TRANSFERABILITY OF RESEARCH ON CONTRACT TYPES AND PROBLEMS

Bill Davison and Richard J. Sebastian,
Public Works and Government Services Canada

Bill Davison, CPPO, is Director of Purchasing, Stearns County, Minnesota

Richard J. Sebastian, Ph.D. is Professor of Management in the Department of Management at St. Cloud State University in Minnesota

PWGSC – Several people from Public Works and Government Services Canada contributed to the administration of this study and to the contextual and analytical text to provide the context, analysis, and interpretation of questionnaire results in the Canadian context. These include: Terri Nadon-Geroux; Michael Turpin, Shima Vigodda and Brett Hughes.

ABSTRACT

Previous research by Davison and Sebastian (2009a) identified the occurrence and consequences of specific problems for seven contract types (e.g., construction, contracted services) in the United States.

Based on that research Davison and Sebastian collaborated with Public Works and Government Services Canada to replicate the previous study to assess the generalizability of the original findings and to expand the overall empirical base.

The results of both studies are compared, with differences analysed based on the Canadian context. The implications of the research results for procurement professionals are discussed, as are avenues for further research.

INTRODUCTION

In 2008, Bill Davison, CPPO, and Richard Sebastian, Ph.D., presented a working paper at the International Public Procurement Conference on their study of the top ten perceived contract administration problems for seven contract types: supplies and small purchases, capital outlay, professional services, contracted services, software, lease and construction (Davison and Sebastian, 2009b). The purpose of their

research was to measure the perception of both the consequence and likelihood of problems with these contract types.

The premise of the original work by Davison and Sebastian was that "advance knowledge of the likelihood of occurrence and the severity of consequences will allow procurement professionals to identify the likely contract administration problems for a specific contract type" (Davison and Sebastian, 2009b). From this, procurement professionals can proactively identify and prepare for known contract risks, work with suppliers throughout the contract to mitigate problems, and ultimately avoid the waste of valuable resources normally spent reacting to problems. They conclude that with this knowledge, and the ability to apply it appropriately, procurement professionals can demonstrate the "strategic value of procurement" through streamlining procurement (Davison and Sebastian, 2009b).

Concurrent with much of the work being done by Davison and Sebastian, Public Works and Government Services Canada (PWGSC) was conducting an extensive literature review of Supplier Relationship Management to support the development of an integrated supplier engagement program. Having heard the presentation and discussion at the International Public Procurement Conference, PWGSC approached Davison and Sebastian to explore the possibility of replicating the study in a Canadian context. The intention of this research partnership was: to produce a comparative analysis of the results from Canada with those from the United States; to expand the empirical base of research beyond a single country; and to indicate whether conclusions drawn from the initial results could be transferable to a Canadian context.

There are a number of differences between the legislative and policy base for government procurement in Canada and the United States. However, since they are both signatories to the North American Free Trade Agreement, and the Canadian and American markets in many industries are considerably integrated, a certain common basis for comparison exists, at least at the federal level.

BACKGROUND – PREVIOUS RESERARCH

Goals

The goal of the procurement of any good or service is successful contract completion. Successful contract completion is defined, by the National Institute of Government Purchasing (NIGP) as successful procurement of

the right item, in the right quantity, for the right price, at the right time, with the right quality, from the right source. (Thai, 2004).

Risks

While there are numerous goods and services that can be purchased, each purchase of goods and services faces the same set of contractual risks that affect the successful accomplishment of any of the criteria for success. Abi-Karam (2002) suggested that every purchase should be evaluated for six types of risks: Proposal risk, Surety and liability risks, Schedule risk, Contractual risk, Performance risk and Price risk. Davison and Wright (2004) expanded on the definition of these risks to include their relationship to the procurement process and the criteria for successful contracting

- *Proposal risk*: The legal document that defines the item or service procured (**the right item**), the mutual areas of agreement, and how risks will be allocated and rewarded.
- *Surety and liability risks*: Protection of the buying organization's financial and legal interests (**the right source and price**). The contract will define the insurance requirements, bonding requirements, and licensing that are necessary to protect the organization in the event of contract termination or to meet statutory requirements.
- *Schedule risk*: Ensuring timely delivery (**the right time**). The contract will contain clear and specific language describing the contract deliverables, delivery terms, and any penalties for late delivery.
- *Contractual risk*: Establishing change order procedures, dispute resolution process and termination procedures (**the right price and time**). The contract is a living document and allowances must be made to accommodate unforeseen conditions that may affect the purchase. The contract will specify who has the authority to make changes, how changes will be made, and what changes will be unilateral. The contract will specify how disputes will be resolved if mutual agreement cannot be reached. The contract will specify the termination process.
- *Performance risk*: Defining acceptance (**the right quality**). The contract will define the conditions under which acceptance will occur and what type of inspection will be required.
- *Price risk*: Defining payment terms (**the right price**). The contract will define how and when the Contractor will be paid.

Contract Problems

Based on observation and communication with peers, Davison (2004) proposes that each of these six contractual risks is comprised of a set of contract problems that may occur each time the good or service is procured.

- **Wrong Product received:** Purchase order or contract clearly identifies correct product, but vendor ships incorrect. No dispute involved.
- **Delay:** Purchase order or contract has a clearly stated delivery completion date. Delivery/completion is late (any length of time) due to either vendor or buyer cause (any reason).
- **Final Acceptance:** Completion of project is delayed due to non-acceptance of final product. Example: difference in either party's definition of what was supposed to be delivered or provided.
- **Change Order:** Change in the scope of work (additional work, money, time), after contract award. Can be requested by either party for any reason.
- **Personality Conflict:** Personality conflicts between procurement project manager or staff and vendor project manager or employees. Disagreement between the parties that cannot be easily resolved. May involve scope of work, materials supplied, payment schedules, or any other aspect of the contract.
- **Poor Performance:** Contract clearly states a level of expected performance (this is not in dispute) and quality problems with vendor's performance of work occur.
- **Subcontractors:** The vendor uses subcontractors not on his payroll to perform any or all of the work. Prior approval, for use of subcontractors, was received.
- **Cost:** Project has a high cost.
- **Other Sources:** There are none or very few vendors that can perform the work.
- **Risk of Failure/Termination**: The project has a high risk of failure; i.e. new technology, new equipment, new vendor, new project type, or tight timeline or budget.

Each contract problem that occurs can threaten the success of the project by affecting any or all of the criteria of successful completion in an adverse manner, such as delivery of incorrect product, incorrect quantity, an increase in project costs, a delay in delivery, poor quality or the ultimate unsuccessful result, contract termination (Davison and Wright, 2004).

Except for intentional gamesmanship, these problems are largely related to a lack of understanding between all parties to a contract. As a result, bringing together research on these problems and on supplier relationship management posed a unique opportunity.

The following table (Table 1) brings the three elements explored above together, and illustrates the relationship between the criteria for successful contract completion, the risks and contract problems.

Table 1 – Mapping of Goals, Risks and Contract Problems

Goal Criteria	Risk	Contract Problem
Right Item and Right Quantity	Proposal Risk	Poor Performance; Risk of Failure; Final Acceptance
Right Price	Surety and liability risk; Contractual Risk; Price Risk	Cost; Change Order; Personality Conflict
Right Time	Schedule Risk; Contractual Risk	Wrong product; Delay; Change Order; Personality Conflict
Right Quality	Performance Risk	Final Acceptance; Poor Performance; Risk of Failure; Subcontractors
Right Source	Surety and liability risk	Cost; Subcontractors; Other Sources; Risk of Failure

Contract Types

Davison and Wright (2004) also proposed that, it is possible that each purchase can be put into one of seven contract types: commodities and small purchases; capital outlay; professional services; contracted services; software; construction; leases; and other. Table 2 illustrates some examples of details of these contract types.

Table 2 – Examples of Contract Types

Contract Type	Examples
Supplies and Small Purchases	MRO (Maintenance, Repair and Operating supplies), and Term Contracts: i.e. Office Supplies, One time orders for durable goods under $5000
Capital Outlay	Durable goods over $5000
Professional Services	Architects, Consultants
Contracted Services	Custodial Services, Food Service
Software	Custom developed and shrink-wrap
Construction	Any type and any dollar amount, new construction or remodeling
Leases	Leased Space or equipment, lease without intent to own

In previously published research, Davison and Sebastian established the likelihood of contract problems for a given type of contract, and which type of contract is likely to encounter the most problems. For example, for construction contracts, change order, delays, and cost have a statistically similar chance of occurring and were significantly more likely to occur than the remaining problems, and that construction contracts are more likely to experience problems than other types of contracts. (2009a)

Supplier Engagement

Carr and Pearson proved a positive correlation between supplier relationships and contract performance. (Carr and Pearson, 1999). While Supplier Relationship Management is generally considered to be a resource-intensive effort entered into with a small number of mission-critical suppliers, (Lambert, 2004), it can include specific discussions to mitigate risk with a greater number of suppliers. (De Luca, 2006). It is this broader application that most interests Public Works and Government Services Canada, in large part, due to the need to respect the fundamental principles of fairness, openness, and access to public procurement. Accordingly, results from this study become part of the considerations in shaping an appropriate supplier engagement program.

METHOD

Subjects and Procedure

For the current research, a questionnaire covering the contract problems and contract types was sent to 436 contracting authorities at Public Works and Government Services Canada. The questionnaire was originally sent to executives outlining the purpose of the research and requesting them to distribute the questionnaire to their respective teams. Upon request, the questionnaire was sent to supervisors and contracting officers directly. The questionnaire was administered via Web sites that allowed for confidential completion and attribution based only on language of completion.

Limitations

Originally, this study was intended to include respondents from other organizations, and arrangements had been made to do this. Logistical challenges with the coordinating body prevented this from happening, which is both a disadvantage and an advantage. Although the Canadian results are less generalized than the US results, they do provide a more solid base for continued work within the organization. The limitation also effectively served as a pilot project, revealing further refinements that would facilitate broader application.

Questionnaire Instrument

To ensure the maximum possible comparability of results, the questionnaire administered in Canada contained no material changes, and only one refinement to substance, from the one administered in the United States for the initial research. Contextual changes were largely based on modifications to reflect Canadian procurement certification bodies, provinces rather than states, and in accordance with the *Official Languages Act*, the questionnaire was also made available in French. The refinement to substance was to adapt the questionnaire to the responses received in the initial questionnaire in which, for one question, the request for rank order produced ordinal ratings rather than relative rankings. In the modified questionnaire, the question was posed as one of ordinal ratings. This change was necessary to eliminate confusion and aid comparability of results.

The questionnaire initially asked a number of background questions, including: education and experience of the respondent; and information about the respondent's current position and contracting responsibilities. The questionnaire then provided definitions of the seven major contract purchase types and ten major contract management problems listed

above. Using these definitions, respondents were asked to indicate the frequency with which the problems occur for each type of contract. Lastly, the respondents were asked to indicate the typical consequences they experienced for each type of problem within each type of contract.

RESULTS

Response rate

103 responses were received, representing a 24% response rate, which is considered sufficient for the purpose of this study. Of the 103 responses, 79 individuals completed the English version of the questionnaire and 24 completed the French version.

Respondent characteristics

The respondents, on average, were well educated. Of the 76 respondents who reported their education level 84% had some post secondary education, while 57% overall had at least an undergraduate a university degree or higher. The respondents were also experienced in their fields. The median number of years the respondents had been in purchasing was 11 and the range was 0-35 with a median of 2.75 years in their current positions. Respondents issued procurement documents of large cumulative dollar value.

Overall

The major results of the research for this paper are the reported likelihood of occurrence for each of the ten contract problems for each of the seven types of contracts. In general, respondents reported very few problems, with the greatest numbers reported for professional services and supplies and small purchases. However, even for these types of contracts the reported likelihood of problems was viewed as rather low. The most common problems reported for professional services were change orders and personality conflict, and for supplies and small purchases the most common problems were delays and change orders. When contract problems occurred, the respondents reported that for most contract types no consequences were more likely than problematic consequences

Reported occurrence of contract problems for each contract type

Initially, means were computed for the respondents' ratings of the indicated likelihood of occurrence of the contract problems for each of the contract types. These means were then rank ordered from most likely to least likely for each type of contract. These results are reported in Table 3.

Table 3 - Ranking Order of Reported Contract Problems for Each Contract Type

Contract Type	1	2	3	4	5	6	7	8	9	10
Supplies and Small Purchases	Delays	Change Order	Definition of Acceptance T4*	Personality Conflict T4	Other Sources	Poor Performance T7	Risk of Failure/ Termination T7	Wrong Product	Subcontractors T10	Cost T10
Capital Outlay	Delays T2	Change Order T2	Other Sources	Definition of Acceptance	Personality Conflict	Cost	Poor Performance	Risk of Failure/ Termination	Wrong Product	Subcontractors
Professional Services	Change Orders	Personality Conflict	Delays	Poor Performance	Definition of Acceptance	Cost	Other Sources	Subcontractors	Risk of Failure/ Termination	Wrong Product
Contracted Services	Change Orders	Cost	Delays	Subcontractors	Other Sources	Personality Conflict	Poor Performance	Definition of Acceptance	Risk of Failure/ Termination	Wrong Product
Software	Delays	Risk of Failure/ Termination	Cost	Change Order T6	Personality Conflict T6	Other Sources T6	Definition of Acceptance	Poor Performance T9	Subcontractors T9	Wrong Product
Leases	Other Sources	Definition of Acceptance	Change Order	Personality Conflict	Delays	Cost	Poor Performance T9	Risk of Failure/ Termination T9	Subcontractors T9	Wrong Product
Construction	Delays T2	Change Order T2	Personality Conflict	Definition of Acceptance T5	Cost T5	Wrong Product	Subcontractors	Other sources	Poor Performance T10	Risk of Failure/ Termination T10

*** (T) indicates Tie**

Reported occurrence of contract problems over all types of contracts
To determine which types of contract problems were reported to be most common across all types of contracts, rather than simply counting the number of times a problem was ranked in a given order, column means were computed for each type of problem. The overall mean for each type of problem was determined by computing the mean of the seven contract type means. The one way analysis of variance carried out on these was not significant, $F(9,41)=.51$, ns. Though the differences were not significant, delays were the most common problem and risk of failure least. The means for the contract problems in rank order are displayed in Table 4.

Table 4 – Ranking order of Contract Problems over All Types of Contracts

Contract administration problem	**Mean**	**Rank**
Delay	1.66	1
Change order	1.57	2
Personality Conflict	1.46	3
Cost	1.31	4
Definition of acceptance	1.29	5
Poor performance	1.26	6
Wrong product	1.24	7
Subcontractors	1.23	8
Other sources	1.21	9
Risk of failure/terminate	1.2	10

To determine which **type of contract** had the **greatest** reported occurrence of problems, row means were computed for each type of contract. That is, the overall mean for each type of contract was determined by computing the mean of the ten contract problem means. The one way analysis of variance performed on these means was marginally significant, $F(6,79)=2.21$, $p<.052$. Overall, leases were reported as least likely to have contract problems whereas professional services were reported as most likely to have contract problems. The means for the seven types of contracts are displayed in Table 5 ordered from most problematic to least.

Table 5 – Ranking order of Contract Type by Reported Occurrence of Contract Problems

Contract Type	**Mean**	**Rank**
Professional services	2.21	1
Contracted services	2.01	2
Capital outlay	1.96	3
Supplies and small purchase	1.8	4
Software	1.58	5
Construction	1.38	6
Leases	1.7	7

Consequences of problems for contract types

These results reflect the respondents' reported consequences of problems by contract type. Table 6 summarizes the frequency and the computed percentage of six consequences for each contract type: no effect; delays of less than 10 days; delays of more than 10 days; cost increase of less than 10%; and cost increase of more than 10%. The percentage for each type of consequence is based on the total frequency of consequences for each type of contract, found in the final column labeled Row Frequency Total. With the exception of professional services and contracted services the results can be summarized by observing that when contract problems occurred, the respondents reported that for most contract types no consequences were more likely than problematic consequences. Problematic consequences were least likely for construction contracts, occurring 19.6% of the time, and most likely for Professional Services contracts, occurring 70.6% of the time.

Table 6 - Consequences of Delay by Contract Type

	No effect		**Contract Delay < 10 days**		**Contract Delay > 10 days**		**Increased Cost < 10%**		**Increased Cost > 10%**		**Termination**		
Type of Contract	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**Row Freq. Total #**
Supplies and Small Purchases	55.8%	91	25.8%	42	14.1%	23	2.5%	4	1.2%	2	0.6%	1	163
Capital Outlay	56.2%	82	14.4%	21	16.4%	25	4.8%	7	6.8%	10	1.4%	2	146
Professional Services	29.4%	84	18.9%	54	22.7%	65	15.7%	45	9.1%	26	4.2%	12	286
Contracted Services	32.8%	67	16.7%	34	22.5%	46	12.3%	25	14.2%	29	1.5%	3	204

Software	57.9%	44	32.9%	25	9.2%	7	0.0%	0	0.0%	0	0.0%	0	76
Lease	68.6%	48	28.6%	20	2.9%	2	0.0%	0	0.0%	0	0.0%	0	70
Construction	80.4%	41	11.8%	6	7.8%	4	0.0%	0	0.0%	0	0.0%	0	51

DISCUSSION

Because the respondents in the Canadian study came from a single, large purchasing organization, it is possible to compare results from this study with known challenges in the organization. Some of the results above indicate that the Canadian results may need to be read with a degree of caution. This caution is explored further in avenues for further research. Further, because of the specific results from the Canadian study, the comparisons rely more heavily on ordinal results than statistical significance.

Comparison of Canadian and US Results

Comparison of Canada and US Respondent characteristics

Table 7 shows the comparison between education, years of experience, and contracting volume between Canadian and US respondents. In general, US respondents had slightly more experience, both overall and in the current position, while education levels are comparable. However, Canadian respondents spent a significantly greater amount of money, issuing procurement documents of large cumulative dollar value.

Table 7 - Comparison Demographic Data Canada and US

	Canada	**US**
Median Years in Purchasing	11.5	16
Median Years in Current Position	2.75	5
% With 4 year degree or more	57%	60%
Median Annual Individual Purchasing Volume	15 Million	5 Million

Comparison of Canada and US Reported occurrence of contract problems by type of contract

Rankings from the two countries of which type of contract experienced problems most often show very different results. The results are summarized on Table 8. The significant findings are that Canadian respondents reported fewer problems in construction contracts than the US.

Table 8 – Comparison of Canada and US Reported Occurrence of Contract Problems by Contract Type

Canada		US	
Contract Type	**Rank**	**Contract Type**	**Rank**
Professional Services	1	Construction	1
Contracted Services	2	Contracted Services	2
Capital Outlay	3	Professional Services	3
Supplies and small purchases	4	Software	4
Software	5	Capital Outlay	5
Construction	6	Supplies and small purchases	6
Leases	7	Leases	7

Comparison of Summary of Problematic Consequences in Canada and United States

When the problems by contract type are expanded to include the degree of consequence of the problem, rankings change slightly, but only with the transposition of one pair of problems. It does not appear that this transposition is material. The comparison of the degree of problematic consequences in each contract type is summarized in Table 10.

Table 9 - Comparison of summary of Problematic Consequences in Canada and United States

	Canada		US		Canada	US
Contract Type	**Problematic Consequences**	**Rank**	**Problematic Consequences**	**Rank**	**No Consequence**	**No Consequence**
Professional Services	70.60%	1	64.20%	3	29.40%	35.80%
Contracted Services	67.20%	2	64.40%	2	32.80%	35.60%
Supplies and Small Purchases	44.2%	3	62.90%	4	55.80%	37.10%
Capital Outlay	43.80%	4	59.20%	6	56.20%	40.80%
Software	42.10%	5	60.30%	5	57.90%	39.70%
Lease	31.40%	6	45.50%	7	68.60%	54.50%
Construction	19.60%	7	68.90%	1	80.40%	31.10%

Comparison of Canada and US Reported Occurrence of Contract problems over All Types of Contracts

Rankings from the two countries on which problems are experienced most frequently also show very different results. Delay was reported as the single most common problem in both countries, however as identified above the variance is not statistically sound enough to demonstrate significant differences in the ranking of problems in the two countries. The respective ranking of contract problems is illustrated in Table 9.

Table 10 - Comparison of Canada and US Reported Occurrence of Contract Problems Over All Types of Contracts

Canada		US	
Contract problem	**Rank**	**Contract problem**	**Rank**
Delay	1	Delays	1
Change order	2	Cost	2
Personality Conflict	3	Change Order	3
Cost	4	Poor Performance	4
Definition of acceptance	5	Definition of Acceptance	5
Poor performance	6	Personality Conflict	6
Wrong product	7	Other Sources	7
Subcontractors	8	Subcontractors	8
Other sources	9	Risk of Failure	9
Risk of failure/terminate	10	Wrong Product	10

Expansion of Empirical Base

The study achieved the objective of creating a larger, cross-border pool of results. However, given the differences between the results from the two countries, additional work would be required to determine whether there is any utility in examining the results across the entire pool. The degree of market integration in the contract types is one of the factors that will affect the extent to which data can be pooled.

Transferability of Study and Results

Although initial efforts were made to ensure clarity of questions within the Canadian context, some respondents experience difficulty with some questions, especially those distinguishing between types of post-secondary education and definitions of contract types for services. To assist in the transferability of the study tool, a point of contact was established to help clarify any confusion in terminology. This proved very useful in increasing the response rate, and should be viewed as a critical success factor in this kind of transfer.

This study was conducted using the same methodology as the original study to ensure the most common base for comparison. Even with that degree of commonality, results indicate that findings from one country are not automatically transferable to the other context. Part of this will be due to market differences, and part will be due to the context in which respondents found themselves and interpreted the questions.

MANAGERIAL IMPLICATIONS

As pressure increases to streamline procurement, there is increasing need to ensure efforts are targeted to most effective, efficient use. Managers and contracting authorities will need accurate information on the severity of consequences of typical problems for each type contract to determine the costs of poor contract performance and how to allocate mitigate the negative consequences for clients. This information also needs to be shared effectively across the organization.

Generally, one might expect the results of this study to help point to a series of questions and decisions related to reducing the occurrence of problems and consequences, and provide the data to inform those decisions. In this vein, identifying the problems most likely to occur in a given contract type, and the likely consequences of those problems can help procurement authorities identify possible mitigation strategies to reduce the likelihood or impact of problems in their contracts. The mitigation strategies could include a combination of: modifications to specifications, terms and conditions; more narrowly targeted contract administration efforts; or specific supplier engagement approaches. For example, the results of this study indicate that professional service contracts are most likely to experience problems related Change orders and Personality Conflict, and the consequences of both problems are likely to be delay, increased cost and lastly termination. In this case, the procurement authorities can focus attention on the circumstances giving rise to the change orders and investing additional effort in managing relationship with the supplier to avoid consequences, especially termination.

Managerial implications in the Canadian context are influenced by a number of factors. The fact that the Canadian respondents were all from a single organization allows managers of that organization to make use of this information in a more focused manner than if the results were generalized across several organizations. As previously pointed out, the fact that this study did not find statistically significant problems or consequences raises some interesting questions, either about the validity of the results, or the implications of the lack of materiality, or some combination thereof.

The extent to which the results of this study may be used in risk management, contract administration and vendor performance, and supplier engagement needs to be considered in light of these factors and approaches currently in use.

FUTURE RESEARCH

Some of the results of this study may be a function of the response rate, especially for given contract types. Additional research may be required to validate or qualify these results. Although the surface results of this study produced few reported problems, they do point to a need for more in-depth research into this area. This could be formal research with refined methodology, or focused discussions among those responsible for contracting in each of the seven contract types.

Although the rate of contract termination reported in the Canadian study is less than in the US study (Davison and Sebastian, 2009b), the fact that the Canadian results are from a single organization allows more exploration of this particular consequence. Results of a termination rate of 4.2% is based on 12 of 286 incidences reported in this study. Public Works and Government Services Canada data indicates that between fiscal years 2004-2009, 3,496 professional services contracts were managed by the department (PWGSC). It would be interesting to examine the full base more closely to see whether the termination rate is valid for the entire base, and if so, whether the statistical significance of problems and consequences is any greater than in this study. It would also be interesting to conduct in-depth exploration and analysis of the factors that affect the rate of contract termination.

For this study, the definition of delays and change orders did not distinguish between those cause by the supplier and those caused by the client. Although this makes sense in reducing the possibility of respondent bias, and because the fact of a delay, however caused, affects successful contract delivery, further research into this distinction would be necessary to produce more refined analysis and conclusions.

To assess the ability to generalize the results, future research can be carried on the factors that might affect transferability of results. These could include not only the educational and experience levels included in this study, but also market structure, the legal and policy context for procurement, specific approaches to specifications, terms and conditions, contract administration and supplier engagement. In support of broader transferability, these factors could form part of the preliminary preparation for further use.

Subject to qualifications indicated above, the results from this study could also be used as a benchmark against which to measure progress

through more enhanced supplier engagement, in streamlining procurement, through more targeted risk management or other corporate objectives.

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