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Use of Customer Satisfaction to Measure Performance of Systems and Contractors: Post-Occupancy Evaluation (POE) Method

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A roofing manufacturer wants to differentiate themselves from other roofing manufacturers based on performance information. However, construction industry has revealed poor performance documentation in the last couple of decades. With no current developed performance measurement model in the industry, two roofing manufacturers approached the research group to implement a warranty program that measures the performance information of their systems and applicators. Moreover, the success of any project in the construction industry heavily relies upon the capability of the contractor(s) executing the project. Low-performing contractors are correlated with increased cost and delayed schedules, resulting in end-user dissatisfaction with the final product. Hence, the identification and differentiation of the high performing contractors from their competitors is also crucial. The purpose of this study is to identify and describe a new model for measuring manufacturer performance and differentiating contractor performance and capability for two roofing manufacturers (Manufacturer 1 and Manufacturer 2) in the roofing industry. The research uses multiple years of project data and customer satisfaction data collected for two roofing manufacturers for over 1,000 roofing contractors. The performance and end-user satisfaction were obtained for over 7,000 manufacturers' projects and each contractor associated with that project for cost, schedule, and quality metrics. The measurement process was successfully able to provide a performance measurement for the manufacturer based on the customer satisfaction and able to identify low performing contractors. This study presents the research method, the developed measurement model, and proposes a performance measurement process that entities in the construction industry can use to measure performance.

Keywords: Performance Information, Customer Satisfaction, Post-occupancy Evaluation, Manufacturer

Introduction

The last couple of decades have revealed a poor documentation of performance information in the construction industry (Cahill and Puybaraud, 1994; CFMA, 2006; Davis et. al., 2009; Egan, 1998; Flores and Chase, 2005). Due to poor documentation of performance, roofing manufacturers and contractors are unable to differentiate themselves from other competitors and are enticing buyers to purchase their services based on low price and long-term warranty durations. Due to this trend, the manufacturers and contractors that provide high quality service and products are unable to compete in this price-based market which is riddled with false promises through the use of warranties (Kashiwagi, 2012).

For a long time, the duration of the warranty has been used in the construction industry as a marketing tool. However, the

warranty does not protect the buyer since it is an offer of protection provided by the manufacturer to the buyer (Agrawal et. al., 1996). The warranty is written by a roofing manufacturer and its legal representatives that contain certain exclusions, if encountered, will void the warranty (Christozov et al., 2009). Hence, the long-term warranties have no proven correlation with the performance and the life cycle of a roofing product (Kashiwagi, 2011).

This trend is prevalent in the manufacturing sector of the construction industry. The industry is flooded with manufacturers and contractors that sell products and systems based solely on the length of the warranties. It has been observed that warranties do not necessarily lead to a quality product (Gajjar and Kashiwagi, 2020)). Many researchers have suggested different type of risk minimization systems and processes in attempt to change this trend. (Hillson, 1997; CII, 1995; Gibson et. al., 2006; Hamilton, 1996; Kashiwagi, 2009; Sullivan, 2010; Davis, et. al., 2009; Sweet, 2011).

Two manufacturers realized that in order to survive in the competitive market saturated with low price and false promises of the warranty, it is critical to differentiate themselves from other manufacturers. Along with differentiating from other manufacturers, creating an environment where warranty is used to measure performance that will minimize the risk of the manufacturer and provide the client with the best quality service and product is crucial. In order to achieve this objective, two subject manufacturers approached the authors.

The researchers proposed a Post Occupancy Evaluation (POE) method that tracks the satisfaction rating of the buyers through the use of performance information of all the warranties issued by the manufacturer known as the warranty tracking program. The Post Occupancy Evaluation (POE) method, where a finished product is evaluated to measure the quality for continuous improvement on future products, is currently being implemented in the industry (Wicks and Roethlein, 2009). Buyer satisfaction questionnaires were distributed after each project to impact future projects positively through corrective behavior modifications (Forbes 2002; Gajjar et. al. 2012).

This paper presents the research method used to implement the warranty tracking program for two manufacturers that measures performance information with the use of customer satisfaction. It also presents the findings of the program and proposes a new performance measurement process that entities in the construction industry can use to measure performance. Previous research published on this topic only focused on one manufacturer and parts of the warranty tracking program. This paper is unique, in that, it presents the results and analysis of the entire warranty tracking program for two national manufacturers collectively.

Methodology

The methodology was to implement the initial warranty tracking program, refine the process based on the pilot study and implement the final process for all the manufacturers' projects. After the implementation of the final warranty tracking process, the feedback process was created in the form of a real-time database that reports the performance information findings back to the manufacturer.

The manufacturer initiates the client satisfaction warranty tracking program by sending a list of all the warranted jobs to the researchers as illustrated in Fig. 1. After receiving the list of jobs, researchers contact the end users for satisfaction ratings and direct feedback regarding the job. The researchers report back the information to the manufacturer with satisfaction ratings, problems and issues identified by the buyer that is compiled into a performance information matrix.

The questionnaires for the warranty process were developed jointly by the researchers and the manufacturer that would provide the appropriate information needed to differentiate and minimizing risk. Along with end user satisfaction rating, the metrics were also measured: contractors installing the product, their representative present on the job site, leaks on the job site and customer retention rate.

Upon completion of the satisfaction check, the performance response (performance information) was reported back to the manufacturer. This proactive risk minimization system enables the manufacturer to identify and resolve problems upfront, rather than becoming reactive to them as they materialize in the future.

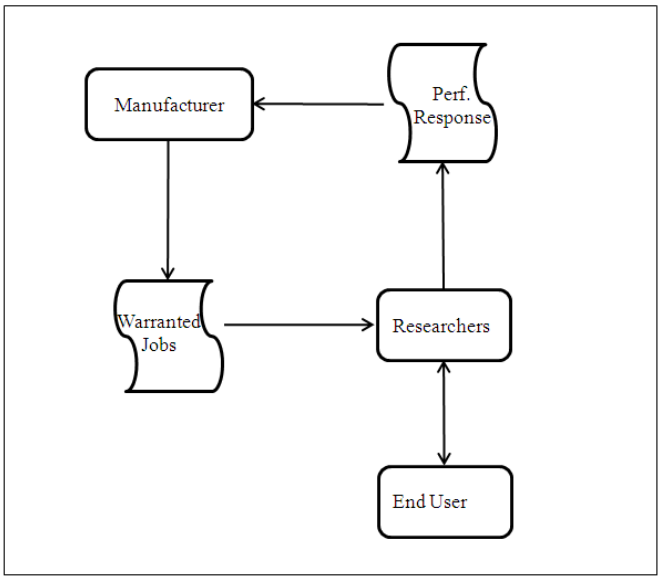

Figure 1: Warranty Tracking Program Process

The two manufacturers also had different objectives in the implementation of the warranty tracking program and had different survey questions which are outlined as below.

Manufacturer 1

The survey questions for Manufacturer 1 were:

- Customer Satisfaction of the Applicator (1 lowest– 10 highest)
- Would you hire the applicator again? (Yes / No)
- Customer Satisfaction of the coating system (1 – 10)

- Would you purchase the system again? (Yes / No)
- Overall Customer Satisfaction (1 – 10)

Manufacturer 2

The survey questions for Manufacturer 2 were:

- Satisfaction rating of the roofing system (1 lowest – 10 highest)
- Would you purchase the manufacturers product again? (Yes or No)
- Is the roof currently leaking? (Yes or No)
- Satisfaction rating of the contractor (1 – 10)
- Would you hire the contractor again? (Yes or No)
- Satisfaction rating of the manufacturer's representative (1 – 10)
- Satisfaction rating of the value relative to the overall roofing project cost (1 – 10)
- Overall satisfaction rating of the roofing project (1 – 10)
- Have you used manufacturer's product more than once? (Yes or No)

Pilot Warranty Tracking Program

Before advancing any further, researchers recommended one of the manufacturers to conduct three pilot tests in order to test the ability of the warranty process to accomplish the desired goal of differentiating the subject manufacturer from other competitors and minimize the risk. The three pilot tests were:

- Pilot 1 - Warranty process on largest and oldest fifty projects
- Pilot 2 - Warranty process on randomized one hundred and fifty projects
- Pilot 3 - Warranty process on fifty different end user projects

Table 1 shows the performance information of three pilot tests. The data reveals that the overall satisfaction rating of the manufacturer is 9.2 out of 10. The customer satisfaction rating of the roofing system is 9.1 out of 10 and 98% of the customers would purchase the manufacturers product again. Overall, 99% of the projects did not have leaks. However, the customer satisfaction rating of the applicator is below 9.0, indicating it is essential to identify low performing applicators; i.e. contractors to minimize manufacturer's and end user's risk.

Table 1: Performance Information for Pilot Test

Criteria	Unit	Overall	Pilot 1	Pilot 2	Pilot 3
Overall customer satisfaction	(1-10)	9.2	8.9	9.1	9.4
Oldest job surveyed	Years	3	3	2	2
Average age of roofs surveyed	Years	1	1	1	1
Customer Satisfaction - Roofing System	(1-10)	9.1	8.9	9.1	9.3
Percent of customers that would purchase the system again	%	98%	100%	97%	100%
Percent of roofs with no current leaks	%	99%	98%	99%	100%
Customer Satisfaction – Contractor	(1-10)	8.8	8.7	8.9	8.7
Percent of customers that would hire same Contractor again	%	95%	98%	97%	100%
Customer Satisfaction – Manufacturers representative	(1-10)	9.5	9.2	9.6	9.5
Customer Satisfaction - Value relative to project cost	(1-10)	8.9	8.7	8.9	8.9
Percent of repeat customers (surveyed)	%	N/A	N/A	N/A	77%
Total job area (of job surveyed)	SF	4,942,175	3,202,636	1,125,333	614,206
Total number of jobs surveyed	#	127	31	76	20
Total number of surveys	#	250	50	150	50

Table 2 shows the percentage of end users that can be contacted and the reason if the researchers were unable to contact the end user. The research revealed that only 52% of the end users could be contacted.

Table 2: Performance Information for Pilot Test

Criteria	Unit	Overall	Pilot 1	Pilot 2	Pilot 3
Bad/Missing Information (No contact info, wrong #, etc.)	%	28.4%	34.0%	26.0%	30.0%
Refusal to Complete	%	2.0%	2.0%	0.7%	6.0%
Jobs cannot be contacted	%	15.4%	2.0%	22.6%	24.0%
Surveys Returned	%	51.8%	62.0%	50.6%	40.0%

Since end users play a critical role in the warranty process, it is essential that the response rate of the end users be increased. The manufacturers and the researchers agreed that the warranty process needed to be adjusted in order to meet its purpose to increase the response rate of the end users.

Final Warranty Tracking Program

Upon presenting this issue with one of the manufacturers for the pilot study, it was evident that the contact information was provided by the regional managers on the field and that they did not realize the importance of accurate contact information in the warranty process. In order to ensure the highest response rate, the following was identified as crucial:

- Educating the regional managers within the organization
- Warranted jobs to be submitted monthly to minimize the time gap between job completion and customer satisfaction check
- Provide a list of jobs where the end users cannot be contacted to the regional managers and request the accurate contact information

The difference, if compared to the previous pilot warranty tracking program, is that if the end user cannot be contacted, the regional manager is responsible for providing the accurate contact information. After the accurate contact information is received, the end user is contacted again for the performance response.

Analysis and Results

The analysis and results are broken down by Manufacturer 1 and Manufacturer 2.

Manufacturer 1

Table 3 shows the performance information of all the manufacturer's systems over the last six years. The total job area surveyed was 36.1 million square feet. The clients were satisfied with manufacturer's product and the applicators who installed the product. The overall customer satisfaction rating was 9.0 with 1,412 warranted jobs surveyed. Since Manufacturer 1 produced products for different construction segments of flooring, roofing, wall coating and waterproofing, the performance information for each segment is broken further.

Table 3: Product Performance Information

Criteria	Unit	Overall	Floor	DB Roof	Foam Roof	Wall Coating	Water-proof
Overall customer satisfaction	(1-10)	9.0	8.5	9.1	9.4	9.2	9.0
Oldest job surveyed	Years	10	5	7	6	7	9
Average age of jobs surveyed	Years	4	3	4	4	4	3
Customer satisfaction - coating system	(1-10)	9.1	8.3	9.2	9.5	9.2	9.0
Percent of customers that would purchase the product again	%	98%	90%	98%	99%	98%	98%
Customer Satisfaction – Applicators	(1-10)	9.0	8.4	9.0	9.3	9.2	9.0
Percent of customers that would hire same Applicator again	%	96%	87%	96%	95%	97%	96%
Total job area (of job surveyed)	SF	36.1 M	0.3 M	3.6 M	3.2 M	2.8 M	26.2 M
Total number of jobs surveyed	#	1,412	31	191	111	63	1,016

Table 4 shows the performance information for jobs that hold potential risk. Jobs that have satisfaction rating below seven or clients that would not purchase the product again were categorized as risky. The data shows that 97% of jobs have no customer complaints and would purchase the product again. However, the risky jobs have a lower satisfaction rating of 4.1 for the coating system and 4.5 for the applicator. The risky jobs constituted only 4% of the total job area installed. The researchers send a quarterly report with a list of all identified "risky" jobs to the manufacturer customer service department. The customer service then contacts the client for further investigation and the actions that need to be taken to satisfy the customer.

Table 4: Risky Job Performance Information

Criteria	Unit	Metric
Total number of jobs surveyed	#	1,412
Number of risky jobs	#	70
Percent of jobs that are risky	%	5%
Satisfaction rating- Coating	(1-10)	4.1
Satisfaction rating- Applicator	(1-10)	4.5
Percent of customers that would purchase the product again?	%	0%
Risky job area	SF	1.5 M

Table 5 differentiates high performing applicators from low performing applicators. Applicators that have either a satisfaction rating below seven or a client that would not hire the applicator again, are deemed as low performing contractors. The data shows that approximately 10% of the applicators that install the manufacturer's product are low performing applicators. Low performing applicators installed 5% of the total job area of manufacturer coating. Upon seeing the results, the manufacturer decided to stop selling their coating systems to the low performing applicators.

Table 5: High Performing vs. Low Performing Applicators (Manufacturer 1)

Criteria	Unit	High Performing Applicators	Low Performing Applicators
No. of Contractors	#	268	29
Satisfaction rating- Coating	(1-10)	9.2	7.4
Satisfaction rating- Applicator	(1-10)	9.3	6.1
Percent of customers that would hire the applicator again	%	100%	69%
Total Job Area	SF	17.2 M	1 M

Manufacturer 2

The warranty tracking program has being continuously ongoing for approximately four years with a total of 2,254 jobs (42.3 M SF) for Manufacturer 2. Table 6 reveals the overall performance information after the implementation of the warranty tracking program. The average applicator customer satisfaction is 8.9 out of 10 (lowest of all categories). Satisfaction of the roofing system is 9.3 out of 10 and percentage of customers that would use the manufacturer's product again is 98%. The overall customer satisfaction rating is 9.2 out of 10 and the percent of customers that would purchase manufacturers product again was 98%.

Table 6: Overall Performance Information

No	Criteria	Unit	Overall
1	Overall customer satisfaction	(1-10)	9.2
2	Oldest job surveyed	Years	37.2
3	Average age of jobs surveyed	Years	3.0
4	Customer Satisfaction - Roofing System	(1-10)	9.3
5	Percent of customers that would purchase the system again	%	98%
6	Percent of roofs with no leaks	%	96%
7	Customer Satisfaction - Applicators	(1-10)	8.9
8	Purchase of customers that would hire same Applicator again	%	91%
9	Customer Satisfaction - Representative	(1-10)	9.5
10	Customer Satisfaction - Value relative to project cost	(1-10)	8.9
11	Percent of repeat customers	%	85%
12	Total job area (of job surveyed)	SF	42.3 M
13	Total number of jobs surveyed	#	2,254

The warranty tracking program was also able to identify high-performing contractors from low-performing. Customer satisfaction ratings for applicators of 7 or below out of 10 was considered as low performing. Table 7 shows that 51 out of 882 (5.8%) applicators are low performing. The low performing applicators have installed a total of 200 jobs and 4.2 M SF.

Table 7: High Performing vs Low Performing Applicators (Manufacturer 2)

No	Criteria	Unit	All Applicators	Low Performing Applicators
1	Customer Satisfaction with Applicator	(1-10)	8.9	5.4
2	Total Job Area Installed	SF	42.3 M	4.2 M (9.9%)
3	Total # of Jobs Installed	#	2,254	200 (8.8%)
4	Total # of Applicators	#	882	51 (5.8%)

The manufacturer had no previous documentation that identified low-performing applicators. Moreover, it was documented that over 50% of the leaks and customer dissatisfaction was caused due to low performing applicator.

Conclusion

The two manufacturers were successfully able to implement the warranty program and measure the performance information of their systems and applicators. Having a proof of documented performance of their systems differentiated the subject manufacturer from other competitors through performance measurement. The research revealed that the product of the two manufacturers in this study is a high performing product.

The warranty program provided the manufacturers with a tool to minimize the risk not only for the manufacturer, but also for the end users by identifying:

- End users that are not satisfied
- Applicators that are low performing
- Jobs that have current leaks
- Having a running log of satisfaction rating for every warranted job

The manufacturer was able to mitigate the risk proactively by identifying the unsatisfied end users and leaking jobs in the warranty process. The manufacturers are able to report these jobs to their respective managers that are responsible for their region within two weeks of notification.

The author proposes the warranty tracking program as a shell and can be implemented by tweaking the program for any entity in any industry.

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Implementing and Sustaining the Best Value Approach in a Large Organization

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In recent years, construction companies have lost millions of dollars due to poor project management performance on projects. The Best Value Approach (BVA) is one of the only documented systems to show an increase in the performance of project management. It has been used on over 2000 projects with a 98% customers satisfaction to cut costs, decrease time, reduce effort, and improve quality on projects. The BVA system is also the most licensed technology at Arizona State University with 65 licenses. The issue with the BVA is that professionals have struggled to implement and sustain the system in their own organizations. Research was conducted at SKEMA Business School as part of a Doctor of Business Administration (DBA) to resolve the sustainability issue. The research included a complete literature review of the BVA and 32 other buyer/supplier systems along with a practitioner's survey (107 participants) and 10 test projects from a large organization that has been utilizing the BVA for over three years. The result of the study is 11 unique BVA characteristics, 6 identified issues by practitioners, and 15 modifications to improve the sustainability of the BVA. The research provides a foundational framework for how organizations can implement and sustain the BVA that has been tested and used with a large organization.

Keywords: Best Value Approach, Procurement, Risk Management, Project Management, Performance Information, Sustainability, Large Organizations, Bureaucracy

Introduction

In recent years, large companies have shown significant losses on projects. Fluor Corp. reported a net loss of $555 million in its second quarter, compared to $115 million in earnings recorded for the same period last year. Fluor, the second-largest contractor by revenue in the United States, scored $4.1 billion in revenue for the quarter ending on June 30, a 16% dip from the prior year's $4.9 billion (Beeton 2019). Granite Construction, one of the country's largest contractors, reported a net loss of $97.8 million for the second quarter of 2019. The CEO, James Roberts, attributed some of the downturn to the delivery systems that were used on the projects (Goodman, 2019). Construction companies are experiencing significant losses from poor performance on projects.

Unfortunately, failed projects are not something that is uncommon in the construction industry. A study conducted in 2015 by the Construction Industry Institute, they identified performance for the construction industry as a worldwide entity with the following statistics (CII, 2015):

1. 2.5% of projects defined as successful (scope, cost, schedule, & business).
2. 30% of projects completed within 10% of planned cost & schedule.
3. 25 to 50% waste in coordinating labor on a project.
4. Management inefficiency costs buyers between $15.6 and $36 billion per year.

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5. Rework by contractors is estimated to add 2-20% of expenses to a contractor's bottom line.
6. An estimated $4 billion to $12 billion per year is spent to resolve disputes and claims.

These statistics give insight into the inefficiency and low performance of projects in the industry. This along with other research has shown that construction projects have low performance when considering the schedule, budget, and customer satisfaction of clients (Lee, et al., 1999, Horman, M. & Kenley, R. 2005; Egbu, 2008; Rivera, 2014, PBSRG, 2019).

More recent research has identified the project management system as being a problem in that project managers struggle to perform at a high level in terms of schedule, budget, quality and customer satisfaction of clients (Memon et al., 2012; Flyvbjerg et al., 2003; Perrenoud et al., 2014; Salunkhe et al., 2014; Ogunsemi et al., 2006). Researchers have found a myriad of issues that face project managers in our day and age. The research identified the following as some of the issues (Ahern, et al., 2014; Elonen, et al., 2003; PBSRG, 2019):

1. Projects are too complex in nature.
2. Increased number of stakeholders.
3. Lack of accountability in roles.
4. Detailed communication and an increase in decisions.
5. Uncommunicated expectations of clients.
6. Lack of transparency.
7. Increase in communication between contractor and client.
8. Lack of planning.
9. Client Management increasing cost of services.

For over 20 years, organizations have developed the tools, systems and knowledge to remedy the problems experienced by project managers (Dinsmore and Cabanis-Brewin 2014). Despite the support and effort that organizations have put into improving project management over the years, project managers still struggle to complete projects on time, on budget, with high customer satisfaction, and high-quality.

In a paper published by PM World Journal, they record that over $100M has been spent on project management education and training in the last 25 years. The paper posed a unique question, "What do we have to show from this investment?" A recognized International Project Management Association Fellow, Stacey Geoff replied "Most people find it difficult to answer this question, because they cannot show improved PM performance, nor can they even show the improved competencies they hoped for. In fact, based on recent discussions with Executives, the perception is that programs and projects are significantly much less successful today than they were 25 years ago, and Executives ask 'What return on investment is this?'" (Goff 2014). These comments represent the state of the industry in project management. Organizations are looking for a solution to remedy the problems in the industry and deliver projects with a high level of performance but have not found one (Beeton 2019; Goodman 2019; ENR 2016).

The Best Value Approach (BVA)

With all of the problems in the industry, the researchers knew of a highly researched and documented system that showed potential to be a solution for low performance in the industry. The researchers did a search to find all the documented performance for the system. The search showed documented performance measurements in over 400 papers, publications, and books.

Based on the high-performance claims, documented case studies, and research results, the existing research showed the system as a potential solution to the low performance in the industry. The following are documented research metrics for the BVA (PBSRG, 2021):

1. 28 years of research and development of the approach from 1992 to now.
2. $17.6M research funding appropriated for pilot projects, and education.
3. 2,000+ project tests delivering $6.6B of services.
4. 9 countries and 33 states have implemented the approach.
5. 65 licenses purchased from organizations around the world [most licensed Intellectual Property (IP) technology developed at Arizona State University.
6. International Recognition in Australia, Botswana, Canada, Democratic Republic of Congo, Finland, France, Netherlands, Norway, Malaysia, Poland and Sweden.
7. Audited four times by the State of Hawaii; COE PARC; Zuyd University & University Twente; WSCA/NASPO Agreement (Duren and Doree, 2008; State of Hawaii PIPS Advisory Committee, 2002; Kashiwagi, 2016; PBSRG, 2019).
8. 400+ journal articles, publications, conference proceedings, and books.
9. 334 educational presentations given worldwide.

Based on the high-performance claims, documented case studies, and research results, the existing research showed the system as a potential solution to the low performance in the industry (PBSRG, 2021). A more comprehensive investigation was conducted that searched for all major organizations that used the BVA was conducted. The investigation found a list of 46 organizations that claimed to have implemented the BVA. During the investigation, some of the documentation was not complete enough to verify if the BVA was implemented and sustained in the organization. These organizations that lacked sufficient documentation were left out of the research. The list of organizations with documentation was finalized at 26. The key points of information that were relevant to the research objective was the following:

1. Total number of projects.
2. Total awarded amount for projects.
3. Time Period in using the BVA.
4. Number of years using BVA.
5. Current Status.
6. Reference.

In searching through the documentation, the key points of information were gathered to understand why organizations were not using the approach. The information was compiled in Table 1 to give an overview of the results and key points of information. This information would be critical in understanding and confirming the BVA research.

Table 1: Major Organizations Overview

#	Major BVA Organizations	# of Projects	Total awarded amounts	Time Period	Years	Current Status	Short Reference
1	Arizona Department of EQ	276	$25,426,638	2015 - 2017	3	Discontinued	Rivera et al. 2014
2	Arizona State Parks	3	$3,655,243	2008 -2010	3	Discontinued	Kashiwagi 2014
3	Arizona State University	16	$1,771,337,569	2006 - 2017	12	Discontinued	Kashiwagi 2016
4	Church of Jesus Christ	10	$8,064,896	2018 - Present	3	Running	Kashiwagi et al. 2020
5	City of Peoria	65	$511,859,012	2004 -2011	7	Discontinued	Sullivan et al. 2010
6	City of Rochester	12	$118,080,736	2009 - 2016	7	Discontinued	Kashiwagi et al. 2015
7	City of Roseville	17	$17,664,842	2009 - 2015	6	Discontinued	Smithwick et al. 2013
8	Federal Aviation Administration	55	$4,513,654	1997 - 2005	9	Discontinued	Kashiwagi 2014
9	General Services Administration	10	$9,994,887	2009 - 2011	3	Discontinued	Savicky et al. 2014
10	Harvard University	12	$6,698,914	2004 - 2005	2	Discontinued	Corenet Global 2005
11	Intermediate District 287	4	$29,973,380	2010 - 2013	4	Discontinued	Kashiwagi et al. 2015
12	Kamehameha School	9	$5,623,979	2015 - Present	7	Running	Kashiwagi et al. 2019
13	Polk County	9	$20,475,197	2009 - 2012	4	Discontinued	Kashiwagi et al. 2015
14	Raytheon	1	$6,400,000	2005- 2007	3	Discontinued	Kashiwagi 2016
15	Rijkswaterstaat (Dutch Agency)	1	$1,700,000,000	2009 - 2011	3	Discontinued	Rijt et al. 2009
16	Rochester Public Schools	44	$29,904,210	2008 - Present	12	Discontinued	Kashiwagi et al. 2015
17	State of Hawaii DAGS	194	$60,923,227	1997 - 2002	6	Discontinued	State of HI 2002
18	State of Oklahoma	23	$91,783,440	2009 - Present	11	Running	Kashiwagi 2016
19	State of Utah	12	$80,893,116	1999 - 2011	12	Discontinued	Byfield et al. 2002
20	State of Utah	1	$366,500	2016 - Present	4	Running	Kashiwagi et al. 2018
21	United Airlines	34	$15,065,195	1996 - 1998	3	Discontinued	Kashiwagi 2016
22	United States Air Force	2	$89,704,000	2007 - 2009	3	Discontinued	Kashiwagi 2014
23	University of Hawaii	41	$2,623,917	2000 - 2005	6	Discontinued	Serikawa 2002
24	University of Minnesota	355	$332,697,732	2005 - 2015	11	Discontinued	Perrenoud et al. 2016
25	University of New Mexico	1	$12,882,131	2008 - 2012	5	Discontinued	Kashiwagi 2014
26	US Army Medcom	619	$1,027,534,879	2006 - 2011	6	Discontinued	US Army 2008

There were 26 major organizations found with documentation on their projects. The references listed for each organization are a way to verify that the system was implemented but additional information on each organization can be found in the PBSRG database. The data was gathered and analyzed to understand the issues and problems that organizations had when implementing and sustaining the BVA. In analyzing the major organizations, the research was compiled into list of reasons why they stopped using the BVA:

1. Political issues (Kashiwagi et al. 2002, Kashiwagi et al. 2015).
2. BVA expert leaves the organization (Perrenoud et al. 2016, US Army 2008, Corenet Global 2005).
3. No more projects available (Kashiwagi 2014, Smithwick et al. 2013).
4. Upper management change in direction (Savicky et al. 2014, State of HI 2002, Rivera et al. 2017).
5. Modified the process (Rijt et al. 2009).
6. Lack of client interest (Kashiwagi 2016).

The investigation was conducted on the BVA and confirmed the documentation but brought up a pressing issue with the system. Most of the 65 previous clients of the BVA stopped using the system which implied that there are issues in the implementation and sustainability of the system as a solution to the project management performance issues.

The literature confirmed the poor performance in the industry, and that the BVA was the only system that was found to be a possible solution to the performance issues. The literature also revealed a research gap in implementing and sustaining the BVA in organizations. Research would need to be conducted to understand and resolve issues that organizations are having with the system to confirm that it would be a possible solution for organizations to use to improve their performance on projects.

Research Questions & Methodology

With the information that licensed organizations are no longer using the BVA, it presents the question, "Why are they not using the approach?" There is a lack of knowledge as to the reasoning behind not using the system. The existing research shows the documentation of the BVA and the use of it on individual projects but does not fully take the perspective of a practitioner. There are a lot of unknowns in this area of research. Research in this area would greatly benefit organizations implementing and sustaining the approach as well as organizations looking into using the system to achieve high performance. Due to the existing research, the proposal is to conduct research on this topic area with the following aims:

1. Gain a greater understanding of buyer/supplier systems in comparison to the BVA.
2. Identify the problems with implementing and sustaining the BVA.
3. Find solutions and tools to implement and sustain the BVA.

These research aims are all focused on obtaining knowledge that could be used in academia as well as in industry to expand the body of knowledge. Since the Best Value Approach has been

used for years, it continues to be developed, refined, and transformed. Now with years of experiences from the system, research can be done to dive deep into the implementation and sustainability of the approach which could not have been possible in previous years. This is the reason why no existing research has been done on this research topic and aims.

Taking literature review into consideration, the main research question for the research was created as "How can organizations implement and sustain the BVA?" The sub-questions for the research are as follows:

1. What is the difference between other buyer/supplier systems and BVA?
2. What issues have organizations dealt with in implementing and sustaining the BVA?
3. How can the BVA be modified to make it easier for organizations to implement and sustain it?
4. Do practitioners agree that modifications will make the BVA more implementable and sustainable?

Propositions were created for the research to suggest what we would expect to find from each question. Table 2 was created to display the summary of research elements. It gives a fluid depiction of how all the research elements connect from the overall research question to the research method.

Table 2: Summary of Research Elements

Overall Research Question	**Research sub-questions**	**Propositions**	**Research Method**
How can organizations implement and sustain the BVA?	SQ1: What is the difference between other buyer/supplier systems and BVA?	P1: Buyer/supplier systems have major differences with the BVA.	Literature Review
	SQ2: What issues have organizations dealt with in implementing and sustaining the BVA?	P2: Organizations experience similar issues in implementing and sustaining the BVA.	Survey Research Content Analysis
	SQ3: How can the BVA be modified to make it easier for organizations to implement and sustain it?	P3: There are modifications that make the BVA easier to implement and sustain in organizations	Case study Grounded Theory Content Analysis
	SQ4: Do practitioners agree that modifications will make the BVA more implementable and sustainable?	P4: Practitioners agree that modifications will make the BVA more implementable and sustainable.	Survey research

In order to answer the research questions and achieve the aims of the research, a research methodology was created that contained five phases of research. The five phases are described below in Figure 1.1:

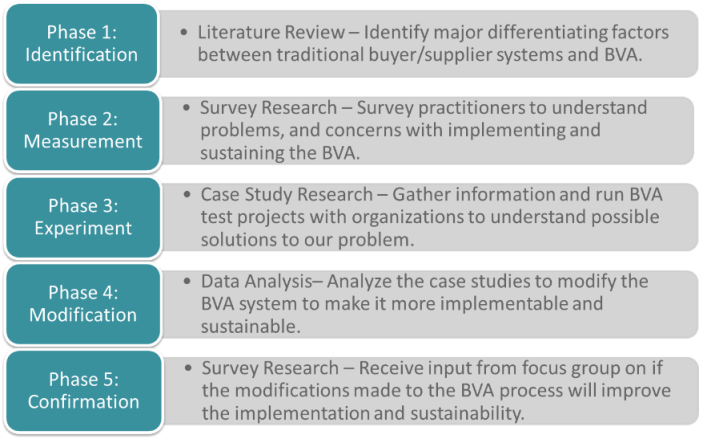

Figure 1.1: Research Methodology

Phase I: Identification - Literature Review

In the first phase of the research, a comprehensive literature review was conducted on the BVA and industry buyer/supplier systems to identify the difference between the two. The literature review contained 211 references and used six academic search engines, professors, and practitioners in the industry to find as much information that was relevant to buyer/supplier systems and the BVA. All references were not included in this paper due to the extensive list but can be found in another paper documenting all references used (Kashiwagi, 2021). The researchers separated the two literature reviews to understand separately the BVA and the buyer/supplier systems.

The literature search on the BVA and theories found 47 literature pieces which amounted to 68 characteristics. The characteristics were analyzed and similarities in the list were found. The characteristics were condensed into a list of 16 key success factors for BVA. The BVA success factors are listed below:

1. Automation.
2. Expert Supplier Model.
3. Information System.
4. Measurement Tools.
5. Minimization of Communication and Collaboration.
6. Minimize Contract Importance.
7. Minimized Client Management, Direction and Control of Vendors.
8. Minimized Stakeholder Involvement.
9. Minimized Training and Education.
10. Performance Information.
11. Pre-planning.
12. Problem Contracting.
13. Project Constraints.
14. Senior/Top Management Support.
15. Supplier Scope.
16. Training Program.

Although there were other characteristics that described the BVA, these success factors were outlined in the literature as the keys to the success of the system. These success factors created the baseline for investigating the industry buyer/supplier systems and the differences from the BVA.

The next literature search was conducted on the buyer/supplier systems. It found 32 industry buyer/supplier systems with over 972 characteristics that helped to formulate 37 success factors for the systems. The 37 success factors are listed in Table 3 with the number of references for each factor.

Table 3: Industry Buyer/Supplier Systems Key Success Factors

#	**Key Success Factors**	**# Ref**
1	Advanced Technology	21
2	Buyer Decision Making	44
3	Collaboration and Partnering	94
4	Communication	78
5	Contract Terms	69
6	Defining Roles	15
7	Delegate Responsibility	14
8	Document Structure	30
9	Early Supplier Involvement	15
10	Incentives and Penalties	44
11	Information System	91
12	Inspection	32
13	Insurance and bonds	13
14	Knowledge Management System	14
15	Living Scope	11
16	Long-term contracts/relationships	37
17	Master Supplier	11
18	Measurement Tools	56
19	Mitigation of Technical Risk	20
20	Multi-Disciplinary Team	18
21	Planning	40
22	Project Constraints	11
23	Quality Surveyor	63
24	Risk Sharing	22
25	Senior/Top Management Support	13
26	Stakeholder Management	20
27	System Hires the Expert	35
28	Training Program	41
29	Trust	21
Total References		**972**

Based on the research results, there were a combined 40 different success factors found to relate to the industry buyer/supplier systems and the BVA. Out of the 40 success factors, 11 success

factors were unique to the BVA with 23 success factors being unique to industry buyer/supplier systems. There were also five success factors that were shared by the two.

The significance of the results was that the BVA had 11 unique success factors despite being compared to over 32 industry buyer/supplier systems. This showed a stark contrast between the BVA to the other industry buyer/supplier systems. After analyzing these unique success factors, it was identified that the unique BVA success factors significantly differed and sometimes opposed the success factors of the industry buyer/supplier systems. The 11 unique BVA success factors and contrasting industry buyer/supplier systems are shown in Table 4.

Table 4: Contrasting Success Factors

#	**BVA Unique Success Factors**	**Contrasting Industry Buyer/Supplier System Success Factors**
1	Minimization of communication and collaboration	Collaboration and Partnering
2	Minimized Client management, direction and control of vendors	Buyer Decision Making
3	Minimized Stakeholder involvement	Stakeholder Management
4	Minimize Contract importance	Contract Terms
5	Problem Contracting	Early Supplier Involvement
6	Automation	Advanced Technology
7	Minimized Training and Education	Communication
8	Performance Information	Mitigation of Technical Risk
9	Pre-planning	Trust
10	Expert Supplier Model	Multi-Disciplinary Team
11	Supplier Scope Creation	Document Structure

Based on the results from the extensive literature review, stark differences between the BVA and industry buyer/supplier systems were found. The differences found in the research indicate why the BVA might be difficult to implement in organizations. These success factors will be valuable in moving into the other phases of the research to identify the issues that organizations might have with BVA.

Phase II: Measurement – Practitioner Survey

The next phase of the research was conducted to gather and analyze information from practitioners that would help to identify problems and solutions with the BVA. A survey was focused on practitioners having experience using the BVA. The survey was created using the success factors found in Phase 1. The survey was distributed and 107 practitioners participated in the research with a variety of different backgrounds and job positions (Kashiwagi 2021). Table 5 gives the overall demographics for the survey participants.

Table 5: Survey Demographics

Demographic Characteristics	**Responses**	**%**
Company Role		
Buyer/Client	52	53.6%
Supplier/Vendor	23	23.7%
Consultant	22	22.7%
BVA Experience		
No experience	13	13.4%
<1 year	5	5.2%
1-3 years	9	9.3%
3-5 years	20	20.6%
5+ years	50	51.5%
Locations		
United States of America	63	65.0%
Europe	26	26.8%
Other	8	8.2%
Other		
# Companies	77	100%
Types of companies	18	100%
# of different approaches used	38	100%

The survey asked the practitioners to rate each BVA success factors on a 5-point Likert Scale from “very easy”, “easy”, “no difference”, “difficult” to “very difficult” for an organization to implement. When analyzing the distribution of the results, the researchers looked for the factors that professionals agreed upon. The software used to analyze the results were IBM SPSS Statistics. Figure 1.2 shows the success factors and displays the results from the survey. There were six significant BVA factors that were identified based on the responses given by the professionals (over 60% practitioners agreed) that made BVA difficult to implement and sustain. The significant BVA Factors were the following:

1. Minimizing stakeholder involvement
2. Minimizing of communication and collaboration
3. Minimizing client management, direction, and control of vendors
4. Supplier creating the scope of project
5. Minimizing contract importance
6. Having senior/top management support

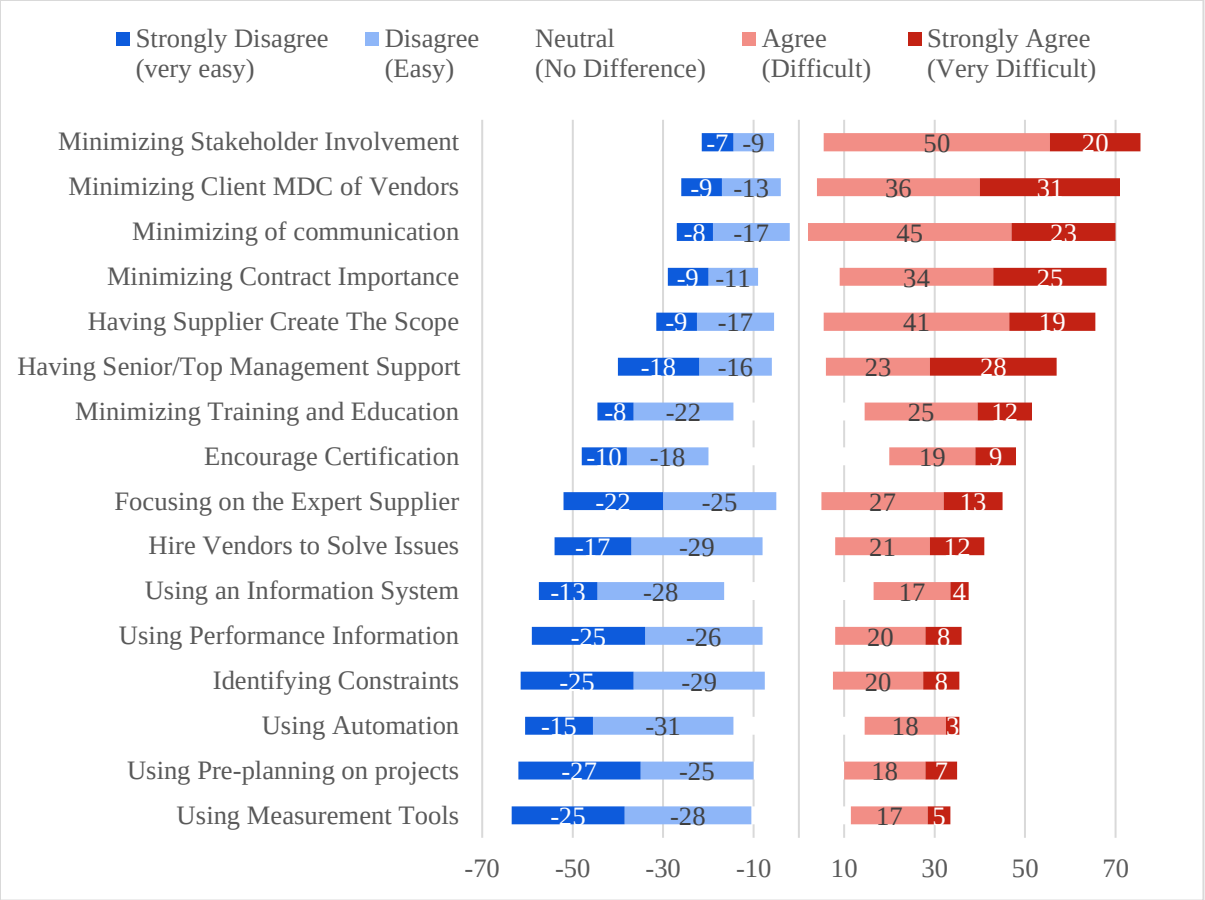

Figure 1.2: BVA Factor Ratings of Practitioners

There were no other factors that the majority of the practitioners agreed were significant. It was interesting to see that the six significant BVA factors that were identified all seemed to deal with the buyer's organization. It is important to note that 53% of the participants were from the buyer's organization which would appear contrary to the results. After looking at the results, correlation analysis was conducted to further verify and understand the information. Using Spearman's Rank-Order Correlation, the research looked to see the level of agreement based on company role, location, and BVA experience of the participants. Overall, the level of agreement was 76-87% between the three groups. These tests created greater confidence in the ratings and showed a high-level agreement on the results.

After the correlation testing, a factor analysis was conducted to see the relationship between the BVA success factors. The Kaiser-Meyer Olkin (KMO) and Bartlett's Test of Sphericity were conducted to verify the legitimacy of factor analysis. In the end of the analysis, the research was left with the following components that are below as well as shown in Table 6:

1. Component 1 – Supplier Centric
2. Component 2 – Buyer Centric
3. Component 3 – Upper Management

Table 6: Factor Analysis Loading Results

Components	Eigenvalue	Percentage of Variance	BVA Factors	Factor Loading
1 – Supplier Centric	7.129	44.556	Identifying Constraints at the Beginning of Projects	0.821
			Using Measurement Tools	0.809
			Using Performance Information	0.732
			Using Pre-planning on projects	0.709
			Using an Information System	0.700
			Using Automation	0.689
			Encourage Certification	0.678
			Hire Vendors to Solve Issues	0.631
			Focusing on the Expert Supplier	0.624
2 – Buyer Centric	1.824	11.400	Minimizing Client Management, Direction and Control of Vendors	0.883
			Minimizing Stakeholder Involvement	0.812
			Minimizing Contract Importance	0.786
			Minimizing of communication and collaboration	0.783
			Having Supplier Create the Scope	0.732
			Having Senior/Top Management Support	0.595
3 – Upper Management	1.132	7.073	Minimizing Training and Education	0.733

The factor analysis was revealing because the six significant BVA factors from the ratings were all in the same component which was the buyer centric component. It was a red flag that a lot of the difficulties that practitioners were experiencing were coming from this component. This component will be a key focus while conducting a case study to gain further information. It is clear that practitioners see a lot of difficulty in this component, and that it is a hinderance to implementing and sustaining the BVA.

In the free response portion of the survey, the research compiled a list of practitioner issues that were compiled into six main themes with the percentage of practitioners that agreed shown below:

1. Client Management (72%).
2. Traditional Culture (62%).
3. Absence of Visionaries (34%).
4. BVA (24%).
5. Vendor (19%).

The main three themes that most practitioners could agree on were absence of visionaries, client management and traditional culture. These results aligned with the results from the other parts of the survey. Along with the problem themes, we compiled a list of possible solutions. There was a total of 108 unique responses for solutions, but they were condensed into a list of 28 recommended solutions. These solutions will be used in the later part of the research.

From the survey the following was found:

1. Six BVA factors were identified as significant in contributing to the difficulty of BVA in the implementation and sustainability in organizations.
2. Correlation Analysis showed there was a high level of agreement (>70%) between different locations, company roles and BVA experience of participants.
3. Three components were extracted by factor analysis, which grouped the factors that showed correlation.
4. Three prevalent themes were identified from the free-response questions that can be used in further research.
5. A list of recommendations for modifying the BVA was compiled and can now be used as information in the case study and modifications.

The common problem found in the survey through the free-response, factor ratings, and factor analysis is client management. Client management is defined as "the way in which the buyer's organization manages a project and their interactions with the supplier that is providing the services". This was the only problem that the practitioners agreed was a problem when implementing and sustaining the BVA. This survey resulted in a greater understanding of the problem and possible solutions to the problem. In the next phases of the research, this problem will need to be confirmed and verified to be accurate from the test projects.

Phase III: Experiment – Test Projects

The objective of this phase was to refine our understanding of BVA problems, obtain first-hand knowledge, and compare results obtained by the practitioner survey. The researchers partnered with an organization to conduct test projects that would produce the information needed for the research. Throughout the three years working with the organization, there were ten test projects that were conducted. These ten projects all had different focus areas, unique stakeholders, special objectives, and varying conditions.

In order to compare and research the problems that were completed in these projects, a method was created for each BVA success factor to identify in the test projects whether that factor was an issue or not. The method is identified in Table 7 for each success factors to create a baseline for the analysis of the projects

Table 7: Methods to Identifying Issues

Categories	BVA Factors	Method to Identify Issues in Test Projects
Supplier Centric	Identifying Constraints at the Beginning of Projects	Supplier does not create a risk mitigation plan
	Using Measurement Tools	Supplier does not track performance on a weekly report
	Using Performance Information	Supplier does not use performance metrics in proposal
	Using Pre-planning on Projects	Supplier does not create a schedule for the project
	Using an Information System	Supplier does not use weekly report to inform client & document actions
	Using Automation	Supplier does not create a weekly report
	Encourage Certification	Does not require the purchasing officer to be B+ Certified
	Hire Vendors to Solve Issues	Client specifies a solution that must be done by supplier
	Focusing on the Expert Supplier	Client does not assist the supplier in creating BVA documents
Buyer Centric	Minimizing Client Management, Direction and Control of Vendors	Client does not follow BVA in documents, communication and coordination
	Minimizing Stakeholder Involvement	Client does not limit amount of stakeholder involvement to predetermined times
	Minimizing Contract Importance	Client does not require supplier to create a BVA plan
	Minimizing of Communication and Collaboration	Upper Management does not change requirements of the projects until the predetermined times in BVA
	Having Vendor Create The Scope	Supplier does not create the scope for the project
	Having Senior/Top Management Support	Upper Management does not stop the BVA
Upper Mgmt.	Minimizing Training and Education	Client follows the BVA and the predetermined trainings and educations

After creating a method to identify issues that correlated with the BVA Factors. The researchers looked into the documentation of each test project to determine whether that BVA factor was an issue for each test project. Table 8 below shows each of the test projects and which issues that they experienced based on the individual methods.

Table 8: Identified Issues with BVA Success Factors on Projects

Categories	BVA Factors	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Supplier Centric	Identifying Constraints at the Beginning of Projects		x				x		x		
	Using Measurement Tools		x			x	x		x		
	Using Performance Information						x		x		x
	Using Pre-planning on Projects		x			x	x		x		
	Using an Information System		x			x	x		x		
	Using Automation		x			x	x		x		
	Encourage Certification	x	x	x	x	x	x				
	Hire Vendors to Solve Issues		x				x		x		x
	Focusing on the Expert Supplier		x				x		x		
Client Team	Minimizing Client Management, Direction and Control of Vendors		x	x		x	x	x	x	x	x
	Minimizing Stakeholder Involvement		x			x	x		x	x	x
	Minimizing Contract Importance		x				x		x		
	Minimizing of Communication and Collaboration		x	x		x	x	x	x	x	
	Having Vendor Create the Scope		x			x	x		x		
	Having Senior/Top Management Support		x	x			x			x	
Upper Mgmt.	Minimizing Training and Education		x			x	x	x	x		

In order to understand the information, we analyzed the data from a vertical and horizontal perspective. The results showed the two extremes of what could happen on a BVA project with high performance and low performance. The analysis confirmed the results in the survey but also brought to light more information.

Looking from a vertical analysis perspective, six of the projects had a small number of issues which dealt with a variety of different factors. When looking into greater detail of these projects and making observations, these projects contained procurement agents that consulted BVA experts, followed the BVA process, and only ran into issues when upper management were more involved in the project. These procurement agents had no control over the upper management decisions which caused some of the issues in the projects.

In the four projects that experienced the majority of the issues, it was clear that something went wrong. In all of these projects, deviations were made to the BVA. The internal stakeholders in charge of the projects had difficulty in consulting with BVA experts and changing from the

traditional process. In each of the projects, the purchasing agent didn't have experience in running a BVA project successfully which made deviations to the project more prevalent.

In looking from a horizontal perspective, there were five factors that occurred on more than 50% of the projects, we found that all of these factors dealt with client management in some way Table 9 show the factors, the number of tests, and % of tests that they were a problem in. Although some of the factors were not included in the Buyer Centric Category, they were actions that the client would be taking in the project. This confirmed the results from the previous sections of the work and clearly identified the culprit for most of the issues.

Table 9: Horizontal Analysis

Categories	BVA Factors	# of tests	% of tests
Supplier Centric	Encourage Certification	6	60%
Buyer Centric	Minimizing Client Management, Direction and Control of Vendors	8	80%
	Minimizing Stakeholder Involvement	6	60%
	Minimizing of Communication and Collaboration	7	70%
Upper Management	Minimizing Training and Education	5	50%

The following significant results were shown and described:

1. Six projects experienced small issues (2-4 identified) while four projects experienced major issues (13-15 identified).
2. The four projects that experienced major issues contained 76% of all issues.
3. Five factor issues occurred on 50% of the projects which all dealt with the client management of the project.

In this phase, the issues of implementing and sustaining BVA were identified. The issues identified in this phase will be essential in the coming phases to be able to create solutions and modifications to the BVA. The coming phases will try to resolve issues and go in greater depth than the findings and documentation of this chapter.

Phase IV: Modification – Model Adjustments

The objective of this phase was to find modifications to the BVA that would make it easier to implement and sustain the approach in an organization. The research completed with the organization was analyzed and reviewed to gather information from an organizational perspective as opposed to a project perspective. The information reviewed included a timeline of major events, background of leadership, the involvement of stakeholders, the feedback from practitioners, the events that occurred throughout the projects and internal documentation that was gathered.

The problems experienced in the overall implementation and test projects were condensed into a list of 15 issues that were gathered from different projects, practitioners and experiences. After compiling this list, there were two overarching themes that presented themselves which includes all the issues. The two themes were:

1. Some procurement agents had difficulty in following BVA
2. Some procurement agents had difficulty in consulting with BVA experts on projects.

In order to solve the two overarching themes, the researchers came up with a method to resolving these. The solution would be to focus on simplifying the BVA system and creating a documented process to assist procurement agents like a BVA expert would. By focusing on these two solutions, the researchers came up with 15 modifications that could be made to the BVA to remedy the 15 issues. The modifications are described in Table 10.

Table 10: Modifications to the BVA.

#	**Modification Name**	**Change**	**BVA**	**Modified BVA**
1	Updated Price Controls	Eliminated the competitive range and required vendors to submit a price breakout with their price	There are three different price controls. The Competitive Range, Best Value Check, and Dominance Check.	Two price controls and a price breakout submitted by the vendor.
2	Adjustment to weighting criteria	Adjusted the suggested weighting on projects by lowering VA and RA percentages	VA was weighted at 15% and RA was weighted at 15%	VA was weighted at 5% and RA was weighted at 5%
3	Services WRR (Automation & Information System)	Created a Services WRR that tracks a service.	No Services WRR	Services WRR
4	Client Requirement in Metrics	Simplified project requirement to one paragraph with metrics on current situation	One Page project requirement	One paragraph project requirement
5	Procurement Checklist and WRR	Created a procurement checklist that procurement can use to track the schedule, risk and deviations on a project	No Procurement Checklist	Procurement Checklist
6	Weekly Risk Mitigation in WRR	Changed the Risk Management Plan to a Weekly Risk Mitigation. Allows vendors to track weekly risk and eliminates unnecessary information.	Risk Management Plan	Weekly Risk Mitigation
7	Minimize client management of vendor	Changed the system so that all technical questions, and reviewal would be done in the clarification phase at a specified time.	Technical questions and reviewal of requirements were done in the selection phase	Technical questions and reviewal is done in the clarification phase
8	BVA Expert Assistance	Created a requirement and instruction sheet that forces the client to review BVA materials with a A+ Certified individual and provides tools for assistance.	No requirement for a A+ individual assistance, and no instruction sheet	Requirement for a A+ individual assistance, and an instruction sheet
9	RFP Client Boiler Plate	Created a client RFP boiler plate that could be used by the procurement agents	No RFP Boiler Plate	RFP Boiler Plate

10	BVA Expert helps vendor in Clarification phase	Created a requirement that a A+ individual not associated with the project would assist vendors in the clarification phase.	Procurement agent would assist the vendor in the clarification phase	A+ individual would assist the vendor in the clarification phase
11	Minimized Organizational Education	Eliminated a requirement to brief internal experts on the BVA.	Requirement to brief the internal experts on the BVA	No Requirement to brief the internal experts on the BVA
12	Simplified Vendor Education	Simplified the vendor education to exclude parts of BVA and unnecessary information	1 hour vendor education of BVA	30 min vendor education of BVA
13	Rubric for system compliance	Created a rubric that ensures the BVA system was done correctly	No rubric to measure system compliance	Rubric to measure system compliance
14	Certification requirements	Created certification requirements for the BVA	No Certification Requirements	Certification Requirements
15	Client objective	Created a requirement that projects should not be started unless they had an estimated budget an overall client objective, schedule and weighting criteria	No requirement to start a project	Requirement to start a project

After making these modifications to the BVA, the organization decided to document the updated BVA process in their internal documents. The internal policy took seven months and included a step-by-step guide to running the BVA, 10+ BVA templates, and 50+ documents to explain and guide users on how to use the BVA integrated modifications into the formal process. The results of this phase were that 15 modifications were made to the BVA and a documented internal system was created to remedy the issues experienced by the organization in implementing and sustaining BVA. The next phase will confirm with practitioners whether they agree if the modifications made it easier to implement and sustain BVA.

Phase V: Confirmation - Focus Group

In this phase, the objective was to identify if practitioners agree that the modifications made to the BVA will make it easier for organizations to implement and sustain the BVA. A focus group of practitioners were chosen to be interviewed from the organization. A total of 15 practitioners that had been a part of the case study were interviewed as a group. 10 of these participants didn't feel like they could comment on the questions asked and excused themselves from the research. There were five participants that felt comfortable answering the questions and confident in their knowledge. The sample size of the focus group was considered a limitation in the research but was sufficient to address the objective of the phase. Further research would need to be conducted to completely validate the results of the modifications in Phase IV.

This focus group answered questions as a group and rated the modifications and questions on a Likert scale. All of the responses and ratings were analyzed and reviewed for accuracy. Additional questions were asked if there was need for clarification. The Table 11 contains the main questions and a summarized response from the group (Kashiwagi 2021).

Table 11: Focus Group Summarized Responses

#	Questions	Summarized Group Response
1	Does the documented process in your internal policy help you to implement and sustain BVA in your organization?	Yes, it is a big step for our organization. The process is clear and easy which helps our group to implement and sustain it.
2	Do you think the modifications made to BVA make it easier for your organization to implement and sustain it?	Yes, unanimous consensus. The organization has made significant progress with these modifications.
3	Do you think more organizations will use the modified BVA system?	Yes, it is easier, more logical and proven. It makes sense that more organizations will use it.
4	Do you think modified BVA system is implementable and sustainable in organizations?	Yes, it is most certainly implementable and sustainable but depending on the organization.
5	Do you have any suggestions to improve the BVA system?	No, the group is very satisfied with the progress and improvements to the BVA.

The overall consensus was that the modifications made it easier to implement and sustain the BVA in an organization. There were minor disagreements in other questions and issues but the main questions were all agreed upon. The following results are described below:

1. 100% of the group agreed that the modifications make it easier to implement and sustain it in their organization. Rated (4.6/5).
2. 100% of focus group agreed that organizations will use the modified BVA. Rated (4/5).
3. 100% of focus group agreed that the modified BVA is implementable and sustainable in organizations. Rated (3.8/5) comments were depending on what organization.

The focus group accomplished its objective in getting the practitioners confirmation of the BVA modifications. The focus group agreed that the modifications to the BVA were successful in making it easier for organizations to implement and sustain the BVA. Although the researchers acknowledge that the results of the focus group served the purpose of this research, further research must be conducted to completely validate the modifications in Phase IV.

Conclusion

The objective of the research was to gain an understanding of the BVA in comparison with other systems, identify issues with implementing and sustaining BVA, and find solutions to implement and sustain BVA in an organization. A methodology was created that included the following main research question “how can organizations implement and sustain the BVA?” In order to answer that question, the following research methods needed to be used: literature review, practitioner survey, case study, and focus group.

The literature review identified major differences in success factors between the BVA and industry buyer/supplier systems. These success factors were used in a practitioner survey to identify the issues that practitioners were having in implementing and sustaining BVA. The results of the survey and case study identified perceived and observable issues with the "client management" portion in organizations when implementing and sustaining BVA. There were 15 issues and two overarching issues identified during the case study of implementing BVA in an organization. The researchers applied a method for solving the issues and created modifications that were made to the BVA. A new modified BVA system was created that was documented in an internal process for a large organization. The modified system was reviewed by a focus group which gave their feedback on the modified BVA system through an interview and ratings. The practitioners unanimously agreed that the new system made it easier to implement and sustain BVA in an organization. An overall depiction of the research is given in Table 12.

Table 12: Overview of Research Results

Phases	**I : Identification**	**II : Measurement**	**III : Experiment**	**IV : Modification**	**V : Confirmation**
Main Research Question	How can organizations implement and sustain the BVA?				
Sub-Research Question	What is the difference between industry buyer/supplier systems and BVA?	What issues have organizations dealt with in implementing and sustaining the BVA? How can the BVA be modified to make it easier for organizations to implement and sustain it?		How can the BVA be modified to make it easier for organizations to implement and sustain it?	Do practitioners agree that modifications will make the BVA more implementable and sustainable?
Research Method	Literature Research	Industry Survey	Case Study	Data Analysis	Focus Group
Action	Conducted literature review on traditional Buyer/Supplier systems and the BVA	A survey was conducted with practitioners using the 16 BVA factors to identify issues	Test projects were conducted to confirm and identify issues of BVA	Proposed modifications to BVA and implemented them in an organization to the BVA	Interviewed a focus group on the modifications made to the BVA
Results	Identified 16 Characteristics of the BVA – 11 unique to BVA and 5 similar to traditional systems. Identified BVA factors as very different from other systems.	Compiled a list of recommendations and themes. Identified six significant BVA factors and 3 categories for the factors: 1. Client Centric 2. Supplier Centric 3. Upper Management	Conducted a case study with 10 test projects with problems identified and confirmed. Identified client management as the greatest source of risk.	15 modifications were made to the BVA process that resolved issues in main categories, themes and took into consideration the recommendations	100% of the focus group confirmed the modifications were beneficial to make BVA more implementable and sustainable

The results of this research fill the research gap identified in the industry from an organizational standpoint of improving project performance. The research is the groundwork for organizations everywhere in learning how to adjust their processes to remedy the performance issues on their projects from a practitioner perspective. Organizations will have a greater ability to utilize this research when implementing and sustaining the BVA. Organizations that take advantage of the research will increase the success rate of organizations in improving performance and eliminating issues in their projects.

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Delivering Janitorial Supplies to a Large International Organization

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The Best Value Approach (BVA) has been in research and development for 30 years [1992 – 2022]. The approach has been successfully tested in the procurement of over 2,000 projects [98% customer satisfaction, minimized contractor change orders to 1% and reduced cost of 5 to 30%] (PBSRG, 2022). The BVA has been successful in delivering construction projects but has not been sufficiently tested in the delivery of contractual services. In 2018, a large organization tested the BVA on procuring recycling services. In 2019, the organization ran a second BVA test to procure the delivery of janitorial products to 7,000 facilities. The BVA utilizes the use of performance information to identify and utilize expertise to dramatically reduce their cost. The case study shows how a vendor can use performance information to define their expertise and value. The paper tracks the performance of the expert vendor for three years [2019 – 2021]. The case study also shows the value of the expert vendor's project manager as the project manager was the only person in the vendor's organization who understood the importance of using performance information.

Keywords: Best Value Approach, Procurement of Janitorial Products, Risk Management, Project Management, Performance Information

Introduction

Client stakeholders have been unsuccessfully attempting to deliver projects in the last 30 years. The Performance Based Studies Research Group (PBSRG) has been doing research to improve performance of projects by identifying and utilizing expertise. There are two major types of projects. The first is the building and installation of systems. The second type of project is providing a service. The PBSRG has spent the majority of time improving project performance of projects being built and installed. Clients have questioned whether the performance of a vendor providing services could be optimized. The service's duration is often longer than delivering projects, and researchers have questioned if the performance of a vendor could be maintained over a longer duration of time. The purpose of this paper is to identify if a service can be procured with the Best Value Approach (BVA), and if the performance of the service can be increased through the duration of the service project.

Phase 1 – Utilizing the Best Value Approach (BVA) to Identify and Utilize the Expert Vendor

Project Background

A large international organization was attempting to optimize the delivery of janitorial supplies to 7,000 facilities in Canada and the United States. The facilities range from 3,000 to 25,000 square feet (Thornley, et. al., 2019; Kashiwagi, 2022). The organization has a cleaning program which uses non-professional cleaners to do weekly maintenance on the buildings. They planned to augment the efforts of the non-professional cleaning staff with professional cleaning companies to deep clean each building 1 to 4 times per year.

This combined approach of using non-professional cleaners and hiring periodic professional cleaner has substantially reduced the maintenance costs of the facilities (Kashiwagi, et. al., 2020). Janitorial supplies are a major component of maintaining the facilities. The client decided to use the Best Value Approach (BVA) to identify the best value vendor to provide the janitorial supplies. The purchasing project manager estimated the total cost of janitorial supplies for the year at $10 million (Thornley, et. al., 2019; Kashiwagi, 2022). The yearly budget was based on prior years' expenditures. The international organization was using multiple janitorial supply vendors to deliver services. The organization wanted to identify the most expert vendor to provide janitorial products to all the facilities hoping the increased scale would decrease the cost.

The organization was introduced to the BVA in 2017 (Kashiwagi, 2021a). After reviewing the documentation and previous results of the BVA, the organization ran their first BVA test-project on procuring recycling services (Kashiwagi D. and Kashiwagi J., 2022). The test project resulted in a cost savings of 42%, a reduction in procurement time by 75%, and a customer satisfaction rating of 10 out of 10 (Thornley, et. al., 2019; Kashiwagi, 2022). After seeing the results of the BVA project, the purchasing agent realized that the approach could be successfully applied to procuring to janitorial supplies.

The Client Requirement for Delivered Janitorial Supplies

The client requirement was represented by the following metrics:

1. Janitorial supplies for 7,000 facilities in the U.S. and Canada.
2. Spend rate of $10 million per year.
3. Delivery of the supplies to all 7,000 facilities to a facility manager responsible for each facility.
4. Billing of the supplies to the client using an electronic billing system.
5. Information tracking systems that the facility managers could manage the ordering of the janitorial products.

The following list of janitorial supplies were given to the vendors. Using their expertise, the vendors were asked to provide unit pricing for each item and the total annual cost of all the items for janitorial products delivered to their 7,000 buildings in the United States and Canada.

Chemicals
1. Window cleaner
2. Surface and toilet cleaner
3. Floor (damp mop) cleaner
4. Bathroom hand soap
5. Spray bottles (32 oz.?)
6. Snow melt

Sanitary Paper
1. Toilet paper (universal dispenser)
2. Hand towels (roll dispenser)
3. Facial tissue
4. Paper cleaning towel (box or roll)

Waste Handling
1. Classroom/office size waste container and liner (21"x27")
2. Bathroom waste container and liner (30 gal., square)
3. Kitchen waste container and liner (55 gal., round with lid)

Other
1. Mops, brooms, dust pans
2. Nitrile gloves
3. Scrubber pads
4. Buckets, pails
5. Industrial toilet plunger
6. Brushes – various
7. First Aid supplies
8. Vacuum bag replacements

BVA Procurement Process

The procurement process began with a request for proposal (RFP) published on May 9, 2018. Although typical projects from this organization required 180 days for procurement, the initial schedule for this project was aimed to finish procurement within 60 days.

The BVA required a change in paradigm from the traditional relationship-based approach that the client had used with multiple janitorial vendors in the past. Since the organization had operated on relationship-based principles in the past, many of the vendors were surprised with the new approach. In order to acclimate vendors to this new approach, the procurement officer decided to hold a second education session on the BVA (see Table 1 for schedule).

Table 1: Final Adjusted Schedule

#	**Procurement Phase 1**	**Day**	**Date**
1	RFP Issued to Vendors – (email)	Wednesday	May 9, 2018
2	RFP Q&A Meeting for Vendors (onsite / WebEx)	Friday	May 18, 2018
3	Second Education & Q&A Meeting	Monday	May 29, 2018
4	Vendor Due Date to Submit their RFP – (email)	Friday	June 15, 2018
5	Interview Vendor Finalists – (onsite only)	Tuesday	June 20, 2018
6	Notification of Best Value Vendor(s) – (email)	Tuesday	June 21, 2018
#	**Procurement Phase 2**	**Day**	**Date**
7	BV Vendor(s) Clarification Period Kick off meeting	Thursday	June 28, 2018
8	Selection Team Reviews BV Contract	Thursday	June 28, 2018
9	Final Clarification Briefing – Legal Review	Thursday	June 28, 2018
10	Review and Approval of Contract	Thursday	June 28, 2018
11	Signing of Contract	Monday	July 16, 2018
12	Notice to Proceed issued to Vendor(s)	Monday	July 16, 2018

The Best Value Approach

The Best Value Approach (BVA) identifies and utilizes vendor expertise (Kashiwagi, et. al., 2015). The client was confident that even in procuring the delivery of a commodity such as janitorial

products, that they could identify and utilize expertise in minimizing their costs and maximizing the value of the service. The BVA makes the following assumptions:

1. The client can identify and utilize the expertise of the best value expert vendor.
2. Not all project managers (PM) in the vendors' organization are experts.
3. Vendor experts have more expertise than the client's professionals and stakeholders because they actually perform the work.
4. Expert vendors know that not all PMs in their organization are experts.

The BVA uses four phases to identify and utilize the best value expert vendor. The four BVA phases are preparation, selection, clarification, and execution (Figure 1). In the preparation phase, the client creates the request for proposal (RFP) and exposes stakeholders and vendors to the BVA.

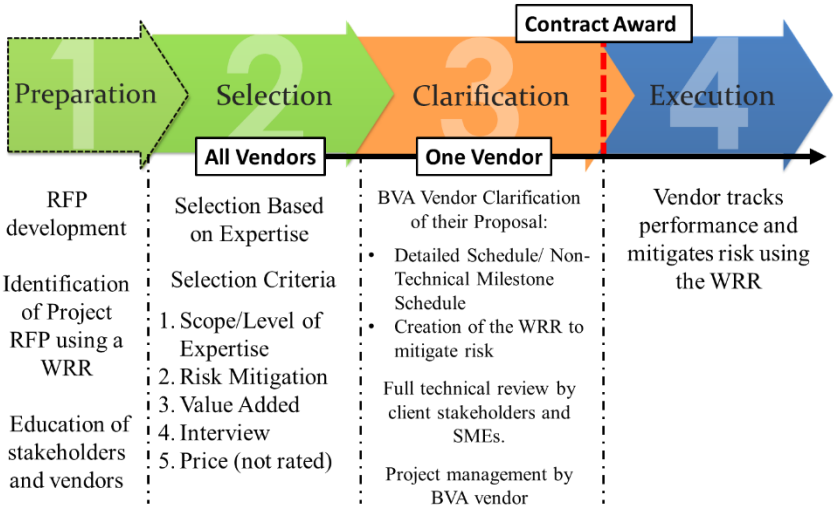

Figure 1: The Four Phases of the Best Value Approach (Kashiwagi, 2021b)

In the selection phase, the BVA competes vendors based on their proposed scope and level of expertise represented by project descriptors and performance metrics. The selection phase required the following from each vendor:

1. Three written submittals (level of expertise, risk assessment, and value added).
2. Inventory list and pricing of 50 janitorial supplies.
3. A 30-minute interview with the vendor's expert representative.

The clarification phase is designed to ensure the selected best value vendor is capable of meeting project requirements. Before a contract is signed, the selected vendor creates a detailed schedule, a simplified milestone schedule, and a weekly risk mitigation plan. For this project, the client wanted to use the clarification phase to verify the cost of janitorial supplies and ensure that they were capable of meeting the required scope.

In the execution phase, the vendor delivers the service while tracking their schedule and performance using the weekly risk report (WRR). The WRR allows all stakeholders to understand

the schedule, potential risks, and current project performance (US MEDCOM, 2008; Van de Rijt, et. al., 2013). The client's only responsibility at this point is to ensure that the vendor is sending an updated WRR. In this system, the client does not need to manage, direct, or control the vendor.

Vendor Selection

In this project, vendors could partner with other vendors. Each submittal would have to meet the requirements of the RFP. If the vendor did not meet all of the requirements, they would be eliminated. Because of the change in paradigm, and the requirement to service all 7,000 facilities, many of the vendors could not meet all the client's project requirements and others could not change from their existing relationship-based contracts to the new BVA paradigm.

Some of the vendors believed that the client would not implement the procurement results (and proposed different levels of services than what the client requested in the selection process). More than one of the vendors disqualified themselves by not submitting a total cost for the janitorial products for 7,000 facilities.

The client received 10 submittals and 1 withdrawal notification. The submittals were all rated on a scale of 1-10, and ratings were verified for accuracy and checked for mistakes by the purchasing agent. After the ratings were completed for the written submittals, the vendors went through the interview phase. Each vendor was given a total score and the selection committee reviewed the requirements matrix (Table 2). The selection committee analyzed the results and made the following observations:

1. Four of the proposals did not meet the requirement to service all 7,000 buildings.
2. Three of the proposals did not provide all supplies and pricing in the client list.
3. Two of the proposals did not include a total price in their cost proposal for all 7,000 facilities throughout the year.

Table 2: Initial Vendor Submittal Ratings

Vendor Code	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Total Score	48.5	59.2	45.8	86.7	86.3	50.2	85.8	90.1	75.9	55.5
Criteria (Raw)										
Level of Expertise	7.0	5.0	5.0	8.0	10.0	5.0	7.0	7.0	7.0	7.0
Risk Assessment	9.0	7.0	5.0	8.0	10.0	6.0	8.0	8.0	6.0	6.0
Value Added	9.0	7.0	5.0	6.0	9.0	7.0	8.0	8.0	5.0	6.0
Interview	0.0	5.0	5.0	5.0	8.8	5.0	10.0	6.3	10.0	5.0
Total Cost (M)	N/A	$9.39	N/A	$2.92	N/A	N/A	$7.50	$2.94	$10.63	N/A
Process Checks										
Disqualification Reason	No Total Cost		Only Cleaning Solution	Only Cleaning Solution	No Total Cost	USA Only		Western US Only		Only Cleaning Solution

The selection committee agreed that seven of the proposals did not meet the requirement of the RFP and were eliminated from consideration. The committee was left to analyze the results of three proposals that met the requirement of the RFP. The ratings and the cost submittals for the three vendors were put into the selection matrix which included their raw scoring and price (Table 3), normalized scores (Table 4), and awarded points and prioritization (Table 5). Vendors were

also asked to provide a complete inventory list along with itemized pricing for all janitorial supplies used throughout the duration of the contract (Table 6).

Table 3: Vendor Raw Scoring and Price

Criteria (Raw)	**Units**	**Vendor B**	**Vendor G**	**Vendor I**
Level of Expertise rating	(1-10)	5.0	7.0	7.0
Risk Assessment rating	(1-10)	7.0	8.0	6.0
Value Added rating	(1-10)	7.0	8.0	5.0
Interview rating	(1-10)	5.0	10.0	10.0
Total Cost (Millions)	$	$9.39	$7.50	$10.63

Table 4: Normalized Vendor Scoring

Criteria (Normalized)	**Best Score**	**Vendor B**	**Vendor G**	**Vendor I**
Level of Expertise rating	7.00	0.71	1.00	1.00
Risk Assessment rating	8.00	0.88	1.00	0.75
Value Added rating	8.00	0.88	1.00	0.63
Interview rating	10.00	0.50	1.00	1.00
Pricing Score	$7.50 M	0.80	1.00	0.71

Table 5: Vendor Awarded Points and Prioritization

Criteria (Assigned Points)	**Weight**	**Vendor B**	**Vendor G**	**Vendor I**
Level of Expertise rating	35	25.0	35.0	35.0
Risk Assessment rating	10	8.8	10.0	7.5
Value Added rating	15	13.1	15.0	9.4
Interview rating	30	15.0	30.0	30.0
Pricing Score	10	8.0	10.0	7.1
Total Points	100	69.9	100.0	88.9
Prioritization		3	1	2

Vendor G and I were the top two scoring vendors. Their scores were within 12 points of each other. Both vendors were highly professional, well known in the industry, and could provide great value to the organization. The purchasing agent made the following observations about the vendors:

1. Vendor G scored higher or the same in every category as Vendor I.
2. Vendor G had a lower price than Vendor I by $3.1M (30%). Vendor G also proposed that if the client purchased the scheduled amount of material, the vendor would lower the cost by an additional $0.4M (5%).

After discussing the results with the client's selection committee and internal stakeholders, the client wanted to select two vendors for the clarification period. They were worried that the best value vendor might not meet all the requirements. By selecting two vendors, the best value vendor could utilize the second if they were not able to deliver for any reason. Although Vendor G was rated the highest in the selection phase, the purchasing department still questioned the accuracy of their cost since Vendor I proposed a higher cost of $10.6 million (compared to Vendor G's cost of $7.5 million). The client's stakeholders were still thinking in terms of relationships and using multiple vendors (they were not comfortable with only using one vendor). In Table 6 it shows the analysis done on the pricing to compare the individual totals for each item proposed on. It identifies who had the lowest proposed total for the item and provides a percentage to show how much higher the other vendors were on each item.

Seeing the client stakeholders' resistance to the BVA, the purchasing manager brought the two top vendors into the clarification phase (the BVA process normally brings only one vendor into the clarification period).

Table 6: Itemized Analysis of Facility Supplies by Vendor

Item	**Vendor B**	**Vendor G**	**Vendor I**
Window cleaner	+718%	+79%	Lowest
Floor (damp mop) cleaner	+6%	Lowest	+54%
Bathroom hand soap	+1183%	+320%	Lowest
Spray bottles (32 oz.)	N/A	Lowest	+297%
Snow melt	+204%	Lowest	N/A
Wipes	+369%	Lowest	N/A
Facial tissue	Lowest	+252%	+353%
Paper cleaning towel (box or roll)	+3255%	Lowest	+4965%
Nitrile gloves	+553%	Lowest	+415%
Scrubber pads	Lowest	+474%	+316%
Buckets, pails	Lowest	+579%	N/A
Industrial toilet plunger	+4%	Lowest	+782%
Brushes – various	+18032%	Lowest	+1272%
First Aid supplies	Lowest	+735%	+1861%
Vacuum bag replacements	+6%	+443%	Lowest
Batteries	+40%	Lowest	N/A
Miscellaneous items 32-80	N/A	Lowest	N/A
Classroom/office size waste bin	Lowest	+8%	N/A
Classroom/office size waste liner	+165%	Lowest	+450%
Bathroom waste container	+3%	Lowest	N/A
Bathroom waste liner	Lowest	+9%	+679%
Kitchen waste container	+42%	Lowest	N/A
Kitchen waste liner	+11%	Lowest	+424%
Mops	+4958%	Lowest	+20206%
Brooms	+105%	Lowest	+1346%
Dust pans	+656%	Lowest	+3313%
Surface cleaner	+123%	Lowest	+213%
Toilet cleaner	+123%	Lowest	138%
Toilet paper	+14%	+45%	Lowest
Toilet paper universal dispenser	N/A	Lowest	N/A
Hand towels	Lowest	+44%	+26%
Hand towels roll dispenser	N/A	Lowest	N/A
Total Cost	**+24%**	**Lowest**	**+18%**

Clarification Period

Both Vendors G and I (top two vendors) presented their scopes, costs, products, and vendor capabilities in the clarification period. Vendor I proposed a competitive bid which included unique features such as custom product catalogs, order tracking, innovative products, and an extensive network of stores and shipping facilities. Vendor I was a well-known national chain which provided building products and offered building facility managers (FMs) the ability to pick products up from their stores. Vendor I was a new vendor who the client had not utilized previously

as a vendor. Vendor I did not give unit costs and their total costs for the items requested by the client did not match their total submitted price. This was most likely due to the inability to give final delivered cost of items.

Vendor G was one of the client's incumbent vendors of janitorial products. Vendor G was unique in their ability to use performance information which made them more price competitive. Key pieces of information included:

1. Vendor G identified that all ordered items would be delivered to facilities within a day of ordering.
2. They identified the difference in the client's facilities based on the number of people who used the facility. Each facility type had a different demand for janitorial products.
3. They identified the top 5 purchased items in the inventory of items which made up 85% of all purchases.
4. From a group of 100 facilities in the southeast, Vendor G identified that the client's purchase volume dropped by 25% from the previously utilized vendor. This could be a combination of changing products and tracking of the number of janitorial products ordered and delivered.
5. Vendor G created a methodology to identify the spend rates based on demand for the client's 7,000 facilities.
6. Vendor G used their documented product order history to estimate the product amounts on the client's list of janitorial products to estimate the total cost of the janitorial products for the 7,000 facilities.
7. Vendor G also gave a value-added cost reduction of 5% if the client's monthly spend ratio reached a specified amount for three straight months.

Vendor G was identified as the best value vendor due to the following:

1. Their pricing was significantly lower than other vendors.
2. Their pricing was based on previous project deliveries for the client.
3. They had proven performance in cutting the cost of the client's janitorial products.
4. They had a delivery and billing system in place with the client which tracked performance information.
5. Vendor G stated that they can deliver supplies in 24 hours to the 7,000 facilities in the U.S. and Canada.
6. They had the capability to use performance information to give the client further value. They were the only vendor who used information to minimize the client's need to manage the delivery of products.

The Result of Using the BVA to Identify the Best Value Janitorial Product Vendor

In reviewing the BVA approach to identify and utilize the expertise of expert vendors, the following observations were made by the purchasing manager and the BVA experts:

1. The expert vendor was immediately identified from all the competitors.
2. The expert vendor was the only vendor who could meet the delivery to 7,000 facilities in 24 hours.

3. The expert vendor utilized performance information that could mitigate risk.
4. The best value expert was an expert in utilizing information to maximize the value of the delivery of janitorial products.
5. The value of the best value vendor far exceeded the capability and competitiveness of their competitors.
6. The expert vendor was looking into the future to identify how to improve the value of the delivery and the janitorial products (cost, safety, and ease of use).
7. The expert vendor was the only vendor to stress the accountability of their delivery service.

The BVA was compared to the traditional approach to securing the delivery of janitorial products. The main components were time, the value of the product, and customer satisfaction. The client stakeholders were still considering the delivery of janitorial products as a commodity procurement. The comparison of time to procure and cost is shown in Table 7. The time to deliver was reduced by 103 days (53% faster) and the cost was reduced by 29% (an even lower price based on the client's requirements). The purchasing manager was extremely satisfied. He was proud of the value of the expert vendor, the value that the purchasing department had given the client's stakeholders, and the value he had brought to the purchasing department.

Table 7: Performance of the BVA in Procurement

BVA Process Metrics	**Traditional**	**Best Value**	**% Difference**
Time to Procure	180 days	77 days	53%
Estimated Cost	$10 M	$7.1 M	29%

Although the vendor was clearly identified as the best value vendor, there was a delay in awarding a contract to the best value vendor. The purchasing manager was extremely disappointed that the client stakeholders did not understand the value delivered and make an immediate award. The purchasing manager, who was a senior purchasing manager, made the decision to retire after seeing the client stakeholders did not understand and appreciate the results of the BVA process. He felt that the stakeholders did not appreciate his expertise as a purchasing manager. He may have had difficulty understanding the challenges of the client's stakeholders:

1. The stakeholders were trying to move from a traditional, relationship-based environment with multiple vendors to a sole-sourced best value buy.
2. The change of environment slowed down the stakeholder's approval.
3. The stakeholders were not used to seeing performance metrics.
4. The stakeholders did not know how to quickly respond to the BVA performance information.
5. The client stakeholders, in an independent purchasing effort, were attempting to minimize the effort of the clients' FMs. They were attempting to run a pilot project in Utah but needed a best value vendor who could reduce their cost, deliver the janitorial products inside their facilities, and automate the ordering of supplies. They did not communicate this effectively to the purchasing manager.

The client stakeholder's final actions showed the following:

1. They approved of the best value vendor.
2. They were satisfied with the BVA results.
3. They agreed that the best value vendor could deliver at the lowest cost.

4. They were willing to give the best value vendor a sole source contract (which they were afraid of doing during the purchasing process).

Although the conclusion of the client's stakeholders was to award a contract to Vendor G, they did not respond to the vendor until August 23rd, 2018 (30 days late). When the client stakeholders finally reached out to the vendor, they changed the project requirements to the following:

1. The vendor would deliver supplies directly into the facility supply closets instead of delivering to the FM representatives who were nearby (for 3,852 specific facilities in Utah and later in Idaho to include a total of 6,667 client facilities).
2. The vendor would remove all excess and unused chemicals from the supply closets before restocking the closets.
3. The vendor would test their information tracking of delivering the janitorial supplies into the facility closets.
4. The client wanted to investigate the vendor's proposal to automate the ordering and delivering system for 85% of supplies in 104 facilities is Northern Utah (this included delivering supplies into the facility closets and automating ordering of the supplies).

The client stakeholders realized that none of the current suppliers they were working with (except the best value vendor) were capable of meeting the above requirements. The best value vendor agreed to the above adjustments to the project requirements but identified that the changed requirement of delivering into the facilities instead of to client's FMs near the facility would increase the cost by 19% (estimated total of $8.9 million) (Thornly, et. al., 2019). The increased cost was due to insurance and in-facility delivery costs.

The implementation date was October 1st, 2018. The client stakeholders realized that they now had a method to deliver the janitorial products inside of their facilities at a cost that was less than the previous competitive cost of delivering janitorial products to their FMs outside of their facilities (by 6%). The pilot project did not include all 7,000 facilities in Canada and the United States. This was advantageous to the best value vendor because they did not currently service a large share of the facilities in the Idaho, Utah, and Arizona areas. The vendor continued to service many of the client's facilities outside of the Idaho, Utah, and Arizona areas with the delivery of products to the client's FMs outside of the facilities at their proposed price.

Phase 2 – Client Changes the Project Requirements

When the pilot project began, the best value vendor and the client collaborated to identify more accurate information about the client's facilities. Table 8 summarizes the different types of facilities based on the number of different groups using the buildings and historical/projected cost of janitorial products. Previously, the vendor had estimated this breakout. Both parties agreed on the breakout. The vendor had two types of deliveries:

1. Delivery of products to the client's FM (25% lower cost than what the client was estimating).
2. Delivery of the products into the client's janitorial closets (6% lower cost due to insurance and other costs to get into the closets).

Upon accepting the new requirements of the pilot project, the vendor designed a third approach to implement the automation of 85% the delivery of janitorial supplies. The automation system did not require a client's professional FM to order supplies. This automation system was implemented approximately a year after the pilot project was started. The vendor created an automation algorithm based on passed order history of 85% of the supplies. The vendor did not have enough information to automate the other 15% of items. However, the vendor agreed to accept orders from a non-professional contact representing the facility. All product usage will be tracked to confirm costs in the future.

Table 8: Client Spend Rate vs Delivery to FM vs Automated Ordering

Organizations Per Building	**Buildings**	**Historical Cost Per Building**	**Projected Cost Per Building**	**Automated Delivery Cost Per Building**
3+	1,787	$1,606.26	$1,205.24	$1,094.89
3	1,316	$1,590.78	$1,193.63	$1,084.34
2	1,405	$1,411.05	$1,058.77	$961.83
1	2,710	$1,126.80	$845.48	$768.07
Total	7,218	$10,000,000.00	$7,503,399.69	$6,816,400.72
Cost Savings from Client Historical Spend Rate			25%	31.8%

When the pilot project kicked off, the best value vendor had spend rates of janitorial products from different client facilities. All the janitorial products were being ordered by the client's FMs. In order to identify the accurate spend rates of facilities and the impact of the best value vendor's cost and delivery performance, the client identified 3,852 facilities in Idaho, Utah, and Arizona where the best value vendor would deliver janitorial products inside the facility.

To ensure that the spend rate/use of janitorial products was accurate, the client stakeholders required the best value vendor to remove all janitorial products and dispensers currently being used or stored in the facilities. The client stakeholders had learned that some of the products they had been utilizing from other vendors were more expensive due to the unique dispensers of products. The client wanted to standardize the products to get the best value vendor's lower prices.

The vendor and the client's associated BVA expert predicted that an automated ordering system would result in an additional cost savings. The source of the savings would come from minimizing the FM's human cognitive processing (thinking, decision making, and storage of janitorial products) (Evertz, 2021). The best value vendor saw great value in testing out this concept of automation (removing the need for FM decision making). No one could accurately predict the actual savings this would bring, however the BVA expert proposed that some of the savings that the best value expert vendor had previously identified was due to minimizing the FM's ordering of materials (i.e., automating a portion of the FM's job function). The client's stakeholders identified 104 of the facilities (out of 3,852 pilot project facilities) where the automation would be tested. In these facilities, the client would remove the FMs entirely. The vendor coordinated with the client organization's BVA expert and developed an optimal Weekly Risk Report (WRR) to accurately track the quantities, cost, and performance of their automated delivery system. After a number of iterations, the WRR was finalized, updated, and shared with stakeholders on a weekly basis which is shown in Figure 2.

Week Number	53	52	51	50	49
Total purchases per week (FS)	$171.61	$10,366.01	$169.46	$203.55	$662.33
Historical purchases per week	$3,055.19	$3,055.19	$3,055.19	$3,055.19	$3,055.19
Actual vs. Historical	-$2,883.58	$7,310.82	-$2,885.73	-$2,851.64	-$2,392.86
Total Purchases YTD	$120,943.28	$120,771.67	$110,405.66	$110,236.20	$110,032.65
Historical Purchases YTD	$161,925.07	$158,869.88	$155,814.69	$152,759.50	$149,704.31
Actual vs. Historical	-$40,981.79	-$38,098.21	-$45,409.03	-$42,523.30	-$39,671.66
Percent Savings	25.31%	23.98%	29.14%	27.84%	26.50%
Number of units placing order	6	48	5	5	15
Total units possible	104	104	104	104	104
Anticipated participation per week	20	20	20	20	20
Actual Vs. Projected	-14	28	-15	-15	-5

Figure 2: Screenshot of the Vendor's Weekly Risk Report (WRR)

The vendor now had accurate data of the cost and quantity of janitorial products in 104 facilities in Northern Utah using the automated ordering and utilizing nonprofessional cleaners to order miscellaneous products compared with using a professional FM. Table 9 shows a summary of the data collected during the pilot project. The table compares the automated delivery system to the professional FM ordering system. The automated system utilized non-professional building users to order any items not on the automatic ordering system.

Table 9: Pilot Project Performance in 2018-2019

Weekly Performance	
Average Purchases per Week [Automated Delivery]	$2,281.95
Average Purchases per Week [Manual Delivery]	$3,055.19
Difference of Average vs Projected	-$773.24
Annual Performance	
Total Annual Purchases [Automated Delivery]	$120,943.28
Total Annual Purchases using [Manual Delivery]	$161,925.07
Automated vs. Manual	-$40,981.79
Percent Savings	25%
Building Adaptation	
Total Buildings	104

As a result of the automated system, the vendor achieved a 25% cost savings compared to the professional FM ordering system. By automating the supply ordering system, the vendor was able to reduce human cognitive processing (inaccurate orders, misplacement of orders, and inventory buildup). The following options were now available due to the client:

1. 25% lower cost by automated ordering and delivery inside the buildings.
2. ~37% lower cost by automated ordering and the vendor delivering the janitorial supplies to FM.

Phase 3 – Implementing a Performance-Based Information Approach

After the effectiveness of the automated pilot project, the vendor increased their scope to maintain supplies at more facilities. In 2019, the vendor serviced over 2,700 facilities (2% of which used the automated system). In the spring of 2020, the COVID-19 pandemic affected the client's facility usage, quantities of product, and spend rates (Thornley, et. al., 2019). Many of the client's facilities stopped regular operations. This reduced the number of janitorial supplies used in 2020 and 2021 (Table 10). The client asked the vendor to continue to stock the facilities despite the low demand of janitorial products. The vendor had to adjust their operations to accommodate the flexible needs of the client during the pandemic.

Table 10: Vendor Performance Metrics

Description	**2021**	**2020**	**2019**
Total Annual Purchases	$3,645,140	$4,200,350	$1,053,939
Products Purchased	781	1,051	494
Facilities Serviced	5,551	6,656	2,778
Facilities Using Inside-Delivery	3,852	2,778	105
Percent Using Automated Ordering	2%	2%	4%
Total Facilities	6,667	6,656	6,590
Percent of Next-Day Deliveries	98.59%	97.01%	97.56%
Average Delivery (days)	1.08	1.24	1.19
Complaints	447	1100	46
Customer Satisfaction	99.24%	98.65%	99.76%
Value Added Items	344	556	50

Performance Metrics System Utilized by the Best Value Vendor

Table 9 highlights performance information that had not been utilized in the client and vendor's relationship-based environment. The client stakeholders realized the high cost of the relationship-based environment. The BVA showed the simpleness of a performance information-based environment (Kashiwagi, 2020). For example, the best value vendor identified that 98% of their deliveries were made within 24 hours which helped maintain a 99% customer satisfaction. They were able to accomplish this at 75% of the competitive cost (the other competing vendor) and 69% of competitive cost for automated ordering and delivery inside of facilities. The BVA has helped the client identify and utilize expertise of a vendor who utilized performance metrics.

Once the client stakeholders learned how to utilize the expertise of the vendor, they began to task the vendor with responsibilities that usually would be handled by the client's stakeholders. They realized that the expert vendor could do tasks much quicker and more effectively. These items are

listed in Table 11 along with a conservative estimate of the minimum costs that the client would have accrued if the vendor's expertise had not been utilized in a timely manner.

Table 11: Value Added Items 2021-2022

2021 Value Added Items		
#	**Description**	**Est. Cost Savings**
1	Delivered janitorial supplies to all facilities for them to be compliant with COVID-19 safety regulations.	$500,000
2	Because of supply chain constraints, the vendor sourced special items to meet facility supply needs.	$20,000
3	Notified client regarding supply chain constraints and proposed solutions.	$3,000
2021 Estimated Total		**$523,000**
2022 Value Added Items		
#	**Description**	**Est. Cost Savings**
1	The vendor moved constricted inventory to meet the client's needs.	$5,000
2	When toilet tissue was unavailable, the vendor provided substitutions without any interruption of services.	$7,500
3	Secured 2022 purchase orders despite paper product shortage.	$10,000
4	Identified a new vendor of feminine hygiene products.	$40,000
2022 Estimated Total		**$ 62,500.00**

Conclusion: the BVA Identifies and Utilizes Expertise which Reduces Cost by 30% while Increasing Performance

The client's purchasing department had a visionary director who realized the effectiveness of the Best Value Approach (BVA) to identify and utilize expert vendors. The BVA experts, who originated out of the Arizona State University Performance Based Studies Research Group (PBSRG), proposed to the international client that they could implement the BVA to:

1. Minimize the cost of commodities.
2. Use performance metrics which show increased value and performance and decreased cost.
3. Utilize characteristics of automation in their purchasing functions.
4. Minimize the client's purchasing duration and cost of delivering services.
5. Identify visionary vendors and integrate their services into the client's organization.

The information shared in this paper summarize the results of the client's multi-year janitorial service project for 7,000 facilities. In addition to this project, the client also used the BVA to select a vendor to oversee their recycling and waste management services for the client's facilities in a designated area. The client's representatives and the two successful vendors learned even more about the BVA environment. The two successful vendors both experienced the following:

1. Even in their own organizations, both visionary project managers identified that they were the only individuals in their organizations who understood the use and impact of performance information.

2. One of the vendors attempted to educate key individuals in their organization to increase the use of BVA. The attempt ended in failure over two years. The visionary ended up in agreeing with the founder of the BVA principles that state it is rare and difficult to find visionaries who can effectively use performance information.
3. Both visionary vendor project managers concluded that no other employee in their company could effectively utilize the WRR to improve project performance.
4. Both vendors who used visionary project managers had renewable three-year contracts. Both vendors' contracts were renewed without costly rebidding because of the performance information being reported in the WRR.
5. If the client desired to rebid the contracts, the WRR had all the information required. The BVA could be run, and the best vendors could compete on the performance information from the WRR.
6. The vendors realized that when new additional services were needed, the client's stakeholders immediately approached the expert vendor to resolve the additional need.

The case study on the delivering of janitorial products to a large international organization showed that janitorial supply is not a commodity service. The expert vendor was able to deliver products and manage portions of the FM functions in addition to delivering supplies. The delivery and the tracking of the commodity by the expert vendor was a high-performance requirement.

The BVA allowed the client to reduce the purchasing timeline by 50% and cut the cost of the service by 30%. The BVA allowed both the client and vendor to minimize human cognitive processing (collecting information, collaborating, communicating, meetings, and decision making). This case study confirmed the delivery of janitorial products can be automated. The case studies also confirmed that experts could be identified in the industry and utilized to raise the level of value and performance. Previous tests confirm that the client's stakeholders are the source of over 90% of project risks (Harare, et. al., 2020). This was claim was further validated in the janitorial services project.

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Recycling Services Using the Best Value Approach

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The Best Value Approach (BVA) has been in research and development for 30 years [1992 – 2022]. The approach has been successfully tested in the procurement of over 2,000 projects [98% customer satisfaction, minimized contractor change orders to 1% and reduced cost of 5 to 30%]. The BVA has been successful in delivering construction projects but has not been tested in the delivery of contractual services. In 2018, a large organization tested the BVA on procuring recycling services. The BVA has two paradigm shifts: a new procurement and project management approach. The new approach minimizes the need for the client to direct and control the vendor and minimizes the need to depend on the relationship between the client and vendor. The BVA replaces the dependence on the relationship with performance information. The performance information creates transparency and minimizes the need for the client to direct and control the vendor. The objective of the BVA is efficiency: to reduce cost and increase profit, revenue and value. The paper tracks the performance of the BVA on recycling service for the first four years of the recycling service [2018 – 2022].

Keywords: Best Value Approach, Procurement, Risk Management, Project Management, Performance Information, Recycling, Services

Introduction

Client stakeholders have been unsuccessfully attempting to deliver projects in the last 30 years. The Performance Based Studies Research Group (PBSRG) has been doing research to improve performance of projects by identifying and utilizing expertise. There are two major types of projects. The first is the building and installation of systems. The second type of project is providing a service. The PBSRG has spent the majority of time improving project performance of projects being built and installed. Clients have questioned whether the performance of a vendor providing services could be optimized. The service's duration is often longer than delivering projects, and researchers have questioned if the performance of a vendor could be maintained over a longer duration of time. The purpose of this paper is to identify if a service can be procured with the Best Value Approach (BVA), and if the performance of the service can be increased through the duration of the service project.

Case Study Background

In 2015, the state of Utah released an ordinance mandating all organizations to reduce 50% of their waste going to the local landfills. All organizations were given until 2020 to comply with the new mandate (City, 2018). A large private organization in Utah assembled an internal team to create a plan to meet this new mandate before the deadline. As the client team investigated their current

resources, they found that they did not have the expertise to manage and track their waste services to meet the government requirements. The organization decided to hire an external party to facilitate waste and recycling services for their facilities throughout Utah.

The organization considered the project to be high risk because of the limited amount of information, lack of client expertise and recycling industry instability. Shortly after, the client team was introduced to the Best Value Approach (BVA) which proposed to minimize the risks of the project by hiring an expert vendor. The client team decided to utilize the BVA to deliver recycling services.

Client Requirement

The client was looking to procure recycling services from a vendor that could meet the requirements of the local ordinance as well as produce the most value for the organization in terms of revenue, and environmental impact. The requirements included:

1. Meet the requirements of the local ordinance for recycling programs for one year with options to renew.
2. Output "from the curb" of waste and recyclable materials.
3. Minimize the amount of material sent to the landfill.
4. Maximize the revenue of recyclable materials to the client.
5. Meet the current legal and operational requirements of the client.

The client also provided:

1. A list of facilities.
2. Known facility characteristics such as facility area, waste streams and amounts of recyclables.
3. Historical recycling and waste information.
4. Unique operational requirements.

Education and Schedule

The request for proposal (RFP) was advertised to all recycling and waste vendors in the state. Since the BVA was new to both the client and vendors, it was necessary to educate both the clients and the potential vendors to understand the BVA paradigm shift. The RFP education meeting had a total of four attendees which included two recycling vendors and two waste haulers. After hearing the education and scope of the project, the two waste haulers withdrew from the competition. The competition was left to the two recycling vendors—one of which was the incumbent. During the education, the vendors were given the following schedule (see Table 1):

Table 1: Procurement Schedule

Activity	Date
RFP issued	Tuesday, March 6, 2018
Vendor Pre-Proposal Meeting (on site)	Tuesday, February 27, 2018
Vendor Facility Walkthrough (on site)	Monday - Friday, March 5 - 9, 2018
Deadline for pre-proposal RFIs	Friday, March 16, 2018
RFP Vendor Submittals Due Date	Friday, March 23, 2018
Interview (on site)	Monday, March 26, 2018
Identification of Potential Best-Value Vendor	Wednesday, March 28, 2018
Clarification Kick Off Meeting (on site)	Tuesday, April 10, 2018
Signing of Contract	Friday, April 20, 2018
Anticipated authorization to proceed	Monday, April 23, 2018

The Best Value Approach

The client decided to use the Best Value Approach (BVA) because of its proven effectiveness for high project performance [low cost, high performance, customer satisfaction]. BVA was developed by Dr. Dean Kashiwagi, the Performance Based Studies Research Group (PBSRG), and the International Council for Research and Innovation in Building and Construction (CIB) Working Commission 117 Performance Information in Construction. The performance of the BVA research has the following performance metrics (PBSRG, 2022):

1. 30 years of industry testing and research.
2. Research funding of $17.6 million.
3. 2,000+ industry tests delivering $6.7 billion of services.
4. 350 refereed conference papers, journal papers and books.
5. 65 licenses issued by ASU for intellectual property (IP) including the Best Value Approach, the Information Measurement Theory, the Industry Structure (IS) model, the Kashiwagi Solution model (KSM), and Spectrum of Observation (SOO).
6. Research results were audited by four major organizations: State of Hawaii Legislature, US Army Corps of Engineers, Twentee University PhD Studies and the Western States Contracting Association (WSCA).

As a result of this ongoing research, the BVA has shown that:

1. 90% of project risk is caused by the client's stakeholders and representatives.
2. Only 1% of risks and change orders are caused by the vendor.
3. BVA customer satisfaction is 98%.
4. BVA decreased client purchasing time by 50%.

The Best Value Approach (BVA) identifies and utilizes vendor expertise. The BVA makes the following assumptions:

1. The client can follow the process and identify and utilize the expertise of the best value expert vendor.
2. Not all project managers (PM) in the vendors organization are experts.

3. Vendor experts have more expertise than the client's professionals and stakeholders because they actually perform the work.
4. Expert vendors know that not all PMs in their organization are experts.
5. Client experts do not utilize their expertise until the clarification phase after the expert vendor is identified.

The BVA uses four phases to identify and utilize the best value expert vendor. The four BVA phases are: preparation, selection, clarification, and execution (Figure 1). In the preparation phase, the client creates RFP and exposes stakeholders and vendors to the BVA.

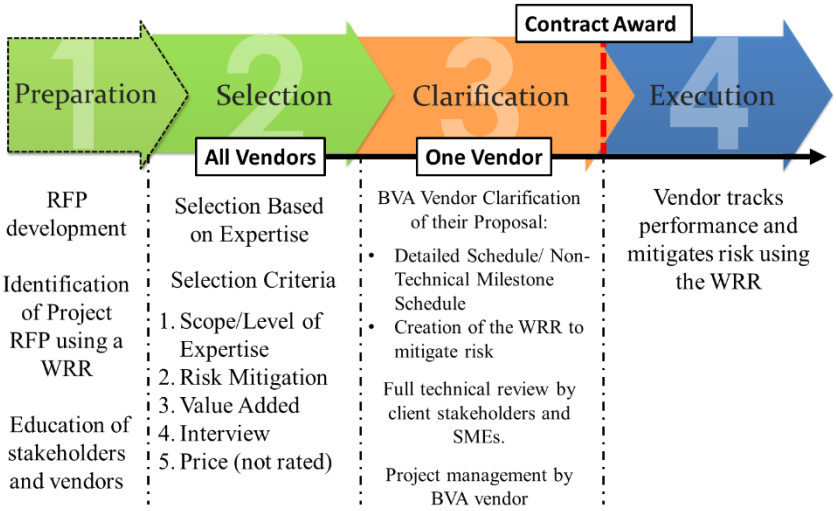


Figure 1: The Four Phases of the Best Value Approach (Kashiwagi, 2021)

In the selection phase, the BVA competes vendors based on their proposed scope and level of expertise represented by project and performance metrics. The client is looking for which proposed scope meets the requirement and shows that the vendor can complete the project. In addition to evaluating the vendor's scope and expertise, the BVA also identifies how vendors will mitigate project risk and how they can add additional value to the project.

The clarification phase is designed to ensure that the selected best value vendor can meet the project requirements. Before a contract is signed, the selected vendor creates a detailed schedule, a simplified milestone schedule, and a weekly risk mitigation plan. The client's stakeholders and experts do a full technical review on the best value expert's scope. This includes a review of documents, receiving vendor clarifications, and approval of the vendor's scope proposal. If adjustments are made during the clarification phase, the vendor documents the adjustments.

In the final phase, execution, the vendor delivers the service while tracking their schedule and performance using the weekly risk report (WRR). The WRR allows all stakeholders to understand the delivery of the service, potential risks, and current project performance. The client's only responsibility at this point is to ensure that the vendor is sending an updated WRR. No other client micromanagement or quality control is required.

Selection Phase

The selection committee consisted of six internal stakeholders. The selection committee was briefed on the BVA ahead of the vendors. The RFP and vendor education outlined the process to evaluate, rate, and prioritize vendor submittals. Two proposals were received from recycling vendors. The ratings were done blind. Raters did not know the vendors' names. Only the purchasing manager and the Best Value expert [both whom did not rate the submittals] saw the recycling revenue proposals. Each written submittal was rated individually by the selection committee members. It took an average of 11 minutes for the reviewers to rate both submittals. The selection committee members also interviewed both vendors representatives. The interview ratings were added to the submittal ratings.

The ratings for the submittals and proposed revenue were put into the selection matrix including their scoring and submitted revenue (Table 2), normalized scores (Table 3), and awarded points and prioritization (Table 4).

Table 2: Vendor Raw Scoring and Revenue

Criteria (Raw)	Units	Vendor A	Vendor B
Level of Expertise rating	(1-10)	6.7	5.8
Risk Assessment rating	(1-10)	5.0	6.7
Value Added rating	(1-10)	5.0	8.3
Interview rating	(1-10)	7.5	7.5
Total Revenue	$	$103,000	$475,000

Table 3: Normalized Vendor Scoring

Criteria (Normalized)	Best Score	Vendor A	Vendor B
Level of Expertise rating	6.67	1.00	0.88
Risk Assessment rating	6.67	0.75	1.00
Value Added rating	8.33	0.60	1.00
Interview rating	7.50	1.00	1.00
Total Revenue	$ 475,000	0.22	1.00

Table 4: Vendor Awarded Points and Prioritization

Criteria (Assigned Points)	Weight	Vendor A	Vendor B
Level of Expertise rating	35	35.0	30.6
Risk Assessment rating	10	7.5	10.0
Value Added rating	15	9.0	15.0
Interview rating	30	30.0	30.0
Revenue	10	2.2	10.0
Total Points Assigned		83.7	95.6
Prioritized		2	1

Vendor B [new bidder] had the approach of increasing the client's recycling revenue, while Vendor A [incumbent] was looking at taking over the management of the client's recycling service for an increased cost from the previous year. After reviewing the submittals of each proposal, the purchasing agent identified a difference of about $300 thousand in the price proposals for each vendor (see Table 5). The difference was significant enough to require a supplemental cost/revenue interview. Each vendor's representative was interviewed on the vendor's financial submittal by

the BVA consultant and the purchasing agent. This was to confirm the accuracy of the vendors' proposals. The vendors were notified ahead of time that they would be interviewed on the details of their submittal. The interview process revealed that:

1. Vendor A's representative was a high-level manager who could not answer any questions regarding their financial submittal.
2. Vendor B brought a high-level executive and the manager who created the proposal. The manager explained his cost spreadsheets. He was able to provide details on the revenues, costs, and how they were estimated.
3. Vendor B's manager provided information justifying the accuracy of their price.
4. Vendor A identified that the client's future recycling business would be minimized due to the instability of the recycling industry, and the management of the effort would cost $45K/year.

Table 5: Cost Proposal Analysis

#	Description	2017 Baseline	Vendor A	Vendor B
1	Recyclable Revenue	$ 485,000	$ 444,000	$ 569,000
2	Total Costs	$ (150,000)	$(341,000)	$ (94,000)
Total Revenue		$ 335,000	$ 103,000	$ 475,000

The performance information in Table 2, 3, 4 and 5 was shown to the entire selection committee. They unanimously identified Vendor B was the best value vendor. The selection team was informed that the Best Value vendor would be presenting a clarification kickoff presentation, and the stakeholders would be able to work with the vendor to ensure that the vendor's scope was accurate and the vendor's implementation plan was acceptable.

Clarification Phase

Vendor B, mentored by the BVA expert, worked on creating a plan that would address the client's recycling needs. It was important that the plan was simple enough for all stakeholders to understand. Vendor B presented their plan to the stakeholders. All stakeholders approved the plan and meetings were set up with the individual stakeholders [from each facility] to discuss the implementation plan. The vendor's plan was identified as an expert's plan because of the following reasons:

1. The plan provided services beyond the RFP requirement. It not only included the management of recycling services, but also took over the management and billing of all waste and recycling services which relieved that responsibility from the client's organization.
2. The vendor's Weekly Risk Report (WRR) included the vendor's commitment to provide total transparency reporting on the recycling revenue, waste expenses, and Vendor B's charges.
3. The plan proposed that the vendor would track and suggest changes to increase revenue and minimize waste.
4. The vendor came up with an innovative pricing model that would not charge a management fee for recycling and waste management. The vendor would charge 22% of all recycling revenue and give the client the remaining 78%. This would allow pricing to be fair regardless of changes in recycling material prices or changes in the recycling industry.

5. The plan would accommodate for all implementation costs. This would include replacing any recycling bins.

The seven stakeholders working on the project were given surveys to rate the BVA process compared to the traditional process. The results are presented in Table 6. The results of the procurement process were also compiled to show the performance of the method in Table 7.

Table 6: Satisfaction Survey

Clarification Phase	**Clarification Phase**	
The process requires the vendor to pre-plan, identify, and minimize risks before the project begins.	10.0	
Vendor's communication, explanation of risk, and documentation.	9.3	
Overall customer satisfaction with the clarification phase	10.0	
Rating of Overall Process	**Traditional**	**Best Value**
The process is simple and easy to implement	5.0	9.4
The process is efficient (minimizes cost, time, and effort)	4.4	10.0
The process identifies the highest performing and lowest costing vendor	4.4	10.0
The process minimizes the risk to the client	6.0	10.0
Overall satisfaction with the selection and clarification process	4.8	10.0

Table 7: BVA Process Metrics

BVA Process Metrics	**Traditional (estimated)**	**Best Value (actual)**	**% Difference**
Time to Procure Project	270 days	67 days	-75%
Estimated Project Revenue	$103,000	$476,000	462%
Customer Satisfaction	4.8/10	10/10	52%

As part of the clarification phase, the vendor created a report to estimate the tons of waste and recycling material that was anticipated revenue for each waste category (Table 8). The amounts were estimated from the previous year. If the quantities went up or down, the vendor would annotate the differential.

Table 8: Estimated Revenue for Waste Categories

#	Recyclable Material	Annual Revenue	Annual Amounts (tons)
1	Books	1,262.33	124.49
2	CBS	29,584.48	439.13
3	Metals	55,808.47	390.753
4	OCC	35,448.62	549.331
5	Plastics	113.027.75	277.653
6	HWS	1,950.72	11.539
7	IGS	5,840.34	58.497
8	Magazines	44,649.85	816.101
9	MWL	46,084.17	273.588
10	ONP	31,285.90	456.011
11	OP1	40,845.17	425.173
12	PMIX	133,852.06	1,293.29
13	Mixed Loads	29,764.80	720
14	Shredding – 1in Hammermill	-8,198.40	192

Sum of all Recyclables Revenue (RR):	$	569,404.66
Total Cost (TC) [if listed separately]:	$	-93,708.34
Total Revenue = RR – TC:	$	475,696.32

After analyzing the current conditions of the client's facilities and their waste management procedures, the vendor proposed two adjustments to improve project performance, create minimum requirements for each facility and maximize cost savings. The minimum requirements were:

1. One recycling bin for every garbage bin.
2. All signage placed throughout buildings.
3. Recycling plan for each site.
4. Tracking and reporting weights.

To maximize cost savings, the vendor was able to:

1. Optimize waste container sizes and pickups.
2. Renegotiate haul charges based on optimized pickups [minimized].
3. Track and monitor dumpster volumes (make schedule adjustments).
4. Place monitors on compactors (ensure hauls are close to full before pickup).
5. Replace 8-yard dumpster with 20–30-yard roll-off.
6. Replace compactors instead of open-top dumpsters.
7. Create a program to divert large waste streams.
8. Pursue re-use solutions for certain waste streams.
9. Switch bin types to avoid public dumping.
10. Adjust the processing procedures of certain recycling streams.

Execution Phase

Vendor B was committed to creating transparency and simplifying the recycling revenues and waste services costs. As soon as Vendor B started the execution portion of the project, there were major changes in the recycling market that greatly affected the vendor's revenue projections. Vendor B also identified many issues within the organization's facilities but was unable to clearly communicate the issues to the upper-level management stakeholders. Stakeholders were not listening to the vendor's suggestions and the vendor often felt responsible for the market changes and the deviation from the anticipated revenue.

Execution Phase - Year 1

Vendor B learned that an effective Weekly Risk Report (WRR) was necessary to minimize the need for the clients to think and make decisions (Kashiwagi, 2019). It took multiple iterations of adjusting the WRR and the help of a BVA consultant to clearly identify the current situation of the recyclable revenue and waste costs. To help the client see the value of the vendor's expertise, the vendor adjusted the WRR to compare their original revenue estimation, their competitor's estimation, and the current revenue (Figure 2). This comparison showed how the revenue differed and provided justification for the differential.

Annual Projected Revenue and Costs

#	Recyclable Material	Competitor Submittal (COM) Revenue	Vendor Submittal (VS) Revenue	Vendor Actual (VA) Revenue	Difference (VA-VS)	Notes	W Ref	VA Ref	Project Start to Date (PSD) Totals PSD Revenue
1	Books	$ 150	$ 1,262	$ 1,917	$ 655	Higher prices	W36		$ 1,597
2	CBS	$ 39,550	$ 29,584	$ -	$ (29,584)	No volume	W13,8		$ -
3	Metals	$ 32,006	$ 55,808	$ 21,213	$ (34,595)	Welfare DI excluded	W1		$ 21,009
4	OCC	$ 13,430	$ 35,449	$ 18,272	$ (17,176)	Print equip change	W18		$ 16,358
5	Plastics	$ 90,370	$ 113,028	$ 20,696	$ (92,331)	China not accepting plastics	W12		$ 20,687
6	HWS	$ 675	$ 1,951	$ 5,069	$ 3,118	Higher volume			$ 4,385
7	IGS	$ 4,650	$ 5,840	$ -	$ (5,840)	No volume	W13		$ -
8	Magazines	$ 38,070	$ 44,650	$ 33,097	$ (11,553)	Higher volume/lower price	W16	V8	$ 33,306
9	MWL	$ 56,106	$ 46,084	$ 10,731	$ (35,353)	Lower volume/lower price	W13		$ 8,943
10	ONP	$ 14,225	$ 31,286	$ -	$ (31,286)	No volume	W13,8		$ -
11	OP1	$ 2,400	$ 40,845	$ 38,657	$ (2,188)	No paper GM vault	W1		$ 35,436
12	PMIX	$ 151,625	$ 133,852	$ 163,732	$ 29,880	Higher prices	W13		$ 163,611
13	ML	$ 500	$ 29,765	$ 1,202	$ (28,563)	Lower volume	W26	V7	$ 1,102
	Totals	**$ 443,757**	**$ 569,405**	**$ 314,587**	**$ (254,818)**				**$ 306,434**

#	Costs	Cost	Cost	Cost	Difference (VA-VS)	Notes	W Ref	VA Ref	PSD Cost
1	Shredding (HM)	NA	$ (8,198)	$ 3,137	$ 11,335	Shredding change	W1	V6	$ 3,157
2	Garbage Costs	$ (122,358)	$ (85,510)	$ (58,354)	$ 27,156	Changes to process		V1-5	$ (58,354)
3	Additional Services	NA	$ -	$ (67,800)	$ (67,800)	Added services/missing	W22,25		$ (67,800)
4	Adjustments Needed	NA	$ -	$ (30,618)	$ (30,618)	Potential adjustments	W30		$ (30,618)
5	Print Division - Add	NA	$ -	$ (93,727)	$ (93,727)	Contaminated bales	W13,18,24		$ (86,386)
6	Mgmt. & Overhead	$ (218,400)	$ -	$ -	$ -				$ -
	Totals	**$ (340,758)**	**$ (93,708)**	**$ (247,362)**	**$ (153,653)**				**$ (240,002)**

Description	Total	Total	Total	Difference (VA-VS)	Notes	W Ref	VA Ref	PSD Totals
Revenue (R):	$ 443,757	$ 569,405	$ 314,587	$ (254,818)				$ 306,434
Costs (C):	$ (340,758)	$ (93,708)	$ (247,362)	$ (153,653)				$ (240,002)
Total Revenue = R – C:	**$ 102,999**	**$ 475,696**	**$ 67,225**	**$ (408,471)**				**$ 66,432**
Value Added (VA):	$ -	$ 195,286	$ 195,286	$ 195,286				$ 195,286
Total with VA:	**$ 102,999**	**$ 670,982**	**$ 262,511**	**$ 159,512**				**$ 261,718**

Figure 2: Screenshot of Year 1 WRR

At the end of Year 1, the revenue deviation was $254 thousand. The vendor provided the following justification for the deviation:

1. Decrease of ~$100K (39%) because employees were not sorting material in correct category.
2. Decrease of ~$41K (16%) because a division was excluded from the program.
3. Decrease of ~$91K (36%) because China was no longer accepting plastics.
4. Decrease of ~$28K (11%) because pleated paper was lighter than the client estimated in the RFP.

At the end of Year 1, the cost deviation was $153 thousand. The vendor provided the following justification for the deviation:

1. Increase of ~$36K (24%) for additional services that were not included in the RFP.
2. Increase of ~$8K (15%) for increased number of services for organization.

3. Increase of ~$20K (13%) for adjustments that could be implemented but haven't due to employee cooperation.
4. Increase of ~$48K (31%) for a division contaminating bails, wasting materials, and not sorting materials in correct bins.
5. Decrease of ~11K (-7%) for Vendor B providing an innovative shredding solution.
6. Decrease of ~16K (-10%) for Vendor B bin changes, switching haulers, and schedule changes.

The vendor believes that many of these deviations could have been avoided if the client project data was more accurate before starting the project. After the vendor began executing the project, the client realized that certain change orders were required to meet their requirements. During the selection process, the vendor submitted a risk assessment plan which predicted the possibility of market changes and cost impact due to inadequate facility information. Although there was a large deviation in Year 1, the vendor was able to predict, document, and mitigate these risks for improved performance.

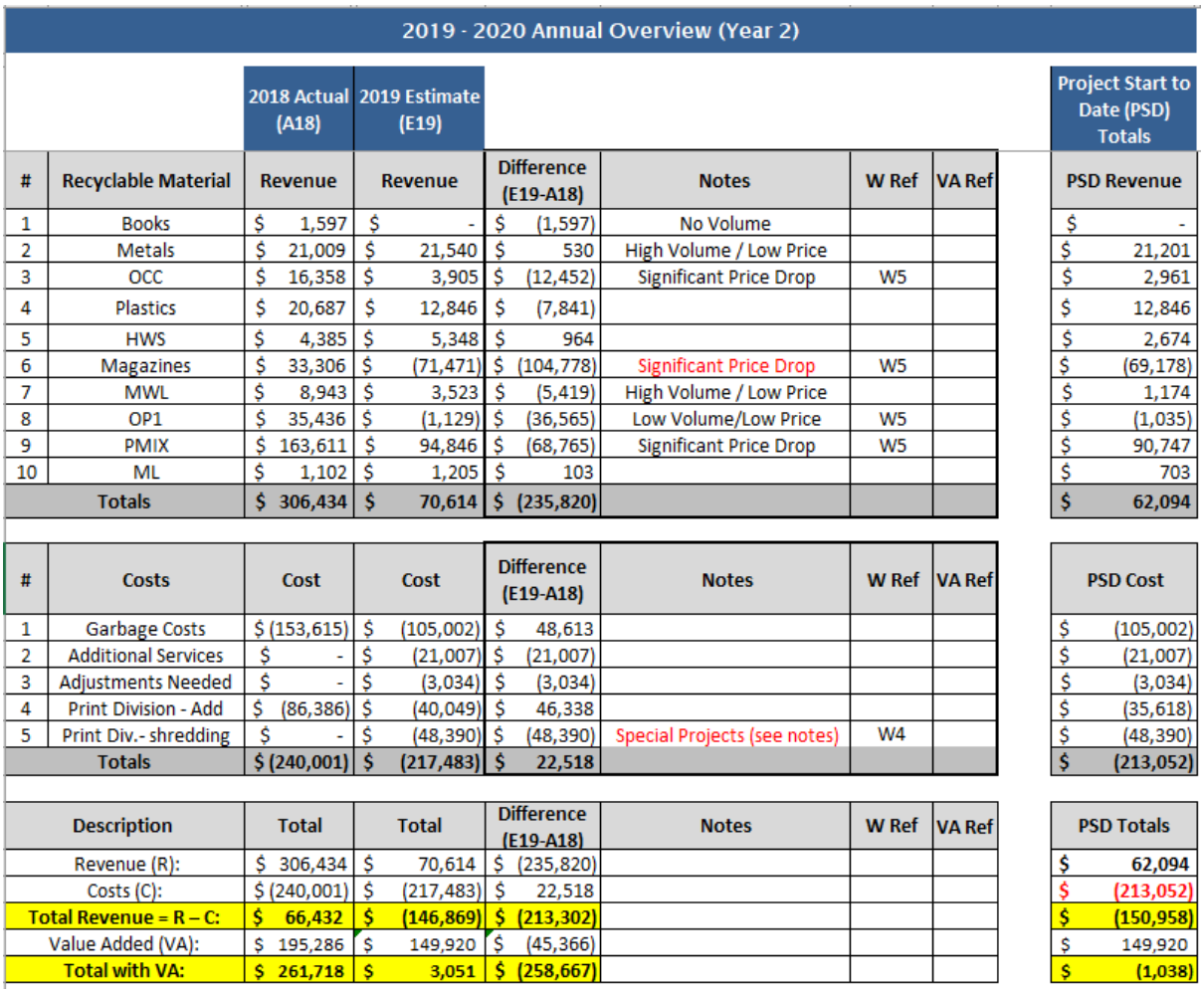
Throughout Year 1, the vendor provided additional services at no cost to the client (Table 9). The vendor identified that services saved the client over $195 thousand. Considering the revenue, cost, and value-added savings, the vendor provided the client with over $261 thousand in valued services.

Table 9: Cost Savings from Year 1 Value Added Services

#	Description / Changes / Results	Annual Cost Savings
1	Changed 6-yard bins at facility to change schedule	$2,455
2	Switched garbage providers	$1,836
3	Changed garbage bin at facility and schedule	$10,012
4	Captured odd recyclables - cut garbage costs	$7,763
5	Changed garbage hauling provider at facility	$3,252
6	Changed shredding to Plant-Based	$11,100
7	Installed compactor for Pleated Paper at facility	$11,177
8	Found a new market for the Magazines	$47,691
9	Took over management saving client one FTE [recur annually]	$100,000
	Total Cost Savings	**$195,286**

Execution Phase - Year 2

During Year 2, recycling market prices continued to drop, thus decreasing project revenue. Meanwhile, the client also conducted several special projects that increased waste (e.g., confidential document shredding). The vendor continued tracking revenue/cost projects (Figure 3). To improve the accuracy of the WRR, the vendor created a quarterly audit system. For further cost savings, the vendor advised the client to purchase a larger roll-off truck instead of the smaller truck that they were planning on purchasing. By purchasing the larger truck, the client saved $24 thousand in the first year and $74 thousand every year after that because client personnel could utilize the larger truck to do work that was usually outsourced. The client followed the vendor's recommendation.



2019 - 2020 Annual Overview (Year 2)

#	Recyclable Material	2018 Actual (A18) Revenue	2019 Estimate (E19) Revenue	Difference (E19-A18)	Notes	W Ref	VA Ref	Project Start to Date (PSD) Totals PSD Revenue
1	Books	$ 1,597	$ -	$ (1,597)	No Volume			$ -
2	Metals	$ 21,009	$ 21,540	$ 530	High Volume / Low Price			$ 21,201
3	OCC	$ 16,358	$ 3,905	$ (12,452)	Significant Price Drop	W5		$ 2,961
4	Plastics	$ 20,687	$ 12,846	$ (7,841)				$ 12,846
5	HWS	$ 4,385	$ 5,348	$ 964				$ 2,674
6	Magazines	$ 33,306	$ (71,471)	$ (104,778)	Significant Price Drop	W5		$ (69,178)
7	MWL	$ 8,943	$ 3,523	$ (5,419)	High Volume / Low Price			$ 1,174
8	OP1	$ 35,436	$ (1,129)	$ (36,565)	Low Volume/Low Price	W5		$ (1,035)
9	PMIX	$ 163,611	$ 94,846	$ (68,765)	Significant Price Drop	W5		$ 90,747
10	ML	$ 1,102	$ 1,205	$ 103				$ 703
	Totals	**$ 306,434**	**$ 70,614**	**$ (235,820)**				**$ 62,094**

#	Costs	Cost	Cost	Difference (E19-A18)	Notes	W Ref	VA Ref	PSD Cost
1	Garbage Costs	$ (153,615)	$ (105,002)	$ 48,613				$ (105,002)
2	Additional Services	$ -	$ (21,007)	$ (21,007)				$ (21,007)
3	Adjustments Needed	$ -	$ (3,034)	$ (3,034)				$ (3,034)
4	Print Division - Add	$ (86,386)	$ (40,049)	$ 46,338				$ (35,618)
5	Print Div.- shredding	$ -	$ (48,390)	$ (48,390)	Special Projects (see notes)	W4		$ (48,390)
	Totals	**$ (240,001)**	**$ (217,483)**	**$ 22,518**				**$ (213,052)**

Description	Total	Total	Difference (E19-A18)	Notes	W Ref	VA Ref	PSD Totals
Revenue (R):	$ 306,434	$ 70,614	$ (235,820)				**$ 62,094**
Costs (C):	$ (240,001)	$ (217,483)	$ 22,518				**$ (213,052)**
Total Revenue = R – C:	**$ 66,432**	**$ (146,869)**	**$ (213,302)**				**$ (150,958)**
Value Added (VA):	$ 195,286	$ 149,920	$ (45,366)				$ 149,920
Total with VA:	**$ 261,718**	**$ 3,051**	**$ (258,667)**				**$ (1,038)**

Figure 3: Screenshot of Year 2 WRR

Throughout Year 2, the vendor provided additional services at no cost to the client (Table 10). The vendor estimated that services saved the client over $149 thousand. Considering the revenue, cost, and value-added savings, the vendor minimized client losses to $1 thousand [the WRR tracking system is within $2 thousand deviation between the actual and estimated revenue/cost].

Table 10: Cost Savings from Year 2 Value Added Services

#	Description / Changes / Results	Annual Cost Savings
1	Grounds Crew Roll-Off Truck	$24,000
2	Took over management from Full-Time Employee	$100,000
3	Confidential Shredding	$23,040
4	Consulting services - Equipment Changes	$2,880
	Total Cost Savings	$149,920

Execution Phase - Year 3

During Year 3 (2020), the COVID-19 pandemic created a volatile stream of recycling materials that affected the supply chain and market prices. While some market prices leveled, other prices were on the rise. Some of the lower-level client workers, who did not like the vendor dictating the client's actions, were asking for a rebid of the recycling program. After reviewing the incumbent's documented performance in the WRR, the client decision maker signed a 3-year renewal with the high-performance vendor. The results of Year 3 are shown in Figure 4. Considering the recycling industry instability, minimized waste hauling cost, and value added savings (Table 11), the client was able to remain positive for their overall program.

2020 - 2021 Annual Overview (Year 3)

#	Recyclable Material	2019 Actual (A19) Revenue	2020 Estimate (E19) Revenue	Difference (E19-A18)	Notes	W Ref	VA Ref	Project Start to Date (PSD) Totals PSD Revenue
1	Books	$ -	$ -	$ -				$ -
2	Metals	$ 21,201	$ 24,667	$ 3,465	Higher Volume			$ 22,653
3	OCC	$ 2,961	$ 10,579	$ 7,618	Higher Price			$ 8,843
4	Plastics	$ 12,846	$ 9,584	$ (3,262)	Lower Volume			$ 9,584
5	HWS	$ 2,674	$ 1,716	$ (959)	Lower Price			$ 572
6	Magazines	$ (69,178)	$ (38,920)	$ 30,259	Higher Price			$ (36,211)
7	MWL	$ 1,174	$ -	$ (1,174)	No Volume			$ -
8	OP1	$ (1,035)	$ (127)	$ 908	Lower volume			$ (85)
9	PMIX	$ 90,747	$ 46,020	$ (44,727)	Lower Volume and Lower Price	5,13,14		$ 45,372
10	ML	$ 703	$ -	$ (703)	No Volume			$ -
	Totals	**$ 62,094**	**$ 53,519**	**$ (8,576)**				**$ 50,728**

#	Costs	Cost	Cost	Difference (E19-A18)	Notes	W Ref	VA Ref	PSD Cost
1	Garbage Costs	$ (105,002)	$ (81,843)	$ 23,159	Less Servicing			$ (81,843)
2	Additional Services	$ (21,007)	$ (33,014)	$ (12,007)	More Services			$ (33,014)
3	Adjustments Needed	$ (3,034)	$ -	$ 3,034				$ -
4	Print Division - Add	$ (35,618)	$ (36,831)	$ (1,213)				$ (30,634)
5	Print Div.- shredding	$ (48,390)	$ (11,772)	$ 36,618	Lower Volume			$ (11,772)
	Totals	**$ (213,052)**	**$ (163,460)**	**$ 49,592**				**$ (157,263)**

Description	Total	Total	Difference (E19-A18)	Notes	W Ref	VA Ref	PSD Totals
Revenue (R):	$ 62,094	$ 53,519	$ (8,576)	Lower prices			**$ 50,728**
Costs (C):	$ (213,052)	$ (163,460)	$ 49,592	Less Servicing			**$ (157,263)**
Total Revenue = R – C:	**$ (150,958)**	**$ (109,941)**	**$ 41,017**				**$ (106,535)**
Value Added (VA):	$ 149,920	$ 174,000	$ 24,080				$ 174,000
Total with VA:	**$ (1,038)**	**$ 64,059**	**$ 65,097**				**$ 67,465**

Figure 4: Screenshot of Year 3 WRR

Table 11: Cost Savings from Year 3 Value Added Services

#	Description / Changes / Results	Annual Cost Savings
1	Grounds Crew Roll-Off Truck	$74,000
2	Took over management from Full-Time Employee	$100,000
	Total Cost Savings	$174,000

Execution Phase - Year 4 [First year of the Vendor's Renewal]

By Year 4 (2022), market prices improved significantly, and recycling volumes went up in the client's facilities. The vendor generated a higher revenue than previous years and the client is generating a profit. In addition, the client faced issues with city violations, but the vendor has been able to respond accordingly and minimize any negative impact. The results of Year 4 are shown in Figure 5.

2021 - 2022 Annual Overview (Year 4)

#	Recyclable Material	2021 Actual (A21) Revenue	2022 Estimate (E22) Revenue	Difference (E22-A21)	Notes	W Ref	VA Ref	Project Start to Date (PSD) Totals PSD Revenue
1	Metals	$ 22,653	$ 50,003	$ 27,350	Higher Volume & Price			$ 43,863
2	OCC	$ 8,843	$ 47,545	$ 38,702	Higher Volume			$ 30,842
3	Plastics	$ 9,584	$ 51,678	$ 42,094	Higher Volume & Price			$ 51,664
4	HWS	$ 572	$ -	$ (572)	No Volume			$ -
5	Magazines	$ (36,211)	$ 156,157	$ 192,367	Higher Price, and Volume			$ 153,004
6	OP1	$ (85)	$ 5,743	$ 5,827	Higher Price, and Volume			$ 3,818
7	PMIX	$ 45,372	$ 68,932	$ 23,560	Lower Volume and Higher Price			$ 68,721
	Totals	**$ 53,519**	**$ 380,057**	**$ 329,330**				**$ 351,912**

#	Costs	Cost	Cost	Difference (E22-A21)	Notes	W Ref	VA Ref	PSD Cost
1	Garbage Costs	$ (114,857)	$ (79,494)	$ 35,364				$ (79,494)
2	Additional Services	$ -	$ (23,134)	$ (23,134)				$ (23,134)
3	Adjustments Needed	$ -	$ -	$ -				$ -
4	Print Division - Add	$ (36,831)	$ (61,471)	$ (24,640)				$ (41,455)
5	Print Div.- shredding	$ (11,772)	$ (4,118)	$ 7,654	Lower Volume			$ (4,118)
	Totals	**$ (157,263)**	**$ (168,216)**	**$ (4,756)**				**$ (148,200)**

Description	Total	Total	Difference (E22-A21)	Notes	W Ref	VA Ref	PSD Totals
Revenue (R):	$ 50,728	$ 380,057	$ 329,330				$ 351,912
Costs (C):	$ (157,263)	$ (168,216)	$ (4,756)				$ (148,200)
Total Revenue = R – C:	**$ (106,535)**	**$ 211,842**	**$ 324,574**				**$ 203,712**
Value Added (VA):	$ 174,000	$ 182,000	$ 8,000				$ 182,000
Total with VA:	**$ 67,465**	**$ 393,842**	**$ 8,000**				**$ 385,712**

Figure 5: Screenshot of Year 4 WRR

Throughout Year 4, the vendor is providing additional services at no cost to the client (Table 12). The services are worth $182 thousand. Considering the revenue, cost, and value-added savings, the vendor provided the client with over $279 thousand in services in the fourth year of the vendor's services. By the end of the year, they provided $385 thousand in services.

Table 12: Cost Savings from Year 4 Value Added Services

#	Description / Changes / Results	Annual Cost Savings
1	Grounds Crew Roll-Off Truck [annual savings]	$74,000
2	Helped Client Address a Sewage Violation	$4,000
3	Consulting on Global Sustainability Practices	$4,000
4	Took over management from Full-Time Employee	$100,000
	Total Cost Savings	$182,000

Overall Comparison

The vendor anticipated that Year 4 would bring in more revenue than previous years (Figure 6). In comparing the project performance of each year, it is clear how the best value recycling vendor helped the client overcome the recycling market collapse in Years 1-3. Despite the issues of the recycling market, the vendor managed to continually decrease project costs every year. The vendor was able to reduce costs in each category except for shredding which was due to the client increasing their shredding volume. Since Year 1, costs will have decreased by an estimated 63%.

Program Anaylsis (Year 1 - 4)

		Year 1	Year 2	Year 3	Year 4
#	Recyclable Material	Revenue	Revenue	Revenue	Revenue
1	Books	$ 1,597	$ -	$ -	$ -
2	CBS	$ -	$ -	$ -	$ -
3	Metals	$ 21,009	$ 21,201	$ 22,653	$ 43,863
4	OCC	$ 16,358	$ 2,961	$ 8,843	$ 30,842
5	Plastics	$ 20,687	$ 12,846	$ 9,584	$ 51,664
6	HWS	$ 4,385	$ 2,674	$ 572	$ -
7	IGS	$ -	$ -	$ -	$ -
8	Magazines	$ 33,306	$ (69,178)	$ (36,211)	$ 153,004
9	MWL	$ 8,943	$ 1,174	$ -	$ -
10	ONP	$ -	$ -	$ -	$ -
11	OP1	$ 35,436	$ (1,035)	$ (85)	$ 3,818
12	PMIX	$ 163,611	$ 90,747	$ 45,372	$ 68,721
13	ML	$ 1,102	$ 703	$ -	$ -
Totals		**$ 306,434**	**$ 62,094**	**$ 50,728**	**$ 351,912**

#	Costs	Cost	Cost	Cost	Cost
1	Shredding (HM)	$ 3,157	$ (48,390)	$ (11,772)	$ (79,494)
2	Garbage Costs	$ (58,354)	$ (105,002)	$ (81,843)	$ (23,134)
3	Additional Services	$ (67,800)	$ (21,007)	$ (33,014)	$ -
4	Adjustments Needed	$ (30,618)	$ (3,034)	$ -	$ (41,455)
5	Print Division - Add	$ (86,386)	$ (35,618)	$ (30,634)	$ (4,118)
6	Mgmt. & Overhead	$ -	$ -	$ -	$ -
Totals		**$ (240,002)**	**$ (213,052)**	**$ (157,263)**	**$ (148,200)**

Description	Total	Total	Total	Total
Revenue (R):	$ 306,434	$ 62,094	$ 50,728	$ 351,912
Costs (C):	$ (240,002)	$ (213,052)	$ (157,263)	$ (148,200)
Total Revenue = R – C:	**$ 66,432**	**$ (150,958)**	**$ (106,535)**	**$ 203,712**
Value Added (VA):	$ 195,286	$ 149,920	$ 174,000	$ 182,000
Total with VA:	**$ 261,718**	**$ (1,038)**	**$ 64,059**	**$ 355,788**

Figure 6: Cost and Revenue Comparison by Year

Conclusion

A large international client ran the Best Value Approach (BVA) to identify and utilize expertise in the recycling area to manage their recycling effort. The recycling industry was facing uncertainty. The incumbent recycling vendor for the client proposed that they would increase the vendor's manpower to provide management for the client's recycling services in a down turning industry. The BVA chose the best value vendor who was proposing to reduce recycling costs and increase revenue my using a performance information system.

The BVA purchasing approach reduced procurement time by 75% compared to the traditional time [67 days instead of 270 days], increased the revenue that the incumbent was proposing by four times [$476K instead of $103K annually], and selected a vendor that took over the management of recycling and the waste programs for the client.

The BVA approach identified and utilized the expert vendor's expertise. Instead of a relationship-based service, the best value vendor optimized the client's revenue and minimized costs. Over the four years of the vendor's service, the vendor minimized the impact of the downturn of the recycling industry and brought the client's recycling program back to where it was four years ago. During the four years, the best value vendor cut costs and maximized the recycling revenue.

The best value vendor managed the entire waste program of the client, identified recycling opportunities, and cut costs by creating efficiencies in the client's organization. The expert vendor utilized a Weekly Risk Report (WRR) to provide transparency on all revenues, costs, value added amounts and client additional requested work.

The project manager for the client observed the following:

1. In the vendor's organization, no other personnel were capable of providing the best value services and documenting all transactions on the WRR. This is the same observation in the client's other program in delivering janitorial services.
2. The client's stakeholders deferred to the vendor to optimize and manage all waste and recycling functions. The vendor took over one FTE position that the client used to employ. The vendor also restructured the green waste pickup, recommending to the client to purchase a larger rollup truck and utilizing their manpower more efficiently. The vendor also minimized the cost of waste operations.
3. After initial resistance by the client's stakeholders, the vendor expert became the manager of all services. The three major stakeholders were given surveys at the end of the project and rated the vendor 10/10.

The client stakeholder renewed the vendor's contract after the first three years because of their value-added nature. The stakeholders used to meet on a regular basis to see the status of their recycling and waste program. The client no longer meets with the vendor but has access to the WRR. The vendor has changed the relationship-based recycling/waste program to a vendor centric, performance information-based program. The weak point of the program is that the service depends on the expertise of the project manager. The client now has two very successful vendor centric services which are run by expert project managers.

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