

# Spatial Maturity in a Health Agency: A Pilot Study

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## Executive Summary

### Geographic information systems (GIS) and spatial technology are essential yet underutilised tools in the health sector.

Technology use can be conceptualised as the product of the context, the tool, and the user. Mäkelä (2012) defined a ‘spatial maturity model’ as a set of capabilities that are required for the effective use of spatial technology. Our focus in this pilot study is on the level of capacity required to attain effective use of spatial technology in a health-sector context. This pilot study aims to develop a framework and a tool to evaluate the use of spatial technology at an organisational level, and to trial the tool in the Public Health and Clinical Services Division (PHCSD) of the Western Australian (WA) Department of Health. Although our primary target audiences are administrators and policy personnel in the health sector, it is hoped that the trial will also provide useful insights for the development of organisational ‘spatial maturity’ in other sectors.

To address the broad aim of this pilot study, the following methodological approach was developed. After the literature review and construction of the

framework and tool, the project proceeded through four stages: (1) spatial maturity survey based on nine personal interviews across three branches in the PHCSD (Epidemiology [EPI], Environmental Health [EH], and Disaster Management [DM]); (2) group discussions across the three branches; (3) analysis of results; and (4) identification of practical recommendations for further action, which allowed the division to determine next steps in developing spatial maturity.

The results show that despite significant effort in recent years to promote spatial technology across the PHCSD, some areas within the division still lack the awareness or resources to benefit from these technologies. Based on the study findings, it was observed that the role of the State Government, spatial data quality, and overall satisfaction with spatial technology were perceived as being at an advanced level of maturity. However, the findings revealed that other aspects were less spatially advanced. For example, it was noted that

This report will reinforce that there is more to technology adoption than ‘cool tools’, that a generic framework is available to look at ‘capacity to use’, that mixed methods analysis can lead to critical organisational insights, and we can realise the potential of spatial technology to contribute to better organisational performance.

there is no one strategic plan of spatial technology for the division, that most of the tasks being done are driven by immediate (ad hoc) needs, and that there is no agreed and structured organisational workflow.

In addition, despite growing awareness of using spatial technology in the division, not enough funding and resources were allocated for training, especially external training, which is essential to develop relevant knowledge and maintain a professional level of spatial skills. Also, it was observed that some areas in the department do not have sufficient access to internal web-mapping tools or other spatial resources, and that the IT support is not well synchronised or coordinated with the spatial needs of the division. To increase the spatial maturity capacity across the PHCSD, it is proposed that action be taken in response to the major findings of this pilot study. Specific actions

will be determined internally within the division and do not fall within the scope of this report for reasons of organisational confidentiality.

In summary, it can be concluded that the application of the new framework and tool provides a solid basis for the PHCSD to improve its practice through effective implementation of spatial technology. It is anticipated that the methodology and conceptual framework developed in this pilot study will become a reference for health authorities. Although this case study is health specific, the framework is generic. The findings have been used in the pilot to drive organisational improvement, but could also be used to benchmark an organisation against its peers, and to provide a baseline or method of monitoring progress. Accordingly, the framework could not only be applied to other health organisations in the future, but also have strong relevance in other sectors.

In summary, it can be concluded that the application of the new framework and tool provides a solid basis for the PHCSD to improve its practice through effective implementation of spatial technology.

## Pilot Project Objectives

THIS PILOT STUDY AIMS TO DEVELOP A FRAMEWORK AND METHODOLOGY TO EVALUATE THE USE OF SPATIAL TECHNOLOGY, AND TO APPLY THESE TO A CASE STUDY IN THE PHCSD WITHIN WA HEALTH. THE TERM USED TO EVALUATE OR DESCRIBE THE EXTENT TO WHICH THIS TECHNOLOGY IS BEING UTILISED IS 'SPATIAL MATURITY'.

To achieve the aims of this pilot study, the following practical objectives were identified:

- Identify the key elements, items and domains of information that are required to evaluate spatial maturity in the PHCSD;
- Develop a conceptual framework and a methodology for evaluating spatial maturity;
- Conduct a spatial maturity evaluation exercise; and
- Provide a summary of the results that can be used to improve spatial technology utilisation across the PHCSD and improve the spatial maturity tool.

The study, therefore, addresses the following research questions:

- What information is needed to develop a spatial maturity evaluation tool?
- How can this spatial maturity evaluation tool be developed, framed, and implemented across the PHCSD?
- How do participants perceive the sophistication of use of spatial technology within their work environment?
- Can the use of spatial technology across the PHCSD be improved?

The peer-reviewed literature offers only a few theoretical models that evaluate the use of spatial technology (i.e., spatial maturity) within certain organisations.

## Background

THE USE OF SPATIAL TECHNOLOGY PLAYS AN ESSENTIAL ROLE IN PUBLIC HEALTH. MÄKELÄ (2012) DEFINES A SPATIAL MATURITY MODEL AS A SET OF CAPABILITIES THAT ARE REQUIRED FOR THE EFFECTIVE USE OF SPATIAL TECHNOLOGY TOOLS TO SUPPORT OPERATIONAL AND STRATEGIC FUNCTIONS.

Our definition of spatial maturity in this pilot study was the extent to which the organisation reached the capacity required to attain effective use of spatial technology across the PHCSD.

The peer-reviewed literature offers only a few theoretical models that evaluate the use of spatial technology (i.e., spatial maturity) within certain organisations. Therefore, the current literature review focused also on white papers and guidelines from the IT sector relating to IT maturity in a more general sense.

One of the most prominent documents that was reviewed was developed by Even Keel Strategies, Inc. (2008). According to the authors, spatial maturity is a structured collection of elements that describe certain aspects of evolution of an organisation's capacity to use spatial technology. A maturity model may provide, for example, a place to start, a common language and a shared vision, a framework for prioritising actions, and a way to define what improvement (in terms of the use of spatial technology) means for a certain organisation.

While developing the evaluation tool in this study, the relevant literature has been reviewed and some of the valuable suggestions adopted. For example, Mäkelä (2012) focused mainly on the collaboration aspects of spatial technology, testing whether the use of spatial technology within a certain organisation can mature from separate actions to a strategic and structured policy. Mäkelä (2012) used the following criteria (among others) to assess spatial maturity:

- Utilisation of spatial data is based on the enthusiasm of one or few employees;
- Spatial data and GIS software needs are solved on a project by project basis; and
- The top management of the organisation does not recognise the potential of spatial data and spatial solutions.

However, it is important to note that, although the relevant literature has been reviewed, in this case study we constructed and developed new assessment criteria based on the needs of the PHCSD (see Appendix 1), using several rounds of refinement and improvement. We held consultation meetings with experts in the Department of Health and CRCSI, and academics within Curtin University. The next section shows the unique conceptual framework and the research process that was developed specifically for this pilot study.

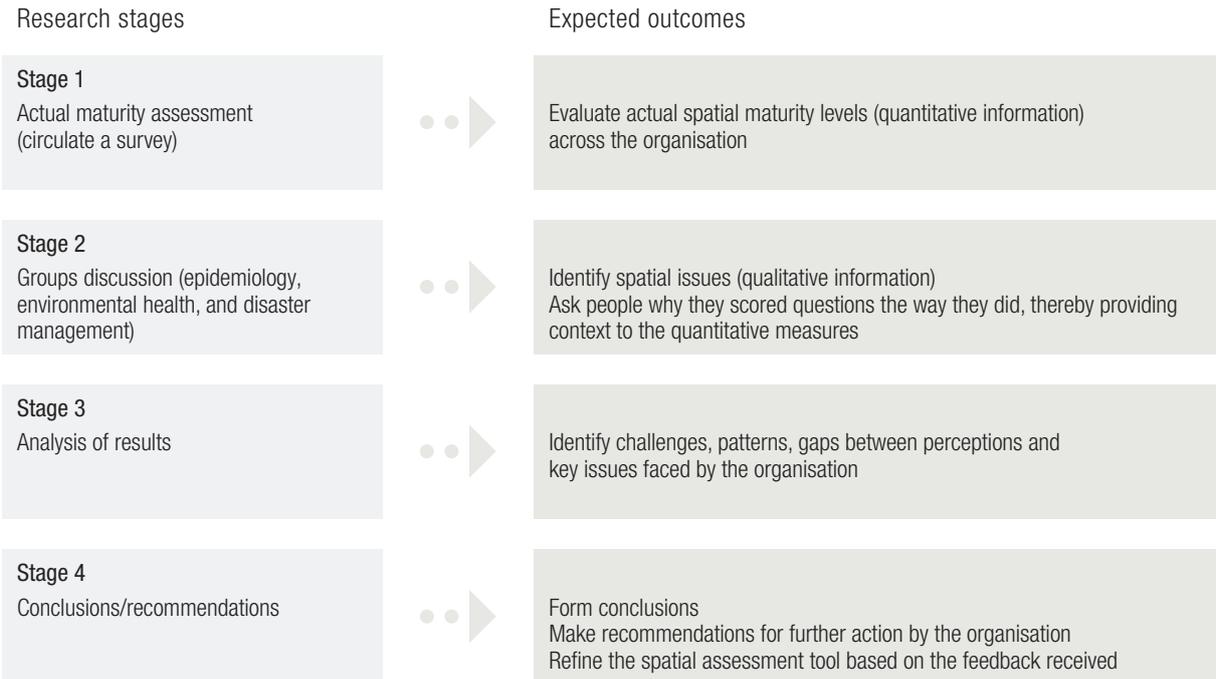
# Pilot Project Methodology

THE INITIAL TASK WAS THE CREATION OF AN ANALYTICAL FRAMEWORK AND A SURVEY TOOL CAPABLE OF MEASURING MATURITY LEVELS WITHIN THE CHOSEN HEALTH AGENCY.

The conceptual framework is described in Figure 1, and the final survey is provided in Appendix 1. With these tools in place, the pilot project was conducted in four stages:

- 1 Actual maturity assessment based on the survey, including nine personal interviews across three branches in the PHCSD (Epidemiology [EPI], Environmental Health [EH], and Disaster Management [DM]) (see Appendix 1);
- 2 Focus group discussions across the three branches;
- 3 Analysis of results; and
- 4 Identification of practical recommendations for further action.

FIGURE 1. SPATIAL MATURITY CONCEPTUAL FRAMEWORK



# Results

## QUANTITATIVE ANALYSIS

The primary aim of this survey was to identify the spatial maturity level and the culture within which spatial technology is currently being used across the PHCSD. The subsequent sections provide more detail about the findings of the survey. The Spatial Maturity Model measures the level of capacity that a particular organisation attained in terms of the use of spatial technology, and may provide a road map for improvement. During Stage 1, nine participants from the three different branches across the PHCSD (Disaster Management, Environmental Health and Epidemiology) completed the questionnaire (see Appendix 1 for an explanation of the measures and their context). Given the diversity in the individual roles of these participants, it was decided to examine the results as a whole rather than classify them by branch. The scores of the respective spatial maturity items fall on a scale from 1 to 5, where 1 represents low performance and 5 represents high performance.

The following items were rated the highest (see Table 1 for a complete list of scores):

- **Q3** To what extent do the executive managers in your organisation support and encourage the use of spatial technologies? (3.56)
  
- **Q9** To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated? (3.78)
  
- **Q13** Overall, how would you rate your satisfaction with the use of spatial technologies in your workplace? (3.67)

Conversely, the following items were rated the lowest:

- **Q1** To what extent do your workplace's broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes? (2.33)
  
- **Q5** To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS? (2.11)
  
- **Q6** To what extent are the PHCSD operational workflows driven by GIS/spatial technology processes and tasks? (2.33)
  
- **Q11** To what extent can unskilled people employ or engage with GIS tools or use spatial technologies in your workplace? (2.44)
  
- **Q12** To what extent do GIS and spatial training exist in the PHCSD (beginner level or advanced level)? (2.33)

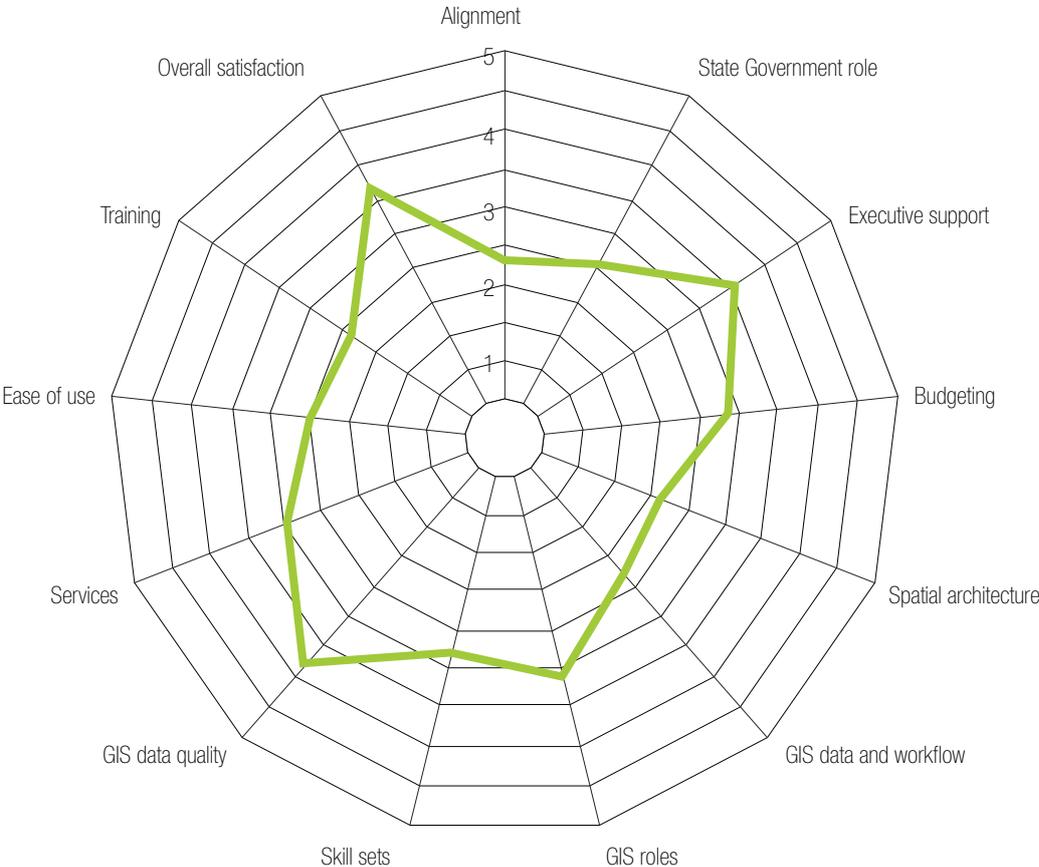
Table 1 shows the overall results of the spatial maturity survey.

TABLE 1. DESCRIPTIVE STATISTICS OF THE SPATIAL MATURITY SURVEY

Spatial maturity item	Mean
1 To what extent do your workplace’s broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes?	2.33
2 To what extent is the State Government influential in encouraging, supporting, or setting standards for using spatial technologies?	2.56
3 To what extent do the executive managers in your organisation support and encourage the use of spatial technologies?	3.56
4 To what extent is there an adequate sum of money/resources to support the establishment and/or development of spatial technologies and GIS in your workplace?	2.89
5 To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS?	2.11
6 To what extent are the PHCSD operational workflows driven by GIS/spatial technology processes and tasks?	2.33
7 To what extent are employees engaged in specialised spatial technologies in their day-to-day roles at your workplace?	3.11
8 To what extent are the skills needed to accomplish a specified task or perform a given function that uses spatial technologies/GIS available in your workplace?	2.78
9 To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated?	3.78
10 To what extent are spatial facilities and tools available to users in your workplace?	2.89
11 To what extent can unskilled people employ or engage with GIS tools or use spatial technologies in your workplace?	2.44
12 To what extent do GIS and spatial training exist in the PHCSD (beginner level or advanced level)?	2.33
13 Overall, how would you rate your satisfaction with the use of spatial technologies in your workplace?	3.67

Figure 2 provides a visual view of the spatial maturity results from the survey.

FIGURE 2. RADAR CHART OF THE SPATIAL MATURITY MEASURES



## QUALITATIVE ANALYSIS

To obtain an in-depth understanding of the reasons why some items received higher or lower scores in the spatial maturity survey, data collected through the interviews (with the same people who participated in the survey) were recorded in audio, transcribed, and thematically analysed. Thematic (i.e., content) analysis is defined by Gibson (2006, p.1) as ‘an approach to dealing with data that involves the creation and application of “codes” to data. The “data” being analysed might take any number of forms – an interview transcript, field notes, policy documents, photographs, video footage. Thematic analysis demonstrated how evaluation of the raw data of the spatial maturity survey (e.g., audio records, transcripts, and observer notes) led to the identification of overarching themes (Fereday & Muir-Cochrane, 2008). Practically, the reasons given by the observers for giving high or low scores for each of the survey questions were divided (‘coded’) into themes.

This initial procedure was useful to identify the main issues or key strengths across the department. Next, the software tool Leximancer was used to identify common trends for each item. Content analysis was carried out on the data collected from each item, and themes for each item were formulated accordingly. In addition, important observer notes were used to substantiate some of the findings presented in this report. The findings summarised in Table 2 present the item constructs and their associated reasons for high or low scores. The qualitative analysis procedures provide important evidence to test and evaluate the level of spatial maturity in the PHCSD for this pilot study.

Content analysis was carried out on the data collected from each item, and themes for each item were formulated accordingly.

TABLE 2. ITEM CONSTRUCTS AND ASSOCIATED REASONS FOR HIGH OR LOW SCORES

Spatial Maturity Item	Identified Themes	Reasons for High or Low Score
1 To what extent do your workplace's broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes?	Awareness Strategy	There is a general lack of awareness. A new strategic plan is essential. There is no GIS strategy across the whole division, rather, isolated pockets of GIS and no overall strategy. There is a need for more strategy to be put in place.
2 To what extent is the State Government influential in encouraging, supporting, or setting standards for using spatial technologies?	Awareness Resources	It is unknown if the government is generally using some or any standards. The government needs to encourage the development of standards with one direction or point of contact. There are some groups in the government, such as Landgate, who develop GIS datasets. The use of SLIP and participation in the WALIS forum is in the right direction. Low awareness of professional groups.
3 To what extent do the executive managers in your organisation support and encourage the use of spatial technologies?	Awareness Resources	There is support for data analysis, but no direction of where we need to go. Support and encouragement are pretty good, but there is still room for improvement. There is more awareness in other divisions. More funding will make it happen. There is room for more professional development. There are different levels of executive support across the division.
4 To what extent is there an adequate sum of money/resources to support the establishment and/or development of spatial technologies and GIS in your workplace?	Resources Funding	Development is very ad hoc; it takes a long time to get the equipment; no concrete effort is made by the department. Unfortunately it is an expensive area and more funding is required. There is enough funding to support day-to-day roles; there is a need to reach more users. The resources are sufficient for day-to-day jobs, but not beyond. There is no specific funding in this division for GIS.
5 To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS?	Collaboration	The computers sometimes don't have the capacity or the licences they need. There is a need to address the lack of collaboration with IT, improve the level of trust, and improve the level of interest, consistency, and understanding.
6 To what extent are the PHCSD operational workflows driven by GIS/spatial technology processes and tasks?	Structure Workflows	GIS does not drive the operational workflows. More analytical work should be produced. There are only ad hoc processes, but there is not one workflow that is coming from above.

Spatial Maturity Item	Identified Themes	Reasons for High or Low Score
7	To what extent are employees engaged in specialised spatial technologies in their day-to-day roles at your workplace?	Capacity Spatial analysis is constantly needed. Only few people can run GIS tasks. A programmer may be valuable. There is a very low level of use despite its possibilities; there is a need for more awareness.
8	To what extent are the skills needed to accomplish a specified task or perform a given function that uses spatial technologies/GIS available in your workplace?	Resources There is no access to internal web-mapping products hosted by the division (e.g., HealthTracks™) or to GIS tools in some branches. In some branches, there is a lack of GIS training and skills that should be addressed.
9	To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated?	Relevance Fit for purpose Good quality provided, some specific topics could be added to address the needs. There is generally a one-year delay in the currency of the data. Our data set is self-managed and aligns its standards to Landgate. Metadata and documentation are being updated once every six months. Metadata is constantly being updated as well as retaining and maintaining name structure. It was identified that on some occasions the data was less relevant for work needs; rather, it was the mapping capability that was perceived as more important.
10	To what extent are spatial facilities and tools available to users in your workplace?	Access Available GIS tools are too advanced for most of the users (multiple participants). People have good access to services, and HealthTracks™ (internal web-mapping tool hosted by the division) is being updated upon request.
11	To what extent can unskilled people employ or engage with GIS tools or use spatial technologies in your workplace?	Capacity Multiple participants said there was no capacity. Multiple participants said the GIS capability is very basic.
12	To what extent do GIS and spatial training exist in the PHCSD (beginner level or advanced level)?	Funding Resources No resources for external GIS training are available (multiple participants). Informal training is available/accessible for those who are keen to learn GIS (multiple participants) Lack of funding restricts opportunities for formal or informal GIS Training externally and internally (multiple participants).
13	Overall, how would you rate your satisfaction with the use of spatial technologies in your workplace?	Awareness More GIS workshops or seminars would be helpful (multiple participants). The use of GIS personnel could be better utilised and integrated across the division (multiple participants).

The qualitative data analysis procedure provided an important tool to understand hidden information. In relation to the observational data, findings indicate perceived strengths or weaknesses across all the spatial maturity items included in this survey. This, in turn, implies that these findings should be further investigated in order to achieve a higher level of spatial maturity and overall satisfaction.

#### GROUP FINDINGS

In this section, the report provides information about the findings of group discussions and the consensus reached by participants for each item in the spatial maturity survey. The group discussions were conducted with the same participants who had been interviewed earlier. The three groups were based on branch. Participants were asked to discuss each item and reach a consensus; this was beneficial in terms of research, as their deliberations and discussions revealed information that may not otherwise have been discovered.

Overall, the EPI and EH branches rated the spatial maturity items substantially higher than the DM branch. The scores of the respective spatial maturity items fall on a scale of 1 to 5, where 1 represents low performance and 5 represents high performance. This is the same scale the participants used to rate the items individually.

Participants were asked to discuss each item and reach a consensus; this was beneficial in terms of research, as their deliberations and discussions revealed information that may not otherwise have been discovered.

The following questions were generally rated the highest (see Table 3 for full detail):

- **Q3** To what extent do the executive managers in your organisation support and encourage the use of spatial technologies?
- **Q9** To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated?
- **Q10** To what extent are spatial facilities and tools available to users in your workplace?

Conversely, the following items were generally rated the lowest:

- **Q1** To what extent do your workplace's broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes?
- **Q4** To what extent is there an adequate sum of money/resources to support the establishment and/or development of spatial technologies and GIS in your workplace?
- **Q5** To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS?
- **Q12** To what extent do GIS and spatial training exist in the Department of Health (beginner level or advanced level)

TABLE 3. DESCRIPTIVE STATISTICS OF THE SPATIAL MATURITY SURVEY QUESTIONS BY BRANCH

Spatial Maturity Item	Group Scores by Branch		
	Epidemiology	Disaster Management	Environmental Health
1 To what extent do your workplace's broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes?	2	1	2
2 To what extent is the State Government influential in encouraging, supporting or setting standards for using spatial technologies?	3	2	2
3 To what extent do the executive managers in your organisation support and encourage the use of spatial technologies?	4	4	3
4 To what extent is there an adequate sum of money/resources to support the establishment and/or development of spatial technologies and GIS in your workplace?	2	2	2
5 To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS?	1	1	2
6 To what extent are the PHCSD operational workflows driven by GIS/spatial technology processes and tasks?	1	1	3
7 To what extent are employees engaged in specialised spatial technologies in their day-to-day roles at your workplace?	3	1	2
8 To what extent are the skills needed to accomplish a specified task or perform a given function that uses spatial technologies/GIS available in your workplace?	3	1	2
9 To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated?	3	1	4
10 To what extent are spatial facilities and tools available to users in your workplace?	3	1	4
11 To what extent can unskilled people employ or engage with GIS tools or use spatial technologies in your workplace?	2	1	3
12 To what extent do GIS and spatial training exist in the PHCSD (beginner level or advanced level)	1	2	2
13 Overall, how would you rate your satisfaction with the use of spatial technologies in your workplace?	3	2	3

## Discussion and Major Findings

This section discusses the major findings of this pilot study and draws conclusions in relation to the original study aims. One of the primary aims was to develop an evaluation framework and tool for examining the level of spatial maturity across the PHCSD. The research focused on a pilot study that was undertaken using a series of interviews and group discussions in three branches within the PHCSD. The study commenced with a comprehensive literature review of spatial maturity evaluation models. It adopted a four-stage methodology: (1) development of spatial maturity survey, (2) personal interviews, (3) group discussions, and (4) data analysis and preparation of recommendations.

Despite efforts taken in the field of spatial technology across the PHCSD, some branches within the division still lack the awareness or the required

resources to engage with spatial technology. It was observed that the role of the State Government, spatial data quality, and overall satisfaction were generally perceived to be high. However, many other aspects were perceived to be poor. For example, it was noted that there is no strategic plan for the division regarding the use of spatial technology, and that most of the tasks being done are driven by immediate (ad hoc) needs rather than a structured workflow. In addition, despite growing awareness of using spatial technology in the division, not enough funding and resources are allocated for training. Also, it was observed that some branches in the division do not have sufficient access to internal web-mapping products hosted by the division. Finally, it was observed that the IT group is not well aligned or equipped to support the GIS needs of the division.

Despite efforts taken in the field of spatial technology across the PHCSD, some branches within the division still lack the awareness or the required resources to engage with spatial technology.

## Conclusions and Recommendations

DESPITE GROWING AWARENESS OF THE BENEFITS OF SPATIAL TECHNOLOGY ACROSS THE PHCSD, THE DIVISION STILL LACKS A CENTRAL, STRATEGIC, AND RESOURCED SPATIAL TECHNOLOGY POLICY TO ENABLE EMPLOYEES TO BENEFIT MORE FROM THIS TECHNOLOGY. BASED ON THE FINDINGS OF THE PILOT STUDY, IT IS PROPOSED THAT ACTION SHOULD BE TAKEN IN RESPONSE TO THE REPORT'S MAJOR FINDINGS TO INCREASE THE SPATIAL MATURITY CAPACITY ACROSS THE PHCSD. NOMINATION OF THOSE SPECIFIC ACTIONS IS BEYOND THE SCOPE OF THIS REPORT AND WILL BE DETERMINED WITHIN THE DIVISION.

A follow-up study to compare changes over time is recommended, particularly if interventions are implemented within the division, as is the extension of this spatial maturity model to other branches or health agencies for the purposes of comparison.

In summary, it can be concluded that this report provides a solid basis for the PHCSD to improve its practice through effective implementation of

spatial technology. It is anticipated that the methodology and conceptual framework that was developed for this pilot study will become a pillar for the executive team. In addition, this framework could be expanded in the future if required. Other organisations could benefit from the application and adaptation of the framework to their particular working environments. Though the framework is generic, the survey questions would need to be adapted to fit the organisational context, and trialled as is usual for other survey instruments.

We look forward to seeing other case studies of this type from other sectors, and sharing of lessons learnt, both in the government and private sectors. We hope this report will reinforce to readers that there is more to technology adoption than 'cool tools', that a generic framework is available to look at 'capacity to use', that mixed methods analysis can lead to critical organisational insights, and that we can thereby better realise the potential of spatial technology to contribute to better organisational performance.

We can now realise the potential of spatial technology to contribute to better organisational performance.

In summary, it can be concluded that the application of the new framework and tool provides a solid basis for the PHCSD to improve its practice through effective implementation of spatial technology.

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# Appendix 1

## Spatial Maturity Questionnaire (derived from Even Keel Strategies, 2008)

The following questions provide information about the different aspects of spatial technology usage in your organisation.

SPATIAL MATURITY ITEM	PERFORMANCE				
<p>Please consider each of the items below in the context of your own workplace.</p> <p>For each item, an example (E) of best practice and a question (Q) about your workplace are included to provide guidance.</p>	<p>Please provide your rating/score of the respective spatial maturity item on a scale of 1 to 5, where 1 represents low performance and 5 represents high performance.</p>				
	Low	Med			High
<b>1. Alignment</b>					
(E) GIS strategy is aligned and included in the organisation strategic plan.	1	2	3	4	5
(Q) To what extent do your workplace's broad strategic plans line up with the use of spatial technologies, and use spatial technologies as part of their workflow processes?					
<b>2. State Government role</b>					
(E) The State Government is involved in establishing professional user groups and standards-setting authorities.	1	2	3	4	5
(Q) To what extent is the State Government influential in encouraging, supporting, or setting standards for using spatial technologies?					
<b>3. Executive support</b>					
(E) There is executive recognition of the use of spatial technology as a strategic direction, and it may be used by executive managers in making decisions.	1	2	3	4	5
(Q) To what extent do the executive managers in your organisation support and encourage the use of spatial technologies?					
<b>4. Budgeting</b>					
(E) The operational budget includes funding for enterprise GIS/spatial technologies initiatives/projects as a cost of doing business.	1	2	3	4	5
(Q) To what extent is there an adequate sum of money/resources to support the establishment and/or development of spatial technologies and GIS in your workplace?					
<b>5. Spatial architecture</b>					
(E) Spatial technologies infrastructure is integrated with IT Infrastructure, and GIS standards are integrated with IT Standards.	1	2	3	4	5
(Q) To what extent is the infrastructure integrated with IT mechanisms and processes to encourage the use of spatial technologies/GIS?					
<b>6. GIS data and workflow</b>					
(E) Most relevant elements use GIS/spatial technologies as part of their operation workflow, and data management is embedded in the operational workflows of the organisation.	1	2	3	4	5
(Q) To what extent are the PHCSD operational workflows driven by GIS/spatial technology processes and tasks?					
<b>7. GIS Roles</b>					
(E) There is a specialisation of analytical staff conducting GIS or spatial technologies tasks (e.g., spatial statistician).	1	2	3	4	5
(Q) To what extent are employees engaged in specialised spatial technologies in their day-to-day roles at your workplace?					

**8. Skill Sets**

(E) Advanced GIS technical skills (e.g., GIS programming, spatial statistics) are available. 1 2 3 4 5  
 (Q) To what extent are the skills needed to accomplish a specified task or perform a given function that uses spatial technologies/GIS available in your workplace?

**9. GIS data quality**

(E) A single repository of GIS data exists, and extracts are up to date and easily accessible across the workplace. 1 2 3 4 5  
 (Q) To what extent is the data set in your workplace fit for its intended use, managed by an authoritative source, and routinely updated?

**10. Services**

(E) On-demand mapping, ubiquitous access, GIS and spatial technology data and tools are available to all levels of users and skill sets, either at their desk or in the field. 1 2 3 4 5  
 (Q) To what extent are spatial facilities and tools available to users in your workplace?

**11. Ease of use**

(E) No training is required for staff in your workplace to obtain map products or spatial data for their own projects. 1 2 3 4 5  
 (Q) To what extent can unskilled people employ or engage with GIS tools or use spatial technologies in your workplace?

**12. Training**

(E) Training material and GIS workshops are in place, and are undertaken from time to time. 1 2 3 4 5  
 (Q) To what extent do GIS and spatial training exist in the PHCSD (beginner level or advanced level)?

SPATIAL SATISFACTION ITEM	SATISFACTION				
	Low	Med	High		
Overall, how would you rate your satisfaction with the use of spatial technologies in your workplace?	1	2	3	4	5

Please type below any other comments you would like to make about the use of spatial technologies in your workplace.

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Please type below any other comments you would like to make about this survey.

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