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EXPLORING FACTORS AFFECTING TOP MANAGEMENT SUPPORT OF IT IMPLEMENTATION: A STAKEHOLDER PERSPECTIVE IN HOSPITAL

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ABSTRACT

This paper presents a qualitative study on top management support of IT implementation in a hospital's cloud computing IT project. Drawing upon stakeholder theory, top management support over the implementation was found to be dynamic, depending on eight higher order factors such as IT productivity paradox, perceived IT importance, flexible IT personnel, trust, project-enabled intangibles, assimilation, shared vision/risk, and data privacy/security while considering different interests of hospital stakeholders. The findings provide confirmation for stakeholder theory. The implications are discussed.

Keywords: Cloud Computing, Healthcare, IT Implementation, Top Management Support, Stakeholder Theory

INTRODUCTION

The healthcare industry is information intensive. Up-to-date and reliable information is essential for providing medical and healthcare services, coordinating organizations and people involved in each service, and administrating economical transactions. However, intensiveness, complexity, and the amount of health information present challenges such as high cost of operations, inefficiency, inadequate safety, insufficient access to information, and poor financial performance [30]. To overcome the challenges, information technology (IT) has been increasingly used [34].

Ideally, IT may catalyze a number of important benefits (e.g., improved access to patient data, streamlined process for monitoring patterns and trends of health, enhanced ability for conducting clinical trials of new diagnostics and treatments, etc.), which helps clinicians as they diagnose and/or treat patients, and also helps patients themselves as they take more control over their health [50]. However, practically, the use of IT does not guaran-

tee benefits mentioned unless it can be implemented effectively [46].

The healthcare IT literature advocates the effective implementation of IT that is essential to maintaining the quality, safety, and efficiency of medical and healthcare services (e.g., Cliff [4], Bates, Leape, & Gullen [5], Schoen et al. [54], etc.). The information systems (IS) literature refers IT implementation to a process where organizations diffuse IT into a user environment [40]. During the process, how top managers perceive IT and therefore give their commitments to support IT functionality affects whether IT implementation is successful.

A plethora of IS studies have examined the impact of top management support on IT implementation outcomes (e.g., Dong [17], Lewis, Agarwal, & Sambamurthy [44]). Top management support is an important IT management asset for the congruence of IT goals and business needs while implementing IT [59]. Effectively implementing IT can be difficult, evolutionary, and dynamic because the environment is not a static condition. In a strategic sense, how healthcare executives

support IT can be plausibly critical to the effective implementation of IT in today's dynamic healthcare context.

Although many healthcare IT studies have examined IT implementation issues such as job satisfaction [11], systems integration [62], privacy/security [13], quality [4], adoption [47], organizational impact [10], environmental impact [48], and even dynamic capabilities [43], little has examined factors that influence hospital top management support of IT implementation. This generates a conspicuous gap. Immediate field research was necessarily conducted to address the gap. Since the healthcare IT literature argues a need for integration and processes among hospital stakeholders while studying IT implementation issue [50], our objective is to use stakeholder theory to explore and identify factors affecting effective support on implementation in terms of different interests and influences of relevant people.

The remainder of the paper proceeds as follows. First, the methods are provided. This is followed by the findings obtained through the case study of SMH. We provide discussion for both researchers and practitioners. Lastly, limitation and conclusions are presented.

METHODS

We conceptualize the stakeholder. Then we present the case setting, and identify participants (i.e., stakeholders) to collect the data through qualitative interviews. We further use the stakeholder concept as a basis to aggregate and categorize the interview data, and interpret findings in subsequent results and discussion where some relevant literature was used to contrast and compare with the findings.

Stakeholder

The core concept of stakeholder theory (ST) is that the organization must manage and integrate the relationship and interests of stakeholders to ensure successful organizational outcomes. Although there are various definitions of stakeholder, a stakeholder generally is any group or individual who can affect or is affected by the achievement of an organization's purpose [22]. Two core elements are emphasized for ST: the purpose of organization and the responsibilities of management [21]. With the two elements, managers articulate a shared vision among stakeholders and create the expected relationship between stakeholders to achieve success in terms of market share and financial metrics [26].

Donaldson and Preston [15] classify ST into three disciplines: descriptive, instrumental, and normative. The descriptive discipline, which views organization as bundles of divergent interests, emphasizes how manag-

ers and stakeholders represent those interests and how they actually behave. The instrumental discipline offers a framework that investigates the relationship between organization's economic performance and the practices of stakeholder management. The normative discipline contains concepts of how managers and stakeholders should act based on moral, values, and philosophic purpose.

The main concern of descriptive and instrumental disciplines focuses on maximizing profits by managing stakeholder relationships in an optimal way [15]. When managers look only to maximize stockholder wealth, other stakeholders can easily be overlooked [23, 24]. Therefore, the normative discipline argues that all stakeholder interests are intrinsically valuable regardless of their power or influence [20, 25]. In this normative sense, overlooking other stakeholders is unwise, imprudent, and/or ethically unjustified [25]. That is, values (e.g., a shared vision) are necessarily and explicitly a part of doing business, and reject the separation between economics and ethics [22, 38]. Despite this controversy [26, 58], ST generally suggests that the purpose of an organization is to create as much value as possible for stakeholders and for sustainability. Managers must keep stakeholder interests aligned [61]. However, the identification of stakeholders must be carefully conducted.

The literature argues that the mission of healthcare organizations is generally patient population healthcare or well-being. In a healthcare context, stakeholder relationships are normative reciprocal relationships for which each stakeholder is accountable. A significant body of literature (e.g., Agich [2], Gilmartin [28], Page [49], Wreder, Johansson, & Garvare [63], etc.) provides normative evidence for quality medical and healthcare services from the perspective of social responsibility, and allows healthcare organizations, especially public hospitals, to handle clinical issues apart from finances. However, Elms, Berman, and Wicks [18] argue that if a healthcare organization merely focuses on ethics without providing managerial incentives, it may fail to prioritize specific stakeholder relationships and improve the performance. To complement the tension between normative and instrumental logic, hospitals must identify the range of stakeholders involved with or affected by organizational goals to achieve the best outcomes for the greatest number [31].

The Setting

The SMH (S Memorial Hospital) was selected not based on random or critical sampling, but because we acquired convenient data access to the hospital. SMH was originally founded in 1980 in central Taiwan, and, based on the concept of the Mayo Clinic; it has been providing a

range of medical and health services to remote and regional Taiwan for over 30 years. Since its inception, SMH has applied the latest technology to deliver medical and health services and overcome the distance and the barriers of communication among its Health Care System island-wide. SMH today employs over 5,000 full-time and part-time employees, and is a comprehensive network composed of six operating sections providing primary medical and healthcare services, general medical practices, as well as research and development of total quality management of health.

The IT vision of SMH is to meet the expectations of clinicians, organizations, and the community while implementing total health information system (HIS) and nursing information system (NIS) solutions. This enables SMH to provide IT-based safe and efficient healthcare to patients and clients. SMH’s IT vision, which meets the aforementioned normative and instrumental concepts of ST, indicates that ST is suitable to use in hospital management while examining IT implementation.

With top management support, SMH has adopted iPads for effective and efficient delivery of medical and healthcare services since 2010. In 2011, SMH further pioneered the implementation of cloud computing IT project (noted as “the project” thereafter) in collaboration with Chunghwa Telecom (CHT), a major local mobile phone operator. The collaboration is expected to improve the quality of mobile clinics and nursing and realize the more effective use of EMR and health information. The

HIS and NIS infrastructure and functionalities are also improved and upgraded with cloud computing incorporated to support health IT applications.

Qualitative Interview Approach

The interview is an effective way to explore insider perspectives and capture rich information [64]. It should be noted that our goal was not seek to statistical significance that generalizes the findings from SMH, but to understand the phenomena (i.e., challenges for top management) in relation to relevant stakeholders’ view on the project implementation.

Based on ST, we referred to SMH’s vision, and defined a stakeholder as any individual or group whose role is vital to the survival and success of SMH, and is most affected by the implementation of the project. Our participants (i.e., unit of analysis) were stakeholders shown in the matrix (Table 1). The matrix reveals respective interests (or concerns) and powers (or influences) relating to the project among four stakeholders: top management, IT people, clinicians/nurses, and vendor. Interests and powers of each stakeholder were adapted (and/or justified) from previous literature [e.g., 4, 5, 17, 32, 33, 35, 36, 37, 40]. Using the matrix, we were able to examine SCH top management supportive behaviors toward the project implementation by considering and coordinating various concerns of hospital stakeholders, which is believed to be of interest to healthcare practitioners.

Table 1: Stakeholder Involved in the Project

Role Relationship	Interests	Powers
Top Management (2)	<ul style="list-style-type: none"> ● IT Payoff ● Quality ● Efficiency ● Economic Outcomes 	<ul style="list-style-type: none"> ● Decision Making ● IT Endorsement ● IT Competence ● Business Alignment
IT People (5)	<ul style="list-style-type: none"> ● IT Resources ● IT Control ● IT Planning ● IT Personnel ● Top Management Commitment 	<ul style="list-style-type: none"> ● Business Competence ● Prioritizing IT ● IT Alignment
Clinicians/Nurses (6)	<ul style="list-style-type: none"> ● Ease of Use ● Usefulness ● EMR Frequent Updates ● EMR Accuracy 	<ul style="list-style-type: none"> ● IT Diffusion (iPad Use) ● Health and Medical Care ● Revenue / Repeat Use ● Word of Mouth/Recommendation
Vendor (1)	<ul style="list-style-type: none"> ● Economic Outcomes ● SMH’s Commitment 	<ul style="list-style-type: none"> ● Accountability ● Risk (Vision) Sharing ● Data Security (Privacy)

Note: The numbers in parenthesis indicate the number of participant

Our study is not an experiment (or research) on participants' body or psychology issue, but their view about the project implementation. The protection of human subjects in research is not violated, and data collection procedure was in full compliance with ethical standards of URM from International Committee of Medical Journal Editors. Based on Dong [17], the semi-structured interview question focused on perceived and expected top management supportive behaviors based on stakeholders' concerns and their relationships in the project. With ST, all stakeholders were considered aware of the planning and implementation process of the project. Interviewing multi-perspective stakeholders is expected to control the single source bias well.

Data were collected over an eight-month period through in-depth interviews. Each participant was interviewed for at least 90 minutes (Table 2). Field notes were taken to record a detailed account of participants' thoughts, feelings, experiences, and perceptions. Follow-up interviews were conducted to ensure that all necessary data were collected. With the prior consent of participants, tape recording was also used. Data were also collected through documentation review (e.g., office memos, meeting minutes, etc.) and discussion in relation to the implementation of the project, interactions between stakeholders, and performance assessment of the project. The informed consent of participants was also obtained for the use of data in the following analysis.

Table 2: Overview of Participants

Role	Description	Selected Interview Topic	Rounds of Interview	Average Time/Person
Top Management	Chairman, CEO	<ul style="list-style-type: none"> ● Strategic Potential of the Project (IT) ● Knowledgeable about Information Asset ● Project (IT) Spending as a Strategic Investment ● Relationship between the Project (IT) and Hospital goals 	3	96 minutes
IT People	IT Manager, HIS/NIS Committee Chair, Senior IT Staff, Director of Medical IT Committee, IT Affiliate	<ul style="list-style-type: none"> ● IT Expectation ● Project (IT) Management Sophistication ● Capabilities/Human Resources ● IT/Business Expectation ● Enabled-project (IT) Benefits 	6	93 minutes
Clinicians/Nurses	Cancer Care, Children Therapy, Neurosciences, Orthopedics, Family Medicine, etc.	<ul style="list-style-type: none"> ● User Satisfaction ● User Expectation 	5	92 minutes
Vendor	Chunghwa Telcom (CHT)	<ul style="list-style-type: none"> ● Synergy ● Privacy/Security 	2	92 minutes

Note: All possible identifications of participants were removed

Categorical aggregation was used to reduce and analyze data. Aggregation started with a provisional list of codes created prior to the fieldwork based on the literature review [56]. These codes were attached to chunks of data

from the interviews, which assigned units of meaning to the information compiled. Our initial data list included broad categories: concepts regarding the challenges that affect top management support behavior toward the pro-

ject implementation. Contrasting to interests and powers of stakeholders (see Table 1), categories were synthesized into influential higher order factors described below.

RESULTS

Top Management

Higher Order Factor: IT Productivity Paradox

Since SMH top management consists of responsible seniors, focus is on the financial viability of the project. The key challenge for the project implementation is the perceived contribution of the project. This is consistent with the literature suggesting that IT does not necessarily generate business value, which is “IT productivity paradox” [12, 46].

We found no clear guidelines or procedures for controlling and evaluating the project performance. This creates a contradiction for top management, who has to decide whether to endorse continuous project investment in the face of an increasingly sophisticated healthcare context. The Chairman notes, “... sometimes feel hesitated to endorse...rarely use traditional financial measures (e.g., ROI) evaluating IT performance (and cost) and lacks clear criteria for non-financial IT benefits.” This finding indicates the importance of necessary and appropriate project evaluation criteria and procedures to increase top management’s last minute confidence in IT, much like the findings from Chan’s [14] study in the “Great Divide between Qualitative and Quantitative and Individual and Organization Measures.”

We further found that the alignment between the project and hospital goal is critical to avoid the IT productivity paradox. As noted, the goal is to improve the effective use of EMR and overall medical and healthcare quality performance. As the Chairman notes, “To ensure success, the project must reflect business goals, recognize other stakeholders’ forces, and reflect business resource constraints...” Moreover, the CEO argues, “... often consider overall IT goals and needs... making decisions [about] cloud computing IT services.” This finding is similar to studies (e.g., Huang & Quaddus [33], Preston & Karahanna [53]) indicating that business must also refer to an IT plan, specific IT applications (e.g., mobile APPs), specific technologies (e.g., cloud computing technology), and must demonstrate reasonable IT expectations.

However, we found that an IT expectation gap still exists. The CEO complains, “Business needs are often incorrectly interpreted while developing the project due to [the fact] that overall, IT technicians lack clinical and medical experiences...” A plausible explanation for

this may be that top management often makes high demands for business value from the project; in turn, IT people are often too optimistic, creating different levels of satisfaction between the two stakeholders regarding the project performance (e.g., Cullen et al. [8], Huang & Quaddus [33]).

Higher Order Factor: Perceived IT Importance

Another key challenge is perceived importance of IT. This is consistent with the literature that understanding how top managers perceive their IT resources is critical and fundamental to the effective use of IT [33]. SMH top management has recognized that the project is critical. They embrace a strong broad-based vision for the role of IT in healthcare and thus, endorse the project, even those that have not satisfied traditional justification criteria and procedures, as previously noted by the Chairman. This is similar to past findings, which reveal that the top management’s psychological state and confidence in IT leads to critical perceptions [35].

We found that effective communication is essential to top management’s confidence and thus strong perceived IT importance toward support. The CEO notes, “Medical IT committee frequently provides updated information regarding health information and IT opportunities...makes the benefits of the project clear even though it is still in the testing and experimental stage for many other organizations.” This is consistent with the literature indicating the importance of effective communication between business and IT (Johnson & Lederer [36]).

We found that a shared vision strengthens top management’s perception. The Chairman notes, “IT people who often use business terms are more effective in creating a shared vision that improves management’s IT confidence and knowledge about health information assets...” This implies that a shared language is critical for a harmonious relationship between top management and IT people. This is similar to the study done by Preston and Karahanna [53], who state that developing a shared vision is the key to narrowing the gap, indicating technical knowledge required for top management while streamlining and giving its full support to the implementation [39].

An affiliated IT structure also evidences SMH top management’s emphasis on IT. Like every other hospital, SMH used to outsource technical support of most HIS and NIS, but the outcomes were less satisfactory. The CEO notes, “Third parties are not familiar with clinical, medical, and general administration in the healthcare context.” To alleviate that issue, an IT affiliate was established to provide technical consultancy and services for both SMH and other hospitals in medical and healthcare related systems development, hardware, health data man-

agement, and so forth. The Chairman notes, “*Sha... [an IT affiliate] is allied with medical IT committee and IT department...governing IT activities and implementing the project through collaboration with CHT.*”

Moreover, the Director of the Medical IT committee notes, “*The Chairman is very aggressive in progressive use of IT [and is] actually participating in [the] planning and implementation of the project.*” This is echoed by the literature that the supportive top manager functions much as a “back-seat driver,” approving the IT manager’s initiatives, signaling the importance of IT to line management, and perhaps providing a general business direction [35]. The Director of the Medical IT Committee also calls the Chairman the *Chief Innovation Officer* because he often initiates IT opportunities. This implies that characteristics of top management may help them view IT as valuable and support the strategic orientation of SMH into more IT-based innovations (e.g., cloud computing IT services). This finding is similar to the study of manager’s attributes that significantly influence how IT is perceived and obtains support [7].

IT People

Higher Order Factor: Flexible IT Personnel

The key challenge focuses on whether IT personnel are flexible to handle diverse contacts of medical and healthcare service. The Director of the Medical IT Committee notes, “*Business skills are crucial for both IT managers and their staff while coordinating the multifaceted and sophisticated medical and health activities...IT specialists work as assistants to clinicians to gain knowledge and experiences about clinical and medical procedures.*” This increases top management confidence (and support), benefits systems design for the project, and indicates that along with technical skills, IT personnel are expected to have business skills to improve their flexibility in response to a dynamic health context.

The CEO further notes, “*IT people should determine positive and negative impacts of a specific system [about medical or healthcare service delivery and processes]...the privacy issue [its implementation on private or public databanks], work effectively in cross-functional teams, and [be] skilled in multiple technologies and tools.*” This implies that business and general problem solving skills are as important as technical skills to IT people, echoed with the literature. For example, Lee’s [41] study shows that IT people need both technical and behavioral skills. Bailey and Mitchell [3] also identify soft, business (or strategic) concept, and technical skills that are important to flexible IT people. Other business skills like management, organization, society, interpersonal (or team work), and personal traits are also empha-

sized to ensure a good working relationship with top management [19, 42, 60].

We found that IT manager plays a role in educating his or her staff. As commented by IT manager, “*The role of being an educator is one of the most important job... show how IT provides flexible solutions for health service problems...also important to educate top management about technology issues, knowledge, capabilities, and problems.*” With this education, IT people may work flexibly under various business situations and leverage their performance with top management support. This education may also help to reduce the IT expectation gap and create strategic alignment (e.g., Preston & Karahanna [53]).

We further found that adaptability of IT people to organizational changes is another key to be flexible. The Chairman notes, “*The business scope tends to be more diverse ... and mainly emphasizes contractual partnership (e.g., alliance) with local and global medical and healthcare practitioners...causes changes in terms of forms (face-to-face vs. mobile) of providing medical and healthcare services and patterns of structural (formal) and social (informal) networks.*” As commented by both the Director of the Medical IT Committee and Manager of Shangri-La, “*Then, IT people should be more adaptive [flexible] to these rapid changes so as to fulfill top management needs [health service needs] through the project.*” With more adaptable IT personnel, SMH easily possesses change-readiness capabilities to quickly develop and deploy IT resources while implementing the project.

Higher Order Factor: Trust

Developing relationship capital (e.g., trust) is the key challenge. One of senior IT staff comments, “*...work under managers who foster fear and distrust generates a great pressure while dealing with health service problems, which affects performance [the project].*” This indicates that the development of an IT trust culture is necessary to secure IT people’s business confidence while formulating and solving complex systems as well as communicating and interacting with other non-computer hospital members. This finding is similar to Guzman, Stam, and Stanton’s [29] study, which stresses the existence and importance of the occupational trust culture of IT personnel. Preston and Karahanna [53] also argue that trust is essential for IT managers to work effectively with top management.

Higher Order Factor: Project-enabled Intangibles

Another key challenge is whether the project enables intangibles that benefit hospital (or users) performance. This is supported by the literature that IT enabled intangibles contribute to the development of core IT ca-

pability and tend to be tacit, unique, and deeply embedded in the organization's social network, all of which are critical to competitive advantage [6].

We found that enabled patient orientation attracts top management support. The HIS/NIS Chair notes, "*The CEO requires the project help to capture patient medical and health information immediately and efficiently while clinicians doing their rounds...improve patient responsiveness and determine patient requirements [quality, service, etc.]*." This means that the project is expected to result in high market orientation that improves IT capability continuously, therefore garnering more top management support. This finding is similar to Songini's [55] study; despite IT investment in customer management systems not easily paying off, good customer relationship management is rooted in the organization's IT capability for superior customer orientation, which is a top management concern.

We further found that enabled intellectual capital (or knowledge asset) attracts top management support. IT manager notes, "*it would probably be easier to satisfy the CEO if the project demonstrates [to top management] how to create, consolidate, leverage healthcare related knowledge across hospital...transfer knowledge embodied in services to new members, [and]create a culture for knowledge management*." This finding is similar to the literature that IT-enabled intellectual capital is valuable knowledge asset toward competitive advantage [52], which interests top management.

Clinicians/Nurses

Higher Order Factor: Assimilation

Whether the project is widely assimilated within SMH is a key challenge. That is, the successful project implementation depends on whether clinicians and nurses are willing to use iPad through cloud computing systems. As commented by the CEO, "*... really believe [need] to train clinicians and nurses and really have to develop them in a way that they feel comfortable...can't just ask them, do this.*" This implies that top management is expected to support resources (e.g., financial) and offer training to users. The literature argues that training is widely recognized as one of most critical factors for successful implementation (e.g., Al-Mashari, Al-Mudimigh, & Zairi [1]). Dong [17] also stresses that top management must ease user anxiety over the incoming system, address their concerns, recognize the challenges they face, and allow them time to grasp the new system.

However, satisfaction with training, appropriateness, the timing, and effectiveness affect clinicians' and nurses' intentions to use the project's cloud computing technology. Several clinicians and nurses note, "*... worry*

whether training is long and detail[ed] enough and whether new systems can provide integrated, accurate, timely, and reliable information." Similarly, Lim, Pan and Tan [45] argue that managing satisfaction with enterprise resource planning systems helps smooth the dissonance between user expectations and managerial policies.

We also found that usefulness and perceived ease of use of iPad through the project's cloud computing technology lead to improved productivity and medical and healthcare services quality. One of clinicians notes, "*I wonder [if] the system will be useful for my job, increase my productivity, and be convenient [responsive] to my job demands, such as running apps and accessing patient information (e.g., EMR) and other hospital data...*" This is similar to the literature that personal relevance of technology and perceived ease of use of a system as identified by the Technology Acceptance Model are critical to top management support over the implementation [9, 45].

Vendor

Higher Order Factor: Shared Vision and Risk

Despite there is an IT affiliate, CHT is SMH's major cloud computing IT services provider. Shared vision and risk are categorized as a key challenge to ensure the success of project implementation. The Chairman states, "*... wonder whether CHT understands hospital vision, risk, and needs while providing cloud IT services...and meet what CHT wants [profit]*." The discrepancies in vision could determine whether CHT is receptive to a certain vendor strategy.

We found that the vendor shares a similar commitment and builds trust, a long-term relationship, and commitment to shared project goals and risks, which is critical to the implementation. A manager of CHT notes, "*Mutual trust could be improved...and more committed [confident] over time as [the] two organizations become more familiar with each other's management practices [vision]*." This finding is similar to the literature claiming that a lack of shared vision contributes to difficulties with system implementation in organizations and limits its contribution to organizational competitive advantage [16, 33].

Higher Order Factor: Data Privacy and Security

Whether a vendor plays a supportive role to increase user's and patient's confidence in privacy and confidentiality of EMR is another key challenge. It may influence assimilation and thus, the success of implementation. IT manager comments, "*Clinicians and patients worry that their data may be disclosed and/or not well*

protected when hospital works with the third party and puts everything in the Cloud.” In a sense, CHT is obligated to protect patient data in terms of privacy and security, which alleviates the ethical issue of the public.

We found that the shared commitment between SMH and CHT is a critical determinant of successful data security and privacy. Both IT manager and manager from CHT note, “...work closely and CHT must act as a fair and just third party to ensure that all data in the Cloud are safe as they are supposed to be in hospital.” The literature also emphasizes data security and privacy while conducting technical collaboration, particularly when public interest is a concern [57].

DISCUSSION

Based on the findings, we emerged a causal model across hospital stakeholders (see Figure 1). Figures 1 shows eight higher order factors (i.e., challenges): two from top management (i.e., IT productivity paradox and perceived IT importance), three from IT people (i.e., flexible IT personnel, trust, project-enabled intangibles), one from clinicians/nurses (i.e., assimilation), and two from

vendor (i.e., shared vision/risk, data privacy/security). Each higher order factor contains respective contributing dimensions. For example, “IT productivity paradox” contains three dimensions of “control & evaluation”, “alignment”, and “IT expectation gap”, which might impact top management support over the project implementation. Future research should work on exploring measurement for these dimensions.

Our findings theoretically confirmed ST by showing that the project can succeed when stakeholder influence is appropriately considered and coordinated by top management. Table 3 shows that three higher order factors such as “trust” meet ST normative requirements that emphasize business ethics and public interests. Five higher order factors such as “IT productivity paradox” meet ST instrumental requirements that emphasize hospital economic performance. In a sense, our emerged model is believed to be a guidance for other hospitals because, based on ST; they can make dynamic adaptations toward their particular stakeholder influences for IT implementation.

Table 3: Theoretical Confirmation of ST

Stakeholder Influence	Higher Order Factors	Normative Discipline (Ethics)	Instrumental Discipline (Performance)
Top Management	IT Productivity Paradox Perceived IT Importance		√
IT People	Flexible IT Personnel Trust Project-enabled Intangibles	√	√
Clinicians/Nurses	Assimilation		√
Vendor	Shared Vision/ Risk Data Privacy/ Security	√ √	

Figure 1: The Causal Model

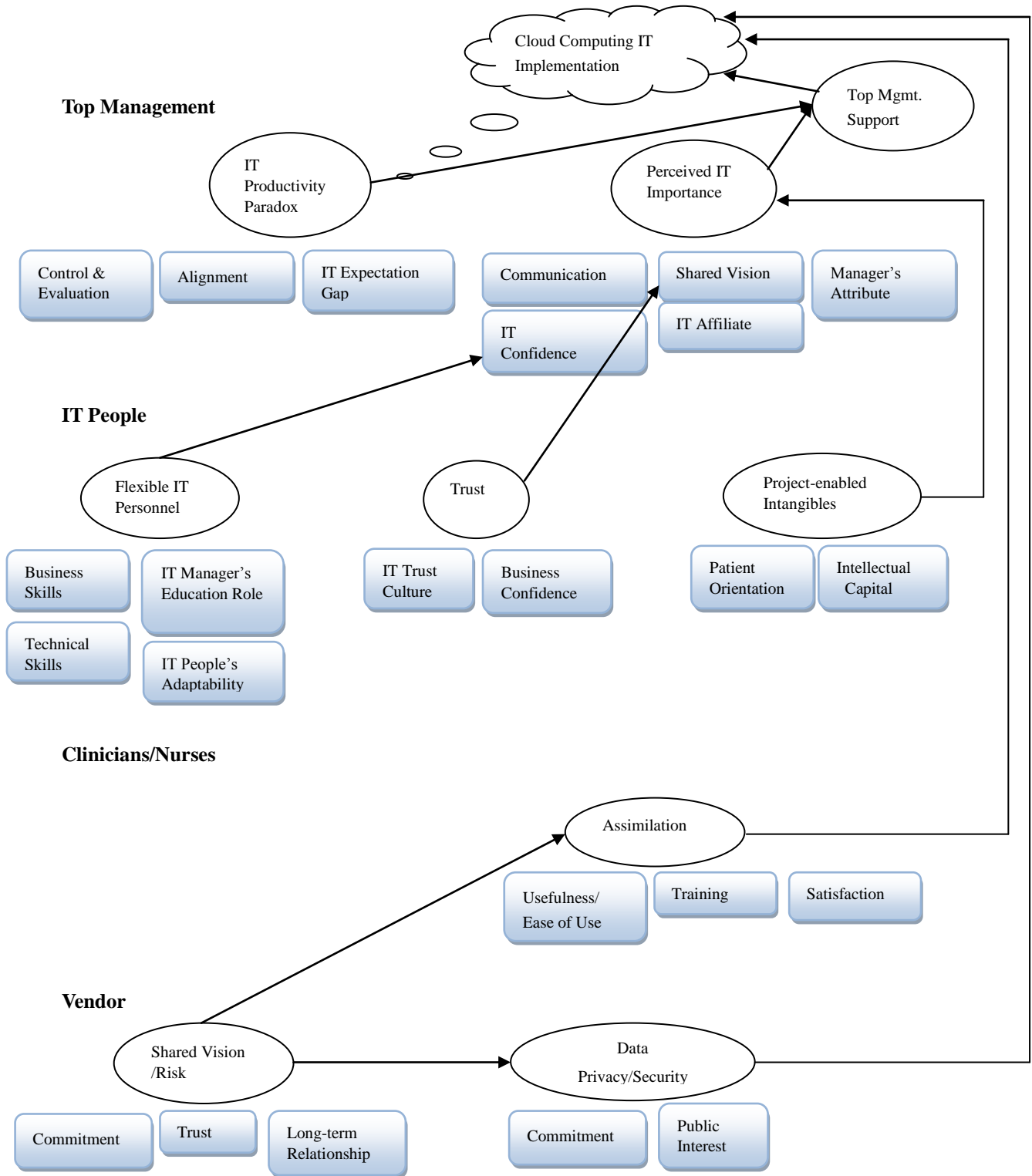


Table 4 shows theoretical implications with key propositions that ST explains how top management supports IT implementation. We propose that a hospital needs to consider the organizational stakeholders' influence in terms of interests and power when planning and implementing an IT project. This would reduce the IT expectation gap and/or get alignment. However, top management

should be aware that the interests of stakeholders might change over time. Hence, we propose that hospital top management should continuously and constantly adjust the level and content of stakeholder support. This helps top management to consider when and what kind of support is appropriate for IT people and clinicians/nurses over the implementation.

Table 4: Theoretical Implications

Higher Order Factors	Theoretically Implications	Key Propositions
<input type="checkbox"/> IT Productivity Paradox <input type="checkbox"/> Perceived IT Importance	ST can be used to assist top management support while planning cloud computing IT project	Hospital needs to consider the whole organizational stakeholders influence in terms of interests and power. Considering the stakeholder's influence, alignment between IT project and hospital goals can be better improved. Top management follows the dynamics of stakeholders, and reacts through the changes in their support content and level to guide the implementation.
<input type="checkbox"/> Flexible IT personnel <input type="checkbox"/> Trust <input type="checkbox"/> Project-enabled Intangibles <input type="checkbox"/> Assimilation	ST can be used to assist top management support over the implementation of cloud computing IT project	The capability of flexible IT personnel increases top management's IT confidence. Trust helps shape shared vision The provision of tangible and intangible IT enabled benefits helps top management emphasizes IT. The level of usefulness/ease use to improve assimilation.
<input type="checkbox"/> Shared Vision/ Risk <input type="checkbox"/> Data Privacy/Security	ST can be used to study ethical issues	The governance of EMR privacy/security to minimize harm to the public interests and to improve assimilation. Shared vision (and risk) ensures a third party's accountability.

However, to gain adequate top management support, challenges such as flexible IT personnel, trust, and project-enabled intangibles must be carefully handled. We propose that an IT manager must also consider how IT personnel can be adapted to serve hospital needs. Top management tends to be more confident in IT decisions when IT people's technical skills are actually complemented with business skills that meet users' expectations. However, top management can be hesitant in endorsing IT investment unless there is an appropriate sophisticated control procedure and formal evaluation method that clearly identifies tangible and intangible IT project enabled benefits. This could be very true in hospitals because the healthcare process is so complex; implementation is a high cost, and time is limited available to build responsive HIS and/or NIS in a cloud environment.

In a sense, for the effective use of IT, there must be a strong mutual trust relationship embedded within the hospital. We propose that trust between IT people and top management would facilitate the development of a shared vision. This would increase top management's IT confidence as well as IT people's business confidence while dealing with hospital issues during the implementation. We also propose that the level of usefulness and/or ease of use can be a greater challenge that affects IT project assimilation. As noted, training may not be enough to increase users' (e.g., clinicians/nurses) skill in the use of IT or, therefore, their confidence. However, top management support should emphasize the evolution of a shared vision in terms of users' expectations and satisfaction through the evaluation of the use of new IT applications.

Along with the use of EMR in a cloud environment (e.g., data storage online and accessible anywhere on an as needed basis), there is an increasing ethical challenge of maintaining data privacy and security while garnering the benefits, especially in a context of complex stakeholder relations and outsourcing of technical services to a third party. We propose that strong governance of EMR privacy and security would facilitate new IT assimilation (e.g., cloud computing). This would encourage clinicians/nurses to use new IT-based services while minimizing harm to public interests (e.g., protecting patients' benefits), which could protect clinicians/nurses from possible legal issues incurred from the violation of data privacy and security. We also propose that a third party of technical services must share the hospital's vision and potential business risks in terms of trust and long-term relationships. This would build third party accountability. Furthermore, the practical implications of higher order factors are discussed below, which facilitates top management support.

Top Management

A practical implication of "IT productivity paradox" and "perceived IT importance" is to establish a mechanism of effective communication although this is a common finding in the literature (e.g., Johnson & Lederer [36]). Through this mechanism, the IT expectation gap is reduced to achieve better alignment; top management would embrace a shared vision of IT and gain last-minute confidence while supporting the implementation [33], therefore increasingly adjusting their IT expectations reasonably.

However, top management's attributes (e.g., aggressive or conservative) might differentiate mechanisms [7]. This is because these attributes would determine different top management's perceived IT importance and thus, different IT expectations (or satisfaction) [33]. Future research may explore the configuration framework for building different ideal mechanisms in terms of communication points and corresponding approaches across strategic behaviors for reasonable top management's IT expectations in a hospital.

Another implication is the development of clear control procedures and non-financial evaluation methods. For example, the responsibility and authority for an IT project direction (operation) and development must be clear as the healthcare environment becomes more complex. This may reassure IT people that an IT project is properly appraised, is clear about hospital goals and responsibilities and performance criteria, and reflects hospital resource constraints. To evaluate intangible benefits, non-financial management and development criteria could be used to balance both quantitative and qualitative forms of IT investment [33]. This would prevent the loss of any associated cash flow due to difficulty of measurement [14], implying that as hospitals become more familiar with the control process of IT investment (i.e., from initiation to review and approval), top management would be committed to health IT function and gain more confidence in implementation.

Future research should demonstrate how to develop necessary non-financial criteria. We also suggest that as a hospital becomes more aggressive, a more sophisticated evaluation process may be used to ensure that an IT project aligns with hospital goals, base policies, and procedures associated with control of IT activities, thus protecting stakeholders' interests.

A specific technical task outsourced is also useful for healthcare practitioners. In our case, top management has perceived that outsourcing key health IT activities to a general IT service company can be problematic. Hence, developing a health IT Service Company (e.g., a SMH affiliate) that knows medical processes can avoid

potential pitfalls. This is in contrast to traditional IT outsourcing, where an IT manager is often called in to manage hospital operations where no significant health IT skills are involved. Future research may investigate how types of IT outsourcing differ across hospitals in terms of medical and healthcare requirements.

IT People

A practical implication of “flexible IT personnel” is that health IT human resources development efforts focus on strengthening technical skills that may have limited contributions unless comparable efforts are spent to enhance business skills as well. This is because technical investment (e.g., cloud computing) may be changing because of the uncertainty of outcomes. Business-oriented health IT human resources investment can be a relatively stable form of valuable hospital resources. Doing this, complementary technical and business skills produce flexible IT personnel in a hospital, which creates top management’s perceived IT importance and confidence over the implementation. Future research may examine the discrepancy between IT manager’s and top management’s IT expectations across different strategic behaviors associated with corresponding IT personnel capabilities (e.g., model skill, people skill, organization skill, performance skill, etc.)

Another implication of “flexible IT personnel” is that IT manager needs to prioritize IT personnel training (education) or human capital investment based on strategic needs of healthcare. However, an IT project’s implementation may necessitate organizational changes [48], rather than just rely on training and technical assistance. The IT manager needs to educate his/her personnel to fit hospital needs, since the adaptability of organizational changes is critical as found.

A practical implication of “trust” is when IT manager does not report to top management directly, and is not a member of top management; an “IT trust” culture must be necessarily fostered during the implementation. IT people get trust when they possess the required medical and healthcare knowledge that helps to increase their own business confidence, and when top management recognizes the strategic potential of an IT project. In a sense, shared vision can be formed. Future research should examine how trust can be fostered through relational capital accumulated over time by social networks, and/or one-on-one contacts between IT managers and top management in a hospital (e.g., Preston & Karahanna [53]).

A practical implication of “project-enabled intangibles” is that leveraging IT project with customer relationship and knowledge management develops the abilities of the hospital. This would efficiently help the hospi-

tal to improve responsiveness to patients (or vendors) and hospital members (users). It would also enable the hospital to create new task related knowledge, consolidate previous knowledge gains, and transfer knowledge across the hospital (e.g., in a cloud environment) more easily and flexibly. With this benefit of agility, the hospital could create a culture of customer management and could accumulate intellectual capital (e.g., knowledge embedded in healthcare services), which would reflect benefits and risk sharing, trust, communication, and coordination between all hospital stakeholders. However, future research should examine deeper how agility can be enabled through an IT project, particularly in a cloud environment.

Clinicians/Nurses

A practical implication of “assimilation” is that top management should not assume that users would be aware of their support. They need to demonstrate their support through concrete actions to increase users’ intention to adopt IT (e.g., iPad via cloud computing) [27]. For example, in addition to technical requirements such as connectivity (e.g., convenient and multi-access, download speed, etc.) and compatibility (e.g., variety of EMR types, including text, voice, and graphics, etc.), the design of IT should carefully consider hospital’s key organizational issues and problems of a given function area, determine positive and negative impacts on specified parts of the hospital, and provide useful and responsive information to aid decision-making for clinicians and nurses. This is because clinicians/nurses often expect they would benefit from IT use in terms of convenience and effective solutions.

Another example is where how top management should incentivize clinicians/nurses to use IT through training by rewards. Doing so, clinicians/nurses may expect satisfaction from the use of IT. However, top management should emphasize the training purpose of improving clinician/nurse adaptability of organizational changes. And to evaluate clinicians’/nurses’ satisfaction with use quality and align health IT functions with expectations, SERVQUAL (a kind of service quality framework) should be used. Future research can examine how to develop appropriate IT-based SERVQUAL in a hospital.

Vendor

To ensure a successful partnership, a practical implication is that a more sophisticated vendor evaluation process may be used to ensure that the vendor strategy aligns with the hospital’s goals, base policies, and procedures. In a sense, the value of vendor strategy can be sustained due to shared vision and risk between the two par-

ties. When this shared vision and risk is achieved, there is the resulting expectation that commitment and trust can be built to protect and secure patient data and privacy. Future research should examine how the vendor evaluation process differs with type of strategic behaviors in a hospital.

CONCLUSIONS

It should be noted that we only examined the phenomena of how top management support affects IT implementation across the various interests of hospital stakeholders, without necessarily looking for its statistical significance in terms of identified factors. However, a future study could consider statistical significance. We conclude that normative and instrumental disciplines of stakeholder theory cannot be mutually exclusive to use when examining IT implementation issues of top management support in the healthcare context. Stakeholder theory can serve as a practical guideline as to what and how hospital top management may perceive and support IT implementation in the face of identified factors.

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