SUPPORT FOR MIS SPECIALISTS: A KNOWLEDGE-BASED APPROACH FOR MANAGING CHANGE

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ABSTRACT

This study emphasizes the critical role of MIS specialists when implementing IS initiatives. Over the years, the work of MIS specialists has evolved from designing technical aspects of an IS to influencing business transformation. The responsibility for managing both social and technological change is referred to as change agent roles. In this study, MIS specialists were interviewed to explore how they function as change agents during their IS engagements. The case data is used to compare the MIS specialists' predisposition for a change agent role, the role employed during the IS implementation and the role recommended by a formal knowledge-based reasoning approach. The design of a knowledge-based system (KBS) that supports the MIS specialist in managing change is augmented with advice sets. These advice sets consist of guidelines that help bridge the MIS specialist's change agent role with the requirements of the IS environment. These guidelines relate to IS project scope, MIS specialist/end-user relationship and role development.

Keywords: Change Agent Role, IS Implementation, Knowledge-Based Approach, Case Study.

INTRODUCTION

This study emphasizes the critical role of MIS specialists when implementing and managing their IS initiatives. Over the years, the work of MIS specialists has evolved from designing technical aspects of an IS to influencing business transformation. The responsibility for managing both social and technological change has been identified in the literature as change agent roles. A change agent is a resource person who has the capacity to initiate and influence structural, employee, and work process changes within a business (13).

A proposed change agentry model identifies three distinct roles: traditional, facilitator and advocator (12). Some MIS specialists tend to work in one change agent role or emphasize one role over another (4,17). At times, these specialists may need to adjust the way they approach their IS change agent responsibilities for a particular IS implementation. If the MIS specialist cannot manage the change surrounding the implementation environment, then modifications to the role are required. The ability of the MIS specialist to make this adjustment is a major concern for organizations that cannot afford diverse IS services and must rely on flexible expertise to address both change management and technical issues.

The findings of this study indicate that some MIS specialists intuitively make a change agent role choice based on IS implementation characteristics. The ability of these MIS specialists to recognize environmental conditions increases the effectiveness of their work. MIS specialists who are unable to handle diverse change agent responsibilities may require expert assistance. A

knowledge base containing guidelines may provide a viable and affordable solution. Guidelines based on literature and case study data that support the MIS specialists in their change agent role are presented in the form of advice sets.

The paper is organized as follows: First, we review the literature that identifies key factors influencing IS-enabled change. Additionally, an overview of a knowledge-based system (KBS) that aims to help MIS specialists proactively recognize an organization's readiness for change is presented. Next, data from a multiple case study are used to demonstrate the importance of identifying factors in the environment that influence the change agent role choice. This change agentry domain knowledge is subsequently formalized in action guidelines represented as advice sets. These advice sets may be used to improve the effectiveness of MIS specialists. Finally, managerial implications of the study are presented.

THEORETICAL BACKGROUND

An in-depth analysis of the IS change agentry domain suggests that it can be disaggregated into two major areas: MIS specialist change agent roles and IS implementation environment conditions.

Change agent roles are identified in three categories (1,2,10,12,15,5):
- Traditional - MIS specialist only implements technological changes of resources and provides technical expertise.
- Facilitator - MIS specialist emphasizes transference of IS capabilities to the stakeholders of the IS project.
- Advocator - MIS specialists champion change in a direction that they believe most desirable.

IS implementation environment conditions include structural compatibility, goals of the IS, and stakeholders' commitment level.
- Structural compatibility - reflects the fit between IS and organizational structure. Studies suggest that the alignment of organizational structure and level of technology affects the type of change in the environment (12,6,11,3,14,10).
- Goals of IS - range in complexity from automating (least complex), to efficiency and effectiveness improvements, to strategic (most complex). More complex goals necessitate more change in the environment (18,16,14).
- Stakeholders' commitment level - composite of stakeholders' motivation, competency, and coordination. This factor reflects the degree of commitment required for successful IS implementation. Motivation ranges from spontaneous commitment to reluctant compliance, to opposition (14,3,8). Competency may reflect change from predominantly manual skills to conceptual skill requirements (14,18,3,8). Coordination refers to the amount and type of new coordinating arrangements required for successful IS implementation, such as intra-organizational workflows, teamwork, inter-organizational cooperation (14,3,8).

Knowledge-Based System (KBS)
Binbasioglu and Winston (4) proposed a knowledge-based system that provides structure to the IS change agentry domain and guides the reasoning process for the evaluation of IS implementation environment factors. The system provides the MIS specialist with a formal approach to compare the different change agent roles. As presented in Figure 1, the change agent roles and IS environment conditions are recognized as the 'end-state' factors in the KBS design. These factors are derived from input variables using IF-THEN rules.
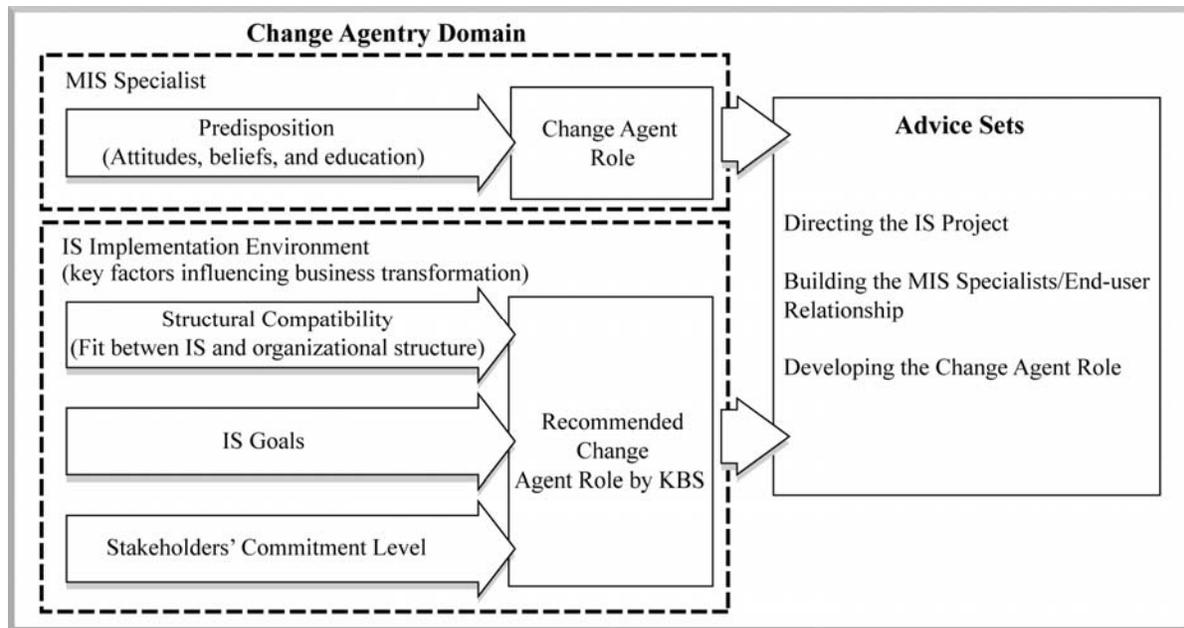

Figure 1. Knowledge Base: Support for MIS Specialists

In the IS literature the classification nomenclature is well established and provides the theoretical foundation for the knowledge base. The evaluation of the IS implementation environment includes structural compatibility, IS goals and stakeholders commitment. Proper assessment of these factors enables the MIS specialists to have a better understanding of the scope and likely ramifications of their IS work. For example, the fit between IS and organization structure can be assessed through a chain of rules that process input data to determine the states of organization structure and IS. If organization structure is *decentralized* and the level of IS is *enterprise*, then the knowledge-based system will recognize structural incompatibility. In this situation it is possible that political resistance will arise when the structural incompatibility alters the balance of power. Recognizing and managing political and social issues enables the MIS specialist to become a better change agent.

Based on the above literature review and the observation that the change agent predisposition may hinder MIS specialists from recognizing factors that impact IS success the following question guided this research: *What guidelines can be offered that will help MIS specialists manage implementation environment conditions in conjunction with their predisposition to change agent roles?*

METHODOLOGY AND DISCUSSION

A qualitative study of 25 cases was conducted to better understand the IS implementation environment conditions when choosing among change agent roles. The multiple case study uses an open-ended interview format to elicit detailed information from the participant MIS specialists concerning their work as change agents. The researchers analyzed the interview data using both within case and across case analysis methods (7,9).

Table 1 compares the MIS specialists' change agent role predisposition, the role employed during the IS engagement, and the recommended role based on an evaluation of the IS implementation environment by a KBS. The recommended change agent role is computed by processing the case data using IF-THEN rules that reside in a knowledge base (4). Table 1 also presents the MIS specialist's evaluation of the likelihood of achieving a successful implementation.

An analysis of the data revealed a relationship between choice of change agent role and quality of implementation. Further, examination of this relationship identified the limitations of the MIS specialists in choosing an appropriate change agent role. In 86% of the cases where likelihood of implementation success was rated as *No* the KBS recommended a different role from the employed role. MIS specialists who indicated that they were not likely to achieve a successful implementation suggested that another change agent role might have been more effective for the engagement. These participants reported that they were limited in their ability to perform as effective change agents due to the conditions of the implementation environment (such as political resistance and developing client competency), inexperience and job insecurity.

Guidelines were derived based on the MIS specialists' limitations in performing their work as change agents. These guidelines formalize the knowledge of the MIS specialists in action statements, which are referred to as advice sets. The advice sets presented in Tables 2a and 2b are based on repeated points identified in the interviews and supported by the literature. These advice sets are organized in three categories: IS scope, MIS specialist/end-user relationship, and role development.

Advice sets help support MIS specialists in their change agent role by taking into account the factors of the implementation environment, as illustrated in Figure 1. MIS specialists who are engaged in IS implementation within a dynamic and ambiguous environment would benefit considerably from access to expert advice. Such a repository of knowledge could augment the ability of MIS specialists to interpret their IS work environment and apply best practice guidelines. New MIS specialists, just entering the field, may be able to move their performance quickly to a standard similar to experts in the field with many years of experience by basing their actions on advice from a KBS.

Table 1. Change Agent Roles and Likelihood of High Quality Implementation Success

Case #	Case Study Evidence			KBS Role Recommendation
	MIS Specialist Predisposition	MIS Specialist Employed Role	Successful Implementation? (evaluated by MIS specialist)	
1	Advocator	Facilitator	No. Not addressing impact of IS on business.	Advocator
2	Advocator	Advocator	Yes. All wheels in place to turn company around.	Advocator
3	Advocator	Advocator	Yes. Company becomes embedded with the IS.	Advocator
4	Advocator	Facilitator	No. Client not working on the IS unless specialist is front of them.	Advocator
5	Facilitator	Facilitator	Yes. Company has much better inventory control.	Facilitator
6	Facilitator	Facilitator	Yes. More people empowered	Advocator
7	Facilitator	Facilitator	Yes. Completing business tasks that could not have been completed without the system.	Advocator
8	Facilitator	Facilitator	Yes. Requirements of IS meet business requirements.	Facilitator
9	Facilitator	Facilitator	Yes. The IS has become integral to everyday work life.	Facilitator
10	Traditional	Traditional	No. I'm not preparing the client for change.	Facilitator
11	Traditional	Traditional	Yes. I'm not interfering with the client's daily work.	Traditional
12	Traditional	Traditional	Yes. Good feedback from the end-users.	Traditional
13	Advocator	Facilitator	Yes. Moving to inter-organizational solutions.	Facilitator
14	Facilitator	Traditional	Yes. Understand how to take into account end-users' position in organization.	Traditional
15	Traditional	Traditional	No. Client is not interested in new business requirements or new technologies.	Traditional
16	Traditional	Advocator	No. Lack of interest in new technology by client.	Facilitator
17	Traditional	Facilitator	No. Client wants everything as soon as possible and settles for incomplete projects.	Traditional
18	Advocator	Traditional	Yes. Completed information requirements report.	Facilitator
19	Advocator	Advocator	Yes. Provide a vision for the company.	Advocator
20	Facilitator	Facilitator	Yes. Improved operating efficiency.	Facilitator
21	Facilitator	Advocator	Yes. Reduced purchase order lead time and increased cost efficiency.	Advocator
22	Advocator	Advocator	Yes. Created new on-line community.	Facilitator
23	Facilitator	Facilitator	Yes. Willingness to use IS by end-users.	Facilitator
24	Facilitator	Advocator	Yes. Strong cultural shift to team effort.	Advocator
25	Traditional	Facilitator	No, Client doesn't understand value of having everyone fully trained.	Advocator

CONCLUSION

This paper presented the results of a qualitative study. Many of the MIS specialist participants in this study indicated that they hold Masters and Ph.D. degrees. They all had experience in the field, with a mean of 15 years. These qualifications demonstrate that these MIS specialists are experts.

The results of this study suggest that some MIS specialists have an understanding about the role types that they are most comfortable performing. Additionally, they have knowledge that the IS implementation environment might indicate that employing a different change agent role may increase their effectiveness. In order to achieve a successful implementation the MIS specialists who have the ability to be flexible may adjust their change agent role.

Table 2a. Guidelines for Achieving Flexible Change Management

Advice Set Chosen/ Advised	Case #	Directing the IS Project	Building the MIS Specialist/End-user Relationship	Developing the Change Agent Role
Facilitator/ Traditional	14	Maintain momentum. Focus on technology.	Locate internal IS champion. Provide technical training.	Build close relationship. Help client make best use of technical resources.
Advocator/ Traditional		Periodically check business and technologies for flexibility to move either in a new direction.	Do not use power or expertise to advocate new technology. IT goals fit with culture.	Work as technician, look for new opportunities.
Traditional/ Facilitator	10,16, 17	Acknowledge achievement of short term goals.	Ensure there is an internal IS champion. Develop collaborative relationship.	Work in conjunction with client. Clarify responsibilities during each implementation stage.
Advocator/ Facilitator	13,18 22	Focus on impact of business process changes. Assist with evolutionary change rather than revolutionary.	Involve client. Delegate responsibility.	Respect client's vision. Use interpersonal skills. Approach implementation diplomatically.
Traditional/ Advocator	25	Develop IS in terms of strategy and environment. Have in-depth knowledge of business.	Develop long-term relationship. Develop trust.	Develop self-confidence to retain position of power and control.
Facilitator/ Advocator	6,7,2, 24	Focus on technology. Assess impact of IS changes. Redesign processes.	Establish trusting relationship. Positive communication.	Develop self-confidence to retain position of power and control. Work as a visionary.

Table 2b. Guidelines for Advancing Change Management

Advice Set Chosen/ Advised	Case #	Directing the IS Project	Building the MIS Specialist/End-user Relationship	Developing the Change Agent Role
Traditional/ Traditional	11,12, 15	Avoid tweaking the system.	Allow client to maintain control. Obtain information requirements from client. Client is responsible for change.	Provide expert knowledge of new IS. Work as technical expert.
Facilitator/ Facilitator	5,8,9, 20,23	Integrate Business and IS strategy. Focus on business impact of process changes.	Prepare client to take ownership of IS. Avoid exerting expert power over professional /well-educated client. Serve interest of all stakeholders not just sponsors.	Have client make the best use of available resources. Find IS talent within the organization. Increase client's capacity for change.
Advocator/ Advocator	1,2,3, 4,19	Integrate business content and technology. Advocate new business and work process change.	Take more control and exert pressure as expert. Client must know what it is you are doing that is revolutionary. Prevent client from halting projects/never reaching goals. Persuade through using power.	Work as visionary of new business processes and strategy. Maintain control over political situation so client does not suggest inadequate system.

Advice sets provide a knowledge repository of experiences that can be consulted during the IS implementation process. MIS specialists can make use of this compiled information source for advice similar to that of a resident, on-call, expert trainer. In particular, entry-level MIS specialists can obtain assistance during IS engagements by having access to stored expertise.

This feature is important since it can help MIS specialists understand variations in work styles that best match different environmental conditions.

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