HIT Institutionalization During the Covid-19 Turbulence

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Abstract. Implementing health information technology (HIT) is one strategy to reduce healthcare costs. However, realizing it remains a struggle. We strive to better understand the utilization of HIT within healthcare organizations by using an institutional theory and environmental turbulence. We used survey data from 432 healthcare professionals to test structural equation modeling. The findings reveal that institutional pressure and environmental turbulence have a variety of (both good and negative) effects on HIT usage. In the study's last session, academic and management contributions were further reviewed, as well as limitations and suggestions for future research.

Keywords: health information technology · institutional theory · environmental turbulence

1 Introduction

Investment in public health is critical to achieving universal health. Every country strives to cut its allocations and redirect funds to other areas of the budget. Because it has the potential to reduce medical errors, cut healthcare costs, streamline clinical operations, and enhance overall quality, health information technology (HIT) implementation is considered a key component of healthcare budget reform [1].

Nevertheless, the results of HIT deployment seem less than ideal. According to a survey from the Healthcare Information and Management Systems Society (HIMSS), only around 12,9% of health care providers had established a clinical data repository (CDR), which is the foundation of the HIT, in Q1 2013. HIT deployment hasn't always been easy, and there are certain potential benefits that haven't been widely recognized [2].

Previous research [3] suggested options for advanced HIT application, taking into account theoretical views of institutional logic and user behavior. Because the healthcare industry is heavily regulated (drugs, vaccinations, and the function of professional associations), the institutional theory is being applied [4]. Furthermore, researcher [3] proposes the use of hypothetical systems collection in IS research, such as the IS success model [5].

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Nonetheless, a couple of studies investigate IS success model in medical services, especially in looking at the progress of HIT. Second, apparently, barely anything research analyzed the relationship of Institutional hypothesis and IS Success model. Earlier IS research on Institutional point of view utilized Diffusion of Innovation hypothesis to inspect IS reception [6–8]. Other research on Institutional viewpoint additionally utilized TAM to analyze IS acknowledgment [9]. Another research on Institutional viewpoint alluded to hypothesis of innovation osmosis to inspect IS execution [10].

The essential goal of this examination is to expand and foster a methodical comprehension of IS Success Model by looking at the relationship of institutional hypothesis and testing the impact of natural choppiness with regards to HIT execution. Moreover, this study means to extend the viable utilization of HIT achievement execution in various institutional settings.

1.1 Healthcare Information Technology

HIT alluding to data frameworks in all PC based instruments utilized in medical services (ongoing and short-term patients), utilized in handling patient information, handling data and information required by medical services experts [11]. HIT covers different applications and advances utilized by medical services suppliers, for example, EHR, EMR, CPOE, CDSS, robot for drug apportioning (ROBOT), bar-coding at prescription administration (BCMA or BarA), electronic medicine administration records (e-MAR), and computerized apportioning machines (ADM).

1.2 Hypothesis Development

Organizations having disproportionate power, such as government agencies and regulators, exert coercive pressure [12]. The government has a strong grip over the healthcare industry. The government regulates pharmaceuticals, oversees the administration of health institutions, spends health funds, and establishes national health insurance. As a result, the government wields a strong and powerful position over hospital and healthcare personnel resources, influencing the conduct of medical workers in hospitals when it comes to the use of HIT [13].

Previous research has found that coercion has a considerable indirect favorable effect on clinicians' decision to oppose the German Electronic Health Card (eGK) deployment [9] because the doctors believed that employing modern information technology reduced their utility. Beside, it alters work practices [15] (including clinical routines, norms, and physician behavior), coercive coercion has a negative impact on IS programs in NPfIT [14]. because it changes work practices (including clinical routines, norms, and physician behavior) [15]. As a result, we propose the following hypothesis:

H1. The use of HIT is negatively influenced by coercive pressure.

Normative pressure is defined as the influence of the surrounding community on the adoption of a system, which is usually characterized by norms or association agreements [12]. Empirical research shows that inter-organizational network adoption is influenced by normative forces, such as in the adoption of systems linking suppliers and customers

[10]. Healthcare institutions are networks of institutionalized services (national hospitals, general hospitals, clinics, laboratories). The amount of other parties who engage in comparable activities inside the network can influence the decision to engage in particular behaviors, such as HIT installation [16].

Organizational exposure to security association and certification forums influences the implementation of security standards (ISO 17790 and BS 7799), according to empirical research [17]. Information on HIT installation success is valuable because it allows companies to demonstrate their commitment to better HIT implementation techniques [18]. According to previous research, normative pressure has a strong beneficial effect on EHR adoption in the United States [13]. As a result, we formulate the following hypotheses:

H2. The use of HIT is positively influenced by normative pressure.

Mimetic pressure refers to an organization's proclivity to replicate comparable IS from other companies [8]. Organizations that follow in the footsteps of others have shown to be successful [12]. The organization often keeps a close eye on successful activities and techniques taken by competitors in the industry. Third parties who are related to decision-makers and rivals (for example, technology providers) might be useful sources of information. As a result, decision-makers are aware of competitors' successful health IT programs. They also make a rough estimate of competitors' resources and investment in health IT implementation.

Mimetic pressure has been shown to have a strong negative impact on doctors' decisions to oppose the installation of the German Electronic Health Card (eGK) [9], as well as a positive impact on EHR adoption in the United States [13]. As a result, we formulate the following hypotheses:

H3. The use of HIT is positively influenced by mimetic pressure.

The turbulent environment is characterized as a dynamic, unpredictable state with triggers that emerge rapidly and irregularly [19]. Uncertainty about market developments encourages businesses to follow in the footsteps of successful competitors [20], including imitations in IT execution [21]. Environmental turbulence aspects are divided into three categories by researchers: dynamism, complexity, and unpredictability.

COVID-19's dynamism demonstrates how patient-handling techniques have evolved dramatically [22]. The risk of mortality is caused by different elements in complicated interactions [22]. Which is described as complexity in COVID-19. The likelihood for infection in youngsters and rural populations, the virus incubation period, undiagnosed cases, and the longevity of the COVID-19 transmission period all contribute to COVID-19's unpredictable nature [22]. Previous research has shown that avoiding EMR adoption in a tumultuous environment has a favorable effect [23]. As a result, we contend that COVID-19's dynamism, complexity, and unpredictability may have a negative impact on HIT implementation.

H4a. The use of HIT is negatively influenced by COVID-19' ET-Dynamism.
H4b. The use of HIT is negatively influenced by COVID-19' ET-Complexity.

H4c. The use of HIT is negatively influenced by COVID-19' ET-Unpredictability.

2 Research Method

2.1 Pilot Test

In constructing empirical study measurements, we followed Neuman's principles [24]. Contextualizing the construct, assuring content and face validity, boosting discriminant and convergent validity, and conducting a pilot test are some of the processes that must be carried out to improve the reliability and validity. We leverage metrics from prior studies, such as the notions of institutional pressure [8, 17], environmental turbulence from [21, 25], IS Success Models from DeLone & McLean [5, 26]. The measures were then tweaked to fit the needs of the study.

Beside that, two linguistic students translated all of the measuring items into Bahasa Indonesia. We then compare and contrast the results of their translation to confirm that they are accurate. The survey questionnaires were then analyzed and validated by two professors at the medical college. Seven questionnaire questions were modified as a result of this technique. Furthermore, all of the questionnaire items, as well as seven modified questionnaire items, were pilot tested on 29 postgraduate medical students in Indonesian universities. They were picked because they have sufficient expertise and experience with health information technology in hospitals.

The expert's judgment of the importance and relevance of the questionnaire items determines the content validity ratio (CVR). The expert's assessment of the clarity of the questionnaire items determines the content validity index (CVI). When calculating pilot study items, these two indicators are used. The outcomes were better than expected. All questionnaire items in this study's survey were graded on a seven-point Likert scale, with 1 indicating "strongly disagree" and 7 indicating "strongly agree."

2.2 Sampling

The hospital target was chosen after researchers contacted physician and nurse associations. In the first phase of the poll, respondents were asked if they had ever used or heard of HIT. To confirm the veracity of respondents' occupations, the Ministry of Health checked their physician/registered nurse's identification. An introductory email was sent, along with a survey reward of $365 USD for twenty random respondents. Because of the hectic circumstances in hospitals during the COVID-19 epidemic, a survey reward has been devised to encourage responders to complete the questionnaire. Identity verification reduces the risk of unintended responders and ensures data accuracy. We obtained 432 valid and acceptable responses from 533 people who had personally performed HIT during the COVID-19 epidemic. Physicians (48%), those with 3 to 10 years of experience (38%), those who use HIT almost every day of the week (31%), those who have joined the COVID-19 squad at their hospital (64%), and those who worked in the emergency department (64%) are the key characteristics of respondents (20%).

3 Results and Discussion

This study employed PLS-SEM by operating statistical software SmartPLS version 3. Assessment of measurement models include (1) composite reliability to evaluate internal consistency (above 0.7), (2) loading factors for each item (above 0.7), (3) average variance extracted (AVE) to evaluate convergent validity (equivalent or above 0.5), (4) Cronbach alpha to evaluate the reliability of internal consistency (above 0.708) [27]. All reflective items were meet the cut-off value (Tables 1 and 2).

Table 1. Reliability and Convergent Validity

Construct	Item	FL	C' α	CR	AVE
Coercive Pressure	GR1	0.912	0.87	0.92	0.79
	GR2	0.923			
	IP1	0.866			
	IP2	0.912			
Normative Pressure	HAP1	0.777	0.84	0.91	0.77
	HAP2	0.868			
	RS1	0.908			
	RS2	0.931			
Mimetic Pressure	RHE1	0.899	0.87	0.92	0.79
	RHE2	0.914			
	SEC1	0.837			
	SEC2	0.846			
Environmental Turbulence of Covid-19	ETD1	0.811	0.82	0.89	0.69
	ETD2	0.861			
	ETC1	0.853			
	ETC2	0.880			
	ETU1	0.834			
	ETU2	0.781			
HIT-Use	EFU1	0.900	0.89	0.93	0.82
	EFU2	0.909			
	EXU1	0.935			
	EXU2	0.942			
	DHU1	0.857			
	DHU2	0.888			

Note: FL = Factor Loading; C'α = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted

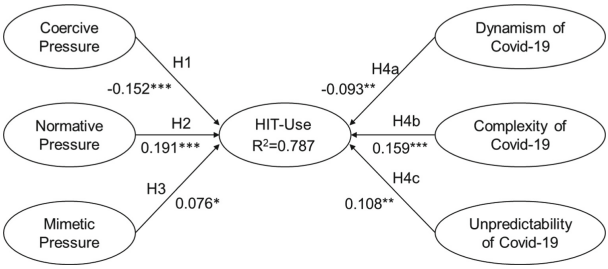

Fig. 1. Structural model results

Table 2. Results of the Path Analysis and Hypothesis

Path	Co-efficient	P Values	Hypo	Results
CP → Use	−0.152	0.000	H1	Supported
NP → Use	0.191	0.000	H2	Supported
MP → Use	0.076	0.033	H3	Supported
Dyn → Use	−0.093	0.003	H4a	Supported
Comp → Use	0.159	0.000	H4b	Not Supported
Unp → Use	0.108	0.006	H4c	Not Supported

Note: ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05; bootstrapping: 1,000 samples with a total of 432 cases

Two of the correlations are negligible, while the other five are noteworthy. The HIT-Use has no significant link with COVID-19's turbulence unpredictability and complexity (H4). Figure 1 shows the interaction form in further detail.

4 Conclusion

The statistical findings reveal that COVID-19's complexity and uncertainty create outcomes that deviate with our hypothesis, which states that both aspects have a large positive impact on HIT use (H4b and H4c). This could be due to healthcare workers' desire for assurance and clarity on COVID-19 [22]. The findings for each institutional construct were all positive. Coercive, normative, and mimetic pressures have all been shown to have a favorable impact on the use of information systems in the past [26].

4.1 Theoretical Implications

This study adds to the corpus of knowledge in a number of ways. To our understanding, this is the first study to combine institutional theory, environment turbulence, and the IS success model, to the best of our knowledge. Second, earlier research on the detrimental consequences of coercive pressure [9, 14, 15] is supported by our study. This also emphasizes the healthcare sector's peculiarity in an institutional setting [4]. Third, this

study may be the first to define three distinct constructs from the standpoint of environmental turbulence and investigate their implications on IS use. Previous research [21, 28] exclusively employed one construct: 'environmental turbulence' or 'market turbulence.'

4.2 Practical Implications

To begin, the government might encourage professional organizations to host debates, seminars, conferences, and academic activities centered on the use of HIT. Our findings suggest that normative pressure induced by HIT and health ecosystems can lead to an increase in HIT utilization [9, 14, 15]. Secondly, the governments can incentivize the private sector to do HIT-related research and development. Our research demonstrates that putting a lot of money into developing HIT can lead to more people using it [4]. Third, in a tumultuous climate, the governments need to provide HIT development incentives. Because the utilization of HIT increases only when the environment is tumultuous. Successful application of HIT, on the other hand, necessitates research and development [21, 28].

4.3 Research Limitation and Suggestions for Future Research

The study's shortcomings could be used as a starting point for further research.

1. To begin with, the study's response rate is relatively low. This is due to the fact that health professionals are short on time and are concerned about study confidentiality [29]. Future studies must formally partner with a physician or nursing organization to solve this challenge.
2. There may be work-related environmental elements to consider. Despite the fact that there has been minimal study on construct for the IS success model [26], we believe that future research should consider the TOE framework [30].
3. The adoption of IS in health care is a large topic.
   Furthermore, current health technology trends are evolving not only from the perspective of the provider (hospital), but also from the perspective of the patient. Future study should explore the convergence of IS health with wearable health technology, according to the authors.

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