The Influence of Organizational Contextual Factors on Health Technology Assessment (HTA) Adoption in Selected Hospitals, Southeast Queensland, Australia

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Abstract—This study is part of a larger study which investigates the effectiveness of the dissemination of HTA products to its target users at institutional level. This part of the study explores the influence of organizational contextual factors on HTA adoption by healthcare professionals in the hospitals. The method used for this part of the study was via self-administered survey questionnaire. Data were analyzed by using SPSS 20. The statistical analyses used were analysis of variance (ANOVA) and multiple regression analysis. The findings from ANOVA shows that the contextual variables in all hospitals under study are similar, thus the data collected can be combined to conduct a more robust multiple regression analysis. Regression analysis shows that the organizational contextual factors only explain a total of 20.5% of the variance in the HTA adoption in the selected hospitals. Hence, organizational contextual factors are not the only factors that influence HTA adoption. This unexpected result may be caused by low awareness among healthcare professionals about HTA at hospital level. Thus, HTA agencies need to find better ways of disseminating HTA products to their target users.

Index Terms—Innovation Adoption, Health Technology Assessment (HTA), Hospital, Organizational Contextual Factors.

I. INTRODUCTION

This study explores the relationship between organizational contextual factors and health technology assessment (HTA) adoption among healthcare professionals in hospitals. The study is part of a larger project which uses multi-method multiple case studies as a research design. The results presented in this paper are from the quantitative component of the project.

This paper starts with a review of the literature providing the background to the study. Then the methodological aspects will be discussed, followed by the findings, discussion and conclusion.

II. LITERATURE REVIEW

A. Health Technology Assessment (HTA)

Most clinical decisions and treatment performed in hospitals are affected by health technology. The pressure to deal with scarce resources at hospital level is very real. Patient management systems and delivery of care have also experienced massive investigation and redesign [1]. The goals of cost containment, superiority of care, and reasonable access to health care represent an ongoing challenge to hospital administrators. The adoption of expensive health technology is an unclear, risky and complicated process [2]. Because of these issues, the importance of establishing health technology assessment (HTA) at hospital level is gaining acceptance and recognition [1].

Recently, HTA increasingly plays an important role in providing clinical guidance, informing reimbursement and pricing decisions on the use of health care technology throughout the world [3]. Now, HTA is viewed as a decision-making tool to assist evidence-based health care decisions [3].

HTA is defined as “the systematic evaluation of the properties, effects and/or other impacts of health care technology. Its primary purpose is to provide objective information to support health care decisions and policy making at the local, regional, national and international levels.” [4] p.3.

The findings published by HTA agencies can help decision makers evaluate new interventions and make an informed decision on prioritization issues. However, the benefits and usefulness of HTA products can only be fully utilized if the health system stakeholders are aware of, and know about the mission of these HTA agencies and their findings[5]. The key reason for HTA to be provide objective information to support health care decisions. HTA programs are designed, therefore, not only to generate high quality information and analysis, but also to exploit this instrument effectively in order to convince decision makers in health care systems [4]. Hailey [4] further states that the most visible presentations of effectiveness of an HTA agency are its products.

Arelanno, et al. [6] categorized HTA products into four categories. They are:
1. Full HTA reports (the lengthy and extensive report of the assessment on a specific technology),
2. Systematic reviews (a report based on existing literature),
3. Joint papers (reports jointly published with another organization), and
4. Short documents (such as technical briefs, rapid assessments, and up-dates).

These products ought to be generally available for organizations and individuals to assess. The obvious indicator of effectiveness is the process by which the decision makers are notified and influenced and this includes the dissemination process of the program’s products [4].

HTA has been recognized as an important source and support tool for decision making at every level of the health care system [7]. However, there is a recurrent concern that HTA is not incorporated as it should be into political, organizational, and clinical decisions [8]. To date, most studies on diffusion and adoption of HTA are done at HTA providers/agencies and policy-makers level. Yet, studies on the forces that affect HTA integration into organizational and clinical practices are scarce [9].

B. Organizational Contextual Factors

Organizations, especially healthcare organizations, are complex [10], having many different actors with their roles intertwined. Besides the individuals, organizational characteristics also play a key role in the adoption process of an innovation in organizations [11]. In particular, research shows that the culture of an organization has a strong bearing on the availability of resources, education and attitudes [12]. Studies carried out on the organizational characteristics that influence organizational innovation adoption have indicated the significance of complexity, innovativeness, size, control, communication, centralization, presence of a champion, organizational slack, access to and amount of resources, time constraints, staffing, professional autonomy, geographic location, and organizational support [10,13]. Greenhalgh et al. [14] classify organizational characteristics as ‘inner context’ which can be thought of as the vehicle through which any innovation must pass before it is diffused and adopted in an organization.Inner context affects the rate and direction of adoption.

Context is defined as the environment or setting in which the proposed change is to be implemented [15], or in this research, the environment where an innovation (in this case, our innovation is HTA) is going to be adopted. Among the characteristics of the context that may influence the adoption of an innovation in an organization are culture, leadership, evaluation or feedback, role, a favorable organizational climate towards research use, organizational strategy, and information processing capacity [13]. Organizational characteristics and contextual characteristics are interconnected and some authors treat the two variables interchangeably. Greenhalgh et al. [14] however, differentiate these two variables as a ‘hard’ medium which includes the visible and measurable organizational structures (such as size and centralization) and a ‘soft’ medium of culture and ways of working.

C. Research Framework

Organizational context is widely considered to have a major influence on the successful diffusion and adoption of an innovation in health care settings, however, there is little empirical evidence to support this claim [16]. Thus, we observe organizational contextual factors as independent variable to HTA (as an innovation) in healthcare organizations (i.e. hospitals) in this study. Kitson, et al. [15] conceived the Promoting Action on Research Implementation in Health Services (PARIHS) framework, a framework that promotes a utilization of research findings such as HTA products in practice. The PARIHS framework suggests that context has three components: culture, leadership, and evaluation. Estabrooks et al. [13] expanded the concepts to include information sharing activities, information sharing interactions, information sharing social processes (social capital), structural and electronic resources, and organizational slack (i.e., time as a resource and human resources). Fig. I depicts the conceptual framework of the study.

This paper examines the relationship between organizational contextual factors and HTA adoption in hospitals. The research question for this study is: “Do organizational contextual factors influence HTA adoption and diffusion in an organization?”

![Fig. I Conceptual framework adapted from the PARIHS framework [13, 15].](image_url)

III. METHODOLOGY AND RESEARCH DESIGN

This study employed multi-method multiple-case study research design. However, for this part of a study, we used a self-administered survey as our data collection method. The survey method was selected because it gave an opportunity for the researchers to achieve in-depth statistical data from a reasonably large sample of respondents. This method provides a workable instrument for respondents and permits the researcher to ask a significant number of questions. It offers speedy, cheap, efficient, and accurate ways of assessing information about the population.

A. Setting

This study took place in Southeast Queensland, Australia. Invitation letters together with a summary of the research project were sent to the General Managers of the hospitals in Southeast Queensland. Only four hospitals gave positive response and become our research sites.

B. Sampling Technique

We chose non-probability sampling as our sampling technique due to time, budget and access constraints. Also,
the aim of this case study is not to generalize the results to the whole population but to gain deeper understanding of the phenomenon within its real-life context [17]. Using a non-probability technique, a convenience sampling method was selected, because of the limited accessibility available to contact the respondents.

C. Sample Selection and Sample Size

The sampling frame for this study is the healthcare professionals including administrators and clinicians employed at the selected hospitals. The total employee population for the four hospitals is 4017. Based on sample size calculator with 95% confidence level and \( p = 0.5 \), the sample needed is 94 respondents.

D. Survey Instrument

To collect data we used (1) a demographic data form, (2) an established instrument developed by Estabrooks, et al. [16] to measure organizational context, the Alberta Context Tool (ACT), and (3) an adapted version of Research Utilization (RU) Questionnaire developed by Champion and Leach [18] to measure HTA adoption. Both instruments have been used in many studies and have been validated by previous researchers. We conducted post-analysis to confirm the validity and reliability of the instruments. The Cronbach’s alpha for both instruments for this study ranges between 0.75 and 0.93, which is more than the 0.70 acceptable levels.

E. Data Collection Process

The minimum sample size needed is 94. In order to get at least 94 responses, we distributed 400 questionnaires to the healthcare professionals in the four hospitals via their head of departments. After a few follow ups, we obtained a 34% rate of return, or 137 responses.

F. Data Analysis

We conducted the statistical analysis by using the Statistical Package for Social Science version 20 (SPSS 20) software. We used an alpha level of 0.05 to determine the statistical significance of the data. Two statistical analyses were conducted: (1) analysis of variance, and (2) multiple regression analysis.

IV. FINDINGS

The results are divided into two sections based on the statistical analyses conducted.

A. Analysis of Variance (ANOVA)

The two-way between-groups analysis of variance (ANOVA) was chosen to test the impact of different hospitals on one dependant variable (HTA adoption). ANOVA compares these variance estimates by means of statistics known as the F ratio.

ANOVA was also used to compare the differences in demographic factors among the four hospitals. The distribution of position in the sample from the four hospitals differed significantly (\( F(3,91)=11.374, p=0.000 \)) with all respondents from Hospital A being managers (administrative and clinical), whereas the respondents from the other two hospitals, Hospital C and Hospital D, were more from clinical posts; Hospital C (16.7% managers, 83.3% clinicians), and Hospital D (19.7% managers, 80.6% clinicians). Hospital B was more evenly balanced with 46.2% managers and 53.8% clinicians. With respect to gender, there were more females than males for all hospitals and in Hospital C the participants were all females. F ratios for gender showed there was a significant difference between male and female samples from the four hospitals (\( F(3,90)=4.116, p=0.009 \)) at 95% significance level. The education level of the sample from all four hospitals indicated that majority of them have undergraduate levels of education such as certificate, diploma, and bachelor degree (77.7%) with only 33.3% of overall respondents qualified at postgraduate level, with either a medical degree, masters or PhD (\( F(3,90)=3.433, p=0.020 \)). Looking at the age and years of experience, the F ratio for both variables showed there were no significant differences between the research sites. In conclusion, four demographic variables; type of hospital, position, gender, and level of education showed significant differences between the sites, these variables may thus become confounding factors in the relationship between dependent and independent variables.

Using ANOVA, we analyzed further to compare the differences in the studied variables (organizational contextual factors and HTA adoption) among the four hospitals. The leadership style F ratio (\( F(3,92)=0.48, p=0.70 \)) shows that there is no significant difference among the four hospitals (Table I). This pattern is also true of other variables. There were no significant differences among the research sites in terms of culture, evaluation, social capital, and organizational slack (staff, space and time), informal interaction, formal interaction, structural and electronic resources, and HTA adoption.

These results show that the differences in the responses between the four hospitals are not significant. This indicates that the organizational context of the four hospitals was quite similar. Hence, to gain the statistical power required in order to run a more sophisticated analysis, such as multiple regressions, we analyzed the results based on the overall (total) responses provided from the four hospitals to answer the research questions.

B. Standard Linear Multiple-regression Analyses

To test the relationship further we used linear regression. The primary goal of linear regression is to examine the predictive relationships between the dependent and the independent variables. Referring to the previous demographic analysis, four demographic variables: hospitals, position, gender, and education showed significant differences among the four research sites. Thus, to control their effect that might confound the association between the organizational contexts and HTA adoption, we included these factors in a second block of regression analysis. A summary of the first regression model, which did not include the demographic variables indicates that the predictors of the organizational contexts explained a total of 15.4% of the variance (\( R^2 = 0.154 \), \( F(10, 74) = 1.343, p = 0.224 \)) in HTA adoption. However, the second model, which included the four demographic variables explained a total of 21% of the variance (\( R^2 = 0.210 \), \( F(14,70) = 1.330, p = 0.212 \)). This signifies that the demographic variables do indeed confound the relationship between organizational context and HTA adoption.

We deleted the variables with the lowest non-significant regression coefficient from the second model, step by step, and conducted another regression analysis. We stopped extracting variables when the last variable we took out caused the other variables remaining in the model to become less
significant. We started the extraction process with demographic variables; type of hospitals and education.

The organizational contexts that we removed were leadership, formal interactions, organizational slack (time), and organizational slack (space). The final regression analysis conducted had an $R^2$ of 0.205 ($F(8,76) = 2.452, p = 0.20$). Table II summarizes the final regression model.

The final model indicates that the six organizational contexts (culture, evaluation, informal interactions, social capital, organizational slack (staff), and structural and electronic resources) and the two demographic factors (position and gender) explained a total of 20.5% of the variance in HTA adoption in the selected hospitals.

The respondents were not familiar with HTA [5] and many seemed never to have heard the term before, suggesting that more work should be done to find effective ways to disseminate HTA products at the institutional level in the future.

Table III displays the regression coefficient for the relationship between organizational contexts and HTA adoption of the final model.

The findings showed that the organizational context for all the four hospitals in this study, is generally positive, except for organizational slack (staff, space, and time), or environment, with means between 3.5 and 4.5. The hospitals’ environment in our study should be conducive for HTA adoption.

However, the results from our regression analysis illustrated that six contexts (culture, evaluation, informal interactions, social capital, organizational slack (staff), and structural and electronic resources, together with two demographic factors (position and gender) only explained a total of 20.5% of the variance in HTA adoption in these hospitals. We believe that this phenomenon occurs because of the low awareness among the healthcare professionals of HTA.

V. DISCUSSION

Theoretically, based on the PARIHS framework, the organizational context of leadership, culture, and evaluation influences the adoption and diffusion of research findings (here HTA products) into practice. Using the PARIHS framework as a basis, the Alberta Context Tool (ACT) was developed by Estabrooks, et al. [16] to measure the contextual factors in healthcare organizations.

As discussed in the methodology section, we used the ACT to measure the organizational contextual factor in our current study. ACT measures ten dimensions of organizational context: leadership, culture, evaluation or feedback, organizational slack (staff, space, and time), structural and electronic resources, information sharing (interactions, social process or social capital, and activities).

### TABLE I: ANALYSES OF RESULTS BASED ON RESEARCH SITES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>Hospital A</th>
<th>Hospital B</th>
<th>Hospital C</th>
<th>Hospital D</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Leadership</td>
<td>1-5</td>
<td>3.48 0.73</td>
<td>3.85 0.85</td>
<td>3.76 0.89</td>
<td>3.82 0.76</td>
<td>0.48 0.70</td>
</tr>
<tr>
<td>Culture</td>
<td>1-5</td>
<td>3.89 0.68</td>
<td>3.94 0.74</td>
<td>3.89 0.92</td>
<td>3.96 0.61</td>
<td>0.05 0.99</td>
</tr>
<tr>
<td>Evaluation</td>
<td>1-5</td>
<td>3.67 0.62</td>
<td>3.46 1.05</td>
<td>3.52 1.11</td>
<td>3.51 0.87</td>
<td>0.11 0.96</td>
</tr>
<tr>
<td>Social Capital</td>
<td>1-5</td>
<td>4.22 0.49</td>
<td>4.27 0.56</td>
<td>4.08 0.56</td>
<td>4.13 0.61</td>
<td>0.50 0.68</td>
</tr>
<tr>
<td>Informal Interactions</td>
<td>0-1</td>
<td>0.62 0.30</td>
<td>0.58 0.21</td>
<td>0.62 0.32</td>
<td>0.65 0.25</td>
<td>0.50 0.69</td>
</tr>
<tr>
<td>Formal Interactions</td>
<td>0-1</td>
<td>0.63 0.23</td>
<td>0.57 0.22</td>
<td>0.55 0.27</td>
<td>0.52 0.24</td>
<td>0.35 0.79</td>
</tr>
<tr>
<td>Structural and Electronic Resources</td>
<td>0-1</td>
<td>0.68 0.16</td>
<td>0.66 0.16</td>
<td>0.57 0.26</td>
<td>0.69 0.20</td>
<td>1.58 0.20</td>
</tr>
<tr>
<td>Organizational Slack</td>
<td>1-5</td>
<td>3.11 1.08</td>
<td>3.29 1.08</td>
<td>3.10 1.14</td>
<td>3.00 1.20</td>
<td>0.33 0.81</td>
</tr>
<tr>
<td>- Staff</td>
<td></td>
<td>3.10 1.21</td>
<td>3.43 0.70</td>
<td>3.19 1.15</td>
<td>3.17 1.08</td>
<td>0.40 0.75</td>
</tr>
<tr>
<td>- Space</td>
<td></td>
<td>3.16 0.57</td>
<td>3.09 0.54</td>
<td>3.21 0.69</td>
<td>3.20 0.73</td>
<td>0.17 0.92</td>
</tr>
<tr>
<td>- Time</td>
<td></td>
<td>3.18 0.82</td>
<td>3.26 0.84</td>
<td>3.29 0.68</td>
<td>3.34 0.49</td>
<td>0.15 0.93</td>
</tr>
<tr>
<td>HTA Adoption</td>
<td></td>
<td></td>
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</tbody>
</table>

Table III displays the regression coefficient for the relationship between organizational contexts and HTA adoption of the final model.

Our claim is supported by looking at the statistical mean for the responses for HTA adoption which is between 3.18 and 3.34. These values show that most of the respondents picked neutral as their response. This finding is supported by the decision makers’ interviews from the qualitative part of the study which indicated that most of the healthcare professionals in these hospitals have low awareness of HTA.

As explained by Hailey [4], the key display of effectiveness is the process of how the decision makers are
informed and influenced. This also includes the way the HTA products are disseminated. Hence, our findings show that the dissemination strategies of HTA products at the institutional level are still not effective.

VI. CONCLUSION

Although the environment in an organization may be conducive to engage and encourage HTA adoption, the awareness of the product must be created first. The findings from this study indicate that positive organizational contextual factors do not influence HTA adoption. We can conclude that in this set of case studies, the awareness of HTA among health care professionals in the hospital is still very low and HTA is not yet fully adopted or diffused at an institutional level.

VII. IMPLICATION TO THEORY AND PRACTICE

Our study makes a contribution to the body of knowledge related to the adoption of technology by conducting a study at the institutional level and our evidence confirms that the awareness of HTA is still low among the decision makers and health care professionals at the institutional level. This, in turn, has important implications for practice of health care policy makers and state health departments, at local and national level. They need to increase awareness of HTA among decision makers and health care professionals at hospital level, whether private or public hospitals. Furthermore, this finding also provides evidence to the HTA providers/agencies indicating that they must be more proactive and find better strategies to disseminate HTA products at institutional or micro-level, and not just to the macro- and meso-level. HTA producers/agencies who simply produce HTA products on their website and journals and hope that the decision makers or health care professionals will search and find them, clearly have to change their policy and practices. The producers/agencies require regular productive interactions with decision makers and health care professionals to build awareness about their products. Our findings can become a foundation for the research on dissemination strategies. Further systematic research based on these case studies should be conducted to test our finding.

VIII. STUDY LIMITATION AND RECOMMENDATION FOR FUTURE RESEARCH

Even though new insights have been identified by this study, we recognise there are several limitations in this study. These limitations include (1) the hospital selection processes which was purposive rather than random, (2) the cross sectional nature of data collection process, and (3) the use of a modified version of survey instruments (a combination of different instruments from different authors).

Future researchers may investigate the dissemination methods that the HTA producers/agencies use in more depth and propose new strategies for more effective dissemination processes at the institutional level. Such studies would be particularly worthwhile, in that it would greatly assist both the HTA producers/agencies and the health authorities worldwide, to improve the dissemination of HTA throughout the health care system and to find solutions for knowledge translation problems of transmitting evidence to practice.

REFERENCES

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