constructs associated with different escalation theories can be used to discriminate between IS projects that escalate and those that do not. In their study, Keil *et al.* [23, p. 656] called for future

research to "attempt to combine elements of these theories to create a richer theory of this complex phenomenon ... (as) escalation is a complex phenomenon and ... more sophisticated models are needed to explain escalation behavior." The review of the escalation and de-escalation literature highlights several knowledge gaps that this paper seeks to address. In the next section, we introduce an alternative analytical framework that can identify, describe, and explain the phenomena of escalation and de-escalation of commitment in IS projects.

III. General Structure, Boundary Conditions, and Content of the Proposed Model

This study views IS development processes as exhibiting a property of path dependency [14]. These processes may be analyzed as a sequence of evolutionary steps where each achieved state is an outcome of an approach-avoidance decision influenced by past process history and the current state of the environment. In our proposed approach, a punctuated equilibrium model is used to aid the empirical detection of repeated patterns of social activity and complex social history [37], [44], [46]. Here, a "state of equilibrium" indicates that the project group has agreed on project leadership responsibilities and targets such as budget, manpower level, and project completion date. Project development will continue unless pushed to change by some unexpected events (such as a major environmental change), or an intentional change is introduced to address a new need in the project [39]. The punctuated equilibrium model entertains two types of changes: small, incremental ones (first-order changes) that in themselves do not change the so-called *deep structure*. This is the normal situation. This relative stability is then punctuated with more significant changes (second-order changes) that at least have the potential to get the stakeholders to reconsider the *status quo* and change the deep structure. For example, in our study, actions (small, incremental changes) were taking place throughout the project up to event 14. But the sudden drop in demand (and the concomitant causes for the drop) was the trigger for management (when they recognized the problem) to reconsider the viability of the project and its eventual abandonment.

As a general condition for the applicability of the model, events are assumed to be instances of social action relating to an IS development process [17], [51]. Events are categorized into three types: positive, ambiguous, and negative. Positive events signify legitimacy and acceptance of the project by the project group, and serve as the basis for the project to proceed in the agreed manner. Negative events represent rejection of the project and are likely to leave project group members in conflict. A project is said to have entered an escalation cycle following a series of negative project events and the commitment of more resources, when decision makers neither decide to abandon the project nor take corrective actions despite unambiguous negative feedback [20]. The third type is the ambiguous event where project group members neither reject nor accept the state of project development. Ambiguous events are most susceptible to intervention by interested parties external to the project group; for example, top managers may intervene for strategic reasons [20]. The uncertainty inherent in ambiguity presents the opportunity for such interventions to influence the IS development process [9]. Critical incidents are those that provide the opportunity for prior poor performance to be addressed, surfacing the unsatisfactory experiences of project members and allowing for future needs to be anticipated. They are events that punctuate an ongoing process and offer opportunities to challenge the *status quo*. When a project stops after a period of escalation, two outcomes are possible subsequently: completion or abandonment.

To illustrate how events are classified in the model, we map positive, ambiguous and negative events according to the conventions in Fig. 1. If a positive project event is followed by an ambiguous project event, then that project event is shown descending from the positive area of the map into the ambiguous area. Similarly, if a project event in the negative area is followed by an ambiguous project event, then that project event is shown ascending from the negative area into the ambiguous area. The model suggests that a project emerges within the organization and develops its own boundaries; these boundaries give the project its own identity, which is different from that of the day-to-day operations of the organization [39]. Furthermore, both project and organizational work activities exist and are expected to interact in parallel and also with their contexts. Project-level events consist of material and uncontrollable events within or outside the project that influence the project. A good example is key personnel leaving or entering the project. Work-level events consist of important events within existing work processes that influence the work system (sometimes referred to as the legacy system). A work system can be defined as a system in which human participants and/or machines perform a business process using resources to produce products and/or services for internal or external customers [1]. Critical work-level events, which may be coordinating events, are also presented in Fig. 1. They follow the same event numbers as the corresponding project-level events. Likewise, the critical environmental events that interact with the project process also use the same event numbering. The sequence of work-level events progresses alongside the sequence of project events and environmental events. At several critical instances, project events would intersect with both work- and environmental-level events that may affect the trajectory of project development. For example, a poor performance resulting from the legacy system might trigger a financial crisis in the company that, once recognized, could affect the IS project's progress materially as its budget comes under greater scrutiny.

Antecedent conditions are essentially the legacy of the history from prior projects [45]. Antecedent conditions play an important role in project development since history may repeat itself. In the IS Division (ISD), patterns of past failures tend to be reproduced unless decisive changes are made to break the pattern [37]. Moreover, project events can be continually influenced by their contexts: both organizational context (inner context) and contexts beyond the organization (outer context). At every event, there are corresponding sets of approach and avoidance attributes. These attributes encompass key elements from several theories; the attributes could therefore act as an

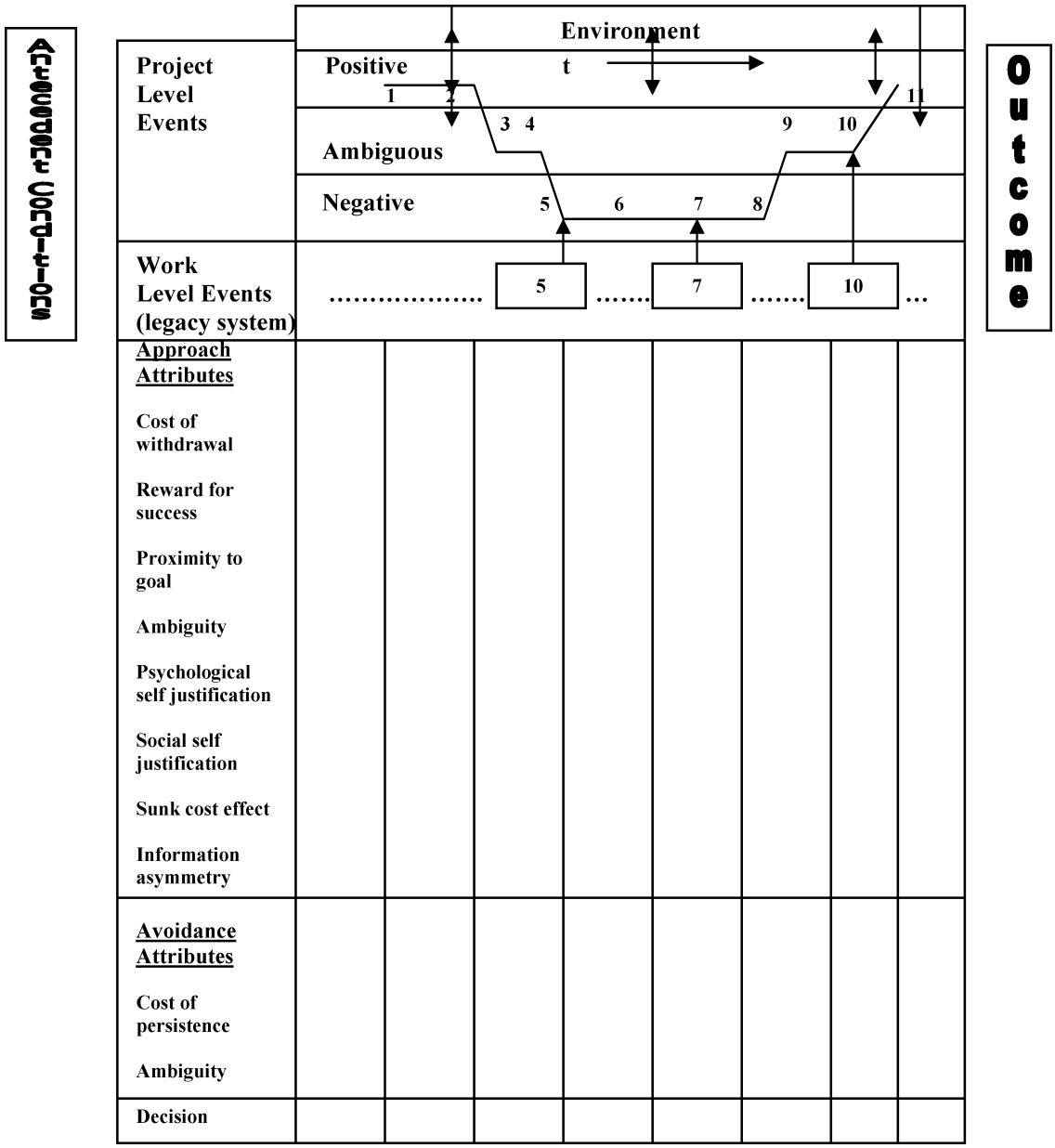

Fig. 1. Integrated theoretical process model of commitment escalation and de-escalation in IS projects.

integrating theoretical framework for the examination of the escalation and de-escalation phenomena. Fig. 1 shows the general structure of the model. Table III shows a summary of definitions of the terms used in the integrated process model. In the next section, we will introduce the case project that we have used in studying the processes of escalation and de-escalation of commitment.

IV. Research Methodology

A. Research Strategy

The main research method in this study is to use an interpretive, in-depth case study [25]. The case study method is an appropriate means of empirical inquiry when the phenomena to be studied are complex and not easily separated from their organizational context [26]. Our case study focuses on escalation and de-escalation of commitment in an IS project in British Utilities (BU, a pseudonym), a large utility provider based in the U.K. The project was initiated to resolve the problem of long telephone queues at BU's call center. The system to be implemented was a telephone queue removal system. At the time of the field researcher's access into BU at around August 2002, the organization had just abandoned its project. From the site selection standpoint, BU has proved to be an interesting and important case to study. It demonstrates how an organization can become overcommitted in constructing a new system, subsequently abandoning it abruptly. Field research (on-site observations, interviews, and documentation reviews) was conducted over ten months (November 2002 to September 2003). A total of 29 interviews were conducted with 25 interviewees. Each session

TABLE III
SUMMARY OF THE DEFINITIONS OF THE TERMS USED IN THE INTEGRATED PROCESS MODEL

Term	Description
Events	Instances of social action relating to an IS development process
Positive events	Signify legitimacy and acceptance of the project by the project group, and serve as the basis for the project to proceed in the agreed manner
Negative events	Represent rejection of the project and are likely to leave project group members in conflict
Ambiguous events	Signify ambiguity which project group members neither reject nor accept the state of project development
Critical events	Provide the opportunity for prior poor performance to be addressed, surfacing the unsatisfactory experiences of project members and allowing for future needs to be anticipated
Project events	Consist of material and uncontrollable events within or outside the project that influence the project. A good example is key personnel leaving or entering the project
Work events	Consist of important events within existing work processes that influence the work system (sometimes referred to as the legacy system)
State of equilibrium	Agreed upon project leadership responsibilities and targets such as budget, manpower level and project completion date
Escalation cycle	Phases of continuous commitment despite negative feedback
Antecedent conditions	Represent the legacy of the history from prior projects

lasted 1–1.5 h. Data were collected mainly through personal interviews with several senior executives, IS personnel, and users. Personal interviews were supplemented by direct observations, documents, and artifacts, including organization charts, annual reports, articles in the business press, and internal documentation. Interviews were based on topic guides, which indicated relevant probes at suitable junctures. The interviewees were asked to describe the IS development and specific comments for illustrating general observations were sought, but they were not asked to force their experiences into any preestablished categories. More vivid events (the resignations of call center manager, project cancellation, etc.) were of special interest as they helped multiple interpretations to be obtained from the respondents. Particularly, subjects were encouraged to focus on critical events or incidents [37]. Historical reconstruction of events was subsequently performed by the field researcher. Intersubject reliability was increased by using the narratives from one subject to confirm or contradict others in a social triangulation [33].

The study sought to use the rich insights available in the case. For any case, insights into the escalation and de-escalation processes can only be obtained from thorough immersion into the transcripts for the case. The researcher used the texts (interview transcripts, documents, and notes from observations) for preparing a detailed case description of events (narrative as instance) of the entire IS development process [45]. The process includes the antecedent conditions and both the escalation and de-escalation periods. This was done soon after completing the case study. In order to reduce researcher bias and also to validate that no important event had been missed in the case summaries, a colleague was asked to take part in early analysis of some of the data. The colleague was uninvolved in the fieldwork and was therefore unfamiliar with case. The role of this colleague was to "bring a different and possibly more objective eye to the evidence" [11, p. 538]. The information he received did not include the field researcher's list of events and ratings. Next, the colleague developed his own list of the events and ratings. A senior IS researcher was also involved in commenting at later stages on the field researcher's list of events and ratings. Both the colleague and the senior IS researcher were involved in characterizing the events as "positive," "ambiguous," or "negative" independently. The purpose of this was to detect any bias in the research approach. Data from various sources coalesced and built a specific narrative that explained the process outcomes [45]. This narrative was then mapped onto the dynamic punctuated equilibrium model shown in Fig. 1. The researcher went through the interview transcripts several times and made changes to the process diagrams where necessary.

The next step of the analysis was to determine the approach and avoidance attributes at several critical events in the development process. Besides the events, key decision makers were also identified. Their motivations and underlying assumptions were first considered before analyzing their decisions. The approach-avoidance process model (shown in Fig. 1) was used as the basis for identifying and organizing the attributes. These approach-avoidance attributes were compared and contrasted against the array of factors that contribute to escalation and the triggering activities that promote de-escalation discussed in the IS development literature. The entire data analysis process went through numerous iterations [25] to formulate a coherent and consistent overview of the case organization.

V. QUEUE REMOVAL SYSTEM AT BRITISH UTILITIES CALL CENTER

This section presents background information about BU and the queue removal system. The case offers an insight into the arrays of attributes that influenced the project escalation and de-escalation processes of the queue removal system project at BU. This section describes the project development process as a sequential pattern of events over the history of the project. These events are examined at three levels—project (P), work (W), and environmental (E). This section presents the series of events in the project development process at BU, the intersecting work and environmental events and the antecedent conditions.

A. Project-Level (P) Events

1) Antecedent Conditions: At the time of our research, BU was a large utility company in the U.K., serving almost 13 million customers. The company was offering a comprehensive range of services including providing water and waste water treatment; the supply of high-quality water treatment products and services; water process engineering; the design and construction of major infrastructure; planning and asset management; project management; customer services; and specialist consultancy. The organization offers many customer solutions that vary from recently improved helpline facilities and bill payment services to mobile drop-in centers. The organization serves over 13 million domestic and commercial customers in the U.K. It takes 2.2 million meter readings and sends out 6.5 million bills per year for its 3.5 million accounts. To manage this operation, to meet the needs of its customers, and ensure the bills it sends out are paid, the company relies on complex IS to help make payments easier for its customers. The customer call center was the central point of contact for all BU customers. It accommodated approximately 1300 staff. The customer call center handled approximately 3.3 million telephone calls per year and received 500 000 pieces of correspondence. Two thirds of which related to customer bills and one third related to water supply and sewerage service matters. BU realized that typical daily peaks and calls in response to the monthly billing could result in customers being kept waiting on-hold. The enquiries could result in heavy call volumes that ran up an average of 50 people waiting at any time. Such long queues were unacceptable customer service to both the company and the public.

Event P1: Proposal for a Queue Removal System (Positive)

To resolve the long queues, BU planned to develop and install a queue removal system to make it easier for customers calling its billing and customer service lines. Its motivation in installing the queue removal system was purely customer focused—to improve customer service at busy times and in the event of any unforeseen circumstance causing an increase in the call volume. Besides, the company also recognized that losing a customer call on a billing line could mean a delay in payment, triggering unnecessary statements, lengthened enquiry times, and even greater administration costs. While difficult to quantify, it was believed that an improved customer service and enquiry handling would achieve a cash flow benefit and reduce the administration costs. Sophie explained why improvement was necessary:

> First, the customers would not waste their time waiting on hold since a call agent would return their call instead. Second, a shorter call time would allow call agents to answer more calls and this would improve the turnover time per call. (*Sophie, Call Center Assistant Manager, March 18, 2003, #BU-7*)

Chris also explained how the system would work:

> When a customer calls in, if no one answers within 20 seconds, the system would prompt him or her for a name and it would automatically capture the caller's phone number. The system would also suggest an estimated call back time. The system would provide for three return calls before erasing the number from its memory. (*Chris, Call Center Manager, March 6, 2003, #BU-6*)

The project started in May 2001 and was expected to roll out after one year. The initial budget for the project was £1 million.

Event P2: Ease of Integration With Existing System Infrastructure (Positive)

The whole customization and integration process progressed very well:

> The customization and integration were completed quickly and the whole process seemed very smooth. It was non-invasive and it integrated easily with the existing systems and network. (*Andy, IS Project Manager, February 4, 2003, #BU-4*)

Event P3: Disappointment Among Project Group Members (Negative)

Even though the pilot test progressed smoothly, some project group members realized that the system did not perform exactly the way they thought it would:

> It was completely inflexible. For example, during the callbacks, when the call was answered by someone else rather than the original caller, who might be temporarily unavailable, the caller would have to rejoin the long queue. The system would not allow call agents to set the timings for re-dialing under any circumstances. (*Johnny, Call Center Agent, May 4, 2003, #BU-14*)

> The original idea was to make everything faster by reducing the queues. But it did not seem so for me. For example, when a caller had made repeated calls, the system would register his/her number several times in the queue even though it was from the same person. That did not make sense to me and wasted a lot of our time. (*Sam, Call Center Agent, April 28, 2003, #BU-3*)

Event P4: Errors in Information Processing (Negative)

Both the business director and Richard were unaware that some project members were disappointed:

> The customer call center manager and assistant manager did not realize any problem with the system. It was my people (IS manager and IS programmer) who reported the limitations of the system to me. (*Richard, IS Director, July 12, 2003, #BU-19*)

Event P5: Departure of Both Customer Call Center Manager and Assistant Manager (Negative)

Both the customer call center manager and assistant manager left the organization abruptly. Many linked their departures with the high number of complaints received from the public regarding the call center's poor customer service:

> They could not solve the problem. I supposed they had both pinned their hopes on the callback system to reduce the long queues within a short time and improve customer service. (*Johnny, Call Center Agent, May 4, 2003, #BU-14*)

> The Business director might have a part to play in their departure. It was obvious that he was very displeased with the fact that both of them had tried to keep the problems from his knowledge. (*Thomas, ACD Engineer, March 28, 2003, #BU-9*)

The call center manager's departure in September 2001 dealt a serious blow to the project since he was both the initiator and manager of the project.

Event P6: Project Began to "Drift" (Negative)

The project was dealt another blow when the business director who was also the project champion left the company. No specific reason was given for his departure. However, the project was certainly in a dire situation. With both project champion and project manager absent, the remaining group members turned their attention to other projects. The next two months saw no project activities. There was no involvement from the top management and the project members. It was not until two months later (around December 2001) that the head of the company called for a meeting.

Event P7: Appointment of New Project Champion and Project Manager (Ambiguous)

After the meeting, the top management decided to continue with the project, even though it was widely perceived by the project members and line executives as ineffective in resolving the problem of long call queues. The resources that were already invested, the project being close to completion, and the symbolic significance of a pro-customer project were cited as the three main reasons for the decision to continue the project:

> Even though some project members had doubts, however, since we had already invested so much, plus the idea of finally being able to complete the project seemed attractive to continue the project. More importantly, the management wanted to show to the public and the authority that the organization was trying to rectify the problem. (*Andy, IS Project Manager, February 4, 2003, #BU-4*)

Wesley, Chris, and Sophie were appointed the new business director, customer call center manager, and assistant manager, respectively. Wesley was also appointed the new project champion. In addition, the top management allocated an additional £500 000 to complete the purchase of the entire system. Since Chris was still new to the organization, he requested that two of his assistants from the call center be included in the project group. Their main role was to orientate him regarding various functions and coordination of interdepartmental project members during group meetings. The addition of the two assistants to the project group also symbolized further commitment to the project. While Chris was still adjusting to the new environment, Danny was appointed as the new project manager.

Event P8: Change of Project Leadership (Negative)

In February 2002, Danny had to leave the project group to take up two important Automatic Calling Distribution upgrading projects at a BU subsidiary company. This was more bad news for the project. With Chris heavily involved with other customer call center initiatives, the implementation of the new system was yet again delayed. No one knew what was going to happen to the new system. The project was left to flounder for six weeks. Despite its gloomy prospect, the project development did not seem to be coming to an end:

> The head of the company had indicated that he would allow the project to continue until the development was completed. He had to see it through since he felt personally responsible for the project. Furthermore, we suspected that the project development wouldn't be far away from the end-point. (*Richard, IS Director, July 12, 2003, #BU-19*)

Event P9: Adding New Modules to the System (Ambiguous)

Andy was appointed the new project manager. After examining the new system, Andy summoned both Lance (IS Contractor) and Steve (IS Contractor) to discuss the possibility of modifying the queue removal system. Lance suggested including a customized module to the complete system, which could greatly improve its performance. However, such a customized module would incur a further cost of £250 000. Andy supported the additional investment:

> We could make the system more flexible by adding a few function keys in the system to allow call agents a greater control of the queue. The original system could be transformed into some sophisticated applications that span business functions. (*Andy, IS Project Manager, April 14, 2003, #BU-12*)

Despite the promise of the new modules, several project members were skeptical about whether they could effectively enhance the system performance after their earlier disappointments (i.e., Event 3).

Event P10: Hiring an Outside Consultant to Assess the Decision to Further Invest (Ambiguous)

Andy, with the consultant's help, prepared a new business plan justifying the additional investment to the top management. Even though £250 000 was not considered a large sum, its approval as additional investment in a "troubled" system was less straightforward. With the assistance of the consultant, Andy conducted a survey to assess call agents' feedback on the system:

> The results were encouraging. However, the setback was that the caller queue had fallen only by five percent. The figure was not significant enough for us to conclude that the system had addressed our problem of long 'phone queues. Nevertheless, we also realized that it was a complicated problem which could involve other issues such as an insufficient number of call agents or an inaccurate billing system. (*Sophie, Call Center Assistant Agent, July 12, 2003, #BU-21*)

In April 2002, despite the mixed results, the consultant recommended adding new modules to the system. The consultant's analysis suggested that an enhancement of the system could reduce call queues by 20%.

Event P11: Senior Directors' Support Toward Further Investment (Positive)

With the consultant's positive report, the senior directors seemed to support a sophisticated system that offered significant advantage over the previous version:

> The directors were happy to see that the call agents liked the system. It could be used as publicity to demonstrate that the company was already working to improve its customer service. (*Richard, IS Director, July 12, 2003, #BU-19*)

Event P12: Head of Company's Commitment to Continued Investment (Positive)

The head of the company was clearly responsible for the additional investment of £250 000 in the project. He approved it without going through the budget committee:

> The head of the company reiterated his support towards this project. He reckoned that further improvements could bring out the full potential of the system and eventually justified his earlier decision. (*Wesley, Business Director, November 11, 2002, #BU-1*)

Event P13: Trial Runs (Positive)

The modified call queue removal system was installed behind the internal telephone system, connected to BU's Rockwell Spectrum ACD via standard digital telephone connections. The company conducted several trial runs on the system and they were all very successful. BU engaged an independent research company to conduct another customer satisfaction survey to assess customers' and agents' feedback on the new system. Chris summarized the survey results:

> 85 percent of customers said the new system had improved their opinion of the company and 92 percent of agents believed the new system reduced the number of angry and frustrated customers they had to deal with. (*Chris, Call Center Manager, March 6, 2003, #BU-6*)

Event P14: Abandonment of the Queue Removal System (Outcome)

Just as the system was about to be launched and much to everyone's surprise, it was abandoned abruptly in August 2002. The project had cost the organization £1.75 million. Apparently, the long queues and public complaints had both vanished due to several initiatives and incidents (refer to work- and environmental-level analyses later).

B. Work-Level (W) Events

1) Antecedent Conditions: The customer call center was divided into two main departments: billing and operations. The billing department dealt with customer billing enquiries such as missing bills and change of payment plans. The operations department was responsible for customer complaints such as no water supply and the rupture of sewerage pipes. Prior to the launch of the new queue removal system project, the call center faced heavy call volumes, running up an average of 50 people waiting at any time during the peak periods of the day. Both the company and the public considered such long queues unacceptable. Therefore, it was crucial for BU to find a solution quickly. Besides the new queue removal system, the customer call center also focused on other areas of improvements. For example, it improved its coordination with the finance department, so that it knew when customer bills would be sent out in order to better predict and manage customers' billing enquires.

Event W4: Escalating Customer Complaints and Poor Staff Morale

The public made a number of complaints about customer service at the call center, which reflected the chaotic state the call center was in. Sam explained:

> We had no idea why there were so many public enquiries about their bills. We had to investigate if there was a problem at our finance department. Anyway, the call center manager had a very difficult time since we were downsizing and could not hire additional call agents to handle the influx of calls. Even though the new queue removal system could provide automatic callback service, it did not seem capable of removing the long call queues as many were repetitive calls. (*Sam, Call Center Agent, April 28, 2003, #BU-13*)

Johnny also commented on the situation at that time:

> We did not have the right system supporting us. Our morale was very low since we were getting callers shouting at us so frequently. (*Johnny, Call Center Agent, May 4, 2003, #BU-14*)

Event W10: Internal Survey of Agents' and Customers' Feedback on the Pilot System

The customer call center conducted a survey to assess call agents' feedback on the pilot system. Comments were kept anonymous to encourage more participation in the survey and also to obtain genuine feedback:

> The agents liked it. They were in better control because when they called the customers back, they would already know the customers' details and what their problems were through the recorded message. (*Chris, Call Center Manager, March 6, 2003, #BU-6*)

Event W14: Sudden Sharp Decrease in Call Queues

Around July 2002 and much to everyone's surprise, the call queues decreased tremendously and abruptly. Almost all incoming calls could be handled immediately by the call agents. The situation was closely monitored by the management. Various reasons were offered to explain why the queues had eased:

> We made several changes to the format of our bills at around April 2002. The new format was easier to comprehend and contained itemized billing, with a daily breakdown. We also printed the lull hours as the preferred hours for bill enquiries to even out the high frequency of calls during peak hours. Besides the change in the format of the bill, we continued our coordination with the call center to plan the appropriate timings to send out our bills. (*Mike, Finance Manager, June 6, 2003, #BU-17*)

C. Environmental Analysis (E)

Event E6: OFWAT's Inquiry Into the Company's Level of Customer Service

OFWAT[1] received a complaint from the public about poor customer service at BU. This led to OFWAT's investigation into the situation at BU. Subsequently, OFWAT required that BU improve its customer service immediately. Failure to comply would incur an initial fine and more serious consequences later:

> OFWAT made an official inquiry into poor customer service at the call center. That could be part of the reason why the call center manager, assistant manager and business director left the organization. (*Wesley, Business Director, November 11, 2002, #BU-1*)

> The call center manager seemed to attribute the high influx of calls to our billing system. We had to conduct a thorough investigation to check if there was any problem with the accuracy of the bills. (*Mike, Finance Manager, June 6, 2003, #BU-17*)

Event E14: Incidents Related to the Sudden Sharp Decrease in Call Queues

Several incidents outside the remit of the project group might have led to the abandonment of the project.

> One of our sewerage pipes was leaking chemical contents off a pharmaceutical plant. Unfortunately, the leak occurred near a fishery and contaminated its water and killed most of the fish. When the emergency call was made, our call agent did not handle it and that triggered the system to activate the callback service. When we finally responded to the emergency call, it was so late that the leak had nearly wiped out all the fish in the farm. It was a shortcoming in the system

[1]The Office of Water Services is the economic regulator for the water and sewerage treatment industry in the U.K., and its primary responsibility is to ensure water companies in the country provide customers good quality and efficient Services at fair prices.

> that we had overlooked. (*Wesley, Business Director, November 11, 2002, #BU-1*)

> It could also be partly attributed to the loss of five percent of our customers from June to August 2002. These customers had switched to another water company for some unknown reasons. (*Wesley, Business Director, November 11, 2002, #BU-1*)

> The senior directors were shocked by the loss of five percent of our customers. They took this matter very seriously since among the customers that switched to another water company, two were multinational pharmaceutical companies that were highly regarded by BU. This triggered a decision by the top management to invest in a fully fledged CRM system that would provide a total customer relationship management solution for all its clients, especially the commercial customers. The queue removal system could no longer fulfill the strategic needs of BU. (*Richard, IS Director, July 12, 2003, #BU-19*)

> I still felt that OFWAT's watchful eye had pressured the management to invest and implement a better customer service system. (*Thomas, ACD Engineer, March 28, 2003, #BU-9*)

Approach and avoidance attributes and the decisions that determine the trajectory of the project are summarized in Table IV. Fig. 2 is a process diagram that describes and explains the call center project development process at BU. From the process diagram, we can infer that the project had an escalatory period over Events 3–6, a de-escalation triggering activity at Event 7, another escalating event at Event 8, and a turnaround attempt over Events 9–13. Event 14 indicates that the project was finally abandoned. The process diagram also highlights a series of conflicting approach and avoidance attributes that influenced the decisions that helped shape the trajectory of the project. Table V provides a summary of the process model features and how they could be applied in the BU case.

VI. Discussion

A. Escalation and De-Escalation as Instances of Approach-Avoidance Conflict

Our results support the view that several escalation theories in the IS literature are much more intertwined than previously supposed [32]. More importantly, our findings confirm that the escalation phenomenon in a project can be explained by more than one theory [23]. Moreover, escalation can be viewed as instances of approach-avoidance conflict [50], and that approach-avoidance attributes operate simultaneously in a project [10]. Extending the existing argument in the escalation literature, we propose that de-escalation can also be viewed as instances of approach-avoidance conflict. For example, in the BU case, Project Events 10–12 (the period of de-escalation) show that top management decided to continue the project despite the conflicting influences of both approach (i.e., strong champion who provided continued funding and protection) and avoidance attributes (i.e., mixed signals regarding the system's effectiveness).

In addition, several approach and avoidance attributes found in our study may offer some interesting insights into the phenomena of commitment escalation and de-escalation. First, our analysis suggests that ambiguous initial performance data had prompted the project group members to reconsider continuing the project.

This finding contrasts sharply with the results presented by some of the earlier escalation studies that suggest that ambiguous performance data contributes to project escalation [47], [48]. Generally, ambiguity can be viewed as an attribute that encourages both persistence [32] and desistance with a project. It can be viewed as an avoidance attribute since a risk-averse decision maker may pull the plug on an "ambiguous" project.

Second, the BU case involved a high turnover of project managers and champion that affected the project and led to a series of escalation and de-escalation cycles. The important difference between the case and previous escalation cases [9], [20], [35], [48] is the frequency of the departure of the key project executives. Previous escalation studies [20], [48] suggest that commitment may decline sharply following the exit of key executives in the project. However, some escalation studies also suggest that a change in the project leadership may still be insufficient in itself to break the cycle of escalation [8], [35]. The BU case indicates that even though commitment might have declined following the exit of key executives in the project, the project continued to absorb valuable resources (e.g., project members' time and costs). The case also offers two reasons why the change of project leadership was insufficient in itself to break the cycle of escalation. The first reason is that the new project champion and project managers did not alter the previous failing course of action. Instead, they allow the troubled project to continue to be entrapped within the escalation cycle. Another reason is that the key executives who departed had relatively low political power in influencing the abandonment of the troubled project [42]. It could be that these executives would easily be substituted by other personnel and their departure would not bring about a collapse of the project. In fact, the project was held together by the Head of Company, who had relatively high political power in influencing the continuance of the project.

Third, one of the main reasons why an organization persists with a project is that the project may symbolize pro-consumer behavior without ever delivering improvements. In the case of BU, the project was used to publicly demonstrate that the company was already working to improve its customer service, thereby presenting a positive image to the public. Unfortunately, this strategy has a limited "shelf-life." In the case of BU (and many other companies), the customers will not tolerate such poor service indefinitely.

Fourth, an unexpected event could lead to sudden project abandonment. In the case study, the demand for the new system vanished when the long call queues eased dramatically from June to August 2002. This followed the redesign of the bills. It is noted here that the case organization was not well coordinated otherwise changing the billing format would have been fixed prior to the investment of the system. The fall in demand was totally unexpected and triggered project reappraisal, which eventually led to project abandonment. This outcome is similar to that of a multimillion dollar software project that involved more than a decade of development and reported by Keil [20]. In that case, the decision to "pull the plug" was driven, in part, by a sudden downturn in the industry that created a financial crisis

TABLE IV
APPROACH-AVOIDANCE ATTRIBUTES THAT DETERMINED THE TRAJECTORY OF THE CALL CENTER PROJECT AT BU

Categories	Events 1-2: Positive	Events 3-6: Negative (Escalation)	Event 7: Ambiguous (Triggering the De-escalation Process)
Approach Cost of Withdrawal			
Reward for Success	-To improve the bill enquiry service so as to encourage faster bill payment -To maintain a positive public image -To meet OFWAT's requirement on customer service		-An effective system which was able to achieve the original objectives
Proximity to Goal			-Close to completion
Ambiguity		-Unsure about the level of system effectiveness	
Psychological Self-justification			
Social Self-justification			-Symbolic significance of a pro-customer project
Sunk Cost Effect			-Committed resources
Information Asymmetry		- Goal incongruency between the call center manager and the business director.	
Avoidance Cost of Persistence		-Appointment of new project manager and project champion	-Opportunity cost of investing in another project
Ambiguity		-Ambiguous initial performance data -Information processing errors	
Decision	Approach	Approach	Approach

TABLE IV (Continued.)
APPROACH-AVOIDANCE ATTRIBUTES THAT DETERMINED THE TRAJECTORY OF THE CALL CENTER PROJECT AT BU

Categories	Event 8: Negative (Escalation)	Events 9-13: Turnaround (De-escalation)	Event 14: Outcome (Project Abandoned)
Approach Cost of Withdrawal		-The decision maker would be considered a failure by others	
Reward for Success			
Proximity to Goal	-Close to completion		
Ambiguity			
Psychological Self-justification	-Decision-maker felt personal responsible	-Strong champion who provided continued funding and protection	
Social Self-justification		-Identification with customers	
Sunk Cost Effect			
Information Asymmetry			
Avoidance Cost of Persistence			-Detection of serious deficiency within the system -The system became redundant due to the disappearance of call queues
Ambiguity		-Mixed signals regarding the usefulness of the system	
Decision	Approach	Approach	Avoidance

for the company, forcing managers to reevaluate their priorities. Last, the detection of a serious deficiency within the system is another important avoidance attribute that could explain why the top management may decide to abandon a project. In the case of BU, the incident of pollution from a sewerage pipe rupture highlighted a serious flaw in the working procedures within the callback system. The detection of serious system deficiency has not been documented as a key avoidance attribute in previous de-escalation literature, but as the BU case clearly demonstrates, it may be a valid reason for a project to be abandoned.

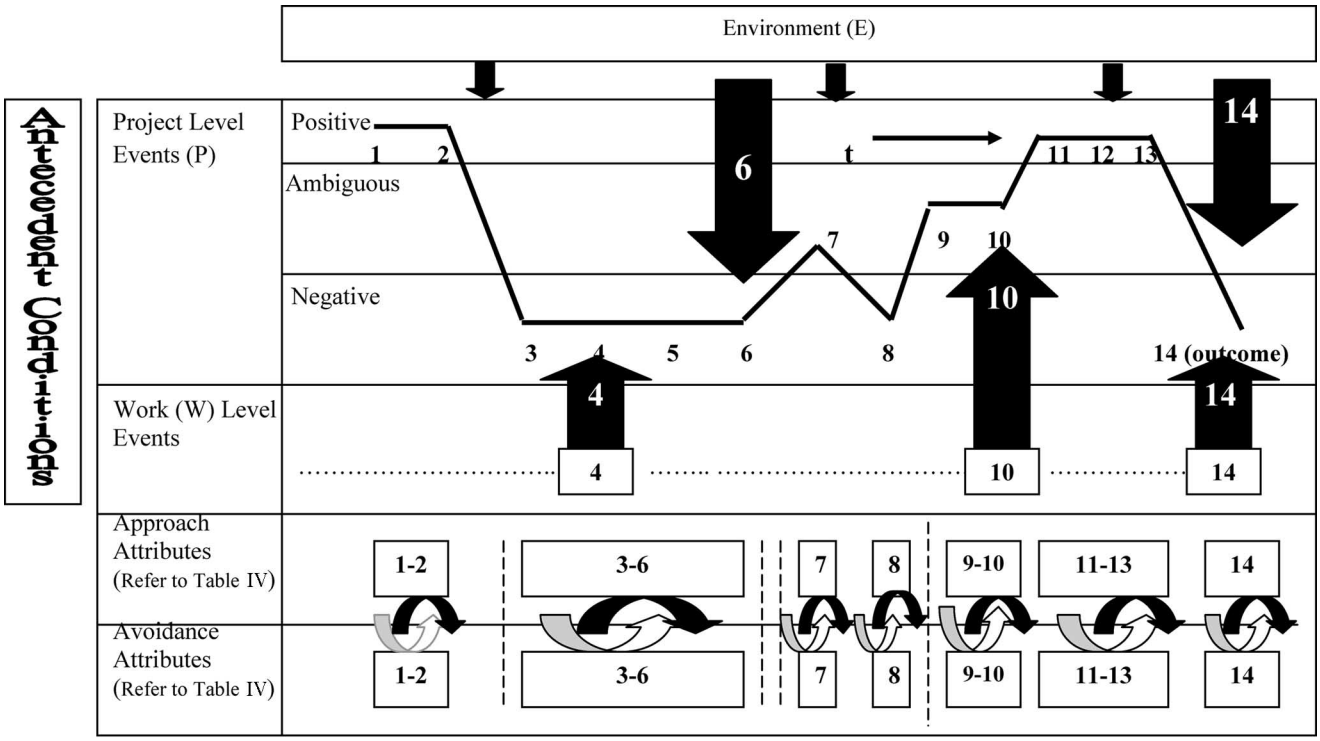

Fig. 2. Process diagram of the call center project at BU.

TABLE V
SUMMARY OF THE PROCESS MODEL FEATURES AND HOW THEY COULD BE APPLIED IN THE BU CASE

Process Model Feature	British Utilities (BU) Call Center
History (antecedent conditions)	Complex information systems at the customer call center that employed 1300 people. The unacceptable length of customer call queues spurred the development of a new system.
Top management support	Sometimes active but allowed the project to drift after the project leader left.
Context	Internal: project manager's exit External: OFWAT complaint Loss of two large customers Sewerage leak Bills re-designed
Process of implementation	A Queue Removal System was proposed to solve the problem at a budgeted cost of £1m. The process was punctuated with several crises one of which was internal to the project and others that were unrelated or unexpected (see context above for details) The budget escalated from £1m to £1.75m. The bills were also re-designed to give customers more and clearer information.
Outcome	Queues disappear and the Queue Removal System was eventually abandoned at a cost of £1.75m and was several months late.

B. Sequences of Multiple Mistakes (Mistake Chains) May Contribute to Project Escalation

Mittelstaedt [34] has identified several attributes that may contribute to sequences of multiple mistakes (mistake chains) in projects such as:

1) failure to believe information that you dislike;
2) success that breeds arrogance and adversely affects decision making;
3) failure to evaluate assumptions;
4) frequent communications absence, failure, or misunderstanding (internal and external, including customers);
5) cultures that suppress initiative, information, or action;
6) failure to evaluate past mistakes and learn from them.

Understanding the nature of these attributes has serious implications for managers since major crises often involve a unique set of compounded errors occurring in sequence. In most cases, if warnings had been observed and acted upon earlier, mistake

chains would have been avoided. Mittelstaedt [34] has listed several of these warning signs that presage typical mistake chains. For example, results off plan, constant revision of plan/budget, failures of control systems, and frequent operational problems that are not addressed by standard procedures. The occurrence of any of these warning signs does not in itself signal a major crisis but indicates a need for further investigation, so as to ensure that one is not in the process of starting a series of mistakes for the project.

Our examination of mistakes within the BU case reveals a chain of mistakes that ought to have been recognized as potential "red flags" and had contributed to project escalation. All of these were behaviors or actions that had been encountered during the project development process and were catalysts for events that inflicted damage to the project. The details of the mistake chain are summarized as follows.

1) *Failure to obtain complete understanding of the system (Event P3):* Some project group members realized that the system was not exactly performing the way they thought it would. Some of the members reckoned that they should not go ahead with the purchase of the complete system.
2) *Failure to provide negative feedback (Event P4):* Both the business director and Richard (the IS director) were unaware of some of the project members' disappointment over how much the system could actually achieve. They claimed that none of the project members told them about the new system's limitations.
3) *Permitting the departure of both customer call center manager and assistant manager (Event P5):* The call center manager's departure dealt a serious blow to the project since he was both project initiator (champion) and project manager.
4) *Neglecting the project and allowing it to drift (Event P6):* The situation was unclear at that time. With both project champion and project manager absent, the rest of the group members turned their attention to other projects. The next two months saw almost no activities. The project was left to flounder with no involvement from the top management and the project members, i.e., it became a ghost project.

Often IS development and implementation are punctuated by unexpected outcomes and side effects that require project managers to "muddle through" the entire development process [5]. However, in most cases, project development requires incremental adaptations [24] as project managers learn by trial and error and gathering further information. By breaking the cycle of escalation early, projects could avoid becoming "out of control" [5]. Likewise in the mistake chain, any of the events may suggest a window of opportunity to alter the failing course of action (i.e., mistakes) or unfreezing commitment to a previous failing course of action [43]. For example, if the decisions had been altered in both Events 3 and 4 to include a reevaluation of the new investment, the escalation cycle might have been broken early in the project. However, by failing to unfreeze commitment to previous failing course of action (i.e., mistakes), previous beliefs and attitudes may remain unchanged. Such beliefs and attitudes to previous failing course of action (mistakes) may even be reinforced that may contribute to project escalation [44].

The mistake chain identified in the case of BU is significant and includes attributes identified in many project escalation situations. The examples include "failure to provide negative feedback" [20] and "permitting the departure of both customer call center manager and assistant manager" [38]. The case findings suggest that it is easy for project groups to feel comfortable with the way things are progressing until alarming crises strike. In our case, three critical incidents occurred—the investigation by OFWAT, the dead fish, and the loss of key customers—each of which captured top management's immediate attention and triggered change. Projects may easily veer off track and drift. During the development process at BU, there was evidence of confusion or lack of information (failure to obtain complete understanding of the system) that troubled those involved. All of these mistakes were important in keeping the mistake sequence accelerating, and BU failed to call a "timeout" for clarifications. The ignored signals presented in the mistake chain illustrate continued escalation of events from a straightforward operating abnormality to a serious failure to manage multiple mistakes. Our findings confirm that multiple, conflicting objectives ought to be dealt with not by attending to them simultaneously but in sequence [7].

C. Intersections Between the Project-, Work-, and Environmental-Level Events May Trigger Both Escalation and De-Escalation Cycles

In this paper, we have argued that project- and work-level events unfold simultaneously in an organization and its environment, and influence materially the progress of the project. Our data analysis of the BU case supported this argument and suggests that the project-, work-, and environmental-level events unfolded synchronously and mostly independently during the project development process. Their necessary intersections triggered both the escalation and de-escalation cycles in the project. For instance, Event 4 at the work level offers some insights as to why the project was allowed to continue despite the emergence of negative information. The project was viewed by the organization as an immediate remedy for resolving the increasing customer complaints against BU's poor customer service. The previous call center manager had no other quick solution to resolve the problem and might have wrongly pinned all his hopes on the new queue removal system as he was emotionally bonded to the project. In addition, Event 14 at the work level sheds some light on why the de-escalation effort was sustained. The customer call center conducted a survey to assess call agents' feedback on the pilot system. The agents' comments were positive that helped significantly toward legitimizing the new course of action. The endorsement by the agents is crucial since, in the final phase of de-escalation, once an alternative course of action has been selected, managers need to assess the level of support from internal constituencies and not assume that the actors will necessarily follow [35]. Pan *et al.* [43] also suggest that in refreezing new attitudes and behavior, organizations should implement influence tactics to ensure "buy in"

and monitor the sustainability of the new belief. Therefore, in the case of BU, the positive survey results helped to strengthen project stakeholders' beliefs and confidence in the new course of action.

Similarly, our environmental analysis also offers insights as to why the project manager left the organization abruptly. Event 6 at the outer environmental level highlights that OFWAT had received complaints from the public about the poor customer service at BU. This led to OFWAT's investigation of BU. The project manager and the project champion might have been held responsible by the senior management for the poor customer service, and their departure could be viewed as an immediate response to the external pressure. This incident provided BU with an opportunity to reassess its project [20], [48]. As Montealegre and Keil [35, p. 433] suggest, it is not uncommon that outside pressure could force "a closer examination of the course of action." Nevertheless, in the case of BU, the organization failed to capitalize on this opportunity to reassess the project conditions. Event 14 at the environmental level also suggests that incidents in external context that were outside the remit of the project group, could lead to a significant impact on the project (i.e., abandonment). These so-called random environmental events could kill a project, and if they escalate over time, there is a greater risk that one or more will affect the project outcome.

The examples from the case of BU suggest that the necessary intersections of work-, project-, and environmental-level events are subtle but critical interplays between simultaneous processes and events. By positing that the project development process should be examined at multiple levels of social analysis (project, work, and environmental), we have introduced greater explanatory power and reconciled the contradictions in the separate processes of the organization [6]. Overall, this demonstrates that any process analysis has to carefully outline an influence and its direction at various points along the evolutionary path in order to show how the project constitutes and influences its context and vice versa.

VII. Implications and Conclusion

In this final section, based on our findings, we offer suggestions to stakeholders including senior managers, project leaders, customers, and researchers. These are summarized in Table VI.

A. Senior Managers

For *senior management*, we see their importance in supporting major information technology (IT) projects both initially when the system is chosen and the budget agreed, and later when important decisions and interventions have to be made. IS are always going to be a struggle to implement so they should not be undertaken lightly. Once you have chosen a system, that commitment is likely to last many years. Also where possible, the projects should be limited in duration. The longer they exist, the higher the risk of problems occurring or the technology becoming obsolete. From the senior manager's perspective, it is hardly surprising to learn that a project's budget and length are often wildly underestimated. In our case, both budget and time quickly escalated. However, what is not so obvious is the importance of understanding historical, antecedent conditions.

Other rationalities have to be chosen to begin a large, complex IS project if the company has a habit of failure in previous efforts (unless negative patterns can be broken by a deliberate intervention and punctuation). This also suggests that large projects should rarely be attempted using a *big bang* approach, but by dividing them into smaller, more manageable subprojects and assessing project capabilities, i.e., how different levels of systems can be punctuated synchronously. Ambitious, lengthy projects are inherently risky as they become increasingly victims of internal and external vicissitudes, drift, and punctuations both at the work system and the organizational level associated with such shocks as key personnel leaving, strategies changing, and new technologies appearing. Senior managers could also be circumspect as to how much change their organization can tolerate. Indeed, the evidence here suggests they need to think of large-scale ISD change as *speculative, risky, and experimental*. And while this applies in particular to large, bespoke systems, as in this case, "off-the-shelf" commoditized solutions such as enterprise resource planning (ERP) systems are not less immune from such problems [9]. For managers and users, our model illustrates that interactions with the project can be time-consuming and stressful. It is easy to get embroiled in complex software, hardware, and organizational issues: good managers should protect their staff from too much uncertainty, and allocate sufficient resources to enable learning about ISD change. Newman and Robey [37] noted that insurance claims staff were heroically struggling to cope with change, uncertainty, and failure. However, on the positive side, they also reported the considerable resources targeted at the claims personnel to ameliorate this problem (e.g., a model office, business analysts, etc.).

B. Project Leaders

Our research also shows that implementation is a complex process and that *project leaders* need to manage the process: looking for signs of stalling or delays and intervening accordingly. In our case, major problems occurred that were required the project leader to resolve. In some cases, it may be necessary to design strategies to encourage the project to proceed. Trajectories are path dependent and commitments made can become future constraints. However, the original project leader at BU was experiencing problems that were structural and not of his own making. If BU had recognized the real problem and fixed the billing system at the outset, the need for the queuing system may never have arisen.

Also, from the IS personnel perspective, the process model shows why early decisions can cause an escalation that later require "band aids." It seems wise to invest time and resources in these early decisions. Moreover, during the management of the project, critical issues can emerge some of which are within the control of project leaders while other, external events will arise that are beyond their control as in our case. So both proactive and reactive stances are needed, and these were both observed at BU. The model also reveals the possibility of *creating* change through launching critical incidents that can lead to

TABLE VI
IMPLICATIONS FOR STAKEHOLDERS

Stakeholder	Findings	Implications
Senior Managers	Events: The queuing project was held together by the Head of BU, who had relatively high political power over the continuance of the project. However, the project still escalated in time and budget. The project was allowed to drift after the project leader and call center manager resigned. Major losses were incurred as a result of abandoning the system.	Management of such projects should be active and decisive. If there is a delay in the project, senior management may have to design interventions to move the project forward or terminate the project as in this case and take a budget hit.
	Interpretation: Ultimately the queuing system was considered to be dispensable.	Not all systems are the same. In contrast to the queuing project, some are so critical to the organization that they cannot be abandoned or allowed to fail.
	Events: The company was hit with several unexpected and damaging events	Attend to the implications of crises in a timely fashion.
	Interpretation: BU was not well co-ordinated otherwise changing the billing format would have been fixed prior to the investment in the system.	Crucial issues (structures, management, design etc.) may have to be re-engineered before the new system is built.
Project leaders	Events: There were many complaints from angry customers. The call center manager and the project leader resigned in the middle of the project.	Failing projects can be damaging to careers of Project Leaders and others (e.g. champions, users).
	Events: the long call queues eased dramatically from June to August 2002 following the re-design of the bills. The fall in demand was totally unexpected and triggered a project reappraisal which eventually led to project abandonment.	Failure can become a pattern in future projects.
	Interpretation: Unexpected events are common and can lead to sudden project abandonment.	Mistake chains may be a useful tool for a Project Leader's understanding of unexpected events. They become warning signs that may not individually signal a major crisis but together indicate a need for further investigation and possible intervention.

TABLE VI (Continued.)
IMPLICATIONS FOR STAKEHOLDERS

Stakeholder	Findings	Implications
Customers	Events: Complaint to OFWAT. BU lost key customers.	Customers both large and small can have a major effect on companies. Organizations have to manage this relationship effectively.
	Interpretation: The queuing project was used to publicly demonstrate that the company was already working to improve its customer service, thereby presenting a positive image to the public.	This strategy has a limited "shelf-life". In the case of BU (and many other companies) the customers will not tolerate such poor service indefinitely.
Researchers	Factor v Process studies	Factor studies are a-historical, a-processual and a-contextual. They offer a big-picture, macro-level approach. Process studies tell the story of a particular project linking history, process and contexts to outcomes and operate at the micro-level.
	Serendipity	Unexpected events during projects are common and can arise internally (e.g. BU's bill re-design) or externally (e.g. sewerage outfall). These events are often unique and actors have to react to them.
	Separating work processes and project processes	Separating work and project processes shows how they mutually influence each other and more accurately depict the complexity of projects.
	Contexts	Unexpected and critical events arise from the contexts of a project (see serendipity).
	Historical patterning (antecedent conditions)	IS "form" or historical patterning is a crucial diagnostic tool for assessing risk. Without major interventions, patterns tend to be reproduced.
	Success and failure	By tracing history, process and contexts we can better describe outcomes of a project (e.g. success, failure or unknown). Success and failure become a pattern that will probably be reproduced in future projects and re-enforce historical form.
	Escalation and de-escalation	The current literature may be too simplistic. Escalation of commitment is best understood as a process. Systems vary in their importance. At BU the queuing system project was dispensable and was abandoned. In other cases (e.g. Newman and Robey, 1992) the system may be so vital that they may commit time and resources to make sure it does succeed.

punctuations. A project manager would do well to recognize when a project is lurching toward failure or getting mired in a dispute and try to unfreeze the process [37].

C. Customers

Customers both large and small can have a major effect on companies. In the case of BU, a regulated company, customer complaints led to an intervention from the regulator, OFWAT, a powerful government "quango." Additionally, BU lost two major customers that focused senior managers' minds on the problem even more sharply.

The queuing project was used to publicly demonstrate that the company was already working to improve its customer service, thereby presenting a positive image to the public. This strategy has a limited "shelf-life." In the case of BU (and many other companies), the customers will not tolerate such poor service indefinitely. Generally, organizations have to manage relationships with users effectively.

In summary, we recognize that many of the aforementioned findings and implications for stakeholders are not unique and much of the professional literature on project management is replete with such suggestions. For example, the Project Management Body of Knowledge (PMBoK) and the later International Project Management Association Competence Baseline (ICB) competence elements recognize, among other issues, context, success and failure criteria, risks, conflicts and crises, business processes, organizational learning, and the management of change. All of these elements would be considered central concepts in the IS literature. However, our approach-avoidance process model does add to our understanding of the *process* of project management and its implications for the various parties involved. For example, while both guidelines talk about project context and stakeholders, a process approach fleshes out what that means in a specific project and thereby what it might imply for other projects. At BU, the customers (both large and small) had a major impact on the company, and indirectly, the queuing system and the personnel involved. The process model shows the interplay between these unexpected and unrelated events (context) the project (the project leader's resignation and the project drifting) and the work system (the call center manager's exit). Furthermore, the process model shows the advantage of explicating the nature of the system being built, something hitherto underreported in the escalation literature. Not all systems are vital to a company as was the case at BU allowing senior managers to terminate the project.

However, for the rest of this section, we will concentrate on what the implications of our process model might be for IS researchers. The message for *researchers* is that empirical process models like the approach-avoidance model, while being labor-intensive and time-consuming, yield many insights absent from the more conventional *factor studies*. While factor studies tell us what variables may be related to outcomes, *process models* tell us how the story of implementation unfolds over time, linking history to outcomes and placing the story within the context of the organization and beyond. Carmel and Becker's work [4] is an example of a process model but it was specific to packaged software development and somewhat overspecified limiting its usefulness as a research framework for ISD projects. Factor studies often sample multiple projects in many organizations making them a-historical, a-processual, and a-contextual. For example, Tiwana and Keil [56] collected risk data about ISD projects from 60 IT managers. Hargrave and Johnson [16] surveyed 1500 systems developers finally obtaining a sample of $n = 150$ in their research into object-oriented systems development. The disadvantage of process models is that they can only examine a relatively few cases. In contrast, factor models can look for statistical associations across many cases, linking factors such as top management support, culture, resistance, etc., with measures of outcomes. But the two approaches (factor vs. process) have widely different ontological and epistemological assumptions. In contrast to the factor approach, top management support is treated in process studies as a process, not a variable. Such support is shown as an unfolding sequence of events (e.g., interventions) that can influence the development process, as in our BU case. In factor studies, such processes are reduced to cross-sectional variables, measured on a five-point Likert scale, for example, and because the sampling may involve many projects in many organizations, there is no common history or context. The explanatory power common to process studies cannot be derived from factor studies.

In the field of ISD, many events occur during the project process some of which will be planned and some *serendipitous*. Unexpected events during projects are common and can arise internally (e.g., BU's bill redesign) or externally (e.g., sewerage outfall). These events are often unique and actors have to react to them. Some critical issues related to ISD have been extensively discussed in the literature on organizational change, IS project implementation process, and IS success and failure. This research followed Lyytinen and Newman's [28], Newman and Zhu's [39], and Pan *et al.*'s [44] approaches that has shown through the use of a contemporary case studies, critical events that occurred along the project process can affect the stability (i.e., equilibrium) of the project process.

The process itself in the case of BU was identified as a sequence of events where the connections between a preceding event and its consequences were depicted. The interactions between the organizational *work process and project process* were also analyzed. For example, we show that a critical event on the organizational work level can generate a similar event at the build level, and vice versa. The idea of combining events both at the project system and work system level (i.e., a coevolution of both systems during process analysis) is something that hitherto has been mostly noted in passing. A notable exception is Orlikowski and Hofman's [40] study that distinguished between planned, emergent, and opportunity-driven change. Their emergent change concept is similar to incremental change in work systems; while planned/opportunity changes cover punctuations in work systems. Therefore, both planned and opportunity-driven changes imply the creation of plans, and thus, carry the idea of a separate project system. Orlikowski and Hofman [40] also recognize the critical role of capabilities and routines within the project system (they call it the system support) in enabling planned/opportunistic change. Their analysis

does not, however, offer any systematic way to analyze mechanisms that generate change at multiple levels—other than referring to organizational learning, nor do they analyze alternative scenarios how system use could proceed after different building system interventions.

Through our case study, several findings were generated. First of all, in line with previous empirical studies, the *project context*, including organizational context and external environmental context, was shown to play an essential role in the project implementation process. Process equilibrium can be seriously disturbed by the critical events that occurred in the implementation context. But this is hardly new. However, we found that the ability of the project team in dealing with unexpected events is vital in ensuring the stability of a project process. In contrast, drift can lead to chaotic behavior and delays as at BU. Unquestionably, the past project patterns or similar patterns from other system processes, as have been suggested in much literature, have significant impacts on the present project patterns. We have shown how negative patterns can be reproduced. However, when it comes to the case that critical events occur totally unexpectedly, such as a natural disaster like the sewage outfall, the knowledge generated from past project patterns or similar patterns from other systems may be of little use.

Overall, our process study provides rich insights into the *historical patterning* effects of success and failure, i.e., how behaviors and structures become reinforced by repetition [46] and how these patterns influence future outcomes. History does repeat itself sometimes many times, and organizations often get mired in patterns of failure [29]. Historical patterning also shows how a failed project outcome becomes the antecedent condition for any new building effort. At BU, abandoning the queuing system may have further implications for the company when they contemplate new project proposals. Failure can become an opportunity for learning or a cyclical pattern repeated many times [46]. This has parallels with other human activities including those of competitive sports, e.g., soccer or horse-racing or criminal trials, where actors use historical analyses to predict present or future performance. Likewise, in ISD change, an organization will have IS "form," or has made "irrevocable" commitments to technologies such as ERP systems, which together can render planned ISD change ineffective without a decisive intervention to establish new, positive trajectories [36].

Process research also provides further insights in understanding the *enigma of success and failure in ISD* and concepts such as *escalation* and *de-escalation* [22]. By linking history, process, and context, we can trace the trajectory of a project and show how the process is uniquely related to the outcome and how the various stakeholders can variously capture the rhetoric of success. For example, in a previous case [37], the project was delivered five years late and four times over budget but was still believed by the managers to be a success. This and other examples indicate that escalation or the commitment of resources to a failing project and the demand to de-escalate such systems, appear to be simplistic from a process perspective. Specifically, in the case of BU, the queuing system was revealed as nonessential to their future effectiveness. A relative cheap and simple redesign of the bills removed the queues and thereby the motivation for the system. Again, clearly this was not predicted by actors. In other cases, systems may be vital to the future of the company. In such cases, time and budget overruns might be escalating but they still needed the system: there is no escalation or de-escalation in the demand for the system and they cannot simply abandon it as they did at BU. Our analysis offers insights into the complexity of assessing ISD change success and failure. In particular, we need to reframe concepts of escalation and de-escalation [22].

Finally, we found it relatively straightforward to map the evidence on to the approach-avoidance model. We would recommend that other researchers, including Ph.D. candidates, consider similar approaches to research. More cases using a process approach will accumulate knowledge in this area. By following a similar research paradigm, the research community will develop rich data sets and theoretical understandings. They offer plausible descriptions and explanations of ISD phenomena and greater transparency of the process.

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