

The International  
**JOURNAL**

*of* KNOWLEDGE, CULTURE  
& CHANGE MANAGEMENT  
*in* ORGANISATIONS,

A Study of the Life Cycle of Knowledge  
Assets

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VOLUME 5

INTERNATIONAL JOURNAL OF KNOWLEDGE, CULTURE AND CHANGE MANAGEMENT  
<http://www.Management-Journal.com>

First published in 2005 in Melbourne, Australia by Common Ground Publishing Pty Ltd  
[www.CommonGroundPublishing.com](http://www.CommonGroundPublishing.com).

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ISSN: 1447-9524 (print), 1447-9575 (online)  
Publisher Site: <http://www.Management-Journal.com>

The INTERNATIONAL JOURNAL OF KNOWLEDGE, CULTURE AND CHANGE MANAGEMENT is a peer refereed journal. Full papers submitted for publication are refereed by Associate Editors through anonymous referee processes.

Typeset in Common Ground Markup Language using CGCreator multichannel typesetting system  
<http://www.CommonGroundSoftware.com>.

# A Study of the Life Cycle of Knowledge Assets

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*Abstract: Although dialogue about knowledge management and intellectual capital often uses the term 'knowledge assets', a review of the literature on these topics has failed to reach consensus on a definition, despite examples given in extant literature. Based on a review of the literature and case study research with twelve organisations in the Australian Public Sector, this paper discusses knowledge assets, and preliminary findings on their importance and how their need or otherwise is identified. The paper concludes with a proposed life cycle for knowledge assets that are organisational resources.*

Keywords: Knowledge Management, Knowledge Asset, Tacit Knowledge

## Introduction

**T**HIS RESEARCH FORMS part of a doctorate of business administration from Southern Cross University, Australia. The objective is to better understand the benefits of and requirements for the management of knowledge assets. The aim is to define, within the context of the three levels of the Australian Public Sector, what constitutes a knowledge asset; and identify the nexus between strategic management and knowledge management. To achieve this, through a review of the extant literature, areas explored are:

- what are knowledge assets;
- why organisations need knowledge assets;
- which knowledge assets are important; and how is the need for knowledge assets determined.

The research also included interviews with knowledge management practitioners working in the Australian Public Sector. To improve reliability and validity of the research, a number of consultants that support the public sector were interviewed.

This paper will briefly discuss strategic management, knowledge management, and, to place the research in context, the Australian Public Sector, before outlining the methodology used for this research. It will then go on to describe the preliminary analysis that has been performed on the data collected through interviews.

## Strategic Management and Knowledge Management

### Strategic Management

Alfred D. Chandler was among the first scholars to study strategic management, publishing *Strategy and Structure: Chapters in the History of Industrial Enterprise* in 1962 (Browne 1994). Chandler was followed by Igor Ansoff releasing the book *Corporate Strategy* in 1965 and Learned, Christensen, Andrews and Guth with *Business Policy: Text and Cases* also in 1965. Another book by Kenneth R. Andrews, *The concept of corporate strategy* (1971) examined organisations from the perspectives of their internal strengths and weaknesses, and opportunities and threats in the external environment.

In 1980, Michael E. Porter published his influential work *Competitive Strategy: Techniques for analysing industries and competitors*, (1980). Porter, building on Andrews' 'Design School' model, focused on an examination of the structure of the industry or market in which an organisation competes (Browne 1994; Feurer & Chaharbaghi 1995; Robbins, Bergman, Stagg & Coulter 2000). Porter's (1985) concept of the 'value chain' was another development that allowed managers to determine potential sources of competitive advantage by examining the activities that their organisation undertook and the links between them.

Porter focused on the analysis of the industry and market that a firm operates in: a predominantly outward looking view, the main thrust of which was the examination of competitive forces, and opportunities and threats present in the external environment (Barney 1991; Black & Boal 1994; Grant 1991;



Leavy 2003). The Resource Based View of the Firm (RBV) regards organisations as a 'broader set of resources' (Wernerfelt 1984, p. 171). RBV is a perspective on strategic management with an emphasis on internal analysis, and an attempt to address a perceived imbalance with Porter's (1980; 1985) 'posi-

tioning' school (Browne 1994). As such, it is a complementary aspect of the strategic management process (Henderson & Cockburn 1994). The resources referred to in RBV include assets, capabilities, organisational processes, attributes, information and knowledge (Barney 1991, p. 101).

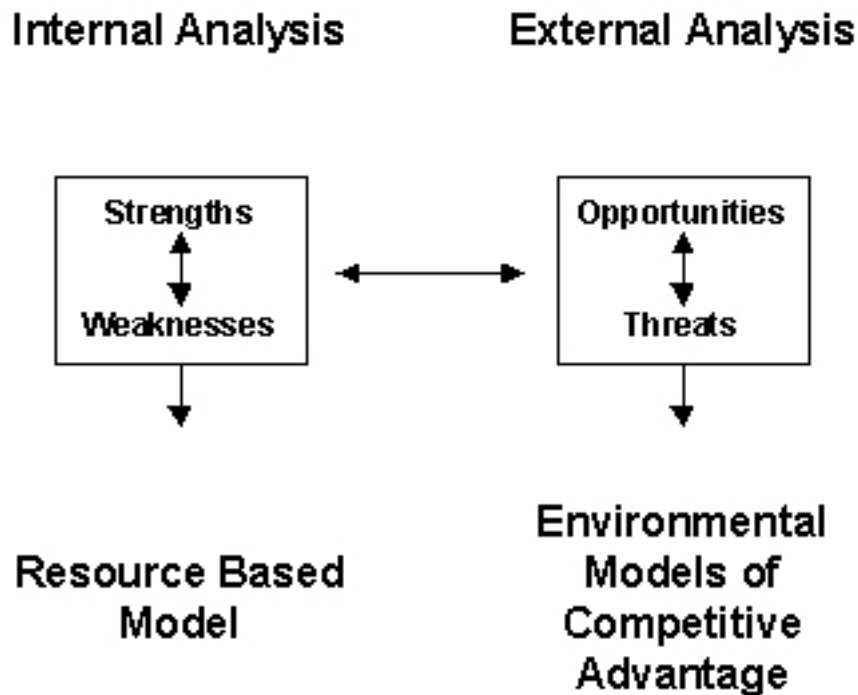


Figure 1: The Relationship between SWOT and the RBV, Source: (Barney 1991, p. 100)

A strategy to a business or organisation is, amongst other things, a plan of how the organisation can achieve its goals and objectives (Davies 2000; Mintzberg 1996), and a 'commitment of present resources to future expectations' (Drucker 1999, p. n.p.). Intangible assets such as know-how and knowledge can provide 'premium value' (Walters, Halliday & Glaser 2002, p. 826), form the basis for competitive strategy, and influence management processes and organisational forms or structures (Drucker 1993; Michalisin, Smith & Kline 1997; Sanderson 1998; Senge 1990).

In the past decade, the RBV movement has spawned something similar called the Knowledge Based View of the firm (KBV) (April 2002; Gehani 2002). The basis of the knowledge-based view is that competitive advantage comes from intangible assets such as firm-specific knowledge, the tacit knowledge of its people, and the ability to create knowledge (Gehani 2002; Grant 1996; Nonaka & Takeuchi 1995). KBV regards knowledge assets, such as skilled people, as the prime strategic resources (Grant 1996; Spender 1996), and represents a link between strategic management and knowledge management. Knowledge management is briefly discussed in the next section.

### Knowledge Management

The terms 'knowledge work' and 'knowledge worker' were coined by Drucker 'around 1960' (1993, p. 6) because work and workers were changing after the agrarian and industrial ages. Since that time there has been a growing interest in the management of knowledge, which has gained momentum over the last three decades (Wiig 1997). This interest was initially focused on information technology, but more recently has included the human, business and social aspects of knowledge management (AS-5037 2003; Leonard-Barton 1998; Stephens 2001). In parallel, there has also been much interest in the identification and management of the resources and capabilities required to support an organisation and add value to its inputs, processes and the organisation itself. (For example: Barney 1991; 2001; Ferdinand 1999; Grant 1991; 1996; Hamel & Prahalad 1994; Leonard-Barton 1992; 1998; Michalisin, Smith & Kline 1997; Porter 1996; Spender 1996)

Knowledge management brings together the concepts of knowledge work and strategic management, in order to manage the required resources and capabilities through the facilitation of knowledge development, creation, representation, access and transfer

(Dilnutt 2000). Many researchers, (For example: Drucker 1993; 1995; Hamel 2002; Leonard-Barton 1998; Michalisin, Smith & Kline 1997; Nonaka 1991; Pemberton & Stonehouse 2000) feel that knowledge will be the cornerstone for competitive advantage. Their view is that knowledge is a key resource in a rapidly changing global market where the development of innovative services, products and solutions is required to attract and retain customers and get ahead of the competition.

### Knowledge Assets

Although dialogue about knowledge management and intellectual capital often uses the term 'knowledge assets', a review of the literature on these topics has failed to find consensus on a definition, despite many examples given in extant literature. Nor is there an agreed definition of the entire knowledge asset lifecycle. Furthermore, the link between strategic management and knowledge management lacks consistency of definition and usage.

The aim of this research is to address these gaps in our understanding, and to determine whether knowledge management is an adjunct to the strategic management process, through its focus on the development and management of competencies (Callahan 2002; Nonaka, Toyama & Konno 2001).

### Australian Public Sector

As mentioned above, the Australian Public Sector has been chosen as the target 'industry' for this research. The reason for using the Australian Public Sector is that many departments and agencies are very active in knowledge management, most often due to the impending departure of many long-serving staff, and hence present a relevant source of data.

### Public Sector Knowledge Management

As with all organisations, government agencies require resources and capabilities (Bell 2004). Of interest to this discussion are the skills the people in government employ, and the organisational capabilities built up over time. The knowledge and skills required includes economic, social, legal, management, governance communication, knowledge of the 'community' served, and policy skills (Adams 2004; Bell 2004).

The need for knowledge management in government departments stems from two major areas. The first is what is termed the '54/11' issue (MAC 2003), and the second being the loss of organisational capabilities through outsourcing (Bell 2004; Edwards, Ayres & Howard 2003).

**The 54/11 Issue.** This problem stems from superannuation (retirement) provisions available to many public sector employees. The superannuation

schemes available to public servants, combined with taxation laws, provide encouragement for people to retire at age 55, or in some cases prior to age 55. Hence the term 54/11, meaning 54 years and 11 months (MAC 2003). 'Finding ways to effectively capture knowledge has become an imperative, given the increasing emphasis on "knowledge work" in the public sector, and the risk posed to corporate memory through loss of employees.' (MAC 2003, p. 10).

**Outsourcing.** Public sector reforms have been aimed at making public agencies operate more like the private sector. These changes include making departments more performance oriented and commercially focused, including changes in accounting practices such as moving from cash to accruals. These changes made outsourcing more viable and desirable, but required a greater emphasis on strategic management (Carnegie & West 2003; Stewart 2004).

There is some concern in public sector management that outsourcing or contracting out, results in knowledge and skills being transferred to contracting companies. The fear is that the loss of skills and organisational memory will result in inefficient policy-making, 're-invention of the wheel', and an inability to judge the quality of service providers' output.

Research by Dr David Stephens (2001) into twelve departments found varying degrees of adoption of knowledge management. Some agencies have adopted a strategic view of knowledge management, while others have an information technology (IT) approach.

### Methodology

A phenomenological paradigm was selected for this research due to the exploratory and theory-building nature of the research (Hussey & Hussey 1997; Perry 2001; Ticehurst & Veal 1999). The objective was to describe real-world practice, using the data collected to refine the theoretical model developed during the literature search. The task for the remainder of the research project was to use the model as the basis for questions designed to collect further data (Ticehurst & Veal 1999).

Case Study is the prime methodology for this research; however, Action Research has been used as a form of meta-methodology. This is discussed in the following section.

### Case Study

Case study research was chosen as it is well suited to research where: a better understanding of 'contemporary phenomena' that requires investigation in a 'real-life context' (Audet & d'Amboise 2001; Yin 2003, p. 13); and 'existing theory seems inadequate' (Eisenhardt 1989, p. 589).

As discussed, case research was the prime methodology used, with action research as a meta-methodology. That is, after the initial interviews, a period

of review and reflection was undertaken that generated improvements to the research methodology and theoretical model. The action research cycle of plan → act → observe → reflect, was slightly modified to plan → collect data (act and observe) → reflect → revise, and was applied during the data collection phase (Carson, Gilmore, Perry & Gronhaug 2001; Dick 2000; Perry & Sankaran 2002). This approach involved continuous comparison of the data collected against the model, moving through a cycle of observation → induction → theory building → observation → deduction → theory testing via data collection and analysis (Gummesson 2003; Perry 1998; Ticehurst & Veal 1999). In this way, the theory was progressively refined through analysis of the data (Eisenhardt 1989; Parkhe 1993; Yin 2003), allowing refinement of all aspects of the research as it progressed, through progressive analysis of individual cases and of the entire sample (Jackson & Trochim 2002).

A second round of interviews was conducted to discuss the preliminary findings, and to provide a means of triangulation.

### Data Analysis

One aspect of case research that requires a very methodical approach, is dealing with the large quantity of free-flowing text. Coding is regularly used to reduce the large quantities of text produced by in-depth interviews to a manageable form (Jackson & Trochim 2002). Although Grounded Theory (Glaser & Strauss 1967) was not the methodology used for this research, aspects of this approach to content analysis was used to break down the data,

and conceptualise and reassemble them in new ways (Corbin 1986a; 1986b; Douglas 2003).

With this approach, recurring themes, or categories were created from the data collected. Themes may come from words, sentences or phrases containing a single concept, or from whole paragraphs (Carson et al. 2001). This reduction to single concepts facilitates categorisation, sorting and analysis so that each concept can be considered separately (Hussey & Hussey 1997; Jackson & Trochim 2002; Miles & Huberman 1994). New nodes (categories) were developed from the data with the relationship between the new nodes enlightening the research. Data analysis included three procedures, namely: *open coding*, the systematic analysis of interview transcripts and other data sources, word-by-word, line-by-line, or sentence-by-sentence; *axial coding*, the identification of relationships between open codes; and *selective coding*, the identification of the focal point from the core codes (Allan 2003; Carson et al. 2001; Douglas 2003; Miles & Huberman 1994).

With the Open Coding process, codes were derived from the data, not from a pre-determined list. Codes came from the subject's terminology, *in vivo* coding, or the researcher's own 'labels' that best suited the phenomenon.

### Unit of Analysis

The unit of analysis for this research is the Australian Public Sector, with 12 cases being drawn from three levels of government. To preserve confidentiality, only the level of government and the organisation's size by staff numbers are presented in the table below.

**Table 1: Organisational Profiles**

Size by Staff <sup>1</sup>	Federal	State / Territory	Local
< 500			2
> 500 and < 1,000	1	1	1
> 1,000 and < 2,000	1	1	
> 2,000 and < 3,000	1		1
> 3,000 and < 4,000		1	
> 5,000	1	1	
<b>Total:</b>	<b>4</b>	<b>4</b>	<b>4</b>

<sup>1</sup> Source: developed from this research

### Participant Profiles

Research participants were approached in person at the 2004 actKM annual conference and monthly meetings, or via the online forum, posting a message on the actKM forum, or through referral by other participants. First-round interviews included four consultants and thirteen practitioners, with two

practitioners being interviewed together. The second round involved a further three practitioners and three consultants.

The experience with knowledge management for the public sector practitioners that were interviewed for this research varied, as did their areas of interest. Some entered the public sector due to their previous

experience with knowledge management; others developed an interest as part of their job. Practitioners came from very senior, and middle management positions. Some had combined roles that included activities such as strategic planning, information technology and internal audit along with their knowledge management endeavours. Two were 'end-users' of knowledge management initiatives.

Consultants were interviewed to: provide context to the application of knowledge management in the public sector; ensure reliability; and refine the questionnaire and theoretical framework. They had a variety of backgrounds that included information and content management, learning and development, distance learning, knowledge management research and consulting, and information technology. Experience in knowledge management ranged from four to over ten years, and all had clients in both public and private sectors.

Interviews averaged just over one-hour, and were recorded with the subject's approval. The 25-hours of interviews were transcribed, resulting in 150,000 words. Transcripts were sent to participants for review and correction.

### Preliminary Findings

As previously mentioned, four research issues were developed from a literature search to guide data collection.

**RI1** – What are knowledge assets?

**RI2** – Which are the most important knowledge assets?

**RI3** – *What influences the knowledge assets that an organisation requires?* **RI3.1** – *How and why is the need for specific knowledge assets identified?* **RI3.2** – *How and why are redundant knowledge assets identified?* **RI3.3** – *How do existing knowledge assets influence the development of an organisation's strategies?*

**RI4** – What is the life cycle of knowledge assets?

The findings relating to each of these research issues is discussed in the following sections.

### RI1 – What are Knowledge Assets?

Participants were presented with a list of potential knowledge assets developed from the literature search. They were asked to indicate the extent to which they agreed, in the context of their organisation, that items from the list were knowledge assets.

The predominant view was that knowledge assets were people, and that knowledge management was

about people and not technology. From the list of potential knowledge assets shown to participants, those that appeared in the Top 10 of knowledge assets and the Top 10 when ranked by importance, all related to people. They are: experienced people; skilled people; people; ability to learn; and social relationships and networks.

What constitutes a knowledge asset is context dependent. For example, theory underpinning practice is only of tangible value when designing the practice. When the practice is actually executed, the underpinning theory is of little real value to the executer. Potential knowledge assets that relate to intellectual property, eg patents, copyrights and registered designs, are also context dependant. These do not apply to all organisations; however, they did rank highly as knowledge assets.

Most participants felt that tacitness was a defining attribute for knowledge assets. For example, organisational procedures are not knowledge assets because they are documented; as they are explicit, they are information. In comparison, organisational routines are knowledge assets because they tend not to be documented; as they are tacit, they are knowledge. However, some had an almost opposite view, in that only tangible things are knowledge assets, and intangible things are not.

**People as Knowledge Assets.** There are a number of dimensions to people as knowledge assets. These include: experience, skills, motivation, ability to learn, and their social relationships and networks. From an organisation's perspective, these dimensions are only of value if they align with or support the organisation's objectives and add value in some way. For example, some people may be motivated for advancement, but the activities that manifest the motivation are only for their own benefit, and not the organisation's.

### Top 10 Knowledge Assets

1. Experienced People
2. Skilled People
3. Social relationships and networks
4. On-line journals and databases
5. People
6. Copyrights and intellectual property
7. Trade secrets
8. Ability to learn
9. Intellectual property rights
10. Registered designs

Participants were asked to rate the list of potential knowledge assets by their importance to the participant's organisation. The next section discusses participants' ranking.

## RI2 – Which are the Most Important Knowledge Assets?

Of the Top 10 knowledge assets ranked by importance, four are people; two, are social relationships and networks, and teamwork, which are about people working together; and one, organisational culture, is created by people. This supports the view of Practitioner 2 that a knowledge asset is ‘a person’.

### Top 10 Knowledge Assets Ranked by Importance.

1. Experienced People
2. Skilled People
3. People
4. Ability to learn
5. Social relationships and networks
6. Teamwork
7. Ability to innovate
8. Ability to manage change
9. Organisational culture
10. Motivated people

The above list is dominated by tacit knowledge assets. Support knowledge assets, although useful, were not regarded as important as core knowledge assets.

## RI3 – What Influences the Knowledge Assets that an Organisation Requires?

The data collected by this research supports the proposition that an input to knowledge strategies will be the Business Strategy or Business Plan. However, there will be a number of other strategies, eg risk management, human resources, finance and others, that may also provide input to and justification for a knowledge strategy. Of these strategies, the prime strategy is the Business Strategy, with strategies arranged in a hierarchy, for both the organisation and its strategic business units (SBUs) (Argenti 1989).

The link between top-level business strategies and knowledge management plans is not direct; there are a number of steps in between. This is largely due to the probabilistic nature of strategic management. Strategic plans tend to cover longish periods of three to six years. In a changeable environment, plans cannot accurately predict the future over such periods. Such variations in the environment are termed strategic uncertainties (Aaker 2001). As a result, strategic plans will describe what the organisation wants to happen, what its goals and objectives are, but at a high level, sometimes in the form of guiding principles or organisational ‘vision’. It follows that the plan will not be able to give a precise destination, only a range of possibilities.

Initiative and project plans tend to cover a shorter period than strategic plans. Therefore, the ability to

more accurately predict the future outcomes of the initiative is higher, and as such, they are more deterministic than strategic plans. However, predicting the future of any duration will always be subject to error.

Addressing business problems can also be the focus for knowledge asset acquisition. The business problems may comprise current or future capability shortages, preserving organisational knowledge, ensuring that knowledge is available to support knowledge-based business processes, collaboration, and knowledge reuse. Three organisations, all from local government, established knowledge management initiatives or programmes to address problems discovered through applying the Australian Business Excellence framework from Standards Australia. A business problem is often the driver or opportunity for innovation within the public sector. However, the capability to innovate must exist to be able to solve the problem.

Government departments and agencies are subject to changes in their environments. Some changes may be due to changes in government, ministers with different agendas and priorities to their predecessors, and changes in the requirements and expectations of other stakeholders. All levels of government are subject to changes in technology to varying degrees, and to the effects of globalisation, eg free trade agreements, international and interstate e-commerce. The hierarchy of plans discussed previously, allow for change, eg high-level plans or guiding principles to cover three- to six-year periods, divisional or business unit plans to cover one year, and project or initiative plans to cover shorter periods.

### RI3.1 – How and Why is the Need for Specific Knowledge Assets Identified?

The knowledge assets an organisation requires are identified through people noticing gaps. What typically bring gaps to their attention are strategic plans, the results of innovation and project plans, and to a lesser extent serendipity and guiding principles. Audits, as a systematic means to find such gaps, ranked lowest amongst participants.

The more specific a plan is, the easier it is to notice capability gaps. Therefore, project plans and tightly focussed audits are of more use to a practitioner with this task, than high-level corporate strategies or guiding principles.

To determine the knowledge assets required, an organisation needs a clear and detailed understanding of the market, its requirements, and hence the core capabilities or competencies required to satisfy the market. This is the basis of strategic management; it is what the strategic planning process is all about. Comparing the required knowledge assets with existing knowledge assets is how gaps and redundant or superfluous knowledge assets are identified. There-



fore, knowledge strategies start with what the organisation is trying to achieve, which involves a thorough internal analysis of the organisation's strengths, which will include knowledge assets, and exploration of ways to exploit these strengths.

Additionally, strategies or initiatives that result in a change of products and services may require the acquisition of new skills and capabilities. For example:

*'... there's been quite a focus on increasing the liaison with tourism, on retail areas, they try and encourage more commercial activity in the city, so that's been a strategic focus I guess in the last couple of years. We've hired new staff with skills to help with that.'* (Practitioner 9)

**Knowledge Asset Gaps.** A gap in knowledge assets or capabilities is a strategic risk, eg the 54/11 issue, or the requirement for new skills to implement a change of strategy. These are examples of impending knowledge asset gaps that can be planned for, and is reasonably easy to predict.

When strategies are emergent or partially emergent, it is not always possible to detect knowledge gaps in advance. Hence, most knowledge asset gaps tend to be detected at the operational level. Some gaps may become apparent when high-level strategies are developed, however the gaps themselves also tend to be high-level and imprecise.

Knowledge asset gaps or deficits can also arise through mergers where:

*'the power brokers don't have an understanding of either the history, or of how they've got there, and the skeletons in the cupboard and the complexities, and because different things are driving them, they have knowledge deficits that don't allow a match to happen'* (Practitioner 5)

In some cases, knowledge workers were unable to keep their skills up-to-date for reasons such as downsizing, multi-skilling (generalisation of work) or excessive workload. This lack of knowledge asset maintenance can lead to capability gaps in organisations. Knowledge assets can be maintained through formal and informal training, personal research and peer group interaction, eg Community of Practice (CoP) or Special Interest Groups.

### **RI3.2 – How and Why are Redundant Knowledge Assets Identified?**

The identification of redundant knowledge assets, and their disposal was a contentious and sensitive issue when discussed with public sector practitioners. This was possibly because respondents felt that the most important knowledge assets are people, and there was some sensitivity about 'disposing' of

people. When asked if the organisation had ever outsourced any functions, all but one agreed that it had been done at some stage. Furthermore, they agreed that this resulted in knowledge asset disposal in some form.

Generally, the Public Sector cannot withdraw from a market unless it is government policy to do so, eg the sale of QANTAS and drawn-out sale of Telstra. Outsourcing is a means for the public sector to withdraw from a market, but still ensure that services are provided, and is a common method of knowledge asset disposal in the public sector.

Outsourcing is a potential knowledge risk from two perspectives. One is the loss of skills and capabilities through outsourcing and the ultimate dependence on service providers for the skills and capabilities. The other is in not adjusting the skills and capabilities of the organisation to adapt to the change of relationship.

Knowledge assets can become candidates for disposal when they are: not being used; no longer needed; or are outdated or superseded. If the knowledge assets are people, disposal may be done by making them redundant, retraining or redeploying them, in which case their existing knowledge, skills and capabilities are not destroyed, but may atrophy through disuse.

*'... if you have people who are really good at learning, then the ability to discard the old and take on the new, ... is an important feature of learning, of somebody who is a continual learner; who's good at learning, the idea of losing the old and bringing on the new is quite comfortable. And so that means that when you are not talking about knowledge assets disposal about being people, people disposal, you're actually talking about the normal process of regeneration, of someone who's an active learner.'* (Practitioner 14)

Knowledge assets can also be disposed of, or destroyed through lack of maintenance. For example no longer updating organisational records and databases where changes have occurred, eg the practice of no longer updating plans with 'as built' or 'work as executed' drawings; not updating procedures (Consultant 2, Department 3). This situation can present a risk to the organisation through the use of poor quality or defective knowledge assets.

Although none of the organisations studied had formal processes or strategies to identify redundant knowledge assets, knowledge asset redundancy does happen where knowledge is not renewed, maintained or preserved.

### ***RI3.3 – How do Existing Knowledge Assets Influence the Development of an Organisation’s Strategies?***

The data indicates that existing knowledge assets will have an influence on strategic plans, but do not determine strategic plans. However the stage an organisation is at in its life cycle has a bearing on the amount of influence they have.

The range of possibilities of the outcomes of strategic plans can be defined or limited by existing knowledge assets, and by the ability of an organisation to acquire the required knowledge assets. Existing knowledge assets can limit strategic plans through: restricting what an organisation can offer in the way of products and services; or through continuing to provide products and services simply to utilise the knowledge assets, rather than disposing of them.

A clear understanding of an organisation’s distinctive competencies can redefine what the business is, and what its real products are. In the public sector, some important competencies are the ability to shape and influence the environment they work in, eg manage the minister, influential stakeholders, or regulator. Another is having the skills to understand what their business is really about, what their distinctive competencies are and how they can utilise them to develop new ways of service delivery – new paradigms. A very closely associated distinctive competency is the ability to scan the external and internal environments, and to develop strategies that will satisfy corporate objectives.

### **RI4 – What is the Life Cycle of Knowledge Assets?**

As we have discussed, the knowledge assets an organisation requires are identified in broad terms through strategic plans, and with greater precision when planning and executing projects or strategic initiatives. This is the start of the life cycle of knowledge assets. Once the need has been identified in the public sector, knowledge assets are acquired most often through partnering and collaboration, training people or acquiring new people, and least often through acquiring or merging with an existing organisation.

Partnering and collaboration is very common in local government, which, for example, uses community and advocacy groups to gain opinion of proposals or performance, eg by people with disabilities. They also have volunteer labour, eg friends of the library. Partnering and collaboration also occurs between levels of government, in particular local and state / territory.

‘we have over, well I think it’s nearly 3,000 volunteers too that we manage, not just people

off the street, we have to check them, train them, get the OH&S sorted out, insure them, you know, and without them, we couldn’t do what we are doing anyway. So a lot of knowledge is sitting with them. ... a lot of those volunteers work in our aged care, you know, doing Meals on Wheels, and others might be Friends of the Bush, or Friends of the Library, you know, and then there’s the Emergency Services. Pretty diversified.’ (Practitioner 10)

The end of the life cycle is when knowledge assets are no longer required, at which point they may be disposed of, or they may simply atrophy through disuse. Conceptually the skill may exist, but in practical terms may no longer be of a useful standard.

‘I don’t think we’d get rid of anything, I think we would tend to let it die its own death, and I mean, it just won’t live if it’s not useful ...’ (Practitioner 10)

‘... we have people in the organisation here who have worked for 40 years or so, so the things that they did 40 years ago are certainly not being used now ...’ (Practitioner 11)

As mentioned, knowledge assets can also be disposed of, or destroyed through lack of maintenance. Indeed, applying concepts such as ‘assets’ to knowledge brings with it other concepts from the domain of physical assets such as defective assets. During their life knowledge assets, like physical assets require maintenance, to prevent them from becoming defective. Knowledge can be wrong, despite being a justified true belief. Knowledge can be in conflict with other knowledge; it can be out of date or superseded; it can be out of context, biased or prejudiced; it can be malicious; and it can be incomplete. An example of how this issue is guarded against in academia and research is the process of peer review for submissions to academic journals, and the practice of publishing articles that challenge previously published articles. Selection and evaluation panels for tenders, employment, and other decision-making processes are also ways to overcome defective knowledge. For example:

‘Some knowledge is wrong, is dangerous, is malicious, a lot of knowledge is strongly situated, from a, because it folds in people’s judgements, it can fold in their prejudices, that makes it much more difficult, and if you look at things people do when they are doing things like decision-making, where you are collecting and converting knowledge into a decision, look at all the things that people do to protect themselves: declaration of interest, external members

on selection panels, rigorous assessment criteria.' (Practitioner 1)

Without maintenance, knowledge assets will lose value and relevance. This applies to skilled and experienced people, and also other knowledge assets such as corporate records, plans, and drawings.

Knowledge asset maintenance could also be seen as a means of preserving organisational knowledge. Some of the subject organisations do this through succession planning with techniques such as pre-departure mentoring, with one organisation (Department 2) '... running a program on recorded and interviewed history ...' to overcome the loss of knowledge when long-serving staff leave the organisation. An-

other technique is a type of alumni program where former staff maintain ties with the organisation and participate in activities that are of interest to them.

Figure 2 represents a view of the life cycle of knowledge assets, developed from this research. Starting with when the need for specific knowledge assets occurs, they are then acquired in some way, and deployed or made available. While the knowledge assets are utilised, the need for them is periodically reviewed and a decision made for minor maintenance, major renewal or disposal if they are no longer of use to the organisation, at which time they are retired. As with all activities that consume resources, the life cycle will be monitored so that adjustments can be made when required.

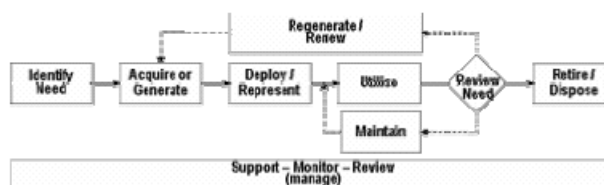


Figure 2: Knowledge Asset Life Cycle, Source: Developed from this Research

Through the application of the preliminary research findings, figure 2 has been adapted from similar models applied to physical assets, and represents the life cycle of knowledge assets as an organisational resource.

## Conclusion

This research has found that there is a marked interdependence between strategic management and knowledge assets. The strategic management process requires skills and capabilities (knowledge assets) for its execution. Moreover, the resultant strategies require the exploitation of knowledge assets to ensure effective execution.

Changes in government agenda and market pressure can result in plans to downsize, change or increase the products and services provided, all of which have an impact on the nature of the knowledge assets required. An organisation's objectives are shaped by the environment that it operates in, which will influence the nature of its strategic plans, which in turn influences other strategies down through the

strategy hierarchy, such as recruitment, learning and development, and knowledge management strategies. Whilst high-level strategies give direction, it is lower-level plans that are able to identify with greater accuracy the knowledge assets required to meet organisational objectives.

It is logical to expect the same approach with respect to redundant knowledge assets; however, the identification of redundant knowledge assets was not a formal process in any of the organisations studied. Decisions to outsource a business function are the most common means of identifying redundant knowledge assets. In the case of people, the most common means of disposing of their knowledge is through retraining, with unused knowledge atrophying.

The lifecycle of knowledge assets starts and ends when their need or otherwise is identified directly or indirectly by strategic plans. Knowledge assets are acquired, deployed, utilised and maintained until they are no longer needed. They are then disposed of by outsourcing or by atrophy when people are redeployed or retrained.

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