

# Towards a Contingency Theory of Control in Information Systems Development Projects

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## RESUMO

O principal objetivo deste trabalho é o de fornecer uma teoria contingencial de controle para a informatização do gerenciamento de projetos de desenvolvimento de sistemas de informação (DSI). Controle é caracterizado por níveis de formalidade. O modelo teórico traz conjuntamente a construção central para controle, contexto e consequências. Seis tipos de mecanismos de controle, que podem ser usados em várias combinações, são identificados e classificados. O contexto é arranjado hierarquicamente em três níveis e fornece os vários fatores contingenciais que podem afetar o controle de projetos DSI. Finalmente, as consequências são divididas, ainda mais, em três perspectivas, cada uma fornecendo um novo ângulo para estudar as saídas de projetos DSI. As amplas propostas unindo as três construções deve fornecer uma base para futuras pesquisas em gerenciamento de projetos DSI.

## ABSTRACT

*The main objective of this article is to provide a contingency theory of control for informing the project management of information systems development (ISD). Control is characterized by levels of formality. The theoretical framework provides a propositional inventory by bringing together the three central constructs of control, context and consequence. Six types of control mechanisms which can be used in various mixes are identified and classified under an informal/formal continuum. The context is hierarchically arranged into three levels and provides the various contingency factors which may affect the control of ISD projects. Finally, the consequences are further divided into three perspectives, each of which provides a new angle to study the outcome of ISD projects. The broad propositions linking the three constructs should provide the basis for future research on the management of ISD projects.*

## Introduction

Management of information systems development (ISD) projects has been an enduring concern with both academicians and practitioners for a long time. During this time a number of solutions have been provided to increase the project's chances of success. These solutions have ranged from *ad hoc* critical success factors and risk management heuristics to propositions well guided in theory.

In spite of these efforts, organizations of today are still faced with significant capacity problems (BENJAMIN, 1982, KEMERER, 1989, KOLODZIEJ, 1986), poor productivity (JONES, 1987), if not outright failure (KEMERER & SOSA, 1990). Hence, continued research leading to better understanding of factors causing poor performance and the steps that may be taken to improve them is clearly warranted.

A number of theoretical approaches to the study of ISD have been adopted by IS researchers. They can vary from the perspective of influence in the user-analyst relationship (EDSTROM, 1977, ROBEY & FARROW, 1982), to the angle of effective communication (BOLAND, 1978, DE BRABANDER & THIERS, 1984), and to the view of project management as conflict resolution strategy development (HIRSCHHEIM *et al*, 1987, ELAM & WALZ, 1988). Each of these perspectives is valid and provides an important insight into the development effort involved in the building of an IS theory. This study is another attempt in this

direction. Our main objective here is to present a theoretical approach to ISD which explains the project management process on the basis of a systematically tested network of constructs (a nomological network). In order to do this we adopt a control theory perspective which views the project management outcomes as a control phenomenon that is contingent on environmental conditions.

Control, *context* and *consequences* and are the three important dimensions of our framework. This framework will be used as a basis for bringing together the various issues, concepts and empirical findings in the IS literature. Considering the breadth of the knowledge body being addressed, the nature of the task attempted in this paper may be considered quite ambitious. However, the objective of this paper is not to provide an in depth detailed analysis of ISD but to provide a broad framework which could be used to generate certain research propositions. Through this effort we hope to create the foundation for the development of a contingency based control theory in ISD.

The next section will deal with the dimension of *control*. Applying contemporary management control theory, we will argue that ISD projects are managed through a mix of controlling mechanisms that vary according to their level of formality. The following section will introduce the dimension of *environmental context*. In this paper, environment will be hierarchically divided into project, organizational and external environments. Each environment has been characterized in the literature in various

different ways and this will be the subject of discussion. Next, we will deal with the *consequences* dimension of the framework. Consequences of ISD projects have been studied primarily under the banner of IS performance (DELONE & MCLEAN, 1992, MASON, 1978). Our taxonomy will address the consequences of ISD projects from the perspective of the project group and the organization, as well as the individual team members. Finally, we will discuss the implications of the above three dimensions within the contingency framework and generate research propositions which lead us towards a contingency theory of ISD project control management.

## The Control Dimension

A number of definitions of control have been provided. Some such as Flamholtz *et al* (1985) view control in the narrow sense as a cybernetic system. Others such as Jaworski (1988) and Merchant (1985) take a more holistic view of control. For the purpose of this paper we shall see control as "...having one basic function: to help ensure the proper behaviors of people in the organization. These behaviors should be consistent with the organization's strategy if one exists, which, in turn should have been selected as the best path taken towards achievement of the organization's objectives" (MERCHANT, 1985, p.4).

Such a definition of control provides us a way to accommodate the existence of both informal and formal controlling forces in

various mixes. It also allows us to view control as being exerted by either the management, workers or any other stakeholder.

The issue of formality has been widely discussed in control literature. Weber is often associated with the formal view of control. This view sees control as well defined standard operating procedures which regulates employee behavior. Woodward (1970) views control as a cybernetic process which tries to control by measuring outcome of the task. Ouchi (1977), Ouchi and Maguire (1975) and Eisenhardt (1985) take a broader view where control implies monitoring and evaluating both the outcome and behavior. Jaworski (1988) proposed a more holistic approach to control which subsumes all of the above. However, while he assumes a formal/informal dichotomy, we view the formality of a control mechanism along a continuum which ranges from purely informal at one extreme to purely formal at the other. Below we discuss the six different types of control mechanisms which can coexist in various mixes in an organization to make the control system range from purely formal to purely informal.

- **Formal Control**

Formal control of any task within the organization can be performed in three ways: *input control*, *process control* and *output control*. "Input controls are measurable actions taken by the firm prior to the implementation of the activity... Process control is exercised when the firm attempts to influence the means to achieve

the desired ends...Output control is exercised when performance standards are set, monitored and results evaluated" (JAWORSKI, 1988, p. 26). While these definitions of control apply to the firm level, we will describe them at the team level which is our unit of analysis.

(i) *Input Control*: The inputs to the activity can be controlled through the management of the various resources available to the project. These resources may be broadly divided into two types: human and non-human resources. The nature of the human resources made available to the project can go a long way in influencing its final outcome. It deals not only with the quantity of staff allocated but also its quality. Staffing represents the former concern and expertise the latter. Staffing deals with providing the right amount of people at the right time and ensuring that staff turnover is low so as to maintain continuity of the project. On the other hand, the issue of expertise is concerned with the knowledge body made available to the project through people with the right kind of expertise (MCCOMB & SMITH, 1991).

A variety of non-human resources are also required for project completion. These include capital, hardware and project management tools and techniques. These can be obtained either from within the organization or from external sources. In the former case, one achieves input control through setting the system objectives. In the latter case, input control is achieved through a bid strategy which lays down the criterion for selecting among the various

external bidders for the project (MCCOMB & SMITH, 1991). It should be noted here that the bid strategy can also be used to perform human resource input control by acquiring human expertise from an external body.

(ii) *Process Control*: Process control may be achieved through either behavioral or structural means (JAWORSKI, 1988). The behavioral process control is used for controlling the human resource while structure may be used for non-human as well as human resources. Behavior may be controlled through a reward punishment system based on standard operating procedures laid down for the group. On the other hand, structure can also serve as a means for achieving process control. Mantei (1981) claimed two prominent control structures in ISD -- the chief programmer team proposed by Mills (1971) and the egoless programming team proposed by Weinberg (1971). Henderson and Lee (1992) interpreted these two to represent a purely hierarchical and a purely decentralized structure.

(iii) *Output Control*: Output control is said to take place when the controlling mechanism is based purely on the outcome of the process, without specifying the process itself. This can be done by evaluating performance against a set budget or a schedule. It should be noted that the budget and schedules may be used as both input and output controls. However, in the former they are used for controlling resource allocations and in the latter they are used for evaluating the use of these resources.

- **Informal Control:**

"Informal controls are the unwritten, typically worker-based mechanisms that influence individual and group behavior" (JAWORSKI, 1988, p. 27). Three levels of aggregation can be used to understand control within a project team. While self control is exerted by the team member, social control is exerted by the team and the IS function, and cultural control is exerted by the organization in which the team operates.

(i) *Self Control:* "Team-member self control is defined as the extent to which an individual exercises freedom or autonomy to determine both what actions are required and how to execute these activities" (HENDERSON & LEE, 1992, p. 760). Self control may be used by the team members when the group cannot adequately measure behavioral performance or standardize transformation process. However self control should not be equated to no control (LAWLER, 1976). Henderson and Lee (1992), Weinberg (1971) and Bailyn (1984) have shown that the performance of technically oriented teams in fact improves with increased self control.

(ii) *Social Control:* "Social control can be defined more formally as the prevailing social perspectives and patterns of interpersonal interactions within subgroups in the firm." (JAWORSKI, 1988, p. 27). Social control has been defined in a number of ways by different authors -- clan (OUCHI, 1979), small group (DALTON, 1971), professional control (WATERHOUSE & TIESSEN, 1978). In an ISD project team,

social control may play an important role in influencing the process. For example, the social norm may decide the kind of software development methodology to be used. The choice of the methodology is thus not made after a rational analysis but on the basis of a generally accepted norm.

(iii) *Cultural Control:* While social control is due to informal controlling forces at the small group level, cultural control occurs at a higher level of aggregation -- division or firm. "Culture is defined as the broader values and normative patterns that guide worker behavior within an entire organization" (OUCHI, 1979). The project team has to work in a larger organizational context and the forces of control which apply to the whole organization also apply to the project team. For example, an organizational ideology which emphasizes customer satisfaction will influence the project team in focusing on user satisfaction as opposed to other technical measures of performance.

## The Context Dimension

The environmental context can be broadly classified as *project* or *internal environment*, *organizational environment* and *external environment*. The three levels are not completely independent of each other. Project environment may be influenced by the organization in which it operates. The organizational environment may in turn be determined by the external environment. This hierarchical organization of the context dimension only serves as a tool in

understanding the various environmental attributes.

- ***Internal Environment:***

The internal environment consists of elements within the project team's jurisdiction. It has a role in determining the type of controls that evolves and in moderating the effects of the control system in use. The internal environment basically deals with the characteristics of the task being performed in the project. Predictability or measurability of the task is one important characteristic. Ouchi (1979) suggested that tasks which are easier to measure tend to make greater use of output controls. March and Simon (1958) proposed that task unpredictability largely determines what type of control is appropriate. This unpredictability/uncertainty characteristic should be higher in projects dealing with newer IS applications. For example, projects concerned with developing a payroll system would be more predictable and certain than one attempting to build an electronic data interchange (EDI) system.

Similarly, the scope of the project have also been known to affect project performance (LOUIS, 1992). Scope deals with issues of complexity of the project. Thus uncertainty and complexity are the two characteristics of the project environment. It is true that uncertainty and complexity are not completely independent. However, for our purpose, we differentiate on the basis that uncertainty deals with the predictability of the task while complexity deals with its size or scope.

- ***Organizational Environment:***

A number of organizational environment attributes have been identified as affecting the ISD process in an organization. The IS literature has characterized the organizational environment in a number of ways. These include the size of organizations (CARTER, 1984, KLATZKY, 1970), the interdependence between IS and the rest of the organization (LUCAS, 1986, IVES & LEARMONTH, 1984, VITALE *et al*, 1986) and nature of task performed by the IS function (HAREL & MCLEAN, 1985, LUCAS, 1975). Control theory supports all the above and adds another one -- the financial status of the organization (JAWORSKI, 1988). In summary, the organizational environment of the project is characterized by size of the IS function, its linkage to the rest of the organization, the nature of its task and the financial status of the organization.

- ***External Environment:***

This concerns with that part of the environment which lies outside the boundaries of the organization for which the IS is being developed. This includes the operating environment which consists of the suppliers, customers and competitors as well as the macro environment, which consists of political and legal issues. Uncertainty is one of the most important characteristic of this environment. Environmental uncertainty has been conceptualized and operationalized in a number of ways. In this article, it is taken in its broadest sense which subsumes both the

static (predictability, structuredness) as well as the dynamic (volatility, dynamism, stability) notions of uncertainty.

(functional and dysfunctional), and performance related" (JAWORSKI, 1988, p. 28).

## The Consequences Dimension

A number of taxonomies have been developed to study the consequences of IS projects (DELONE & MCLEAN, 1992, IVES & OLSON, 1984, ZMUD, 1979). However, all of them focus on the issue of IS success. IS success has been interpreted in many different ways and in its broadest sense could cover both the technical (project group/producers) and organizational (user/stakeholder group) consequences of an information system. However, it does not cover the consequences of the project for the individual project members. Our taxonomy of consequences of ISD projects also covers this latter consequence and is thus broader than the ones provided earlier. It uses a three-tier approach to analyzing the consequences of ISD projects. The three tiers are: *the individual project team member, the producer group and the organization (user/stakeholders)*.

- ***Individual Team Member Consequences:***

The individual member consequences have been studied in a variety of studies in psychology and control theory. For the purpose of this paper we shall use the typology provided by Jaworski (1988). He identifies four broad areas of individual level consequences. "Individual consequences can be psychological (job tension), role-related (conflict, ambiguity, overload), behavioral

Each of the above consequences is important for the successful completion of a project. Role conflict between users and developers has been widely studied in the IS literature (ELAM & WALZ, 1988, HIRSCHHEIM *et al*, 1987). However, intra project role conflict between team members (for example, requirement analysts and technicians) have not received the attention it deserves. The effect of managerial control on project team members remains a sadly understudied area.

- ***Producer Team Member Consequences:***

At the project group level, the consequences will be from the producers perspective. The producer will be concerned with the technical quality of his product and the process of production (MASON, 1978). Shannon and Weaver (1949) classified Mason's production/product typology of IS performance measures as technical and semantic levels. DeLone and McLean (1992) use system quality and information quality to explain the same two concepts. For the purpose of this paper we shall draw upon the above classification schemes in order to propose our own.

All of the above classifications refer to the information product and to the information system which produces it. We propose one more dimension -- the production process of the ISD project. These three dimensions will be defined as follows: *Product quality* chooses "to study

the information product characteristics such as accuracy, meaningfulness, and timeliness" (DELONE & MCLEAN, 1992, p.62). *System quality* focuses on "the desired characteristics of the information systems itself which produces the information" (DELONE & MCLEAN, 1992, p. 62). Finally, *process quality* as a measure of IS performance refers to the desired characteristics of the ISD process which produces the information system.

A number of measures of both the information product and the information system have been proposed or developed (SWANSON, 1974, EMERY, 1971). Similarly, the quality of the product of the IS has also been measured as an indicator of IS performance. These measures primarily deal with the quality of the output reports of the system. This quality has been measured in terms of perceived importance/usableness (LARCKER & LESSIG, 1980), accuracy, reliability, timeliness, relevance, currency, etc. (BAILEY & PEARSON 1983, AHITUV 1980, MUNRO & DAVIS, 1977).

Process productivity is also an important issue in software development. Many of the ISD projects today are still plagued by the problem of poor productivity (JONES, 1987). A number of heuristics have been suggested in contemporary literature to improve the productivity. The measures of IS productivity have ranged from objective measures such as number of lines of code, number of errors to subjective measures which view productivity as a ratio of the costs upon benefits. A number of firms have

even launched organization wide metrics programs in the hope of improving productivity (GRADY & CASWELL, 1987). The framework proposed by Basili (1984) reflects a holistic approach to measuring productivity which incorporates both subjective and objective measures.

- ***Organizational/User/Stakeholder Consequences:***

The third level of analysis consists of the individual user, stakeholder groups and the organization as a whole. This tier of consequences includes all organizational members, excluding the producers, who use the system or are affected by its use. These consequences have been broadly classified by Shannon and Weaver (1949) as the effect of the information on the recipient.

The typology provided by DeLone and McLean (1992) comes closest to our typology of user, stakeholder and organizational consequences. They provide four types of measures of IS performance from the non-producer's perspective. In our typology the *user consequences* refer to the effect of the IS on the individual decision makers in the organizations who use or are affected by the use of the IS (e.g., a manager responsible for the IS function). DeLone and McLean call this the individual impact. The *stakeholder consequences* refer to the impact of the IS at the group level. This includes all those groups who use or are affected by the use of the IS (e.g., managers, workers, owners, shareholders, etc.). DeLone and McLean refer to this issue under the banners of system use and user satisfaction. *Organizational consequences*

of IS are concerned with the effect of the IS on organizational performance. DeLone and McLean capture this issue under organizational impact.

## Research Implications

This section will discuss the relationships between the various dimensions described above so as to provide certain research propositions which could lead towards a theory of ISD project management. These propositions are based on empirical findings and conceptual discussions in the field of management control, social science and information systems literature. This section will provide broad, generalized propositions which are presented in the hope that empirical research may lead to more refined

propositions. The following figure provides a graphical description of our model.

The controlling mechanisms used in the project can be viewed as being determined by the environment. As described earlier, context can be divided into three levels: project, organizational and external environments. A number of contingency studies have been provided in the IS literature (WEILL & OLSON, 1989) to explain the influence of project environmental characteristics on the choice of controlling mechanisms. Burns and Dennis (1985) have provided a contingency framework which links project uncertainty and complexity to the choice of development methodology used. Louadi *et al* (1991) have used this framework in conjunction with the Gorry and Scott-Morton (1971) typology on IS to

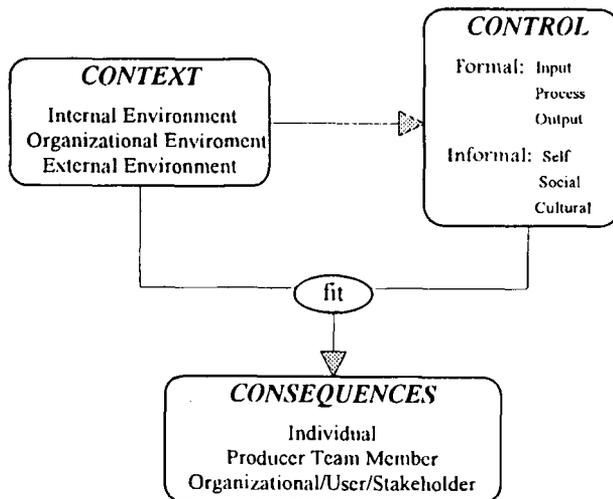


Figure 1 - Contingency Model of Control in ISD Projects.

provide a new contingency framework which explains the formal control process used as a function of application type and project characteristics. However it should be noted that most contingency frameworks in IS concentrate on the relation between environment and formal control mechanisms. We also need to look at the informal controls. Henderson and Lee (1992) discuss informal controls but do not link this to environmental variables.

Control theory asserts that no single system of control evolves in all organizations. Environments with greater degree of uncertainty and complexity are better off relying more on informal controls (HOPWOOD, 1974, OTLEY, 1980, OUCHI, 1979). Therefore,

**Proposition 1:** Project environment uncertainty is negatively associated with the level of formality in the ISD project controls.

**Proposition 2:** Project environment complexity is negatively associated with the level of formality in the ISD project controls.

Control literature has noted that the size of an organization is directly linked to the degree of formality used in the control mechanisms (BLAU & SCOTT, 1972, BRUNS & WATERHOUSE, 1975). Since the ISD project is a part of the IS function, the size of the IS function should also affect the formality of controls used. This would lead us to the next proposition:

**Proposition 3:** The size of the IS function is positively associated with the level of formality in the ISD project controls.

As mentioned earlier, the linkage between the IS function and the organization will also affect the control process. As the IS function gets more integrated with the rest of the organization, control problems increase (DALTON, 1971, OTLEY, 1980, CHILD, 1972). Compounding of the problem of controls causes greater reliance on formal controls. Also, linkages between the IS function and the strategic function of the organization have been proposed to be of various degrees of strength (THOMPSON, 1992). Therefore,

**Proposition 4:** The degree of linkages between the IS function and the organization strategy is positively associated with the level of formality in the ISD project controls.

Control literature has also identified another organizational environmental factor which may affect the control type used -- financial position of the organization. Organizations in troubled times tend to rely more on formal than informal controls (JAWORSKI, 1988). Thus,

**Proposition 5:** The financial position of the organization is positively associated with the level of formality in the ISD project controls.

Different organizations may have different roles for IS. A number of frameworks and empirical findings are available in the IS literature to support the fact that the role played by IS in different organizations may vary from highly routinized and stable to highly unstructured and creative (MCFARLAN & MCKENNEY, 1983, DAS *et al.*, 1991). In organizations

where IS is used as a competitive tool, the emphasis is on innovation in which case informal controls are more used than formal ones. In others, the IS may take care of more routinized tasks such as maintenance of transaction processing system, report generation, etc. In such cases formal controls are more likely to be used as compared to informal controls. The proposition that the kinds of control employed depend on the nature of task to be performed is well supported in control literature (OUCHI & MAGUIRE, 1975, MARCH & SIMON, 1958). Thus,

**Proposition 6:** The level of routinization of the task performed by the IS function is positively associated with the level of formality in the ISD project controls.

As discussed before, the external environment can be broadly characterized by its uncertainty. Both the IS and control literatures contribute to developing the following propositions. In an exploratory empirical survey, Das *et al* (1991) found that the stability of the environment may influence the role of the IS function within an organization. An unstable environment would contribute to greater flexibility within the organization and more informal control structure within the IS function. This fact has been supported in control theory (JAWORSKI, 1988). Environmental uncertainty has also been known to affect the kind of controls used (GORDON & NARAYANAN, 1984). We therefore propose that:

**Proposition 7:** The uncertainty of the external environment is negatively associated with the level of formality in the

ISD project controls.

Since the purpose of this paper is to provide a contingency theory on ISD, we should now focus on explaining how the environment moderates the effect of control mechanisms on the project consequences. As explained before, the consequences can be analyzed either from the individual team members, users or producers perspective. The effect of environment on the consequences implies a certain *fit* between the control system and the environmental characteristic. The notion of fit has been widely discussed in the IS literature. For the purpose of this study, fit will be loosely defined as the match between the environmental characteristics and the control mechanisms used in the ISD project. The proposition being made here is that the desirability of the consequences is associated with the degree of fit between the environmental characteristics and the controls in use within the ISD effort.

The degree of fit will influence the individual team members, producer group and users and other stakeholder in different way. As discussed earlier, the consequences at the individual level are psychological, role perceptions, behavioral and performance. Literature in control theory would strongly support a positive association between control and context, and the desirability of individual consequences. However, most of the IS literature has ignored consequences of control for the individual project member. Although individual differences have been considered as contingency variables for explaining IS performance (FRANZ, 1985, KASPER,

1985), individual consequences have largely been ignored. Hence, the proposition concerning consequences for individual project member in ISD projects are based on empirical and conceptual works done in general control theory not specific to the IS domain (please refer to JAWORSKI (1988) for detailed review and justification of the propositions given below).

**Proposition 8:** A fit between the environmental context and the controls in use in the ISD project will lead to lower levels of individual team member job tension.

**Proposition 9:** A fit between the environmental context and the controls in use in the ISD project will lead to lower levels of individual team member role ambiguity and role conflict.

**Proposition 10:** A fit between the environmental context and the controls in use in the ISD project will lead to lower levels of individual team member dysfunctional behavior (gaming, smoothing, focusing and invalid reporting).

**Proposition 11:** A fit between the environmental context and the controls in use in the ISD project will lead to higher levels of individual team member managerial performance.

The notion of fit in IS has been typically viewed as the match between some contingency variables (organizational characteristics) and some characteristic of the information/control system (WEILL & OLSON, 1989). The dependent variable is typically IS performance which, according to our typology, can be studied from the producers or the users angle.

The consequences of ISD projects at the producers level have been measured in terms of the quality of the product and the production system. All these measures of performance have been studied under contingency theory in ISD. However, most of the IS literature on contingency approach neglects technical measures from the producers perspective and concentrates on the users/organizational perspective. The following research propositions are intended to fill this gap.

**Proposition 12:** A fit between the environmental context and the controls in use in the ISD project will lead to higher levels of information product quality.

**Proposition 13:** A fit between the environmental context and the controls in use in the ISD project will lead to higher levels of information system quality.

**Proposition 14:** A fit between the environmental context and the controls in use in the ISD project will lead to higher levels of process productivity.

In contrast, most of the performance variables studied under the contingency approach have been from the users/organizational perspective. The most common performance variables are user satisfaction and system use (GRUDNITSKI, 1984, HOGUE, 1987, MCKEEN, 1983). The contingency variables studied have addressed various aspects of the environment task, technology, structure etc. (please refer to WEILL & OLSON (1989) for a detailed review). On the basis of these empirical findings we propose the following:

**Proposition 15:** A fit between the environmental context and the controls in

use in the ISD project will lead to higher levels of user satisfaction.

**Proposition 16:** A fit between the environmental context and the controls in use in the ISD project will lead to higher levels of system use.

## Conclusion

The framework discussed in this paper is proposed in the hope of providing a foundation for a contingency-based control framework for ISD projects. However this framework is not without its limitations. By its very nature, a contingency approach is intuitive and hence cannot purport to be the best approach. The contextual, contingency variables here provided have intuitive appeal but have been selected in an *ad hoc* manner. The aim was to provide contingency variables which could be as comprehensive and independent as possible. However, we acknowledge that other variables could also meet our requirements.

Though we have presented sixteen research proposition in this paper, by no means they cover all the possible propositions that could be generated from the given framework. Our intention was to highlight only a few broad propositions which, in our personal opinion, were enough to convey the gist of our discussion. A more comprehensive development of the proposition inventory and empirical testing of them are still necessary to complete and validate our framework. That should also include an extension in the control

dimension, which was analyzed here only through its formality attribute.

Nevertheless, we believe this framework can be very useful for the IS manager faced with the problem of control in information system development projects. Decisions concerning the use of a particular ISD methodology or the introduction of automation into the ISD process can be guided by the contingencies here proposed if one sees these as control portfolio issues. As recent IS studies have shown (HENDERSON & LEE, 1992), proper control management of ISD efforts is critical for the project success and the organization members satisfaction. We hope our framework brings light to this complex issue and opens new avenues of research in the IS field.

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