**DIFFUSING SUSTAINABILITY: TOWARDS A FRAMEWORK FOR ADOPTING**

**SUSTAINABLE PROCUREMENT**

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**Profile**

Suzanne is currently finishing her PhD at the Institute for Sustainable Futures at the University of Technology, Sydney where her current research is exploring the implementation of sustainable procurement by Australian organisations including the corporate and public sectors.  This entails examining how they incorporate elements of environmental and social sustainability into their purchasing decisions.  Suzanne holds a Bachelor of Architecture from the University of Technology, Sydney and is a consultant to governments on sustainable procurement.

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**ABSTRACT**

Rogers (2003) presented a Diffusion of Innovations (DOI) framework which has been used to examine the factors influencing the rate of adoption of various types of innovations in a wide variety of organisational contexts. However, this has had limited application in sustainability studies. The results of a survey of Australian organisations indicate that items related to corporate attitudes and values, under Rogers' category of compatibility, were more strongly predictive of the level of adoption of sustainable procurement. Compared to previous findings in other disciplines and settings, the results of this study suggest that greater consideration should be given to issues addressing existing culture for the successful implementation of sustainability programs in organisations.

**Key words**

Diffusion of innovation, attributes of innovation, sustainable purchasing practices,

**INTRODUCTION**

More than thirty years ago the Club of Rome (1992) and Commoner (1992) raised our consciousness of the plight of the unbridled growth in consumption, particularly of non-renewable resources (Club of Rome. & Meadows, 1972; Commoner, 1972; Daly, Cobb, & Cobb, 1994; Hawken, Lovins, & Lovins, 1999). Organisations exert a great influence on the earth and its capacity to regenerate resources for humans to sustain life (Shrivastava, 1995). This paper reports on the adoption of sustainable procurement within organisations across the public, for profit and not for profit sectors operating in Australia, examining the perceptions of Sustainable Purchasing Practices (SPP) as an innovation, filtered through survey respondents in organisations. In this investigation, SPP was deliberately confined to the environmental and financial aspects of purchasing. The empirical study examines SPP as an innovation and utilises Diffusion of Innovations (DOI) theory as a framework to analyse and classify the factors that influence an organisation's level of adoption of SPP.

Rogers proposed that the rate of adoption of an innovation is explained by five groups of variables. In applying Rogers' framework, we analyse what factors influence the adoption of SPP in Australian organisations, and which of these have the stronger influence. We also question if the influencing factors uncovered are consistent with those contained in Rogers (2003), DOI attributes of adoption model (Rogers, 2003). The study presents a prescription for change managers in organisations to implement sustainable purchasing practices and highlights attributes that are more relevant to an understanding of the adoption of innovations for sustainability that have not been emphasised in previous research on the adoption of innovations.

**BACKGROUND**

**Sustainable Procurement**

Whilst individuals exert influence through their products choices, organisations as discretionary consumers have a powerful impact on greening the economy. Sustainable procurement as a term has developed over time, from a narrow waste and resource perspective to a broader definition encapsulating economic, environmental and social considerations in purchasing (UNEP, 2001) and more recently extending to ethical responsibilities. It emerged from the practice of

purchasing recycled products described as environmentally preferable purchasing (Ellwood & Case, 2000), responsible buying and sourcing (Drumwright, 1994), green purchasing (Green, Morton, & New, 1998; Lamming & Hampson, 1996; Ochoa, Fuhr, & Gunter, 2003), eco procurement (Erdmenger, 2003) to purchasing social responsibility to include ethical considerations (Carter, 2004, 2005; Carter & Jennings, 2004) and most recently to sustainable organisational procurement (Grob & McGregor, 2005). As this is a developing discipline, understandably theory development is in its infancy (Zsidisin & Siferd, 2001). Frequently, large organisations have introduced elements of sustainable procurement as part of a path towards corporate sustainability (Grob et al., 2005), however, the literature reveals that no comprehensive instrument exists to measure the perception of adopting sustainable procurement as an innovation.

**Diffusion of Innovations Theory**

Rogers (2003), first proposed the Diffusion of Innovations (DOI) research construct in the early 1960s to explain the spread of innovations. This study investigates the adoption of sustainable purchasing practices in Australian organisations.

**Research Questions**

Listed below are the research questions to be addressed in this paper.

Based on Rogers' Attributes of Innovation what factors influence the adoption of sustainable procurement as an innovation in Australian organisations, and which of these have the stronger influence?

Are these influences consistent with those contained in Rogers (2003) Diffusion of Innovation model?

Are there particular attributes that are more relevant to an understanding of the adoption of innovations for sustainability that have not been emphasised in previous research on the adoption of innovations?

**Attributes of Innovation**

This study applies Rogers' classification system to describe the adoption of sustainable purchasing practices in organisations. The rate of adoption of an innovation is the speed it is adopted by its audience. Rogers (2003) claims that the perceived attributes of an innovation by members of

that audience determine its rate of adoption. He also states that 49-87% of the variance in rate of adoption is explained by five variables. These include relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003). Aside from complexity, all other variables are positively related to the adoption of an innovation. An additional attribute, voluntariness, was added to explore voluntary compared to mandatory adoption (Moore & Benbasat, 1991). A summary of each variable and its applicability to SPP is discussed in the next section.

Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes (Rogers, 2003). The degree of relative advantage is often expressed as economic profitability, social prestige and other benefits. Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences and the needs of potential adopters (Rogers, 2003). Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, 2003). Trialability is the degree to which an innovation may be experimented with on a limited basis (Rogers, 2003). Observability is the degree to which results of an innovation are visible to others (Rogers, 2003). Moore and Bensbasat (1991), identified voluntariness as an additional attribute and defined it as "the degree to which use of the innovation is perceived as being voluntary or of free will" (Moore et al., 1991).

## RESEARCH METHODS

**Data Collection and Sample**

Data was collected by means of an online questionnaire-based survey. In late 2005, 20 peak industry bodies and networks that represented a broad range of organisations across all industry sectors were approached to participate in this survey. Included were organisations operating in Australia with either Australian or foreign ownership and representing the public, private and not-for-profit sectors across all industry segments. Every effort was made to approach and include peak bodies that represented this diversity. Recognising the limitations of online surveys, particularly in estimating an accurate response rate it was felt that this medium provided the most cost and time effect method of gathering data. To a large extent the limiting factor of unfamiliarity with technology was not anticipated as it was channelled through peak bodies and this was their preferred method of

communication with their members. This sample selection process makes it difficult to give a meaningful estimate of the response rate. Of the 327 survey responses received, 108 were discarded due to a large number of key questions being unanswered. As a result of the above procedures, a total of 219 useable questionnaires were retained for analysis.

The largest proportion of responses were from local government organisations (21.9%), followed by the manufacturing sector (16.9%), State government (8.2%), mining sector (6.8%) and wholesale trade (5.9%). Large organisations with more than 1000 employees, both part and full time represented a third of survey respondents (33.3%) and were the largest segment, followed by medium sized organisations with between 201-1000 employees (22.8%) and small organisations with 21-200 employees (18.3%). The majority of responses were from organisations with Australia as the primary country of ownership (79.0%), followed by the United States of America (6.4%) with the remainder distributed across a range of countries in Europe and Scandinavia.

**Questionnaire Design**

Within the questionnaire 28 questions were developed to test the application of Rogers' framework to explain the adoption of SPP as an innovation, including two dependent variables. Aside from three "yes" and "no" questions, the balance were closed ended, predominantly using a seven point Likert rating scale. Table 1 displays the items to be analysed and assigns them under the categories of relative advantage, compatibility, complexity, trialability, observability and voluntariness. The following section describes the rationale for classifying items under these headings.

Six items were selected to test the variable of relative advantage. They examined economical profitability dimensions, including the cost of sustainable products, whether they were more expensive or delivered organisational savings and the expenditure associated with introducing SPP programs, prompting that these may be perceived as barriers to adoption. The relative advantage of adopting SPP as a competitive advantage and its potential to increase staff morale was also explored.

The compatibility variable contained ten items associated with the sociological beliefs and values of the organisation including support from management, external support from clients and

suppliers and congruence with existing organisational values and sustainability programs. It also examined the lack of staff awareness and organisational knowledge as potential barriers to adoption.

Three items centred on complexity, one examining the practice as being too complex, whilst the other two focused on the quality and availability of products. Two items described trialability, examining if organisations had piloted SPP and reviewed their programs over time, inferring that trials were ongoing to improve existing practices. Observability explored if sustainable products were visible in the organisation, and whether collaboration with organisations had assisted SPP. Voluntariness examined the type of decisions associated with SPP, ranging from a mandate by senior management to optional considerations for business units and individual staff.

**Data Analysis**

The survey responses were downloaded from the website hosted by the University of Technology, Sydney, Australia using Microsoft Excel. All statistical analysis was carried out using the program Statistical Packages for Social Sciences (SPSS), Version 14. In order to allow comparisons between items to be made more easily, several items (numbers 4, 5,6,11 & 13) that examined potential barriers to SPP, were reverse coded. Thus, for these items, higher scores would be expected to be associated with higher levels of adoption, as is the case for the other predictor items.

The two items measuring the breadth and depth of adoption of SPP (items 2 and 3 in Table 1) were combined to form a single adoption variable (item 1 in Table 1), which was treated as the dependent variable in the subsequent data analysis. The relationships between this dependent variable, and 26 independent variables (items 4 to 29, Table 1) were examined using bivariate correlations and hierarchical regression analysis. To produce more parsimonious regression models, the Backwards procedure, as implemented in the SPSS program, was used to reduce the number of variables in the equation.

Data reduction was also achieved though factor analysis of the responses to the 26 independent variables, with the factor scores also being used as independent variables in regression analyses for the prediction of the level of adoption of SPP. The Principal component method of extraction was used, with rotation to simple structure using the Varimax procedure.

**RESULTS**

Table 1 displays the means, standard deviations and correlations with the level of adoption of sustainable purchasing for the main variables in the study. It also classifies the selected items according to the Rogers' categorisation .A number of analyses were performed to investigate the extent to which various factors predict an organisation's level of adoption of Sustainable Purchasing Practices (SPPs). In the present study two items (items 2 and 3, Table 1) measured the breadth of use of SPP and the extent to which they had become routine. For the purposes of analysis, it was decided to combine by averaging these two items to form a new variable, Sustainable Purchasing Adoption (item 1, Table 1). The two component items were highly correlated (r = .98), and inspection of the correlations of the two component items with the other variables in the study showed that they had almost identical relations with these other variables. (This was confirmed using a Repeated Measures analysis, with the two items being used to define the two levels of a within-subject factor. Only very weak interactions with this factor were observed for only two of the 26 predictor variables).

The level of sustainable purchasing adoption (item 1) can be seen to have a mean value below the scale mid-point value of 4 (mean = 3.33). This indicates an overall low level of implementation of SSP in our sample. There was not strong agreement that the cost of products (item 4) nor the cost of introducing programs (item 5) were barriers to adoption, with mean scores just above the mid point (means = 4.06 and 4.48, respectively). (These items were reversed coded). However, respondents did not agree that buying environmental products delivered organisational savings (mean = 3.03). The mean ratings revealed moderate receptiveness by respondents to adopting sustaining purchasing practices including, support from senior management (item 17), piloting SPP (item 23) and a desire to be innovative (item 19) with mean scores just above the midpoint (means = 4.81, 4.45 & 4.42, respectively). CEO receptiveness to innovations to improve performance (item 16) was very strong (mean = 6.13).

Positive and statistically significant correlations can be seen in Table 1 between the level of adoption of SSP and both sustainable purchasing, forming part of sustainability programs (item 10) and the organisation's desire to be innovative (item 19) (r's = .70 and .71, respectively; p's < .01).

There is also a strong correlation between the review of SPP (item 24) and the level of adoption of SPP ($r = 72$; $p < .01$).

In order to gain greater insight into the nature of the variables predicting the level of adoption of SPPs, responses to items 4 to 29 from Table 1 and reassigned a new item number for convenience and readability before being factor analysed. The Principal Component method of extraction was used, and the solution rotated to simple structure using the Varimax procedure as implemented in the SPSS (Version 14) statistical package. Root-one criterion suggested that seven factors could be extracted, and this solution is shown in Table 2.

The first factor is most strongly defined by items reflecting the relationship between SPP and the organisations' attitudes, values and other practices (items 1-12 inclusive). Therefore, this factor has been labelled "Values". The second factor reflects barriers to SPP relating to the cost of the products (items 13 and 14) and of a SPP program in general (item 15) and has been labelled "Cost". The third factor is defined by the relationship between SPP and staff awareness (item 16), organisational knowledge (item 17) and (negatively) with a lack of congruence with organisational programs (item 18). This factor has been labelled "Knowledge".

Items associated with the perceptions of products define the fourth factor; quality (item 19), availability (item 20) and the complexity associated with incorporating sustainability into purchasing decisions (item 21) and this factor has been labelled "Products". The fifth factor is defined by support for SPP by suppliers (item 22) and customers (item 23) and has been labelled "External Support". The sixth factor is defined primarily by just one item, measuring perceptions of the Chief Executive Officer's (CEO's) receptiveness to innovation for business improvement (item 24). It also had a minor loading of .43 from item 11 (whose major loading of .60 is on the first factor), which measures opinions of whether SPP is a means of differentiating the organisation from competitors. It has therefore been labelled "CEO Innovation". The seventh factor is most strongly defined by items reflecting the extent to which business units (item 25) and staff have the option of undertaking sustainable purchasing practices (item 26), and has been labelled "Purchasing Options".

Hierarchical regression analyses were carried out to further investigate the relationship between the level of adoption of SPPs and the other variables measured in the study, and these results

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are shown in Table 3.  Models 1 and 2 represent hierarchical regression of the level of adoption on individual items.  In the first step, the control variables were entered into the equation.  These control variables comprised the industry sector (represented by dummy variables 1 to 3), the number of employees in the company (item 4), the annual spending on purchasing goods and services (item 5) and the country of ownership (represented by dummy variables 6 and 7).

In the second step (Model 2) individual items were entered into the equation.  Rather than enter all 26 predictor variables, a more parsimonious model was obtained using the Backward procedure, as implemented in the SPSS statistical package.  This resulted in a reduction of the number of variables to those (variables 8 to 15) displayed in Table 3.  The individual items with the strongest independent relationship with the level of adoption were numbers 8 and 14 (betas = .27; $p<.01$), representing the extent to which SSP forms a part of the organisation's sustainability program and practices, and the extent to which senior management mandates sustainable purchasing.  Smaller, though statistically significant, beta's were also found for variables 9, 11, 12, 13 and 15 (betas = .10, .17, .14, .16 and .10, respectively; $p$'s $< .01$) and for variable 10 (beta = -.09, $p < .05$).  There was a moderate independent relationship with the level of adoption and an organisation's desire to be innovative (variable 11) and collaboration with other organisations (variable 13) (betas = .17 and .16 respectively).  Also, there was a significant but smaller independent relationship with the level of adoption for staff having the option to purchase sustainable products (variable 15) and staff awareness influencing SPP, (variable 9) (betas both = .10).

Hierarchical regression analysis was also performed using factor scores derived from the analysis shown in Table 2.  Four of the seven factors, Factors 1, 3, 5 and 7, were found to have statistically significant beta's (all $p$'s $< .01$).  The factor with the strongest effect on the level of adoption was Factor 1, representing values (beta = .77; $p < .01$).  Factor 3 representing Knowledge had a lesser effect on adoption (beta = .24; $p < .01$) as did external support (beta = .17; $p < .01$) and purchasing options (beta = .14; $p < .01$).

It is interesting to note that in Model 1, the size of the organisation (variable 4) is observed to have a small but statistically significant negative effect on the level of adoption (beta = -.27, $p<.05$), but this disappears when the other variables are entered into the equation, in both Models 2 and 3.

Examination of the correlations organisational size with the other variables in the equations, shows negative correlations with items 8, 10, 11, 12 and 13, that vary between .20 and .31 (p's <.01), and with Factors 1 and 3 (r's = -.20 and -.23, respectively; p < .01). Thus, it appears that the negative effect of size on the level of adoption displayed in the results of Model 1 can be interpreted as being due to these negative relationships between size and these other variables in the equations of Model 2.

## DISCUSSION

This paper applies Rogers' framework to explain sustainable purchasing adoption. The resulting model of seven factors for introducing sustainable procurement, suggests that certain variables within the framework may be more influential in adoption, depending on the innovation setting and industry sector and the type of innovation and whether it is mandatory or discretionary. Rogers (2003), acknowledges that "one possible problem with measuring the five attributes of innovations is that they may not always be the five most important perceived characteristics for a particular set of respondents" (Rogers, 2003). The proceeding section discusses our findings in comparison with literature from other disciplines and more generally to explain SPP as an innovation in organisations. As sustainable procurement is an emerging literature comparison studies are drawn from other diverse literatures that have tested attributes of innovation.

### Organisational values

Whilst relative advantage did not emerge as a separate factor, items pertaining to organisational values were strongly predictive of adoption. Tornatzky and Klein (1982) concluded that relative advantage as a scale is a very generalisable concept and recommended breaking it down into separate components may be more meaningful (Tornatzky & Klein, 1982). In agreement with their observations, cost emerged as a separate factor.

In a study examining the introduction of decimals for trading in equities and stocks of publicly traded companies relative advantage was the strongest attribute, whilst compatibility was unrelated to adoption (Chakravarty & Dubinsky, 2005). Relative advantage was also the strongest variable in a study of drug prevention policy in schools (Pankratz, Hallfors, & Cho, 2002). These illustrate examples from different disciplines, yet in both cases compatibility did not materialise as a

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factor of influence in innovation adoption. The major difference between these examples and adopting SPP is the type of decision is both previous innovations were mandated, whereas, the decision to adopt SPP is at the discretion of an organisations or individuals.

Al-Gahtani (2003), examined the rate of adoption of computer technology at work in Saudi Arabia, using Rogers' five attributes concluding that each was correlated with adoption, except complexity (Al-Gahtani, 2003). In our research complexity related to the type and perception of products emerged as the only identical factor. In a study of the adoption of the internet as a teaching aid in foreign language schools observability and trialability were the most significant predictors of adoption (Martins, Steil, & Todesco, 2004). In our study these factors were understood as part of the culture of the organisations.

**Organisational fit**

Our findings emphasised the critical nature of staff awareness and skills within the workplace as success factors in implementation. Related to issues of organisational climate, respondents acknowledged there was a gap between existing purchasing practices and environmental policies and programs. Hence, it could be surmised that the corporate climate was right for introducing sustainable purchasing, as there was an alignment with the corporate values and attitudes that engendered a receptive culture (fit for the organisations and the innovation) (Carter, 2005; Grob et al., 2005). Our results infer that these innovative purchasing practices are being embedded in organisations due to organisational fit and innovation fit, and that SPP is understood as the next logical step in organisational sustainability.

The perception of sustainable procurement as an innovation identified strongly with sustainability programs and policies, rather than with purchasing practices as business processes. This is further evidence of the innovation's specialist nature.

**Reputational worth**

There is a growing body of literature detailing the relationship between stakeholder management and the perception that an organisation is socially responsible (Harrison & Freeman, 1999). Increasingly organisations are 'mainstreaming' corporate social responsibility driven by legislation, market forces and stakeholder expectations (Carlisle & Faulkner, 2004). Rogers (2003)

found that one of the most important motivations for almost any individual to adopt an innovation is the desire to gain social status (Rogers, 2003).

**Support from outside the organisation**

Our findings confirm that support from customers and suppliers influence the adoption of SPP. Green et al. (2000), suggest that organisations need to focus on their relationships as buyers and suppliers (purchasers and marketers) and how this connects with innovation. Company leaders are beginning to realise that their customers, as well as other stakeholders do not make a distinction between the environmental performances of the company and that of their suppliers (Rao, 2005). Supplier relationships are critical to address green procurement and several organisations are monitoring their suppliers for compliance to environmental standards and against their own performance in corporate sustainability (Chen, 2005; Darnell, Gallagher, & Andrews, 2001; Handfield, Walton, Sroufe, & Melnyk, 2002; Noci, 1997; Sarkis, 2001).

**Collaboration**

Goes and Park (1997), found cooperative relationships amongst distinct but related organisations enhanced innovative processes in organisations (Goes & Park, 1997). Organisations in this study agreed that collaboration with other organisations had assisted progress in SPP. Another distinct characteristic of sustainable procurement is the formation of collaborative arrangements with the formation of trading partners and alliances (Lamming et al., 1996; Zsidisin et al., 2001).

**Role of senior management**

A mandate by senior management to undertake sustainable purchasing had a strong influence on adoption. As part of organisational sustainability initiatives senior managers are routinely required to introduce, maintain and monitor policies and programs to reflect corporate performance in sustainability. Carlisle and Faulkner (2004), observed a shift from senior management awareness to policy development in CSR (Carlisle et al., 2004). Green et al. (2000), found managers with a commitment to personal or organisational environmental agendas may be a highly effective basis for the greening of procurement. Drumwright (1994), suggested that policy entrepreneurs had an influencing role in implementing socially responsible organisational buying (Drumwright, 1994).

Hansen & Middelton (2002) labeled them "eco leaders" singling out examples of vendor managers who administer sustainable procurement programs like British pioneers B&Q, the hardware retailer (Hanson & Middleton, 2000; Wycherley, 1999).

## CONCLUSION

Sustainable purchasing delivers organisations an innovative method of purchasing, taking into account the natural and social environments in the decision-making process. As a recent organisational practice and research area, it is therefore not surprising that individualised frameworks to measure its effectiveness, as an innovation are not commonplace. This 26-item instrument comprising seven scales is the first instrument to examine sustainable purchasing as an innovation and measure its adoption in organisations.

This framework provides several contributions to the study of innovations and sustainability. Whilst this study centred on innovations in organisations, it may be possible to replicate our model in other audiences and disciplines. Primarily, it serves as a prospective framework for wider promulgation of sustainability programs, recognising that the acceptance of sustainability is a unique innovation. This framework could inform the wider diffusion of sustainability in organisations, once the attributes of innovation are identified this could enable organisations to embark on large scale cultural change sustainability programs which has the potential to change behaviours in workplaces, in homes and in the community. By virtue of its position in the supply chain purchasing has a strategic role in fostering sustainable innovation. If the attributes identified are to encourage sustainable procurement as an embedded organisational practice, then influence can be exerted along the supply chain for more innovative sustainable products, thereby extending the market and potentially lowering cost, as demand increases by the organisational sector.

Prospective innovations, like SPP present organisations with ways of enriching the lives of those within and beyond the organisational boundaries, now and in the future. Like a collection of Russian dolls, sustainable procurement is encased within an envelope of organisational sustainability, which is contained in an outer casing of contributing to sustainability in the Pacific and the globe.

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TABLE 1

**Descriptive Statistics of main variables and correlations with the level of adoption of Sustainable Purchasing Practices**

| | | M | s.d. | Correlation with level of adoption |
|---|---|---|---|---|
| 1. | Sustainable purchasing adoption | 3.33 | 2.05 | 1.00 |
| 2. | Environmentally sustainable purchasing has been implemented across the entire organisation | 3.28 | 2.13 | .98** |
| 3. | Environmentally sustainable purchasing is a routine practice in our organisation | 3.38 | 2.06 | .91** |
| **Relative Advantage** | | | | |
| 4. | The cost of environmentally sustainable products is a barrier to implementing sustainable purchasing programs and policies (rev) | 4.06 | 1.84 | .08 |
| 5. | The cost of introducing environmental sustainable purchasing programs is a barrier to introduction (rev) | 4.48 | 1.77 | .09 |
| 6. | Environmentally sustainable products cost more to buy (rev) | 3.37 | 1.45 | .04 |
| 7. | Buying environmental products delivers savings to my organisation | 3.03 | 1.50 | .25** |
| 8. | Buying environmentally sustainable products is a means of differentiating our organisation against our competitors | 4.13 | 1.92 | .43** |
| 9. | Adopting environmentally sustainable purchasing practices increases the morale of our employees | 4.40 | 1.73 | .51** |
| **Compatibility** | | | | |
| 10. | Environmentally sustainable purchasing forms part of our sustainability program and policies | 4.33 | 1.88 | .70** |
| 11. | Lack of staff awareness of environmentally sustainable products is a barrier to implementing sustainable purchasing.(rev) | 3.82 | 1.88 | .31** |
| 12. | Our organisation has identified a gap between its environmental policies and programs and its purchasing practices | 3.71 | 1.98 | .10 |
| 13. | Lack of organisational knowledge about environmentally sustainable purchasing practices is a barrier to implementing sustainable purchasing. (rev) | 3.94 | 1.92 | .42** |
| 14. | Our suppliers are encouraging our organisation to purchase environmentally sustainable products | 2.89 | 1.60 | .24** |
| 15. | Our customers are encouraging our organisation to purchase environmentally sustainable products | 3.59 | 1.87 | .32** |
| 16. | Our CEO is receptive to innovations to improve business performance | 6.13 | 1.25 | .15* |
| 17. | Senior management supports sustainable purchasing practices | 4.81 | 1.86 | .64* |

| | | M | s.d. | Correlation with level of adoption |
|---|---|---|---|---|
| | **Complexity** | | | |
| 20. | The quality of environmentally sustainable products is a barrier to introducing sustainable purchasing programs and policies | 3.09 | 1.55 | .01 |
| 18. | Buying environmental products is compatible with our organisational values | 5.41 | 1.58 | .59** |
| 19. | Environmentally sustainable purchasing practices reflect our organisation's desire to be innovative. | 4.42 | 1.91 | .71** |
| 21. | The availability of environmentally sustainable products is a barrier to implementing sustainable purchasing programs and policies | 3.94 | 1.77 | .14* |
| 22. | It is too complex to consider sustainability in purchasing decisions | 3.09 | 1.66 | -.24** |
| | **Trialability** | | | |
| 23. | My organisation has piloted buying environmentally sustainable products | 4.45 | 2.07 | .49** |
| 24. | Environmentally sustainable purchasing in the organisation has been reviewed and changed significantly over time | 3.55 | 1.93 | .72** |
| | **Observability** | | | |
| 25. | Products that use less resources in their manufacture and use are visible in my organisation | 3.90 | 1.90 | .68** |
| 26. | Collaboration with other organisations has assisted the organisation's progress in environmentally sustainable purchasing | 3.95 | 1.97 | .61** |
| | **Voluntariness** | | | |
| 27. | 30. Does senior management in your organisation mandate environmentally sustainable purchasing? | .39 | .49 | .65** |
| 28. | Do business units have the freedom to undertake environmentally sustainable purchasing, as long as they meet targets and adhere to policies? | .92 | .28 | .14* |
| 29. | Do staff have the option to purchase environmentally sustainable products? | .85 | .36 | .30** |

*p<.05; **p<.01.
For all items, except numbers 27, 28 & 29, participants responded using a 7-point rating scale, ranging from 1 = "not at all" to 7 = "very much".
Items 27 to 29 were recoded to take into consideration "yes" and "no" responses
Rev indicates items that have been reverse coded

**TABLE 2:**

**Principal Component Analysis; Rotated Component Matrix**

| Variable | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 | Factor 7 | h2 |
|---|---|---|---|---|---|---|---|---|
| 1. Desire to be innovative (19) | **.81** | -.01 | .09 | -.03 | .20 | .24 | .05 | .761 |
| 2. Compatible with org values (18) | **.79** | -.04 | -.05 | .09 | -.04 | .18 | .12 | .687 |
| 3.SPP reviewed over time (24) | **.78** | -.07 | .12 | .06 | .08 | -.08 | .11 | .689 |
| 4. Part of policies and programs (10) | **.77** | -.04 | .17 | -.04 | .23 | .06 | .02 | .468 |
| 5. Piloted Products | **.76** | -.13 | -.06 | -.03 | -.04 | -.07 | .14 | .631 |
| 6. Products with less resources (25) | **.75** | .14 | .09 | -.03 | .16 | .00 | .07 | .499 |
| 7 Senior Management support (17) | **.73** | .02 | .18 | .09 | .12 | .24 | .13 | .686 |
| 8 Collaboration (26) | **.70** | -.06 | .09 | .11 | .27 | -.17 | .14 | .831 |
| 9 Increases morale (9) | **.69** | .09 | -.04 | -.04 | -.03 | -.04 | .12 | .500 |
| 10 Mandated by senior management (27) | **.60** | .16 | .09 | .05 | .25 | .22 | -.03 | .851 |
| 11 Competitive advantage (8) | **.60** | -.10 | -.06 | -.11 | .14 | .43 | -.21 | .764 |
| 12 Delivers organisational savings (7) | **.41** | .29 | -.29 | .23 | .20 | .16 | -.12 | .666 |
| 13 Products cost more (6) (rev) | .00 | **.82** | -.08 | .00 | .02 | -.06 | .02 | .779 |
| 14 Cost of products is a barrier (4) (rev) | -.05 | **.81** | .21 | -.23 | -.04 | .06 | -.01 | .665 |
| 15 Cost of programs is a barrier (5) (rev) | .02 | **.74** | .22 | -.25 | -.10 | .12 | -.04 | .689 |
| 16 Staff awareness (11) (rev) | .20 | **.08** | **.88** | -.10 | -.06 | .00 | -.07 | .766 |
| 17 Lack of org. knowledge (13) (rev) | .31 | **.14** | **.85** | -.01 | .04 | .05 | .02 | .785 |
| 18 Gap between programs & SPP (12) | .38 | -.13 | **-.49** | .21 | .17 | -.16 | .07 | .670 |
| 19 Quality of Products (20) | -.04 | -.20 | **.01** | **.84** | .17 | .11 | .06 | .541 |
| 20 Availability of products (210 | .23 | -.22 | **-.17** | **.71** | -.17 | .00 | .07 | .621 |
| 21 Complex to consider SPP (22) | -.23 | -.03 | **-.18** | **.48** | .06 | -.31 | -.35 | .661 |
| 22 Encouragement from suppliers (14) | .18 | -.10 | **-.06** | **.06** | **.84** | -.05 | .01 | .625 |
| 23 Encouragement from customers (15) | .30 | .02 | **-.05** | **-.01** | **.74** | .13 | .07 | .637 |

| Variable | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 | Factor 7 | h2 |
|---|---|---|---|---|---|---|---|---|
| 24 CEO is receptive to innovations | .10 | .09 | .08 | .05 | .04 | **.86** | .07 | .507 |
| 25 Optional for business units | .09 | -.06 | -.15 | .12 | .00 | -.02 | **.77** | .644 |
| 26 Optional for staff | .23 | .03 | .06 | -.08 | .08 | .06 | **.64** | .481 |

Factor 1: Values; Factor 2: Cost; Factor 3: Knowledge; Factor 4: Products; Factor 5: External Support; Factor 6: CEO Innovation; Factor 7: Purchasing Options.
$h^2$=communalities; factor loadings greater than .40 are shown in bold type.
Figures in brackets refer to the item numbers in Table 1
Rev indicates items that have been reverse coded

TABLE 3

**Hierarchical Regression Analyses for the Prediction of the Level of Adoption of Sustainable Purchasing Practices**

| | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| **Control variables** [b] | | | |
| 1. Dum_Industry_Government | .09 | .04 | .02 |
| 2. Dum_Industry_ Not-for-Profit | .12 | .02 | -.02 |
| 3. Dum_Industry_ Manufacturing | -.07 | .00 | .03 |
| 4. Number of Employees | -.27* | .02 | .01 |
| 5. Spending | -.01 | -.02 | -.09 |
| 6. Dum_Country_Australia | -.03 | .00 | -.03 |
| 7. Dum_Country_United States of America | .11 | -.01 | .02 |
| **Predictor items** | | | |
| 8. Part of Policies and Programs (10) | | .27** | |
| 9. Staff awareness (11) rev | | .10** | |
| 10. Gap between programs & SPP (12) | | -.09* | |
| 11. Desire to be innovative (19) | | .17** | |
| 12. Products with less resources (25) | | .14** | |
| 13. Collaboration (26) | | .16** | |
| 14. Mandated by senior management (27) recode | | .27** | |
| 15.Optional for Staff (29) recode | | .10** | |
| **Predictor factor scores** | | | |
| 16. Factor 1 (Values) | | | .77** |
| 17. Factor 2 (Cost) | | | .05 |
| 18. Factor 3 (Knowledge) | | | .24** |
| 19. Factor 4 (Products) | | | .05 |
| 20. Factor 5 (External support) | | | .17** |
| 21. Factor 6 (CEO Innovation) | | | .04 |
| 22. Factor 7 (Purchasing Options) | | | .14** |
| R-Square | .105** | .738** | .710** |
| R-Square Change [a] | | .633** | .605** |

$*p<.05; **p<.01.$
[a] R-Square Change for both Models 2 and 3 are relative to the R Square for Model 1.
Numbers in Table are standardised regression coefficients.
[b] The reference category for the industry dummy variables is "other", and that for the country of ownership dummy variables is "other".
Figures in brackets refer to the item numbers in Table 1

**Explanation of Control Variables**
Australian New Zealand Standard Industry Classification (ANZSIC) Codes1 were used to segregate organisations and examine relationships between industry categories and ESP. The highest response was from local government organisations (21.9%), followed by the manufacturing sector (16.9%),

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[1] [1] http://www.arc.gov.au/apply_grants/anzsic_codes.htm

State government (8.2%), mining sector (6.8%) and wholesale trade (5.9%).  The remainder of all respondents recorded less than 5% in each of the remaining categories.  To allow for more manageable analysis of results, the twenty industry sectors were collapsed into four groups comprised of Government (33.8%), (made up of Government Administration and Defence, Local, State and Education), Not for profit (4.1%), Manufacturing (16.9%) and the all other remaining sectors (45.2%) as shown in the Table .

The Australian Bureau of Statistics (ABS) classifications of businesses were used to describe organisations based on number of employees. Small and medium businesses (SMEs) have less than 200 employees. Small businesses have less than 20 employees and micro less than five employees. Medium businesses have between 20 and 199 employees.2.  Organisations with more than 1000 employees both part and full time represented a third of survey respondents (33.3%) and were the largest segment followed by organisations with between 201-1000 employees (22.8%) and organisations with 21-200 employees (18.3%).

Slightly less than a fifth of organisations surveyed had annual spending on purchasing goods and services excluding accommodation and labour costs in the $10 to $50 million range.  Organisations spending $10 to $50 million were the most highly represented group of respondents (18.7%) followed by organisations spending in excess of $500 million (14.6%) and organisations spending $100-500million (13.2%).  The survey results revealed that Australia was predominantly (79.0%) the primary country of ownership of respondent organisations, followed by the United States of America (6.4%) and the remainder were distributed across a range of countries in Europe and Scandinavia. The highest response was from organisations with their main location in NSW at just less than half (49.3%), followed by Victoria (21.9%) and Queensland (14.6%).

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[2] ABS: Small Business in Australia 2001 [Catalogue no. 1321.0])