

**Managing innovations: A study of the implementation of Electronic Medical Records in
Dutch hospitals**

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Abstract

Innovation projects are prone to “escalation of commitment” (the tendency to continue projects even if it is clear that they will be unsuccessful). In this study, we introduce a construct measuring the Escalation Prevention Potential (EPP) of innovation projects as perceived by individuals in the organization. EPP consists of three components, (1) goals; (2) process; and (3) ability, to shield projects from escalation to commitment. A survey was conducted among 1,062 clinicians working in hospitals implementing Electronic Medical Records. The empirical results show that the three theoretical components of EPP sum up to a single measure. Four organizational characteristics of organizations (organizational routines, leadership reflexivity, employee involvement and support staff quality) explain a large share of the variation in EPP.

Keywords: innovation; escalation prevention potential; escalation of commitment; Electronic Medical Records

INTRODUCTION

This study investigates Escalation Prevention Potential (EPP) as the ability of an organization to stop or steer unsuccessful innovation projects. Theoretically, EPP is rooted in the literature about “escalation of commitment”, which focuses on the tendency to continue projects even if they are unsuccessful (Staw, 1976, Sleesman et al., 2012). Research shows that escalation is caused by several determinants at different levels of analyses (project, psychological, social, and structural) (Ross & Staw, 1993) and is explained by multiple theoretical mechanisms (e.g. subjective expected utility, self-justification, framing, goal-substitution, self-presentation, and agency problems) (Sleesman et al., 2012). Basically, this literature challenges rational models of project management (Cooper & Zmud, 1990), as it shows that many innovation projects do not reach their intended outcomes.

In this article we propose that the more EPP organizations have, the better they are equipped to steer projects and to abandon them if they turn out to be unsuccessful. To date, most of the research focuses on what may be called the negative side of escalation of commitment, namely the list of studies aimed at understanding why projects fail (Brockner, 1992; Keil & Robey, 1999; Ku, 2008; Montealagre & Keil, 2000; Pan, Pan, & Newman, 2009; Ross & Staw, 1993; Schulz-Hardt, Thurow-Kröning, & Frey, 2009; Simonson & Staw, 1992; Staw, 1976). Far less attention is paid to the other side of the process, namely the factors that prevent escalation behavior. In other words, from previous studies we know a lot about *why* escalation takes place, but far less is known about *how* to stop it. Furthermore, studies that do focus on the question how escalation may be prevented (Keil & Robey, 1999; Montealagre & Keil, 2000; Pan et al., 2009; Pan & Pan, 2011) have a limited scope as they either focus on a *specific kind of action* to prevent escalation, only focus on its *project and psychological determinants* and rely either on

experiments or a *qualitative case study* (which may limit their generalizability). The present study broadens the existing view on escalation prevention by looking at *general mechanisms* underlying EPP, by also including *social* and *structural determinants* (Sleesman et al., 2012) and by developing a *survey* instrument to assess the level of EPP of an organization (which can also be applied across different kinds of organization).

We test our model of EPP in a specific kind of organization and focus on one particular kind of innovation. The study is conducted in healthcare organizations. As in other organizations, healthcare organizations implement new technologies to increase efficiency and customer satisfaction. We focus on the introduction of Electronic Medical Records (EMRs), which serves as an example for innovations in general. EMRs are IT tools to store patient information and enable the exchange of information among health care professionals within hospitals, assist professionals in decision making and can improve patient safety. While EMRs explicitly aim at improving the work performance in healthcare organizations, it turns out that it does not do so automatically. In the Netherlands, where this study was conducted, doctors and nurses are not forced to use EMRs. This means that hospitals have a lot of freedom in applying EMRs, both in the sense of whether they use them and how they use them. As a result, EMR use varies among hospitals in the Netherlands. Studies on implementation of EMRs show that it is difficult to determine the objective added value of working with EMRs and that resistance of users or other barriers reduce the potential benefits of using an EMR in hospital care (Chaudoir, Dugan & Barr, 2013; Greenhalgh et al., 2004; Grol, Bosch, Hulscher, Eccles & Wensing, 2007). This implies that a purely rational models of technological innovation, according to which innovations by definition have added value to all stakeholders in an organization and that do not regard change process as a part of a larger social system that need continuous attention do not suffice to

understand successful innovation.

The present study develops and tests a survey instrument providing an overall indicator of an organization's escalation prevention potential. Having such an instrument allows comparing EPP between individuals and organizations. And, ultimately, it can be used as a diagnostic tool. To do so, we developed a measurement scale and investigate whether the proposed building blocks measure the EPP construct. The empirical part of this study relies on survey data that were gathered among 1,062 respondents (doctors and nurses) of a random sample of hospitals in the Netherlands.

THEORY

Escalation prevention potential

The *escalation prevention potential (EPP)* construct refers to the mechanisms that organizations possess to steer or stop a project. This construct is based on the de-escalation activities and conditions suggested in earlier studies (see for example Pan & Pan, 2011). However, while in this previous work only a list of possible de-escalation activities was presented, we take the next step by conceptualizing them and analyzing them at a more abstract level. We propose that there are three general mechanisms shielding projects from escalating, which are termed (1) goals, (2) process, and (3) abilities. A basic assumption of the proposed model is that the level of EPP is higher if these mechanisms are in place. And, if they are aligned, they may be even more successful to prevent escalation. This assumption closely follows the idea that organizational policies are more effective if they are internally consistent, as it signals a clear message to members of the organization (Huselid, 1995; Koster, 2011). What is more, the management of an organization with a higher level of EPP allows for feedback on their performance, as innovation

projects are more transparent to the whole organizations. Hence, it is assumed that the more transparency they instill in these projects on all three aspects, the more EPP they have.

Goals

Innovation projects are characterized by outcome uncertainty (Eisenhardt, 1989). In response to outcome uncertainty, decision makers (and others involved in the project) may try to find means to justify what they are doing and why they do it. Hence, outcome uncertainty paves the way for sunk cost issues, self-justification and agency problems (Whyte, 1986; Shapiro, 2005). According to Nilakant and Rao (1994) there are several ways to reduce outcome uncertainty. Stating clear goals at the start of a project and formulating measurable success factors at the beginning of it, lead to a reduction of outcome uncertainty as it defines the direction of the project and how it can be assessed whether it develops as preferred. Or the other way around, projects lacking clearly stated goals and success factors are more likely to escalate as participants may look for other means to justify their actions. If the purpose of the innovation project is unclear and no success factors are formulated, projects may go on without intervention because there is no reason for it (Satyashankar, Rinkoo & Somu, 2007).

Process

Escalation of commitment is a dynamic process through which projects become gradually entrapped (Ross & Staw, 1993). This is allowed to happen if there are no clear guiding lines and if the progress of the project is not monitored. Breaking up the project in smaller parts makes it easier for participants to intervene in the process and adjust or stop a project that is heading in an undesired direction (Pich, Loch & De Meyer, 2002). This can be done by defining projects in

terms of sub-projects and by having regular meetings in which the progress of the project is evaluated. Piecing projects into smaller parts reduces the influence of some of the escalation determinants (Sleesman et al., 2012), such as sunk cost problems (as the amount of resources that are already used remains limited), self-justification (as there is more information about the actual success of the project), embarrassment (because decision can be justified by referring to external rules), and agency problems are detected in an early stage of the project. Again, to put it the other way around: projects that lack predefined phases and that are not regularly evaluated, are more likely to escalate.

Ability

Finally, the skills of the project members and the clarity of the tasks they perform matter for instilling EPP (Pant & Baroudi, 2008). Project management is demanding in the sense that it asks a lot of the information processing capabilities of project participants in order to make informed decisions about the project. Hence, projects benefit if people with the right qualifications participate in them. Furthermore, according to the “responsibility effect” (Schulz-Hardt et al., 2009), projects can escalate because a small group of individuals is responsible for it. This is reinforced if the ones starting the project are also the ones responsible for the implementation and success of the project (Simonson & Staw, 1992). A clear distribution of tasks (planning, implementation, and performance) among a larger number of participants can reduce these tendencies (Katz & Allen, 1985). In combination with ensuring that participants possess the necessary knowledge and capabilities to manage and fulfill the project (Yang, 2014), clear tasks can contribute to the de-escalation capacity of an organization. The escalation prevention mechanism “ability” reduces the risk that a small group of people becomes too much involved

and dependent upon the project, while a large share of the organizational members are not involved at all. For example, by also including skeptics in the team (Pan & Pan, 2011), the likelihood of self-justification decreases.

Determinants of escalation prevention potential

The core theoretical explanations of escalation of commitment (Brockner, 1992; Sleesman et al., 2012) provide the basis for defining and measuring the perception of the escalation prevention potential of organizations and offer suggestions regarding its determinants. The extent to which organizations are able to develop and maintain the three components of escalation prevention according to its members depends on other characteristics of the organization. It is assumed that the perception of an organization's escalation prevention potential depends on the availability of means to reduce outcome uncertainty, a focus on improving decision making, actions that encourage a shared understanding and that lead to a less stronger connection between persons and projects. In a recent overview, Boonstra et al. (2014) show that there are several context, content and process factors contributing to its successful implementation. Following that study, we conclude that the process of EMR implementation should be treated as a innovation project that is led by implementers or change managers and that the quality of change management is important in the success of such a project. In addition to that, Greenhalgh et al. (2009) find that realistic evaluation of goals and preliminary goals during the implementation process can be a valuable source of information for those involved. Periodic and realistic evaluation can provide valuable lessons on how certain preconditions make anticipated outcomes more likely. The present study focuses on four of these contextual factors and preconditions of innovation projects.

Routines

Organizations have different ways of dealing with changes and innovation processes.

Organizational routines (patterns of behavior, action, or interactions) provide stability in the course of organizational change (Feldman, 2000). These routines can contribute to the performance of organizations in different ways, for example through the reduction of outcome uncertainty (Becker, 2004), by decreasing the need for gathering information or by gathering more information to improve decision making capacity (March & Simon, 1958).

With regard to decreasing the need for information, organizational routines can refer to certain rules, like standard operating procedures (Cyert & March, 1963) and programs (Simon, 1977), prescribing how organization members ought to behave in certain situations. A consequence of such standard procedures is that it is not necessary to consider every new project completely, but that parts of it may be organized in a similar (and effective) way. This kind of stability is likely to decrease the uncertainty associated with new projects and hence minimize chances of excessive risk taking and agency problems, given that organizational routines and rules can function as effective coordination and control mechanisms (Becker, 2004), which in turn can be strong mechanism in dealing with agency problems in organizations (Eisenhardt, 1989).

In addition to minimizing the need to search for new information, organizations can possess learning routines (March, 1991), providing stability to the organization and hence reduce outcome uncertainty. Organizational learning means that organizations adapt their routines gradually based on past performance. Hence, if organizations have more experience with implementing new technology, if they are willing to take negative feedback seriously and are able to experiment with new rules to further improve performance, the introduction of each new

technology project becomes easier as project members can rely on existing rules. Since learning routines are not held by individuals, but are part of the repertoire of aggregates like teams and even the whole organization (Becker, 2004), their presence are a strong counterbalance to self-justification mechanisms in organizations. Based on these arguments, the first hypothesis states the following relationship between organizational routines and an organization's escalation prevention potential.

Hypothesis 1. Organizational routines contribute to the perception of escalation prevention potential of organizations.

Authentic leadership

Authentic leadership (Avolio & Gardner, 2005) refers to the extent to which managers allow themselves to have a critical look at their own functioning and performance. Hence, this kind of reflexivity means that managers are actively involved in gathering information from project participants, acknowledging their own failures and are open to suggestions.

A reflexive attitude of organizational leaders establishes additional mechanisms that contribute to the potential of an organization to prevent escalation. Most and for all, authentic leaders generate their own critics and skeptics, rather than constituting a close circle of yes-sayers that do not dare or wish to critically approach the management of their organization (Prusak, 1997). Authentic leadership thus counterbalances many of the escalation determinants. In the presence of authentic leadership, self-justification and self-presentation are difficult to sustain as it forces organization leaders to come to terms with themselves rather than keeping up an image for the outside world (Sleesman, et al. 2008). By critically considering their own performance,

the management of the organization ensures that they actively aim for de-escalation of their projects. Hence, the second hypothesis reads as follows.

Hypothesis 2. Authentic leadership is positively related to the perception of escalation prevention potential of organizations.

Employee involvement

Escalation of commitment is more likely if there is a strong divide between organizational members who are involved in the innovation project and those who are not. If only a small fraction of the organization is engaged in a project, while the rest of the people in the organization remain rather distant, self-justification, self-presentation and agency problems will lead to escalation of commitment more easily compared to projects in which more organization members are involved and feel responsible for its success. In that regard, it can be expected that organizations in which projects are carried out and managed by a small group of participants leads to neglect among the majority of the organizations or even exit among those who dislike the project altogether (Farrell, 1983). While projects that are managed in such a way can be more efficient, they are less effective if they lead to escalation of commitment.

Creating voice within an organization increases its de-escalation potential. Expanding the project and involving more organization members (for example, starting with those who are affected most by the innovation), has the potential to turn neglect into voice and loyalty through increased efficacy (Withey & Cooper, 1989). Obviously, in many instances voice may be seen as a pain and part of the complaints about projects results from a resistance to change instead of constructive comments and critical reflection (Oreg, 2003). However, if employees are not

consulted in the innovation process, there will still be resistance to change, but it is simply not heard (and can therefore be neglected by the leaders of the project). Employee involvement itself can even be a means of taking away a lot of the resistance among employees. Thus it can lead to more loyalty to the project, at least compared to the situation in which employees do not have the feeling that their opinions matter. Management techniques like Total Quality Management, for example, heavily rely on employee involvement (Lawler, 1994).

As is the case with authentic leadership, employee involvement means that projects get criticized, providing a strong counterbalance to self-justification and self-presentation forces. Agency problems are reduced because those leading the project are less able to only work on their own behalf since they need to incorporate the needs and interests of other members of the organization as well. Finally, employee involvement contributes to the outcome of the project. Provided that the success of many projects depends on whether employees apply certain techniques, taking their opinions into account at an early stage ensures that projects are legitimized. Given these considerations, it is hypothesized that employee involvement is an important precondition of an organization's de-escalation potential.

Hypothesis 3. Employee involvement is positively related to the perception of escalation prevention potential of organizations.

Support staff quality

Information processing and quality of decision-making are means to prevent escalation of commitment. Support staff plays a crucial role in facilitating the users of new technologies (Blank & Valdmanis, 2013; Struik et al., 2014). In organizations where the human resource

department manages to attract, attain and develop necessary personnel, where the information and communication technology manages to develop and sustain well-functioning computer and software systems and where administrative processes run smoothly thanks to the administrative department, the escalation prevention potential is expected to be higher than in organizations lacking such support (Ahire, 1997). A major reason for this is that each of the three components of the escalation prevention potential construct suffers if the support staff is functioning suboptimal. The required information to monitor goals and success of the project will not be delivered in time or is of inferior quality. The process will be hard to manage if the organization's own administration is not up to date. And, having a knowledgeable workforce presumes a HR department that is able to find the right people for the project (Abraham, Crawford & Fisher, 1999).

Not having the right information in time undermines effective decision-making, which in turn makes projects susceptible for escalation. The information to decide to move into another direction or to dismantle the project may simply be not available. Therefore, the escalation prevention potential of organizations is expected to be higher if the support departments are capable.

Hypothesis 4. Support staff quality is positively related to the perception of escalation prevention potential of organizations.

[Figure 1 about here]

Figure 1 presents the conceptual model linking escalation prevention to its four hypothesized

determinants.

METHODS

Sample and data collection

The data for this research were collected using a questionnaire. This questionnaire enables to gather information across a large number of respondents located at different hospitals. Hence, the questionnaire intends to cover the variation in EPP as much as possible. In this study, we focus on a specific issue regarding the use of EMRs. As noted in the introduction, researchers have shown that hospitals are slow in adopting EMRs. This may result from the preferences and attitudes of the persons who have to work with the EMRs on a daily basis. Therefore, instead of aiming the survey at administrators (who are the key initiators of EMRs in hospitals), the survey was held among doctors and nurses.

An on-line questionnaire was sent to 2.000 doctors and 3.623 nurses who participated in existing panels. Via email they were asked to fill in an on-line questionnaire. The questionnaire contained items measuring the constructs of the theoretical model, questions on personal information, and basics information about the work situation. The nurses received an email with an invitation to fill in the same on-line questionnaire as the doctors. Participants were selected if they worked in hospitals where the implementation of an EMR took place at time of the data collection. The respondents could access the questionnaire via the Internet, where it was published by an external research agency. When respondents completed the questionnaire, they received a small monetary reward (the doctors received cash and the nurses received a voucher that they could spend on items or gifts through the research agency). No reminders were sent.

Measures

Escalation prevention potential

The three escalation prevention measures are operationalized by a series of questions about how the organization deals with projects concerning the introduction of new technologies. For each of the three sub-mechanisms, questions are asked reflecting the mechanisms defined in the theory about the escalation prevention potential of organizations. All questions are measured on a five point Likert scale (1 = completely disagree and 5 = completely agree). For the selection procedure of these items, see the factor analysis below.

Goals are measured with the items asking whether new information technology projects in the organization have a clearly defined aim, whether success factors are formulated and if there are measurable goals.

Process. Regarding the process of new IT projects it is asked whether such projects consist of predefined stages and whether the project is regularly evaluated.

Ability. The two items measuring how new IT projects are organized ask whether responsibilities are clearly defined and whether the project participants have sufficient knowledge.

Determinants of escalation prevention potential

The 4 determinants of escalation prevention that were hypothesized in the theoretical model are operationalized as follows. These variables are also measured on a five point Likert scale.

Routines. Two items are used to measure whether the organization possesses certain routines if new technology is implemented. The items reflect opinions about the following statements. *Standardized procedures* are measured by asking respondents whether a standard

procedure is used when new technologies are introduced. The variable *Learning routines* is measured by asking respondents whether the organization learns from past mistakes.

Authentic leadership. Respondents are asked to score the level of authenticity of their leaders with the following 8 items: improving communication, analyzing relevant information before making a decision, providing performance feedback to individuals, acknowledging own mistakes, taking different points of view into consideration before arriving at a conclusion, knowing when to reassess points of view and encouraging voice and support employees.

Employee involvement. A scale with 4 items is used to measure the extent to which organizational member can influence decisions. This scale asks respondents about the way in which a technological device was introduced. The items ask about whether respondents had a say in the process, if they were consulted about their needs to improve performance, to what extent they could voice their opinions about the new device, and whether they could make suggestion for improvement during the process.

Support staff quality. Respondents are asked to rate the quality of the HR department, the IT department and the administrative department with a set of similar items. *HR department quality.* The quality of the human resource department is indicated with a scale consisting of 3 items about training related to the new technological device, the extent to which the HR department listens to the needs of the respondents, and whether the department has sufficient resources to provide training. *ICT department quality.* Three items are used to measure the quality of support staff responsible for the functioning of information and communication technology within the organization based on the experiences with the introduction of the new technological device. Questions are asked about the adequacy of responses, whether the department has sufficient knowledge and expertise, and the departments' knowledge about

adjusting the device to the needs of the respondent. *Administrative department quality*. The quality of this department is assessed with three items measuring the adequacy of responses, whether the department has sufficient knowledge and expertise, and their knowledge about adjusting the device to the needs of the respondent.

The dependent variable is constructed based on our theoretical ideas. A pilot was conducted by discussing the items five nurses and two doctors. The resulting items are the first effort to measure EPP quantitatively. The independent variables are based on existing measures, which means that they have been validated in earlier research. Table 1 summarizes the core concepts, along with the individual items, and the sources from which they are drawn.

[Table 1 about here]

Control variables

To take into account that responses can be affected by background variables of the respondents, a number of control variables are added to the analysis. The control variables are *gender* (0 = male and 1 = female), *age*, *position* (0 = doctor; 1 = nurse) and *level of implementation*. The level of implementation is based on answers of respondents about how computerized the EMR in their hospital is (or whether it is partly administrated on paper). The score is higher for respondents working with a completely computerized EMR. If the complete EMR was reported to be in one system, the score on this variable is higher and if the EMR functioned in multiple systems, the score is lower. And when the data of the nurses were visible for physicians and vice versa, the score of implementation level is higher.

Data analysis

Factor analysis and reliability analysis. The first part of the analysis (Kim & Mueller, 1978) aims at investigating whether the proposed conceptualization of de-escalation prevention potential is corroborated by the data. To find out whether the three components of the theoretical construct (goals, process, and ability) actually form a single dimension and add up to a measurement scale, the underlying items are analyzed using factor analysis. The exploratory factor analysis revealed that 7 of the 9 items load on a single factor. The two items that did not load on this factor are: “When a technological change is implemented many people benefit from its success” and “Stopping the process is seen as a personal letdown”. These outcomes lead to the conclusion that these items do not reflect EPP as was expected. Hence, these two items are dropped from the analyses. Besides that, a factor analysis is conducted with all constructs of the theoretical model (see below for the outcomes). Finally, we performed a reliability analysis per scale to check for the internal consistency of the items.

Regression analysis. The second research question is which factors are associated with an organization’s escalation prevention potential. An ordinary least squares (OLS) regression analysis (Fox, 1991) is performed with escalation prevention potential as the dependent variable and the four proposed determinants (routines, authentic leadership, employee involvement, and support staff quality) as well as the control variables as the independent variables. As mentioned above, Dutch hospitals have considerable leeway in adopting EMRs. As a result, the level of implementation of EMRs varies between hospitals. Measurement between the hospitals is likely to yield sufficient variation in regression analyses of both dependent and independent variables to be able to find associations.

RESULTS

Response and sample characteristics

474 Doctors replied and 699 nurses returned the questionnaires (response rates of 24% and 19%, respectively). Of the doctors, 72% is male and 28% is female. 94% of the doctors is specialist, 4.5% was resident, and 1.5% was specialist-assistant not in training. Of the respondent, 24% reported to be working in an academic hospital, 71% in a general hospital, 1% and 3% in other types (specialized or private). The mean age of the 474 doctors in our study is 49.2 years (SD = 10.10), which corresponds with the average age of Dutch population of male physicians (48.4 years)¹. The mean age for female physicians is a little higher in our study, namely 44.1 (SD = 8.2) compared to 40.2 in Dutch population of female physicians¹. In this study more male physicians that responded to the survey compared to the overall physicians' population of 2012 (National 50-50% male/female physicians; our sample 71% male and 29% female)¹.

Of the nurses, 20% is male and 80% female, (The national average: 15% male and 85% female¹). The mean age of the total group of nurses is 43.8 years. The mean age of the male nurses is 48.9 years (SD = 10.5). The mean age of male nurses in the Netherlands was 48.6 in 2012¹. The mean age of female nurses is 42.6 years (SD = 11.5), compared to 44.0 years in the Netherlands in 2012. 17% of the nurses reported to work in an academic hospital, 22% in a top-clinical hospital, 50% in a general hospital, 3% in a specialized hospital, 7% in a mental hospital, and 1% in a private hospital. In the Netherlands, 8 of 85 hospitals are academic (9.4%), and 90.6% are general or specialized¹. This means that nurses and doctors from academic hospitals are overrepresented in the sample, which is due to the fact that academic hospitals in the Netherlands precede the other hospitals in implementation of EMRs. Due to item non-response

and respondents indicating to work on paper patient files, 1062 respondents were included in the analyses, 626 nurses and 436 doctors. To investigate whether the non-response influenced the outcomes, we performed the following analyses. A marker variable was constructed for early-responders and late-responders. The population was cut in two, based on the median response-date (e.g. half of the population responded before that date and half of the population responded after that date). Including this variable in the regression model did not change the results and the variable itself was not significantly related to EPP. Subsequently, we tested all variables included in the regression model by comparing the mean values of the early-responders and the late-responders. ANOVA analysis and T-test showed no statistically significant results. These analyses lead to the conclusion that the time of response did not affect the outcomes.

Factor analysis and correlations between the scales

[Table 2 about here]

Table 2 presents the results of the factor analyses and reports the Cronbach's alpha of each measurement scale. The factor analysis shows that the theoretical constructs in the research model (evaluation prevention potential, authentic leadership, employee involvement, and support staff quality) refer to different measures. Looking at table 2, all items that were included in the analyses belong to 1 particular dimension (the items measuring EPP belong together, the items measuring authentic leadership belong together, and so forth) and are not (or only weakly) related to the other dimensions. This outcome shows the strength of the measures that were validated in earlier research (such as authentic leadership and employee involvement) and that EPP forms a

measurement construct that differs from these existing measures. Furthermore, table 2 shows that these measures form reliable scales. Cronbach's alpha ranges from 0.88 for escalation prevention potential to 0.93 for the scale measuring the quality of the administrative department.

Table 3 presents the descriptive statistics and the correlation coefficients of the variables. Constructs 1 to 8 represent the variables presented in the theoretical model. On average, the level of EPP is somewhat above the theoretical mean ($m = 3.32$) and varies across hospitals ($sd = 0.69$). Furthermore, it is noteworthy that all means are above 3 except employee involvement. Also for these variables it holds that they vary across hospitals.

The correlation coefficients show that the dependent variable (EPP) is related to the other constructs ($r = 0.48$ or higher). Besides that, some of the independent are strongly related. Of the correlations between the independent variables, two may be problematically high: 0.70 of quality of IT staff and quality of administrative staff 0.62 between routines and authentic leadership. To account for this, we examined whether multicollinearity is problematic using the variation inflation factor (Fox, 1991) and assess alternative model specifications. The results of the analyses are reported in the next section.

[Table 3 about here]

Analyses of the determinants of escalation prevention potential

The factor analysis and the reliability analysis show that the three components of an organization's escalation prevention potential indeed sum up to a single dimension. Next, it is investigated how the capacity to prevent escalation of commitment relates to the four determinants, while accounting for other background variables. The results are reported in Table

4.

[Table 4 about here]

To start with the control variables, Table 4 shows that age and tenure are not significantly related to perceptions of the escalation prevention potential ($b = 0.00$). The effect of gender is positive, but not significant. The control variable “job” shows that nurses report a higher escalation prevention potential to their organization than doctors do. However, it should be noted that this variable explains only 1 percent of the variation in escalation prevention potential. The control variable level of implementation is negative but not significant.

Turning to the four factors that are hypothesized to be associated with the escalation prevention potential of an organization, the following results stand out. First, the four organizational characteristics explain 57 percent of the variation in an organization’s escalation prevention potential. All four hypotheses are supported by the regression analysis: apart from the quality of the administrative department, each of these factors is significantly associated with the escalation prevention potential of the organization. The variance inflation factor of each variable is computed to test for multicollinearity. These results show that all VIFs are lower than 2.5, meaning that there is no reason to believe that outcomes are the result of multicollinearity between the variables. To be sure that the strong correlations did not affect the outcomes, we also conducted separate analyses for each of the variables. These additional analyses lead to the same outcomes. Finally, looking at the standardized coefficients in Table 4, authentic leadership is the main predictor of EPP ($\beta = 0.30$).

Based on these results, it is concluded that hypotheses 1 through 3 are fully supported by

the data and hypothesis 4 is supported for quality of the HR and ICT department, but not for the administrative department. With regard to the latter department, hypothesis 4 is rejected.

CONCLUSION AND DISCUSSION

Conclusion

In this study, we investigate the management of new technologies. The literature on escalation of commitment provided the theoretical lens to identify important characteristics of innovation projects. Based on this literature, this study develops the concept of escalation prevention potential, provides a measurement instrument and investigates how it relates to other factors. To test these theoretical ideas, a survey was held among doctors and nurses using EMRs. The empirical results of the study are in line with the theoretical expectations. There is a single dimension of escalation prevention potential and this dimension is strongly related to the four factors. The only exception is that the quality of the administrative department is not related to escalation prevention potential.

Theoretical implications

This study contributes to existing theories of escalation and de-escalation in five ways. First, while a large share of the literature focuses on determinants of escalation, the present study examines what organizations can do to manage their escalation prevention potential rather than investigating the dynamics of escalation. Secondly, it offers a theory-guided measure of the escalation prevention potential that consists of three components and thus shows that it is possible to integrate these different activities and conceptualize them under the heading of a more general notion of de-escalation potential of organizations. Thirdly, this study shows that

escalation prevention potential consists of different activities. While prior studies that list several of these activities do not distinguish between activities contributing to actual and the determinants enhancing the escalation prevention potential (e.g. Pan & Pan, 2011), the present study shows that it is worthwhile to make such a distinction. Fourthly, this study included social and structural factors to investigate their relationship with the escalation prevention potential of organizations. The empirical results emphasize the value of including these social contextual factors in understanding escalation and de-escalation. Fifth, this study contributes to leadership studies. Leadership research is largely concerned with the question how certain leadership styles affect the behavior of employees. The question how a authentic leadership style can contribute to the functioning of projects is largely ignored in the literature.

Another contribution that this study offers concerns the measurement of EPP. While it was tested in a specific setting (hospitals) and focuses on a specific kind of project (IT project and more specifically the use of EMRs), the measures are formulated in general terms, meaning that it should be possible to apply them to other kinds of projects and in other kinds of organizations. The simplest way of doing that is changing the introductory text: “New IT projects in this hospital...” and formulating this in such a way that it matches the research question. Researchers are encouraged to use these measures and apply them in different organizations and investigate different kinds of projects. Doing that would say more about the value of this measure.

Practical implications

The outcomes of this study have practical implication for managing innovation projects. Reading escalation studies may make someone pessimistic about the possibility to prevent escalation.

Somewhere in the background of escalation research, it looks as if the main message is that projects are bound to grow beyond the control of decision-makers. What the present study shows is that such forces may be managed by organizations if they follow a number of principles.

The first three principles relate to how projects are organized. Clearly defining and stating the goals of the project, dividing the project into different parts, and guaranteeing the responsibilities and capabilities of the project participants are of major concern here. Projects that do not apply these principles face the risk of failing due to escalation dynamics. Paying attention to goals, processes, and abilities simultaneously enhance the escalation preventing potential of organizations.

Whether organizations manage to get these three components in place depends on other factors. Both the stability of the organization and the ability to learn contribute to its escalation prevention potential. It may therefore be necessary conditions for managing projects and the results of this study have consequences for how organizations can deal with projects. First, it emphasizes the importance of gradually developing the ways in which projects are handled by the organization. Evaluating past projects and using these experiences in new projects guarantees a step-by-step improvement of projects. Secondly, there is also a strong need for ongoing criticism and even skepticism, both by from the management of the organization and the employees of the organization, during the course of the projects to keep it on track. Hence, organizations should encourage and even reward self-criticism and even stimulate whistle-blowing as they increase its escalation prevention potential. Support staff plays an essential role here given its ability to gather the information required for feedback.

For organizations, the challenge is how to ensure that the three components of EPP are in place. Some advice can be distilled from this research. The first thing that organizations can do is

taking the measure of EPP and use it as a diagnostic tool. With every new project they are advised to ask questions like: Do our projects have clear aims? Are the responsibilities of the participant formulated clear enough? If they can answer the questions positively, their EPP is in place. If they do not pass this EPP-test, they should try to fix it. And, ultimately, if they realize that it is not possible to have a high level of EPP, they may question whether they should start a new project at all.

The beta weights in the model indicate that authentic leadership is relatively important in the EPP in organisations. Managers who implement measures that increase the EPP of their organizations have made themselves vulnerable to a certain extent since the goals of their project are clearly defined and monitored. The existence of these goals and evaluations of processes enables employees to control the performance of their management. However, it may be the best way to introduce transparency in the organization, to activate and involve all employees in an organization in realizing its organizational goals. By working according to the principles of EPP, management moves towards a model of rational management, because it acknowledges the dangers related to escalation of commitment, for instance group think, readjusting goals during the project or denying responsibilities when the project has failed. Management that has equipped their organization with more EPP acknowledges that they are part of the social system in their organization. By explicating the goals and sub goals, a potential gap between current processes and needed processes becomes more apparent, and consequent necessary skills and resources (i.e. becomes) clearer. Then management can evaluate which ability is present in the organisation and which abilities need to be acquired to realize the goals. They are likely to be better connected to their organization and are therefore better able to successfully manage their organization. By acknowledging the social dynamics also exist in management, they are able to enforce the

rationality in their decisions during (implementation) projects. By this, they potentially de-escalate commitment and prevent excessive failure of implementation processes.

Discussion

While the study provides insights about what EPP is and how organizations can facilitate it, it also has several restrictions that should be taken into account. Focusing on a specific innovation (the implementation of EMRs) enables comparison across healthcare organizations, but the downside is that the outcomes are restricted to a specific kind of organizations. Besides that, the focus is on developing the construct of EPP and its determinants and less on its outcomes. As a result, we do not know whether and how EPP contributes to de-escalation in organizations.

Another point worth mentioning is that EPP is investigated using a questionnaire, which has strengths, but also some weaknesses. One of the main weaknesses is that the answers represent the perceptions of doctors and nurses, besides that actual level of EPP. Finally, some issues could not be investigated in this study due to limited time and length of the questionnaire. Following from these restrictions, a number of questions should be addressed in future studies.

First, a major question concerns the validity of EPP across other types of organizations and innovation projects. Scholars are encouraged to apply the instrument developed in this article in other kinds of organizations and other kind of projects. The second question is how EPP relates to actual prevention of escalation and other outcomes, like quality of the innovation and organizational performance. While some work has been done in that direction (Lambooij & Koster, 2016) additional work is needed. Thirdly, the question is how the perceptions of EPP relate to actual EPP. Comparing objective and subjective measures would further deepen our understanding of the concept. Then, finally, there are different routes for future studies. For

example, which is not touched upon here, but would require further investigation are issues of privacy and security in IT systems like EMRs (Cremonini et al., 2005; Korte & Koster, 2016). And, with regard to the factors influencing EPP, it is worthwhile to focus on solutions such as the business rules approach (Cisternino et al., 2009) and how competency management influences the knowledge process within project teams (Ceravolo, Corallo & Elia, 2008). Finally, an issue that was not investigated here relates to the size of the project team. In theory, two opposing mechanisms can be at work here. While large project teams may be harder to steer and stop than small ones, it is likely that larger teams have fewer difficulties to fulfill the aspects of EPP. Smaller project teams may be more flexible, but for them it may be more difficult to have all EPP components in place. To figure out how EPP relates to size of the project team, additional work is needed. If these points are addressed, we know more about the use of EPP and its performance effects.

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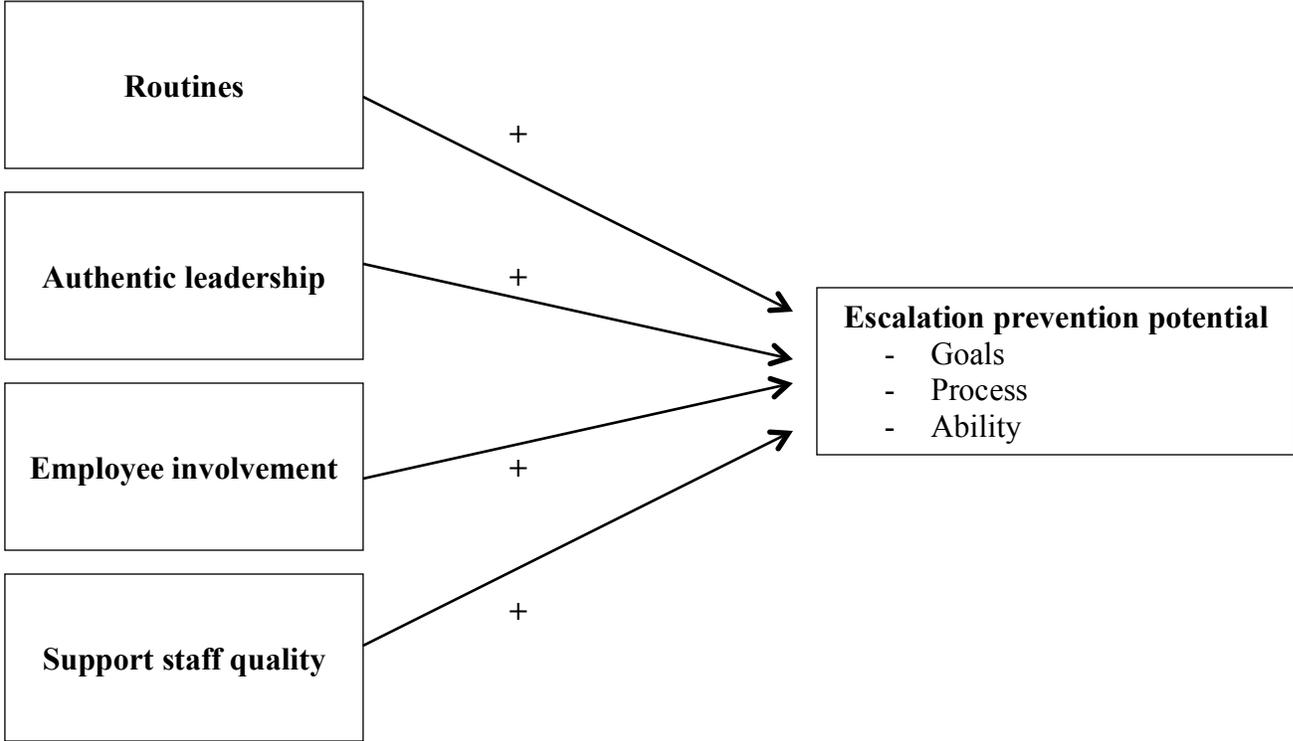
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Notes

1. CBS StatLine - Medically qualified, employment status, position in employment, by occupation. Retrieved from <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=81551NED&D1=0,2,9,14,19-20&D2=1-2&D3=1-10&D4=4,65&D5=1&HDR=T&STB=G3,G1,G4,G2&VW=T>
2. Information retrieved from <http://www.zorgatlas.nl/zorg/ziekenhuiszorg/algemene-en-academische-ziekenhuizen/aanbod/>

Figures

Figure 1. Content and determinants of escalation prevention potential



Tables

Table 1. Overview of concepts and measures

Concept	Measures	Source
Escalation prevention potential		Own measures
New IT projects in this hospital....	... have a clearly defined aim	
	... have success factors	
	... have measurable goals	
	... consist of predefined stages	
	... are regularly evaluated.	
	... have clearly defined responsibilities	
	... have project participants with sufficient knowledge	
Routines		
Standardized procedures	In this hospital standard procedures are used to implements innovations	Based on Feldman (2005)
Learning routines	In this hospital people learn from past mistakes	Based on March (1991)
Authentic leadership		Cummings et al. (2010)
The management of this hospital...	... discusses matters to improve communication within the hospital	
	... analyzes relevant information before making a decision	
	... provides performance feedback	
	... acknowledging own mistakes	
	... considers different opinions before drawing a conclusion	
	... reassesses points of view from time to time	
	... encourages employee voice	
	... supports employees	
Employee involvement		Sassen (2009)
	In this hospital people are encouraged to offer suggestions to improve work processes	
	My colleagues are open to suggestions to improve work processes	
	It is not a problem if attempts to improve work processes fail	
	My supervisor listens if I voice my opinion	
HR department quality		Greenhalgh et al. (2004)
The HR department...	... offers IT training	
	... offers need-based training	
	... has sufficient resources	
ICT department quality		Kraatz, Lyons & Tomkinson (2010)
The IT department...	... responds adequate	
	... has sufficient knowledge to make the EMR work	
	... has sufficient knowledge to adjust the EMR to my job	
Administrative department quality		Miller & Sims (2004)
The administrative department...	... responds adequate	
	... has sufficient knowledge to make the EMR work	
	... has sufficient knowledge to adjust the EMR to my job	

Table 2. Factor analysis of the measurement scales

	1	2	3	4	5	6
Escalation prevention potential ($\alpha=0.88$)						
Success factors defined	0.74	0.17	0.08	0.10	-0.01	0.17
Clearly defined aim	0.70	0.29	0.16	0.07	0.10	0.09
Predefined phases	0.70	0.14	0.10	0.05	0.02	0.12
Clear responsibilities	0.66	0.30	0.17	0.17	0.23	0.07
Sufficient knowledge	0.55	0.26	0.14	0.35	0.31	0.11
Measurable targets	0.60	0.34	0.08	0.21	0.32	0.09
Regular evaluations	0.55	0.35	0.17	0.22	0.32	0.06
Authentic leadership ($\alpha=0.92$)						
Improves communication	0.25	0.69	0.14	0.11	0.16	0.11
Analyses relevant information	0.30	0.70	0.15	0.07	0.20	0.09
Provides performance feedback	0.22	0.65	0.09	0.18	-0.07	0.12
Acknowledging own mistakes	0.11	0.78	0.11	0.09	0.08	0.09
Considers different opinions	0.19	0.82	0.18	0.08	0.16	0.10
Reassesses points of view	0.20	0.80	0.14	0.09	0.18	0.07
Encourages voice	0.15	0.75	0.13	0.14	0.07	0.11
Supports employees	0.18	0.77	0.12	0.12	0.09	0.11
Employee involvement ($\alpha=0.90$)						
Suggestions about process	0.08	0.20	0.83	0.10	-0.06	0.08
Consulted about improvements	0.11	0.22	0.84	0.10	0.02	0.11
Consulted about process	0.18	0.16	0.85	0.11	0.08	0.05
Able to voice opinion	0.16	0.12	0.83	0.12	0.13	0.04
HR department quality ($\alpha=0.90$)						
Offers IT training	0.13	0.16	0.13	0.86	0.07	0.13
Offers need-based training	0.20	0.20	0.15	0.85	0.15	0.14
Has sufficient resources	0.20	0.20	0.14	0.82	0.17	0.10
IT department quality ($\alpha=0.91$)						
Adequate response	0.16	0.16	0.03	0.16	0.75	0.34
Sufficient knowledge	0.18	0.18	0.05	0.16	0.80	0.37
Adjustment to need	0.20	0.22	0.09	0.11	0.77	0.38
Administrative department quality ($\alpha=0.93$)						
Adequate response	0.15	0.18	0.12	0.15	0.25	0.81
Sufficient knowledge	0.17	0.16	0.08	0.14	0.33	0.84
Adjustment to need	0.20	0.20	0.09	0.13	0.34	0.82
Eigen value	2.80	11.26	2.22	1.70	1.45	0.78
Explained variance	10.00	40.22	7.92	6.06	5.19	2.79
Cronbach's alpha	0.92	0.88	0.90	0.90	0.91	0.91

Note. $N = 1062$. Method: PCA; Rotation: Varimax. Coefficients 0f 0.55 and higher in bold.

Table 3. Descriptive statistics

	M	s.d.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Escalation prevention potential	3.32	0.69											
2. Standardized procedures	3.29	0.85	.45**										
3. Learning routines	3.28	0.94	.57**	.49**									
4. Authentic leadership	3.09	0.75	.64**	.35**	.62**								
5. Employee involvement	2.71	1.03	.41**	.28**	.34**	.41**							
6. HR department quality	3.20	0.94	.51**	.34**	.36**	.42**	.35**						
7. ICT department quality	3.42	0.97	.52**	.37**	.44**	.43**	.22**	.41**					
8. Administrative department quality	3.35	0.84	.48**	.35**	.42**	.41**	.27**	.39**	.70**				
9. Job (1 = nurse)	60%	----	.18**	.08*	.12**	.11**	-.20**	.03**	.27**	.19**			
10. Gender (1 = female)	59%	----	.11**	.05	.11**	.10**	-.13**	.03**	.19**	.15**	.51**		
11. Age	45.4	11.07	-.08*	.01	-.10**	-.08*	.04	-.01	-.13**	-.12**	-.17**	-.27**	
12. Level of implementation	1.74	0.80	.13**	.16**	.10**	.10**	.02	.10**	.21**	.22**	.16**	.07	.02

Note. N = 1062.

* $p < 0.01$; ** $p < 0.001$.

Table 4. Regression results of escalation prevention potential

Variable	b	s.e.	β
Routines			
- Standardized procedures	0.08 **	0.02	0.11
- Learning routines	0.09 **	0.02	0.13
Authentic leadership	0.28 **	0.03	0.30
Employee involvement	0.09 **	0.02	0.13
Support staff quality			
- HR department	0.14 **	0.02	0.18
- IT department	0.10 **	0.02	0.14
- Administrative department	0.04	0.02	0.05
Control variables			
Gender (1 = female)	-0.05	0.03	-0.03
Age	0.00	0.00	-0.01
Job (1 = nurse)	0.17 **	0.04	0.12
Level of implementation	-0.01	0.02	-0.01
Constant	0.70 **	0.10	
Adjusted R ²		0.57	
F		128.45**	

Note. $N = 1062$.

Dependent variable: EPP measured on a 5 point scale.

Unstandardized regression coefficients and standard errors reported.

Adjusted R² without the control variables is 0.56.

** $p < 0.001$.