The International JOURNAL

of KNOWLEDGE, CULTURE
& CHANGE MANAGEMENT

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VOLUME 5, NUMBER 7

INTERNATIONAL JOURNAL OF THE MANAGEMENT
<http://www.Management-Journal.com>

First published in 2005/2006 in Melbourne, Australia by Common Ground Publishing Pty Ltd
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 THE 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 Model for Assessing Wireless ICT and Workforce Mobilisation Impact on Organisational Performance

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Abstract: We propose a methodology for assessing the impact of the introduction of MWT (mobile wireless technology) in Australian organisations with a view towards organisational mobile transformation. The data collected indicates a strong tendency towards an effect on intangible resources, traditionally hard to measure. By quantifying interviewee's opinions we derive a model that, if applied in a usable spreadsheet form, could predict (with reasonable accuracy) the impact that such an adoption could have at the P&L level. As such the study is foreshadowing reasonable benefits for corporations that choose broad-based MWT adoption with almost immediate expected benefits to personal stakeholders, desired business values and the business model itself. As a direct result of this study corporations can look forward to a comprehensive framework (established through consultation with experts) for the collection and analysis of corporate opinions, trends, impact and resource-based data regarding the adoption of MWT.

Keywords: Workforce Mobilisation,, Resource Based View,, Strategic Resource Management

Introduction

IN THE PAPER we propose a model for the determination of the effects that a workforce mobilisation initiative coupled with MWT (Mobile Wireless Technology) will have in the Australian corporate sector.

Within the scope of the paper we propose a heuristic model that works progressively with organisation where evidence of change on a workforce in the early stages of wireless liberalisation (time and space) is beginning to show (i.e. is emergent). Predicting how these transformations will occur though is problematic as no longitudinal studies currently exist. However, the issues that offer certainty are namely that:

- MWT will be one of many components or strategic resources that are integrated as parts of an organisation's ICT strategy.
- The way in which MWT is integrated into an organisation's ICT strategy will also vary from one corporation to another.
- The reasons for adopting MWT based capabilities will vary for each organisation (i.e. the objectives of each organisation will differ).
- MWT based strategies will be judged on their ability to increase shareholder, customer and employee value.

As the strategies for MWT are emergent (potentially leading to a state of heightened emergence) the research aims to adopt a framework that is sensitive

to the variety of prospective configurations and objectives that organisations may pursue.

Workforce Mobilisation Issues

We believe that the successful implementation of these concepts needs to be guided with due consideration across a number of issues. Namely:

- Increased virtuality
- Organisational ability to evaluate agents of change
- Organisational ability to handle increased emergence
- Organisational communication culture
- Organisational information sharing culture
- Intangible resources appreciative reporting systems
- Workplace agreements
- Self management
- Supervision
- Result focus work objectives

These areas are of concern because our research has shown that managers believe that mobilisation with MWT will create more dynamic organisations that need to be responsive on a number of levels, including: quicker and smarter reactions to changing market/stakeholder requirements (resulting from increased networking capabilities); and the shifting of responsibilities and decision making to the fringes (thanks to virtual support), instilling an acceptable level of self management skills (self-efficacy) to

support a goal oriented, rather than task oriented, work culture.

The study is important for at least the following reasons:

- There is a need to define a model to understand and measure impact and outcomes the broad-based adoption of MWT will have on,
 - Personal stakeholders of the business
 - Business values
 - The business model and infrastructure itself
- Its introduction is likely to create benefits at many levels, and further overlap between private and work life, and
- MWT needs levels of support from external infrastructures that would facilitate use.

While within the context of our investigation we looked at a variety of aspects that potentially could have an affect, or be affected by, workforce mobilisation. The prime purpose of this paper is to report on the establishment and validation of a method to measure the impact of broad based adoption of MWT (Mobile-Wireless Technology) on personal stakeholders of the business, business value and business model variations. Our aim therefore, is to develop a refined corporate MWT value framework for the adaptation of the technology and realisation of its desired outcomes, namely workforce mobilisation.

The research noted herein, is intended to be the first phase of a three-phase research plan. The three phases are:

1. Validation and Refinement of a Value Framework

2. Change Management Methodology
3. Vertical Industry Refinement and Overlay

This research specifically excluded the study of the technology itself, in the light of the comprehensive work being already conducted by the ICT industry.

We now give an overview of the proposed model. In the section that follows we explain the antecedents of our model for mobile computing adoptions. The objective of this refined model is to produce something that is both useful and understandable to industry but which is defensible and rich.

The Proposed Model

The model considered is based on the creation of value to shareholders, employees and customers, via the more effective and efficient utilization of the organization's resources. It was developed based on industry observation of the benefits of MWT enablement in selected case studies.

In a common sense way it relates the transformations that mobile technology can facilitate, to value creation process in the form of *Value Drivers*. While drawing from the Strategic Resource Management (SRM) literature, it extends this by introducing the employees and customers as stakeholders of the firm, whereas traditional SRM is focused on aligning managerial behaviour to maximize shareholder returns via measurement of Discounted Cash Flow (DCF) and Shareholder Value Add (SVA) (Rappaport, 1998) (Figure 1).

Figure 1: Original Mobile Workforce Value Model

This model, while being practically attractive, raises some issues that must be addressed. First and foremost, there is a need to establish the ontological framework of the model. SRM is based on advanced accounting procedures. There is debate with the SRM community as to which measures are best for predicting shareholder value (Martin and Petty, 2000; Rapaport, 1998; Stewart, 1991; Young and O'Byrne, 2001; Copeland et al, 2000 as reported in Weaver & Weston, 2003). The literature, however, suggests that all roads lead to shareholder value. In this context expanding the Corporate Objectives to include Customer and Employee Value is problematic and, within SRM, these can be seen only as subsidiary objectives that must affect Shareholder Value to be of relevance. An alternative to SRM is the Balanced Scorecard Methodology (Kaplan and Norton, 1993). Balanced Scorecard attempts to broaden the focus by directly or indirectly (via proxies) measuring performance indicators that the firm believes will lead to long-term strategic success. Balance Scorecard has found favour with practitioners because measurement is simpler and it can be applied to a

wide range of organizations, not just for-profit enterprises.

An aspect not addressed in this model is an attempt to determine the relative importance of particular organizational capabilities. For example, is a reduction in office rental equivalent to the creation of new organizational processes to manage knowledge? Clearly it is not. We must, therefore, develop our appreciation of strategic value and the best means of doing this is by looking at the research on sustainable competitive advantage and strategy.

The Resource based View

A comprehensive review of the field of strategy is not our objective here, however, one can say that success of the firm stems from its ability to create a competitive advantage relative to other firms and maintain that advantage over time (Porter, 1980).¹ There are two dominant schools of thought regarding how we should think about strategy: the Structure – Conduct – Performance (SCP) model (Porter, 1980) and the Resource-based View (RBV) of the Firm

¹ One may not intuitively see how this also applies to not-for-profit and government organization but it does. Even a government department is seeking its preservation and the retention of its allocation of its budget. As such, it carves out bureaucratic space and must defend this from alternative providers of service and consumers of budget.

(Barney, 1991). The SCP model examines how the firm's position relative to industry structure and the competitive landscape, provides it with competitive advantage or disadvantage. The RVB approach considers how the resources of the firm can lead to the development of sustainable competitive advantage (SCA). We can therefore categorize SCP as being externally focused whereas RBV is inwardly focused. Both have advantages and disadvantages however as we are here concerned with the utilization of resource to the advantage of stakeholders, we feel that the RBV is more relevant.

The Resource-based View was first articulated by Penrose (1959) but fully outlined by Wernerfelt (1984). He described the RBV position as: The resource-based view suggests that firms should not be observed in terms of their product market activities but rather in terms of their resources (Wernerfelt, 1984). As noted in Carmeli (2001), "The notion of defining a firm according to its strategic resources

was expressed in the seminal study of Prahalad and Hamel (1990)." Barney (1991) proposed that SCA could only be derived from resources or capabilities that were: rare, valuable, not easily copied (inimitable) and for which substitutes did not exist. He proposed that resources are configured into resource bundles and these bundles deliver capabilities to the firm with are the source of SCA (Barney, 1991).

This static model of RBV has transformed into a dynamic capability view by Kyläheiko, Sandström, and Virkkunen (2002) (see Figure. 2). The firm's competitive advantage is in its "in the dynamic capabilities rooted in high performance routines operating inside the firm, embedded in the learning processes and conditioned by its history, thus generating path dependencies." They view the firm "primarily as knowledge repositories, where the evolution of knowledge can be analysed in terms of knowledge creating, transferring and integrating processes."

Figure 2: DCV of Firm

Kyläheiko, Sandström, and Virkkunen (2002) also apply Real Option theory to look at the economic effect of this dynamic model. They conclude that managers must decide between numerous options for configuring resources and that these choices create capabilities that are both idiosyncratic and path dependent.

A Revised General Model

Our first step to generating a model applicable to workforce mobilization is to rearticulate what we have concluded into a reframed RBV model that is clear and easy to understand. Figure 3 contains this model.

Revised General Model

Figure 3: Revised General Model

In this model we assert that organizations have resources, and that by configuring these resources into resource bundles, capabilities are created. These capabilities will deliver value, however to contribute to the SCA of the firm, the capability must be Rare, Valuable, Inimitable, and Non-substitutable. If this is the case then the first will in time return superior benefits to shareholders (and continue to exist for the benefit of all stakeholders).

Other researchers have found (Foss, 1998) that intangibility of resource is a predictor of success. The explanation is that intangible resources are harder to characterize and copy.

We are therefore in a position to suggest a hierarchy of capabilities of resource bundles that should predict the order of benefit to the firm (Table 1).

Table 1: Complexity Order of Resource Bundling

Order	Resource Configuration	Example. of Wireless ICT
1 st Order	Tangible Resource(s), Efficiency improvement or cost savings.	Reduced office space.
2 nd Order	Intangible Resource(s), Efficiency improvement or cost savings.	Faster access to data.
3 rd Order	Complex resource bundles that produce capabilities that are rare and valuable but do not provide a sustainable advantage. E.g. They provide a first mover advantage.	A company equips its sale force with WiFi enabled notebooks. Sales reps are now able to configure sale orders while with customers, reserving stock and confirming delivery dates.
4 th Order	Complex resource bundles containing intangible resources configured to produce a capability that is rare, valuable, inimitable and non-substitutable.	An organisational culture that encourages and supports cooperation with other business partners in <i>collaboratoriums</i> – common use spaces used by industry groups instead of individual firms.

This proposes that efficiency saving of tangible resources is worthwhile but is unlikely to give the firm a differentiator in the market. We feel it is reasonable, therefore, to more heavily weight initiatives that revolutionize the way a firm does business and give a SCA. A good example of this is Dell Computers, which did not create the concept of a e-commerce web site or create the mail-order PC concept, however the combination of web technology and

Michael Dell's vision of a virtual supply chain delivering configure-to-order PCs, produced a competitive advantage which has been difficult to emulate.

Revised Special Model Addressing Mobile Workforce

As our objective in the research is to examine how a move from a desk-bound to a mobile technology

infrastructure in a firm leads to the creation of stakeholder value, we must take our general-purpose model of value creation based on the configuration

of resource and create a special purpose model for mobile enablement.

Revised Special Model

Figure 4: Revised General Model Further Revised

In this model the introduction of a new *technological resource*, Wi-Fi or mobile technology, combined with other *resources* in idiosyncratic and path-dependent ways (*resource bundles*) produce new *capabilities* that can in turn deliver *value* to various *stakeholders*. The nature of the combination determines the likely magnitude and type of the value created. We refer to this as the *order* of the bundle (see Figure 4).

To illustrate the operation of this model, we will use some of the anecdotal examples from the Intel case studies.

Reduction in Office Space Required

The average space required to house an employee in an open plan office is 15 m²². By providing a wireless notebook staff are able to hotel, which means to book a desk when needed rather than have one permanently allocated; work from a home office or work in communal space. If 30% of staff work in a flexible arrangement *visa vie* office space, we could see a reduction of up to 10% of office space requirements. This translates to savings in rent in the order of \$500,000 per annum for a 1000 person organization.

The resources involved are wireless-enabled notebook computers and office space, a physical resource. The Wireless-enabled notebook computers reduce the demand for office, producing either increase capacity or a cost reduction. We would conclude that the value created is of the 1st Order and the value will be in the form of cost savings.

Improvement in Employment Productivity

Intel IT conducted a research study into time saving from wireless. They identified that by using wireless technology employees were able to reclaim several hours per week on non-productive time spent in transit and waiting for meeting to begin.

The resources involved were Wireless-enabled notebook computers and the employee's time (a human resource). We would conclude that the value created is of the 2nd Order and the value will be in the form of productivity savings. Productivity savings have the potential for both cost reduction, in that less employees may be needed to product a fixed quantity of work, but it also has the ability to create additional time for employee development, social cohesion, employee well-being and creative output. The extent to which these occur is not determined by the productivity saving itself but by other actors such as the employee's personal attributes and social codes and ethics.

Use of Wireless Devices at the Point of Care in Health Case

A proposed benefit from mobile devices is the ability to access patient and other data by the patient's bed during an examination. The potential benefits include better treatment outcomes because of access to up to date and higher-quality information as well as cost saving from reducing the cost of records management.

² Source: Graystones – verbal enquiry on commercial office requirements

In this situation there is a more complex configuration of resources: Mobile devices, people and also organizational systems and procedures. There are also interactions in the area of client confidentiality and trust and community acceptance of technology that can affect adoption. We consider this to be a 3rd Order value creation process because the value bundle / capability produce is complex and influenced by the path-dependent nature of its adoption. A community that can enable its health system to effectively use patient data at point of care will enjoy superior health outcomes. Potentially many health systems could do this however the complexity of the resource will cause many to fail. Over time however, such innovation tends to become productized and commoditized, allowing imitation.

The Collaboratorium and the Virtual Team

We propose the establishment of a National Magnetic Resonance Collaboratorium (NMRC)-a virtual laboratory or "centre without walls" that would network collaborations among sites and the nation's biological, chemical and materials science communities creating a national resource that would integrate magnetic resonance-related science, education, and technology to levels and capabilities never before envisioned. (Anon, 2003)

The concept of virtual project teams collaborating via the Internet is not new. With the move to wireless infrastructure and a move from private to public shared infrastructure, it becomes possible for collaborations to occur in physical as well as virtual space. For this to be allowed to occur, organizations must rethink concepts such as IP protection, trust and IT governance. For organization able to maximize the positives of this collaboration and manage the potential downside, there are significant benefits. In an innovation intensive industry the speed of bringing to market new products is a principal determinant of success. Bringing in sources of intellectual capital from outside the firm and enabling to fully participate in projects via full-service access to infrastructure, can give a market advantage that will be difficult to imitate. We therefore call these complex resource bundles 4th Order value generation functions as their idiosyncratic nature makes them not only rare and valuable but, because culture and world view are very intangible, this can become a sustainable competitive advantage.

Having now illustrated this new special model, we return to the original model and compare it.

The Original Model Redeemed

The original benefits model (Figure 1) attempts to relate how the move to a mobile-equipped workforce produces value to stakeholders. In this section we will relate the concepts of the original model (OM) to our new model (NM).

Looking at the concept of stakeholders, in the OM we have three type of stakeholder value: shareholder value, employee value and customer value. In the NM we have six categories. We believe that the three of the OM are covered in the NM and that the other three are important categories to add for completeness. No one argues however, the importance of shareholders, employees and customers. In the NW we have stakeholders whereas in the OL they are only indirectly reference i.e. shareholder value implies shareholders are stakeholder for whom value is created.

Within the three value categories we have values that can be mapped to the orders and types of value created. For example improved work-life-balance in the OM can be seen as a 3rd Order value in that few organizations have the organizational resource to create systems that maintain improvements in work-life-balance, and hence the improved retention and attractiveness of the organization as an employer can be seen as a distinctive capability.

The *value drivers* in the OM can be best seen as antecedents to value creation in the form of emergence organizational capabilities caused by resource bundle configuration. So we can see that the old model is in fact in general alignment with our new model and deals specifically with some of the potential benefits of workforce mobile-enablement. Where we believe that the new model is more useful because:

- It is built on coherent theoretical foundations;
- It predicts the order and type of value created by different uses of mobile technology;
- It is able to align with case study material to date;
- It is more comprehensive and general allowing the model to be applied to as yet un-thought-of applications of Wireless mobile technology in an organizational context.

Model Essentials: Tangible and Intangible Resources

The business objectives of a firm can be described as establishing a competitive advantage and creating shareholder value (Rappaport, 1998). According to Rapport the linkage of earnings to shareholder returns using the accounting based indices, return on investment (ROI) and return on equity (ROE) as measures of financial performance, does not provide an accurate measure of a company's performance (Rappaport, 1998). He argues that discounted cash flow (DCF)

and shareholder value added (SVA) indices should be used instead of ROI and ROE. Connor suggests that competitive success lies within the hands of managers from a resource-based view of the firm, rather than a firm trying to constantly fit its environment (Connor, 2001). Managers should be encouraged to align strategic management decision making with the stock market via incentive systems, to produce a sustained competitive advantage for the firm.

The benefits of a Wireless mobile enabled firm will be measured by the increase in shareholder value due to an increase in a firm's DCF. The cost savings

and increased productivity of a firm by a more efficient use of tangible resources and the competitive advantage attained by the appropriate bundling of tangible and intangible resources is measured within the DCF function. A spreadsheet is produced to enable the likely quantifiable benefits of a firm's decision to move to a Wireless enabled workforce, to be explored. Figure 5 shows how the dynamics of the SRM model works in terms of causality, while Figure 6 gives an example of a calculation carried out using the causality effect on the SRM model resulting in an increase in shareholder value.

Figure 5: Causality in SRM Model

Example: Calculating an increase in shareholder value

Shareholder value is derived by the following formula:

Sum of future free cash flows discounted by Weighted Average Cost of Capital (WACC) less Debt

To calculate sum of future free cash flows two formulae are used the first is for profit and loss items the second for balance sheet items.

Profit and Loss items

Free cash flow can be calculated by the following formula:

$(\text{Total current cost per \$ revenue} - \text{Best Practice cost per \$ revenue}) \times \text{Revenue}$

For example

Current cost of the accounts payable function = \$1.50 per \$1000 revenue

Best practice = \$0.50 per \$1000

Total Revenue = \$10 Million

Weighted average cost of capital = 20%

$(1.50 - 0.50) / 1000 \times \$10 \text{ Million} = \$10,000 \text{ total saving per year.}$

To convert this annual figure into the sum of future free cash flows, we assume 3% inflation and that the benefit will last for 10 years. Discounted for WACC of 20% = \$46,055.88 added value to the shareholders.

Balance Sheet items

Free cash flow can be calculated by the following formula:

$(\text{Average value of balance sheet item} - \text{Improved value of balance sheet item}) \times \text{WACC}$

For example

Current average accounts receivable balance = \$1 Million

If the average days sales outstanding is reduced from 50 days to 40 days, this will reduce the average accounts receivable balance to \$800,000.

Weighted average cost of capital = 20%

The saving of \$200,000 $\times$ WACC = a \$40,000 per year saving.

Figure 6: Calculating Shareholder Value

Tangible Resources

The impact of Wireless technology on the tangible resources of a firm is generally to translocate the cost of tangible resources to outside entities. For example a reduction in the need for a firms office space due

to the employee being able to work from home and community hotspots like café, transport systems etc, translocates the costs of renting the space, energy consumption etc to the owner of the space being used by the employee. Employee work locations can be

defined as, home as primary office, client or remote office, in transit, corporate office and public space.

Key benefits identified by Wireless notebook users include the ability to expedite decision making, handle urgent messages, and have all their information accessible and in one space. In addition, employees enjoyed the flexibility of working from a variety of geographical locations and accessing the Internet easily (Gartner, 2001).

The research participants in the case studies are asked by survey to ratify an initial list of tangible resources that by reduced consumption, a firm may be able to achieve cost savings. Any new tangible resources that are identified by the participants are included in the list for inclusion in a predictive spreadsheet. Tables 2 and 3 List the resource classifications and tangible resources used.

Table 2: Resource Classes

Types of Resource Classes
Financial
Physical
Human
Organisational
Relational
Technological

Table 3: Tangible Resource Classification

	Reference	Type	Perf. Impact	Class
Physical items	[1]	Tangible		Physical
Facilities	[1]	Tangible		Physical
Raw materials	[1]	Tangible		Physical
Equipment	[1]	Tangible		Physical
Firms' plant and equipment	[1]	Tangible		Physical
Databases	[1]	Tangible		Technological
Fixed network hardware	[1]	Tangible		Physical
Ancillary communication hardware (fixed telephones, faxes, shared resources, etc)	[1]	Tangible		Physical
Consumable office resources (stationary etc)	[1]	Tangible		Physical
Communication expenses (Phone bills etc)	[1]	Tangible		Financial
Rental of ancillary space to support office space (car parks, corridors, toilets etc)	[2]			Financial
Furniture	[1]	Tangible		Physical
Energy (Space temperature control, lighting,)	[1]	Tangible		Physical
Transport costs (Employee expenses)	[1]	Tangible		Human
Time (Employee costs)	[2]	Tangible		Human

Intangible Resources

Defining the core intangible resources of a firm has proven to be a challenging task for quantifying the resource-based view of the firm, as discussed by Rouse and Daellenbach (1999),

because the RBV emphasizes the idiosyncratic nature of a firm's resources and capabilities, empirical testing of the resource-based theory faces great challenges. (Rouse and Daellenbach, 1999).

The resources and competencies that a firm controls that are valuable, rare, imperfectly imitable and not substitutable can be used to provide a firm with a sustained competitive advantage. Any particular resource that can be identified as possessing all four of these characteristics may enable the firm to achieve a competitive advantage (Barney, 2001). Table 4 lists the base table of intangible resources used in the MWT impact evaluation process.

Table 4: Intangible Resource Classification

Intangible Resources	Reference	Type	Perf Impact	Class
Organisational strategy	[1]	Intangible	High	Organisational
Internal control	[1]	Intangible		Organisational
Ability to raise funds	[1]	Intangible		Financial
Environmental fit	[1]	Intangible		Organisational
Know-how	[1]	Intangible	High	Human
Industrial relations	[1]	Intangible		Human
Ability to learn	[1]	Intangible		Human
Ability to manage change	[1]	Intangible	High	Organisational
Managerial competence	[1]	Intangible	High	Organisational
Organisational reputation	[1]	Intangible		Relational
Product/service reputation	[1]	Intangible		Relational
R&D	[1]	Intangible	High	Organisational
Human Capital	[1]	Intangible	High	Organisational
Intellectual Property	[1]	Intangible		Relational
Relationship with the community	[1]	Intangible		Relational
Relationship with government	[1]	Intangible		Relational
Marketing and selling	[1]	Intangible		Organisational
Business development and planning	[1]	Intangible		Organisational
Organising	[1]	Intangible		Organisational
Organisational communication	[1]	Intangible		Human
Organisational culture	[1]	Intangible	High	Human
Entrepreneurial recognition	[2]	Intangible		Organisational
Ownership of brand	[3]	Intangible		Organisational
Special marketing skills	[3]	Intangible		Human
Access to patent	[3]	Intangible		Organisational
Economies of scale	[3]	Intangible		Financial
Economies of vertical integration	[3]	Intangible		Financial
Ability to differentiate products	[3]	Intangible		Relational
High emphasis on R&D	[3]	Intangible		Organisational
Technology used in the firm	[3]	Intangible		Physical
Firms' plant and equipment	[3]	Intangible		Physical
Training	[3]	Intangible		Human
Experience	[3]	Intangible		Human
Intelligence	[3]	Intangible		Human
Relationships	[3]	Intangible		Human
Intelligence of managers	[3]	Intangible		Human
Intelligence of workers	[3]	Intangible		Human
Marketing expertise	[3]	Intangible		Human
Formal reporting structure	[3]	Intangible		Organizational
Formal/informal planning	[3]	Intangible		Organizational

Controlling	[3]	Intangible		Organizational
Efficiency and synergies existing between marketing and R&D	[4]	Intangible		Organisational
The integration of knowledge through teamwork	[4]	Intangible		Human
The fostering of learning	[4]	Intangible		Human
Manage external resources		Intangible		Human
Manage external networks of relationships (including political, familial, friendship and alumni links, as well as alliances via boards, trade unions and banks etc).	[4]	Intangible		Relational

There are some usable methods (Wernerfelt and Montgomery, 1988) to help define a list of core intangible resources that may be affected by the introduction of Wireless technology, the ones considered were:

- The balanced scorecard technique
- Tobin's Q
- Analysis of Variance
- Cognitive Maps
- Repertory Grid Analysis
- Game theory

As the data gathering process was to be carried out through a series of interviews soliciting information from high level executives It was decided to

adopt the balanced scorecard method. This was done because the information solicited is believed to be of high quality and the time high level executives can afford is limited.

The balanced scorecard method, as adopted for the research, involved presenting the participants with a list of intangible resources. If the participant identifies intangible resources that are not defined in the given list, they may be added to the list. The participants are firstly asked to select a subset of seven intangible resources from the list that may classify as the core intangible resources of the firm. Participants are then asked to distribute 105 points amongst their chosen list of resources four times to assess a resource's value, rareness, inimitability and non-substitutability. See Table 5 as an example.

Table 5: Defining and Rating Intangible Resources (example)

Intangible Resources (7 Chosen by participant from a given list)	Value	Rareness	Inimitability	Non-substitutability	Total
i.e. Organisational strategy	25	35	40	35	135
i.e. Internal control	15	5	10	5	35
.....					
Total	105	105	105	105	525

This method, the interval rating technique is used instead of an ordinal rating scale where each selected resource is rated on a scale from 1 to 7. The interval rating technique of resources can be used explore the differential of the resources which is not possible using ordinal scales.

These results can emphasise the perceived importance of any particular intangible resource to the firm.

Next the impact of MWT on the yearly reporting method of corporations (P&L, ABC, etc.) is determined. This procedure involves sessions with the CFO considering the Business Drivers, the affected resources, and the (P&L, ABC, etc.) components. During the session, the effect of the affected resources on the (P&L, ABC, etc.) components is determined in light of the business drivers (Figure 7).

Figure 7: Calculating Shareholder Value through Business Drivers

Method of Research and Data Acquisition

We adopt an interpretative approach to the research as wireless technology functionality can be interpreted through its subjective perception and therefore influenced by humans.

Case study research was deemed to be the most effective method in meeting the objectives of the research due to the constraints on time. Also, other aspects of case study research that make it suitable in meeting the objectives of the research is that there is no restriction to specific theories or pre-defined paradigms (Darke, Shanks and Broadbent, 1998; Cavaye, 1996). This is advantageous, because it allows the consideration of other paradigms, or the formulations of new ones as evidence emerges from the data gathered.

Survey Methods

Due to the nature of the inquiry, consisting mainly of soliciting information from people, it was decided to use a questionnaire and semi-structured interviews as the survey method. Group discussion, which can be employed for a variety of reasons, was also used (see Sarantakos, 1993, pp.249-250); in our case it served two purposes. Firstly it was used to provide answers to questions about hypothetical scenario outcomes. Secondly it was used for the purpose of defining if none, some, or indeed all of the results from data analysis were in any way convergent.

It should be noted that all interviews were recorded and suitably transcribed.

Session Overview

Session 1: Introduction to the research programme. Briefing on emerging capabilities, trends and technologies supporting the notion of organisational mobile wireless transformation and liberated workforce.

Session 2: Individual or small group (1-3 people) guided questionnaire completion. People will be asked to comment on material distributed prior the commencement of the research. We will seek: opinions, perceived opportunities, barriers to adoption, and effect on work/personal/social life in their domain of expertise.

Session 3: Corporate group session. Group feedback on material analysed in session 2 and subsequently distributed. Corporate scenarios (rather than departmental) should be discussed. This session will be 'real world' and 'hypothetical'.

Session 4: Individual or small-group (1-3 people) validation session and semi-structured interviews. Results from the analysis from the data collection episodes in sessions 2 and 3, and subsequently distributed, are critically appraised by participants.

Research Scope and Interpretation

The research and validation work was carried out across four corporations belonging to the government, public and private sectors with the participants being a major government health provider, a leading media-publishing organization, an SME corporate, and a University.

Scope of the Study

Although some of the respondents seemed to exhibit some confusion in distinguishing government and public sector companies, as put forward by interviewee opinion, the survey consisted of:

- 60% Government employee representatives
- 20% Public employee representatives
- 20% Private employee representatives

Representation by industry type was:

- 40% higher education sector
- 33% health care sector
- 20% IT sector
- 7% media sector

The gender split was 21% Female and 79% Males. Most of the interviewees held Level C position or above with the split being:

- 33% CIO, CTO, CMO
- 20% Director
- 27% Second line manager
- 13% First line manager
- 7% Non Managerial

The age distribution had the median set in the 35-45 group with the lesser majority in the 46-55 group and the minority in the 25-34 group.

The level of education consisted of 14% of the interviewees with vocational training, 43% graduates, and 43% post-graduates. One interviewee held a PhD, and 10 others had limited research experience at the graduate level.

Preliminary Findings

With respect to the RBV model, the resource data gathering process is indicative of some interesting trends. Government and Public corporations do not see the need to guard their resource for competitive advantage, but welcome the chance of sharing the knowledge of how to best use and bundle them. There is however concern about losing good resources, essentially related to personnel, which is viewed as a valuable resource. Private corporations also seem to be surprisingly lenient on how they guard resources. What was surprising was the degree of importance attached to intangible resources. Indeed, when asked to rank the topmost resources interviewees always chose intangibles over tangibles, subsequently the resource data was divided into two sheets one containing tangible resources and the other intangible resources. Information about which resources were the most important to the organisation was gathered by asking the interviewees to choose from two lists in turn (one containing tangible resources and the other containing intangible resources) which in their opinion were the 7 topmost important tangibles and the 7 topmost important intangibles. They were then asked to weight their choices in order to give as realistic a view as possible in terms of rank separation. Next the interviewees were asked to take each of the chosen and weighted resources and estimate the degree of impact that MWT would have on them (using the balanced score card approach). The raw scores were then converted and expressed as a %. The topmost resources can be seen in Tables 6 and 7. Only the top seven are shown.

Table 6: Top Seven Tangible Resources and Expected +ve Impact

Tangible Resources	Expected Impact
Reduction in fixed costs (i.e. Hardware, real-estate etc.)	22%
Time (Employee Costs)	17%
Data Resources (increase in data accuracy, data concurrency) resulting in less mistakes and better, faster decisions.	16%
Equipment (one all purpose mobile device can substitute several fixed ones)	13%
Reduction in Ancillary Communication hardware (Fixed telephones, faxes, etc.)	10%
Aggregation and Reduction in Communication Expenses	7%
Software licensing (reduction in number of licenses, etc.)	5%

Table 7: Top Seven Intangible Resources and Expected +ve Impact

Intangible Resources	Expected Impact
Organisational Culture	9%
Integration of knowledge through teamwork	20%
Human capital (attraction, distribution, retention)	10%
Ability to Learn	27%
Ability to Raise Funds	6%
Ability to Manage Change	30%
Intellectual Property	18%

The next step, concerned a session with the CFOs of the corporations involved in the study, so as to establish a mapping between the affected resources and the respective P&L (or equivalent). This is done in order to assess the impact that MWT and Mobilisation is expected to have on the corporation. These mappings are at the moment organisation specific and in the early stages of development. We feel that it would be inappropriate to report on them here as this investigation though promising is still incomplete.

Conclusion

The proposed model has been derived/evolved from the concepts of Strategic Resource Management (*a la* Rappaport) and Activity Based Costing (popular frameworks used in management accounting) and from Tobin's concept of intangibility being correlated with a firm's performance.

The value model framework that establishes the benefits of MWT adoption has three basic components to it as shown in Figure 8.

Figure 8: Value Model Framework

Through this model organizations will be able to accurately assess MWT impact in terms of broad-based adoption. Identification of potential benefits and structural impediments to MWT can be specific-

ally identified and a change management methodology subsequently devised.

The power of the RBV model used in the framework is its ability to identify value, as well as sources

of value creation. Whether a CEO tags community relations; a CMO tags corporate intelligence; and a Finance Director tags dollars as value, the RBV model will incorporate these into appropriate resource bundles.

RBV captures tangible as well as intangible resource values considered important to organization decision makers, as well as customers and shareholders (or citizens and taxpayer in a public sector setting). Resource value identification (in either qualitative or quantitative measures) comes from the stakeholders. Indeed the essence of the model is the weight applied by each stakeholder to the resource in terms of perceived importance.

These values are incorporated into organization nomenclature, which can then be utilized in business decision-making. Stakeholders and decision makers will be able to understand returns (ROI etc.) at each level of value on any given initiative or program. This will be more specific than traditional more tangible measures (but does not exclude them.) More importantly the respect and confidence in these predictive values by stakeholders is reflective on their initial and continued review of the value measures and resource bundles.

In other words it makes more sense to the stakeholders, as they know that all of the other stakeholders have their beliefs and commitment reflected in these metrics, and in supporting their value creation. For instance if stakeholders believe corporate intelligence and customer relationships are determinants of value, then development of this resource bundle will lead to improved customer satisfaction and customer satisfaction ratings, a measure of increased value.

The financial component is not forgotten but reinforced with this model. That is recognizing mapping resources extends value further and resource bundles against management adjusted financial statements (i.e., by providing perceived financial tags to the

bundles.) By mapping resources, resource bundles and their perceived dollar value, a predictive financial model guides stakeholders to what will be more realistic financial returns. The key twist here is that with the RBV model these predicted numbers now have the supportive metric and measurement framework, which allows value creation progress to be monitored and controlled during the life of that program.

The model (as developed) looks to identify the most important resource types, in terms of organisational performance. In a private business we can see that resources have an impact of the business in terms of increasing revenue or profitability. We ask the group to estimate the extent of that impact. We then ask them to consider the effect of MWT on that resource. As example "Human Capital" may have an effect on revenue in that new sales are achieved. MWT may have an impact on the efficiency of "Human Capital" in that it allows more efficient use of time. Ultimately this is a structured estimation technique. The ultimate assessment will be longitudinal, based on its predictive power. Senior experienced industry CFOs do believe however, that the approach has merit.

We conclude by acknowledging that the use of a model based on P&L and Balance Sheet is appropriate only in certain circumstances. In the case of the government health organisation, the impact on an existing ABC model was considered more relevant. The model was easily able to be adapted to this approach. In a government organisation optimisation of profit is not considered relevant but efficiency is. Ultimately it is about creating value for the stakeholders, be they government, citizens or shareholders.

Regardless of the method of accountability, this study produced a model through which organizations can better estimate, predict and ensure future value realisation.

Figure 9: Resource Based Value Model

This paper represents the initial account of an ongoing longitudinal study being carried out in the Australian corporate sector. The intent is to continue to strengthen the model, and to streamline the expected impact so that corporations can more confidently assess their move towards workforce mobilisation. We next expect to be able to report on some very

concrete mapping procedures between the impacted resources and the P&L (or equivalent).

Acknowledgment

The authors acknowledge and thank Intel Corporation for sponsoring the research reported in the paper.

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