### Paul A. Rogers

is the founder and Managing Director of Spire Consulting (formally known as RDT Pacific) a New Zealand based management consultancy firm. Paul specialises in strategic asset management, organisational performance improvement and supply chain optimisation. Based in Christchurch, New Zealand, Paul who is a Registered Engineer consults to a wide variety of clients globally in the health, infrastructure, utilities, manufacturing and commercial property environments, and is a visiting lecturer at Hong Kong Poly University where he teaches part of the post graduate FM course for MSc students.

Paul graduated with a Masters Degree of Building Science from Victoria University, Wellington, New Zealand and has more than 20 years experience in various asset and strategic management roles, having worked for J.P. Morgan, Lloyds of London, Colliers International and AMP Investments. Prior to forming Spire, Paul was National Manager – Facilities Management at Telecom New Zealand where he was responsible for the contract and performance management of New Zealand's largest facilities management portfolio.

### **Key Words:**

Outsourcing relationships, Strategic alliances, Supply Chain Optimisation, Facilities Management and Information Technology service delivery, Performance Based Contracts, Contract Management, and Process Management.

# Paul A. Rogers

Spire Consulting (NZ) Ltd P.O. Box 13611 Christchurch New Zealand. Tel: +64 274 400 867 E-mail: paul.rogers@spireconsulting.co.nz

# Optimising Supplier Management and Why Co-Dependency Equals Mutual Success

Paul A. Rogers
Received:

### **Abstract**

A recent article in the prestigious MIT Sloan Journal suggested that managing suppliers might be the most influential strategic lever organisations can use to reduce costs<sup>1</sup>. That statement might be correct in theory but the challenge of generating real benefits, both financial and non-financial to the organisation through third party service provider relationships is for most organisations a monumental challenge.

From the outset, the supplier will list the opportunity and gains from outsourcing in their summary presentations and tell you that they are better equipped, skilled and more effective at delivering your non-core services than you are, and all for a lower cost. Well maybe. But as auditors of outsourced contracts around the world we can also tell you about the organisations who entered into outsourced arrangements for Facilities Management (FM) and Information Technology (IT) services that failed to deliver any efficiency or productivity improvement, couldn't exploit the so-called 'economies of scale and scope' and failed to streamline any processes. Ultimately many of these outsourced provider examples did little that the organisation couldn't do for itself and out of frustration some organisations ended up prematurely terminating the outsourcing agreement and sourced the services back 'inhouse'<sup>2</sup>.

Based on experiences, lessons and observations over the past 10 years it is necessary to cut through the suppliers compelling pitch and clarify what really makes a strategic outsourcing alliance work and why performance management and mutual co-dependency in the relationship is the foundation for outsourcing success.

This paper considers the motivation and driving force behind outsourcing and advocates a strong relationship model based on co-dependency and collaboration, between partners. It also provides a summary of smart practice procurement management tools for effective, ongoing contract management to reinforce the importance and value of cooperation and communication between partners.

### **OUTSOURCING STRUCTURES AND THEIR INFLUENCES**

For most organisations, the driver for outsourcing is the ability to shift non-core services (such as facilities management) out of the organisation, to allow the organisation to better focus on their proprietary functions – those functions that give the organisation their competitive advantage. As a result of the outsourcing process, organisations need to ensure they don't lose sight and control of the outsourced service provider, especially if the supplier becomes dependant on driving up volumes, to remain profitable, to the detriment of quality and innovation.

When implemented and managed well, outsourcing can deliver startling results. In Australia alone, 97% of the largest companies claim to have outsourced at least one non-core or overhead type service function (Property and Facilities Management, Information Technology, Human Resources, Finance, etc). However, the failure rate of outsourced arrangements remains high, for IT services alone failure is estimated to be more than 30% (equivalent to AUS \$3.6B in 2001)<sup>3</sup>. Many large mature outsourced partnerships are struggling. For example, according to specialist outsourcing company Orbys, only 29% of companies believe that outsourcing contracts do more than they were expected to – which suggests that most do far less. What's more, the evidence is that contracts are taking longer to bed in as they become more complex. In fact contracts let after 2000 achieve lower satisfaction ratings than those let before the millennium<sup>4</sup>.

Entering into an outsourced arrangement for services' provision necessitates a similar degree of observation, planning and resourcing as choosing your own life partner. Organisations are quick to identify and evaluate technical supplier attributes (previous experience, resources and cost) but slow to identify the 'softer' relationship elements such as partnering ability, empathy, collaboration ability, strong leadership, enthusiasm and emotional intellect. Of all of these softer attributes – the concept of collaboration and the compelling motivation of co-dependency is by far the most important for a long term sustainable strategic alliance.

Ideas of competition are rooted in independence. However, as Porter<sup>5</sup> pointed out, the value chains of suppliers and buyers are not independent, but rather interdependent. The classic story about interdependence is that of the small birds which feed on the parasites in the mouths of crocodiles. The crocodile foregoes from eating the bird for the benefit of relief from parasites<sup>6</sup>. The analogy in the business world is that collaboration between two interdependent organisations can be beneficial to both.

Collaboration and co-dependency is achieved through strong trusting relationships. Organisations devise different sorts of relationships: some are formalised through contractual arrangements; others are informal understandings. Most, in reality, include formal and informal elements.

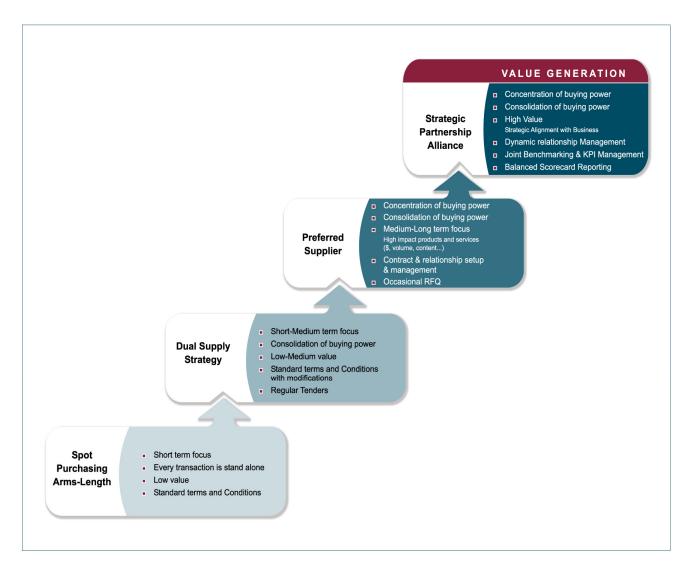
Regardless of the formality or informality of the arrangements, the outcomes of a relationship need to be reviewed. The arrangements need to be adjusted as circumstances or the expectations of the parties change. That is, the relationship needs to be actively managed. Important elements in management are controls which range from so-called 'soft' or communal controls (such as trust and loyalty) to commercial contractual and accounting management mechanisms. Acknowledging the importance of collaboration means accepting the reality of significant time investment (remember the life partner analogy!) in the relationship. To optimise your time and resource constraints you need to assess your organisations availability and capability to devote enough time to each of your suppliers.

### SUPPLY CHAIN OPTIMISATION

Driven by brutal competition, supply chains in every industry are moving toward integration. The demands on individual organisations have become too vast to allow them to continue operating in isolation. For an organisation to deliver maximum value to its customers, it must receive maximum value from its suppliers. Moreover, no organisation working alone can differentiate its products or its services from its competitors without the suppliers' help. An organisation can only provide top quality lowest cost services if their suppliers provide them with such services. A contract or any amount of bargaining power cannot create these benefits. Benefits can only be gained in an environment of cooperation, collaboration and mutual commitment – the precursors for co-dependency.

Strategic relationships or alliances work better when an organisation reduces the number of suppliers to a select few. This creates scale economies, gives each remaining supplier a better chance to win more of the customers business, and facilitates closer working relationships. Moving towards a single supplier strategy leverages cost, performance and operational effectiveness opportunities. Single supplier sourcing promotes greater commitment to forming an alliance. This fosters best practice initiatives and innovative developments that assist both parties. By giving a single supplier more reliable and greater volumes of work allows the supplier to discount price by volume yet protects the supplier's cost structure. Figure 1, below, illustrates the evolution and leverage benefits of moving from arms-length supplier to preferred supplier and, finally into a strategic partnership.

Furthermore, collaboration within alliance structures allows a critical assessment of risk sharing and appropriate risk allocation; improving logistics cycle times and an opportunity to work on mutual supply chain opportunities or constraints.



**Figure 1:** Supplier Relationship Evolution (Rogers 1999)

# **PARTNERING & STRATEGIC ALLIANCES**

By evolving and developing the supplier-relationship procurement model, more opportunity is created to develop better business alliances. To enable this opportunity, necessitates smarter application of people, process and technology so that the benefits of the business relationship are achieved. Table 1 below summarises the key frameworks for leveraging relationship gains.

Supply Chain Optimisation:	<ul> <li>Aggregated volumes and scope that make it attractive for the supplier to invest in meeting the organisations needs.</li> <li>Focused contract 'account' management.</li> </ul>
Focus on Performance:	<ul> <li>Need to ensure that the quality/cost/risk trade-off is defined in line with the organisations objectives.</li> </ul>
	<ul> <li>Regularly monitor through key performance indicators.</li> </ul>
	Provide objective feedback.
Develop Strategic Alliances through Partnering:	Joint problem solving
	<ul> <li>Work on the relationship as well as the contractual aspects.</li> </ul>
	Co-dependency and collaboration.

**Table 1:** Building Blocks for Encouraging Suppliers to Excel (Rogers 2000)

With remarkable consistency, suppliers whose (recipient) organisations rate them highly credit the benefits they get from alliances as a key source of their motivation to do their best. The closer business relationship helps both parties implement more effective practices through being co-dependant and reliant upon each other. This level of collaboration is strategic in nature and we describe this relationship as a *strategic alliance*.

The linkage between the outsourced relationship and the formal mechanisms for managing the relationship are usually undertaken through a contract or service agreement. Contracts in their various forms address:

- The definition of outcomes or outputs;
- Describe the formal contract roles and responsibilities;
- Allocate risk;
- Describe dispute resolution procedures; and
- Define payment arrangements.

Most however, are silent in the areas of teamwork – assisting each other to deliver or exceed the required outcomes or outputs; communication – including developing and maintaining a focus on a shared vision and the achievement of shared objectives; the avoidance of disputes – resolving issues promptly before they become disputes; and the sharing of the rewards of exceptional performance.

The application of partnering is a set of structured processes and management tools that can deliver outstanding results provided the following critical success factors are focussed upon;

- 1. Vision a compelling picture of the possibilities;
- 2. Intimacy closeness, sharing and mutual trust;
- 3. Impact delivering real productivity and value; and
- 4. Process a set of jointly developed tools to implement and monitor success.

Once these processes and tools are prevalent in the day to day working relationship, the strength of that relationship is enhanced and the benefits accrued become significant.

# TRANSACTION COST ECONOMICS (TCE) AND PRIORITY CONFLICT

A further reason for adopting supply chain optimisation and strategic alliance relationships is to counter the cost burden known as Transaction Costs.

Transaction costs are a significant financial burden present whenever the parties (buyer – seller) exchange goods or services. Transaction costs include the communication (formal and informal), procurement process – tendering, valuation, appointment, contract set up, monitoring, administration, and invoicing.

A benchmarking study undertaken by Spire Consulting for an Australasian telecommunications provider<sup>7</sup>, indicated that the TCE burden in a large nationwide FM contract, accounted for 30 - 40% of the overall service delivery cost. By maintaining the same levels of service, and aggregating and rationalising the FM supply chain, the numbers of service providers reduced from 2450 down to just 7 and generated savings of AUS\$2.4M per annum – the bulk of these savings being generated from eliminating the duplicated TCE.

Organisations that outsource their non-core activities or tasks to the most efficient supplier, keep for themselves those activities in which they have a comparative advantage. They can then continue to lower their transaction costs through strong strategic alliances. Their suppliers also enjoy a strong market position. Such an alliance becomes strategic in nature and economically feasible because the specialisation of each supplier makes the final total cost lower. The relationship can be sustained because long term ties generate trust through co-dependency which in turn lowers transaction costs. A 'fairness' in the sharing of the value added is achieved, through the mechanism of trust and through valuing the relationship itself. This makes it easier to solve specific problems.

The final reason for adopting supply chain optimisation and reducing your suppliers is the risk and priority conflicts inherent in multiple supply chains. The conflicts generated are directly proportional to the number of suppliers in the supply chain and Figure 2, below illustrates these conflicts and transaction costs in a Facilities Management Supply Chain. Here multiple suppliers provide a variety of similar facilities services to support a Telephone Network building.

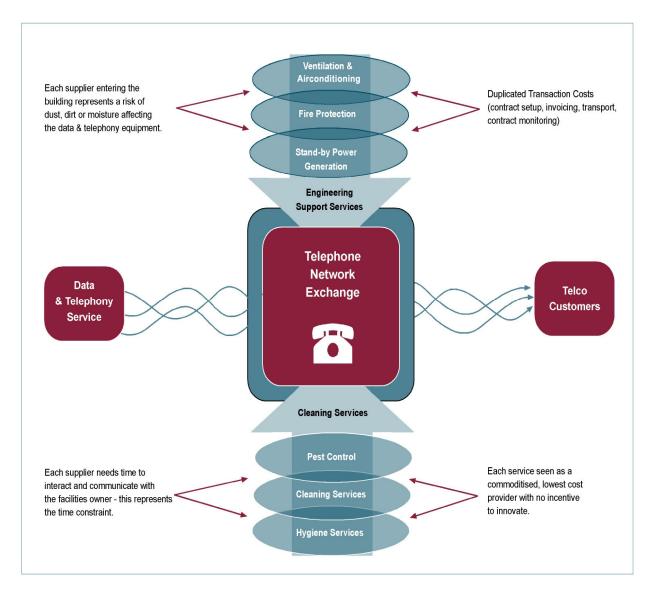


Figure 2: Transaction Costs and Priority Conflicts. (Rogers 2003).

# PERFORMANCE BASED CONTRACTS

Like a pre-nuptial agreement – the formal engagement of the two parties (organisation and supplier) must be based on a sound commercial services agreement or contract. Traditionally contracts were initiated by the organisation and based on arms-length "master-slave" models, heavily biased in favour of one organisation. Naturally these "lop sided" agreements were doomed to failure. Under this arms-length agreement, suppliers were known to bid low during tender, under-staff their contract to make it economically viable, fail to meet service levels and then either choose to invoke the penalty payments rather than fix the original service problem, or issue copious amounts of contract variations to boost the base fee.

Initially, the arms-length model was widely accepted as the most effective way to coordinate outsourced relationships. This was until the success of Japanese strategic alliance relationships (particularly in the auto industries) showed its benefits.

The Japanese did not use this master-slave model so forcing a re-evaluation of its imperfections. To support these new strategic alliance models dictated a re-write of traditional contract documents. No longer were the adversarial arms-length contracts suitable, so in the past 10 years Performance Based Contracts (PBC) have become the formal legal tool of choice in formally binding the two parties together across the facilities, information technology and general services industries.

PBC's have evolved as a mature procurement tool that allows risk to be shared. The risk is shared between parties in a way that is consistent with the service suppliers primary role of ensuring the delivery of certain outcomes (rather than just services). Outcome levels "levels of service" or "minimum performance levels" are scoped and determined, often by mutual party agreement with an emphasis on a shared benefit being returned to both parties.

The minimum performance levels are determined by technical (outcome) related dimensions such as, quality, quantity, availability, legislative, maintainability, capacity, comfort, appearance and safety. PBC's are ideal for strategic alliances. They ensure that payment is made only for services that meet the required levels of service and places the whole contractual emphasis on the *purpose* of the service to be performed, rather than the *manner* by which work is to be performed.

Failure by the supplier to deliver the minimum performance outcomes results in a deduction of the contract value, comparable with the lost performance opportunity. Conversely, extra or additional value delivered above and beyond the minimum performance levels results in a reward or increase in contract value, comparable with the additional value delivered.

By using performance management mechanisms such as key performance indicators, balanced scorecard reporting and regular customer satisfaction survey results, allows for objective and clear performance monitoring and alliance management.

# ALLIANCE EFFECTIVENESS – ONGOING CONTRACT MANAGEMENT

Driving gains out of the ongoing supplier management programmes is a relentless challenge. Assuming you have navigated your way through the reduced supplier strategy, optimised the supplier base, agreed to embrace partnering alliances and sealed this up with a nice shiny PBC then you can look forward to putting your feet up. Wrong. Strategic alliance management needs to be consistent and sustainable.

Organisations such as Telecom New Zealand and New Zealand Post that exemplify best practice in supplier management have full time resources dedicated to continuous supplier improvement. The first step in ensuring your supplier management programme is sustainable is to consider the key contract engagement mechanisms.

These mechanisms are vital to sustaining a healthy co-dependency between parties. Table 2 illustrates these key considerations.

PEOPLE	PROCESS	POLICY
<ul><li>Who are all the stakeholders of contract management?</li><li>How are roles and</li></ul>	• What are the current business processes related to the contract?	• Is organisational knowledge in the form of policies maintained and accessible?
responsibilities allocated across shareholders?  • What skill sets and competencies	How complete, standardised, mature and effective are these processes?	<ul> <li>What management level controls are essential and are these encoded within current policies?</li> </ul>
are required during the contracting process?	<ul> <li>What incremental processes related to contracts need to</li> </ul>	How does management receive visibility into the compliance to
<ul> <li>What metrics might an organisation utilise to estimate the resource requirements for the contracting function?</li> </ul>	<ul> <li>emerge to support new procurement practices?</li> <li>How do we implement and oncurs partnering is systematic?</li> </ul>	<ul><li>policy and direction?</li><li>What guidance do policies offer when exceptions emerge?</li></ul>
<ul> <li>Is a central, executive-level owner of the contract management competency required?</li> </ul>	<ul> <li>ensure partnering is systematic?</li> <li>What priority level would be associated with those processes which are not yet supported?</li> </ul>	<ul> <li>Does the policy management infrastructure continue to benefit from ongoing organisational learning?</li> </ul>

**Table 2:** Key Contract Engagement Mechanisms (Modified from Rafiq, 2003)

Typical challenges related to these organisational issues include<sup>8</sup>:

- Lack of clarity in roles and responsibilities. Questions that organisations should ask relate to identifying all organisational skills sets and perspectives that need to be leveraged during the course of the contracting activity. For example, who are all the stakeholders that need to contribute? Who owns what aspects of which agreements? How does this division of labour get communicated among the contracting team?
- Lack of clarity on the business process. Questions that organisations should ask relate to how effort between the stakeholders should be organised into a set or repeatable business processes. For example, how is the need for a contract communicated? How is a contract draft generated for any given relationship? How do stakeholders of the contract communicate their feedback? How is an approval process structured when multiple people need to be involved?

• Lack of clarity on organisational standards. Questions that organisations should ask include what aspects of a contract are negotiable by whom? What aspects of the contract require special attention depending upon the characteristics of the supplier such as size, category, or risk profile? How are organisational goals for contracts set? When are deviations from precedents and comparables acceptable?

Of all these mechanisms - lack of clarity with partnering expectations is perhaps the most common pitfall.

Increasingly important to the objective of developing "good contracts" is a simultaneous desire to achieve efficiency and excellence in the over all contracting process. Putting the right people in place to setup, develop, manage and monitor the PBC is obviously vital to the long term health of the partnering relationship. This group is known as the Contract Control Group (CCG).

Strong emotional intelligence from all stakeholders is critical. Emotionally intelligent norms that support and reinforce behaviours for building trust, contract identity and efficacy are necessary to leverage all the operational effectiveness and minimise the transaction cost. When these conditions are absent, either from one or both partners, going through the motions of cooperating and participating is still possible. The contractual relationship will not, however be as effective and as the parties will choose to hold back, fail to engage and lose any chance of gaining through co-dependency.

The use of 'formal' contract control mechanisms is also both relevant and prudent, especially with the new PBC formats which are predicated on less prescriptive specifications, choosing to focus instead on broader performance outcomes. Organisations that adopt formal control mechanisms gain significant leverage from these regular sessions. Examples of formal contract control mechanisms include:

- 1. Contract Control Group Meetings. Formal meetings with agendas, minutes and action points, held weekly and monthly (operational and finance focus). Every third CCG meeting can be designated a quarterly meeting where attention to more strategic contract activity is discussed and the results of a formal quarterly Customer Satisfaction Survey is presented. Examples of formats appear below in Table 3.
- 2. *Monthly CCG Report*. The monthly CCG report is a formal progress reporting tool, specified in the contract. This document, produced by the supplier with some assistance from the organisation formally records, in writing, performance and progress against the contract scope and specification.

CCG FREQUENCY	PURPOSE AND OUTCOMES
Weekly/Fortnightly:	<ul> <li>Communicate day to day activity and confirm/reassure 'business as usual' operations.</li> </ul>
	Review of previous week completion of levels of service
	Closure of issues
	Brief overview of forward work plans and any unscheduled activity
	<ul> <li>Weekly 'highlights', 'low-lights' and 'red lights' ("dash-board" balanced score card indicators work well here).</li> </ul>
Monthly:	<ul> <li>Review of monthly contract performance (usually best presented via a formal monthly report) including service call numbers, type and frequency, etc.</li> </ul>
	Overview of financial contract progress (actual spends against budgets)
	<ul> <li>Review of PBC Key Performance Indicators (KPI) and consequence of metric scores for risk and reward monies</li> </ul>
	Review of any audit results
	Confirmation of legislative compliance
Quarterly:	Review of formal quarterly Customer Satisfaction Survey (CSS) (see Fig 3 below)
	<ul> <li>Growth and development review to discuss any value improvement opportunities and initiatives that could be implemented in the next quarter.</li> </ul>
	<ul> <li>Quarterly financial review – wash up and review on past quarters financial performance, suppliers resource allocations and profitability.</li> </ul>
	<ul> <li>Formal scope and specification assessment. Identification of scope and specification changes that will impact either operationally and/or fiscally on the contract.</li> </ul>
	• Strategic changes. Organisational or market changes that are likely to impact on the contract and the contract managers the next quarter.

**Table 3:** Contract Control Group Meeting Formats (Rogers 2001)

The monthly CCG report forms the backbone of the monthly CCG meeting and contains the results of the previous months contractual fiscal performance, KPI adherence (or otherwise), audit results and on a quarterly basis the CSS results. Each of the meeting formats deliver concise minutes and multiple action points, timeframes and accountabilities – all aimed at maintaining, and where possible or feasible, enhancing contractual value to both parties.

### **CUSTOMER SATISFACTION SURVEYS**

The use of Customer Satisfaction Surveys provides a particularly useful feedback mechanism from a much wider group of contract participants, other than the CCG. Undertaken quarterly, these need to be simple to use and easy to analyse.

A favoured method to present these spreadsheet applications that allow the presentation of results in a simple, balanced spider graph format, across a range of contract effectiveness areas is presented below.

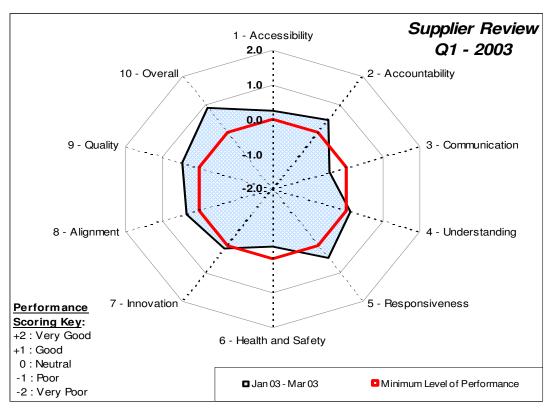


Figure 3: Customer Satisfaction Survey Graph Example (Rogers 2003)

Formal CCG tools are a 'must' for keeping your PBC's on target, ensuring sufficient formal and informal communication is undertaken to reinforce the importance of clarity. Creating value together can only occur in a positive, constructive environment. Formalising that environment through CCG mechanisms sets the appropriate framework for co-dependency effectiveness.

The evolution of PBC's is gradual, as both parties learn to understand the formal and informal boundaries between them. Greater trust and understanding – leading to co-dependency becomes prevalent for the partners as does the opportunity and frequency to add greater value to both parties. The ability to lower the overall cost of service supplied also increases.

# **SUMMARY**

It's clear that using a structured approach to procurement relationships as illustrated in this paper and predicated on co-dependency enables significant value gains for both contracting parties. The traditional master-slave relationship is fast becoming redundant. And so it should be. Smart organisations leverage significant gain in procurement value through strong partnering relationships with a few key suppliers in a co-dependant model. Procurement models based on performance based contracts are proven mechanisms for delivery of mutual benefits to both parties.

In the competitive reality of today's marketplace, the potential cost savings and value gains are two motivating factors behind the historic investment in this new wave of progressive procurement practice. The CCG management function plays an essential role in the realisation of value stemming from shared working practices, continuous measurement, and feedback of the contracts' overall effectiveness.

Organisations have begun to invest in efforts to consider how to organise their people, processes and policies into a proper foundation for building strategic alliances with their suppliers; and they realise it will take time to fine tune, and time to generate trust and co-dependency.

Leading organisations have been planning an organisational methodology around the management of contracts and their outsourcing programmes. In 1999, New Zealand Post (the national postal service and one of the largest facilities owners in New Zealand) embarked on a procurement strategy for all their non-core services that was based on a shift to a streamlined supply chain, strategic alliances with their suppliers and performance based contracts with minimum performance levels, using KPI's. From an original FM supplier base that exceeded 450 suppliers for all FM services, just two suppliers were appointed, one for engineering maintenance, the other for cleaning services. Savings of AUS\$900k per annum were achieved with a significant improvement in service level consistency. These two contracts are approaching the five year mark and are characterised by a very strong level of attention, communication and recognition of the mutual dependency between the respective contract managers and their organisations. Customer satisfaction surveys are generated quarterly and provide an important scorecard to ongoing service delivery satisfaction. When problems do arise, both parties constructively apply problem solving expertise to ensure a swift resolution, without fair of retribution, unless gross negligence is involved.

At a minimum, organisations should immediately begin to evaluate their needs in this area by auditing their current organisational capabilities to assess gaps and dependencies. As the MIT Sloan Journal promised - managing suppliers may well turn out to be the most influential strategic lever organisations can use to reduce costs.

As organisations realise the benefits from collaborative relationships, and performance based contracts, new initiatives in this area will accelerate, as they represent major milestone towards realisation of the value and promise of the next-generation procurement practices.

© Paul A. Rogers 2005.

### **REFERENCES**

- <sup>1</sup> Editorial 'Strategic Purchasing Remains an Oxymoron', *Sloan Management Review*, Winter 2001. Page 18.
- <sup>2</sup> For example, the Otago District Health Board, Dunedin, New Zealand provides medical health care services to the Otago region (pop. 300,000) and owns an extensive portfolio of hospital facilities and assets. In 1996, they made the decision to outsource all their facilities management to a global provider of FM services. Most of the FM employees (130) were transferred to the new external service provider, new management was appointed and new systems and processes were utilized. For four years, both parties tried to make this arrangement work but poor communication, poor contract clarity, ineffective systems and an inability to retain and train suitable staff saw a termination of the FM contract and a reinstatement back to an in-house service delivery model by 2001. Satisfaction and control levels then improved immediately.
- <sup>3</sup> Abernethy. M., 'Par for the Source', *The Bulletin*, (Australian business weekly journal) May 8. 2001. Page 42.
- <sup>4</sup> Vernon. M., 'Is IT Outsourcing still the Answer?',(UK) *Management Today Journal*. December 2004. Page 56.
- <sup>5</sup> Porter. ME, Competitive Advantage of Nations, Macmillillan, London, 1990
- <sup>6</sup> Bubna-Litic D, 'Managing cooperative supplier relationships: a case study', Unpublished PhD thesis, 1994. UNSW. Australia.
- <sup>7</sup> Telecom New Zealand & AAPT Supply Chain Optimisation Project Review. For the period 1998 2003.
- <sup>8</sup> Rafiq. A, 'Contract Management and Organisational Transformation'. 2003. www.ascet.com