

Organizational Implementation of Best Value Project Delivery: Impact of Value-Based Procurement, Preplanning, and Risk Management

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Many buyer organizations have attempted to implement new project delivery methods to increase performance on their contracting processes. Yet implementing new business practices can be difficult to accomplish successfully. An action research methodology was utilized to present a longitudinal case study of the University of Alberta's implementation of the Best Value Business Model (BVBM). A key research objective was to document and present observations of the change management principles utilized during the implementation of organizational change at a large public organization. Other research objectives included quantification of project-level and organizational-level success indicators that reflect the progress of change implementation. Results are analyzed after more than two years of implementation of the BVBM on ten separate contracts. Direct cost savings on these projects as a result of the BVBM has been documented to be as much as \$16 million when considering savings below budget and conducting comparisons against traditional project delivery methodologies. Other success factors include low rates of vendor and contractor change orders and high satisfaction among owner project managers with regards to the performance of contracted service providers. Contributions of this research include documentation how theoretical change management principles have been applied within an action research setting as well as the identification and documentation of success indicators for project- and organizational-level implementation of new project delivery methods.

Keywords: best value, change management, preplanning, project delivery, risk management.

Introduction

Many large organizations, both public and private, rely upon frequent purchases of external services, whether in the architecture, construction, and engineering industries or in other general service areas. Yet as market conditions and growing competition continue to become more disruptive, buyer organizations have become increasingly interested in implementing advanced project delivery processes (Hallencrutz & Turner 2011). Within the context of this paper, the term "buyer organizations" refers to public organizations – such as city and state governments as well as public institutions that deliver higher education – that purchase some type of services, whether in the areas of design, architecture, construction, facilities, or business services. Buyer organizations are looking to improve performance in a variety of ways, typically by introducing new procurement methods, contract planning techniques, and risk management and performance measurement systems (Santema 2011). However, successful implementation of new business processes can be difficult for organizations to accomplish and literature sources suggest that more than half of all efforts to implement new business processes ultimately fail to accomplish their original intended goal (Balogun & Hope Haley 2004; Maurer 1996; Pascale *et al.* 1997). This high rate of failure is a function of the fact that implementing new business practices within

an organizational setting can be complex and presents a variety of challenges (Judson 1991). In light of this fact, successful change management practices are rapidly becoming a required project management skill (Todnem, 2005).

Implementing new project delivery processes into buyer organizations is a project-driven process and presents a key challenge. Organizations that attempt to implement new business processes must balance the dichotomy between the company-wide implementation effort and the specific application of the new process on individual projects. This becomes a challenge in a project-driven environment because each project group is responsible to independently apply the new process while dealing with their own unique set of project-specific objectives, constraints, and needs (Pheng and Teo 2004). In this environment, the implementation effort becomes split between strategic and tactical viewpoints. The organization level, program-wide viewpoint is more strategic, a long-term effort which typically aims to implement a business process as the organization's "new way of doing business," or at very least as a permanent tool within the organization's skill set. On the other hand, the project-level viewpoint is more tactical in that the separate project groups must implement the process within their day-to-day operations while also remaining conscious of the specific objectives and shorter time span of their individual project.

One method that buyer organizations are turning to in order to improve their procurement, pre-planning, and contract delivery processes is the Best Value Business Model (BVBM), which is a holistic project delivery methodology (Kashiwagi *et al.* 2012b, Sullivan *et al.* 2010; van Leeuwen 2011, Watanabe *et al.* 2012). Implementation of BVBM within owner organizations typically occurs on two levels – multiple individual projects and the overall organizational adoption effort – and both must be implemented successfully for the BVBM to be sustained long-term (Sullivan *et al.* 2011). In response to this problem, the researchers reviewed the existing literature regarding process models of organizational change, which suggest certain actions that can be taken to increase the probability of successful organizational adoption of new business practices. The research then presents a longitudinal case study of BVBM implementation at a large public organization, the University of Alberta, over a two year period. An action research approach was utilized to gather and document the process of organizational implementation of BVBM within the University of Alberta and relate observations regarding how the implementation effort was structured in alignment with literature theories. In order to address both the project- and organizational-levels of organizational change implementation, success indicators at both levels were identified to assist in quantifying the impacts of BVBM implementation. Data for these success indicators was collected via the action research process from the researchers' observation of project meetings and electronic communication as well as project archival documentation. This data contributes quantifiable metrics that can be measured by buyer organizations that are implementing new project delivery methods such as the Best Value Business Model.

Research Objective

The objectives of this research were threefold:

1. Present the process model of organizational change utilized by a large public Buyer Organization to implement a new project delivery method (the BVBM).

The researchers document their observations of the process model implementation based upon their participation from an action research perspective. These observations provide application of theoretical organizational change concepts from the literature within the context of a longitudinal case study.

2. Quantify project-level success indicators resulting from implementation of the BVBM as a part of the overall organizational change effort.
3. Quantify organizational-level success indicators that reflect organizational implementation progress in adopting BVBM as a new project delivery method.

Literature: Process Models of Organizational Change

In order to promote successful implementation and long-term sustainability of project delivery processes, such as BVBM, it is important to first have an understanding of existing research in the area of organizational change implementation. In response to this, five process models of organizational change were reviewed to develop an understanding of the recommended change management principles that increase the probability of successful implementation. Process models of organizational change include specific change management principles that can be followed by organizations to increase their probability of successful implementation (Kinicki & Kreitner 2006). The importance of process models of organizational change was supported by Holt *et al.*'s (2003) comment that the extent to which organizations are able to achieve the benefits of new business practices is directly affected by the influence strategies used by organizational leaders to implement the change. The process models included in this paper were selected due to their prominence and comprehensive nature to gain a broader perspective into the existing knowledge within the field of organizational change research. The reviewed models included: Beer, Eisentat, and Spector 1990, Kanter *et al.* 1992, Kotter 1995, Armenakis *et al.* 1999, and Luecke 2003. Although these process models originated in the 1990's and early 2000's, these process models are still relevant to current research and are widely cited in the literature today (Kinicki and Kreitner 2006). Ates and Bititchi (2011) noted that organizations today still place heavy emphasis on implementation, although unfortunately the planning and preparation phases are sometimes less emphasized, which can lead to less success.

The key change management principles contained each within model were tabulated to develop an understanding of important practices and strategies to increase the success of organizational change efforts. Twelve leading change management principles were identified within the reviewed models and the frequency with which each change management principle appeared in the literature models was noted (see Table 1). Each of the change management principles is summarized in the following section.

Table 1

Change management principles identified in the literature

Change Management Principle	Beer, Eisenstat, Spector 1990	Kanter et al. 1992	Kotter 1995	Armenakis et al. 1999	Luecke 2003	Frequency of Citation
Create Motivation for Change	X	X	X		X	80%
Analyze Problems & Needs	X	X		X	X	80%
Identify Solutions & Vision	X	X	X	X	X	100%
Establish Core Team Leadership	X	X	X		X	80%
Secure Executive Support	X	X	X			60%
Strategic and Tactical Planning		X				20%
Educate the Change Message	X	X	X	X	X	100%
Overcome Resistance	X		X	X		60%
Implement on Test Basis		X		X	X	60%
Expand to Intended Scale	X		X	X	X	80%
Transition to Institutionalization	X	X	X	X	X	100%
Long-Term Measurement					X	20%

Create Motivation for Change. Change efforts require coordinated efforts by a multitude of people, and these people are more likely to be engaged when there is a sense of urgency to motivate them (Kotter, 1995). Luecke (2003) suggests a good rule of thumb is that the goals of the change cannot be achieved unless 75 percent of managers believe they must change from the status quo.

Analyze Problems and Needs. A broad review of the business is undertaken to come to a “joint diagnosis” of the roots of the current problems (Beer *et al.*, 1990). Kotter (1995) observed that successful changes generally start with frank discussions about unpleasant facts where multiple parties are engaged.

Identify Solutions and Vision. The vision is a “picture of a destination aspired to, an end state to be achieved via the change” (Kanter *et al.*, 1992). The vision is not necessarily a fully developed strategy, but is intended as the general purpose or goal for the movement; oftentimes, the details are worked out during implementation. Nanus (2003) stated that the vision for change must convey “a realistic, credible, attractive future for your organization.”

Establish Core Team Leadership. A visible leadership or Core Team must act as the leading change agents to implement the change. It is critical that these personnel have the operating know-how to accomplish the goals (Luecke, 2003). Armenakis *et al.* (1999) stated that the most important trait of Core Team leadership is credibility in the eyes of other organizational members.

Secure Executive Support. Executives often control resources needed by the Core Team implementers and their backing is crucial (Kanter *et al.*, 1992). Executive also supporters also wield the clout to further legitimize the change.

Strategic and Tactical Planning. The strategy is important to clarify high level goals, identify who is involved, and define roles and responsibilities of participants (Kanter *et al.* 1992). Tactical planning of specific projects or areas to change is important not only to help foster learning, but also to create short-term wins to maintain momentum and bring recognition (Kotter, 1995)

Educate the Change Message. The change message is critical to helping implementation and should answer five key questions: (1) Is the change really necessary? (2) Is the specific change being introduced appropriate? (3) Can I/we successfully implement the change? (4) Is there high level, long term support for the change? (5) What's in it for the change recipients? (Armenakis *et al.*, 1999).

Overcome Resistance. Resistance often crops up as employees feel shock, fear of the unknown, mistrust, fear of failure, loss of power, lack of perceived rewards (Armenakis *et al.*, 1990; Luecke, 2003). Education and communication to address these issues is an important responsibility of the Core Team change agents.

Implement on Test Basis. Starting change on the periphery enables flexibility, experimentation, and improvement before impacting the whole organization (Luecke, 2003). Individual units or projects essentially become “developmental laboratories” for the change (Beer *et al.*, 1990).

Expand to Intended Scale. Building on initial implementation and short-term wins aids the diffusion process. Beer *et al.* (1990) recommend letting each department or expansion area “reinvent the wheel” to find the most optimal way to integrate the change into their environment.

Transition to Institutionalization. Institutionalization is the condition where the change becomes “the way we do things around here” (Armenakis *et al.*, 1999). The transition begins when the change has become more entrenched, the right people are in place, and the new team work setup is functioning (Beer *et al.*, 1990).

Long-Term Measurement. Kanter *et al.* (1992) stress the importance of sustaining the change by continuously providing feedback mechanisms to show organizational performance in terms of results metrics (showing we have “done it”) and process metrics (showing we are doing the right things to accomplish “it”).

Research Background

The research background is divided into two sections. The first section provides greater background detail concerning the characteristics of the Best Value Business Model, representative organizations that have implemented BVBM, and key organizational change that BVBM implementation necessitates. The second section provides a brief background on the University of Alberta and its goals for BVBM implementation.

Best Value Business Model (BVBM)

The Best Value Business Model is not a new process; rather, it has been tested on more than 900 individual procurements of construction and design services with a total value of more than \$2.7 billion (Kashiwagi *et al.* 2012a). The BVBM has been implemented by more than 80 organizations, generally representing large buyers of construction services in the public and private sectors, including the U.S. Army Medical Command, Arizona State University, State of Oklahoma, University of Alberta, State of Idaho, University of Minnesota, General Dynamics, Harvard University, and Rochester Public Schools (Sullivan 2011).

The Best Value Business Model includes a three-phased project delivery model, which is described below.

1. Selection Phase

The selection phase consists of a value-based evaluation process to procure a contract for the delivery of any type of good or service. Components of the value-based procurement include (Bos 2012, Van de Rijt and Santema 2012):

- Past Performance Information on key firms and individuals.
- Risk-based submittals that ask Proponent to identify, prioritize, and minimize risks they see in the service delivery.
- Value Added submittal wherein Proponents may propose alternatives to the prescribed scope of services.
- Interviews with the operations personnel who will deliver the good or service.

2. Pre-Award Clarification Period

Prior to awarding the contract, the highest rated Proponent from the Selection Phase participates in a brief, yet rigorous, pre-planning and risk management process. The highly flexible and unique approach includes traditional pre-planning activities augmented with a specific focus on risk, client concerns, alignment of expectations, and the selected Proponent's service delivery plan.

3. Performance Measurement

The third stage incorporates a performance measurement system for the duration of the contract terms. The selected Proponent tracks risks or other impacts that are encountered for the duration of the service delivery. Performance measurement data can be collected from individual contracts and combined into a single, program-level report.

When implementing the Best Value Business Model, organizations undergo several key changes in their procurement and project management processes: (1) a value component is added to the traditional procurement process wherein proposing AEC firms are asked to submit risks they identify to delivering a successful project and provide their proactive risk mitigation solutions; (2) a formal, risk-based pre-planning process is conducted with the highest-rated proposer in

order to clarify the plan for project delivery prior to entering into a contract; and (3) a performance measurement system is utilized to track risk against the original contract plan for the duration of project management and delivery.

Introduction of BVBM at the University of Alberta

The University of Alberta is located in Edmonton, Alberta and is the largest postsecondary institution in the province, as well as one of the largest in all of Canada. UA has a student enrollment of approximately 37,000 full time students and part time students with an academic support staff of approximately 11,700. The budget for UA is \$1.7 billion and has a \$500 million procurement spend, making it a large public organization that commands a large amount of buying power. The services that UA procures are wide ranging, from design and construction of capital projects in the range of \$150 thousand to more than \$150 million, along with many general services.

Methodology

The researchers utilized an action research approach to examine the project- and organization-level implementation of the Best Value Business Model at the University of Alberta for a period of more than two years. Action research is a methodology that provides the researcher with the opportunity to observe changes as they occur in “real time” (Coughlan and Coughlan), which provides researchers with a more holistic perspective regarding how change occurs within the organizational context (Gummesson 2000). There are three main benefits of action research conducted in this manner (Powell Jr. 2002). First, the research is based on actual conditions and not just preconceived or theoretical models. Due to this approach, the research presented in this paper contributes to organizational change literature by providing “real time” observations and success indicators of project delivery implementation in a large public organization. Second, action research enables high levels of collaboration between researchers and the participating members of the organization, which grants researchers greater access to critical information such as archival documentation, implementation issues, and project performance. Third, action research provides the adequate research flexibility to observe, analyze, and evaluate the constantly evolving aspects of organizational change endeavors. The action research team was composed of multiple investigators who, in accordance with research methodologies of Eisenhardt (1989), practiced an overlapping data collection and analysis process while in the field. Following the recommended practices of Ravenswood (2011), data collection was conducted using multiple methods including project archival documentation, contract performance data, and direct observations of project meetings as well as organizational-level strategic planning sessions.

Project-Level Implementation

Successful implementation of the BVBM on the project level was documented via multiple forms of performance data for each individual contract. The project performance data collected for project level implementation is summarized in Table 2 and described in detail below. The Contract Value for each project was recorded as the awarded contract

cost in millions of dollars. The Contract Duration was also documented as the number of months from the Notice to Proceed to substantial completion and project close out. Budget Savings were defined as the amount of dollars (in millions) that the Client organization saved on the selected vendor proposal price in reference to their budget. The percentage below budget was also calculated. Project Cost Savings were also tracked for as the total dollar value (in millions) that the Client organization estimated were saved via the risk minimization aspects of BVBM implementation when compared against their traditional project delivery methodologies. Project schedule savings were documented as the actual project duration (reported as number of months) compared against the original client-estimated schedule. Value Added was measured as the dollar value of vendor-generated contract alternates that were accepted by the client organization. Finally, Client satisfaction was measured on a 1 to 10 Likert-like scale by the Client project manager assigned to each project. The lead project manager for each contract provided satisfaction ratings specifically relating to the project delivery process used to select, contract with, and manage external vendor teams.

The data was gathered via direct research observation and participation in project meetings, including planning sessions and risk management meetings that occurred on a weekly basis for the duration of each contract. Project archival documentation included copies of the Request for Proposal, bid packages with risk and value proposals, scope documents, key performance indicators, service level agreements, change orders, and project email communications.

Table 2

Summary of collected data for project level implementation

Project Performance Data	Metric
Contract Value	\$ millions
Contract Duration	months
Budget Savings	\$ millions (percentage)
Project Cost Savings	\$ millions (percentage)
Project Schedule Savings	months (percentage)
Value Added	\$ hundred thousands
Client Satisfaction	1-10 Rating

Organization-Level Implementation

In addition to the project-level data, the researchers also emphasized the observation and analysis of success indicators to show more holistic progress of implementation on organizational level. Table 3 provides a summarized view of the data collected for organization-level implementation of the BVBM, which mainly consists of aggregated project data, project characteristics, and overall contract performance. For example, the number of BVBM implementations was tracked alongside the total dollar value of all associated contracts to identify the scale of organizational implementation. The number of unique project types was also tracked to show the flexibility of BVBM application to accommodate various scope packages. Unique project types were defined as the distinct industries or highly variable project sizes and objectives within a certain industry. As an

illustration of this classification, a large-scale new capital construction project was counted as a unique service when compared against smaller renovation projects that were limited to single laboratory or classroom spaces.

Table 3

Summary of collected data for organization level implementation

Project Performance Data	Metric
Number of Project Implementations	#
Total Contract Value of Projects	\$ millions
Unique Project Implementations	#
Percentage of Projects where Highest Rated Proponent was Lowest Cost	%
Total Cost Savings of BVBM Program	\$ millions
Overall Client Satisfaction	1-10 Rating
Vendor Change Order Rate	%
Vendor Schedule Delay Rate	%

The percentage of projects where the highest rated proposing Vendor during the Selection process was also the lowest proposal price were documented as an overall organizational metric. The researchers observed that buyer organizations may be hesitant to implement value-based procurement methodologies because of the perception that proposal prices will increase. In this metric, the highest rated Proponent was defined as the vendor team that received the highest rating from the Client’s evaluation committee. The researchers then tracked how frequently this occurred on across the entire organizational implementation of BVBM at the University of Alberta. Total Cost Savings were measured as the total value of contract award in comparison to budgeted dollars in addition to internal cost comparisons showing project execution savings compared against traditional process performance. Overall client satisfaction with the BVBM in terms of project delivery performance was measured as the average satisfaction ratings provided by all project managers on each BVBM project implementation. This rating thus represented the overall organizational satisfaction with project delivery performance under the BVBM. Organizational rates for change orders and schedule delays were aggregated for all BVBM project implementations. A modification of Wang and Gibson’s (2010) methodology was used to track change order and schedule delay rates, such that change orders were defined as $[(\text{final cost} - \text{award cost}) / \text{award cost}]$ and schedule delays were defined as $[(\text{final duration} - \text{award duration}) / \text{award duration}]$.

Results of the Process Model for Organizational Implementation

Organizational implementation of BVBM at the University of Alberta was conducted in accordance with the change management principles included in the process models from the existing literature. The researchers participated in the implementation process from an action research perspective and recorded their observations of the “real time” implementation effort in relation to the theoretical change management principles that were recommended in the literature. The observed actions and results from BVBM implementation at the University of Alberta are described in the following section according to each process step recommended in the literature.

Create Motivation for Change, Analyze Problems and Solutions

The University of Alberta was first introduced to the BVBM approximately five years prior to their decision to proceed with implementation. UA's first introduction to BVBM came when their Vice President (VP) of Finance and Administration and the VP of Facilities and Operations attended a presentation by Dr. Dean Kashiwagi. UA was motivated to consider BVBM implementation in order to adopt value-based procurement processes to increase the quality of outsourced service providers UA selected and to incorporate pre-planning and risk management practices to save costs, increase efficiency, and reduce change orders. After their initial introduction, UA conducted an extended internal review to analyze challenges and opportunities within their environment. Over the next few years, UA sought increased exposure to BVBM concepts by attending additional presentations. UA then waited for the right time to pursue initiation in a more direct manner.

Secure Executive Support

Since it was the VP of Finance and Administration and the VP of Facilities and Operations who were first motivated to enact the change, executive support for BVBM implementation was in place even before implementation efforts ever began. Once the decision was made to move forward with implementation, the VPs functioned as executive sponsors to the core team who would be responsible to drive the day-to-day implementation effort on both the tactical and strategic level. The UA core team was responsible to report to the executive sponsors on a regular basis to present BVBM implementation progress, future strategic direction, and identify any organizational barriers that may exist.

Establish Core Team Leadership

Once UA partnered with PBSRG, they quickly established a core team to plan and lead the actual implementation effort. The key leaders of the core team included the Director of Supply Management Services (SMS) and the Executive Director of Facilities (F&O) and Operations, who effectively formed an implementation partnership between their two departments. This was a natural partnership because SMS housed the contracting officers responsible for university procurement while F&O was one of the largest end users for which SMS procured these goods and services. F&O personnel included UA project management personnel responsible for delivering many of the contracts procured by SMS.

Strategic and Tactical Planning

UA's strategic vision for BVBM implementation was to improve organizational effectiveness via four objectives:

1. Become a measured organization that can demonstrate value on contracts.

2. Increase preplanning and risk management techniques on contracts.
3. Procure and contract with high performing vendors.
4. Add value-based selection methodologies to UA's procurement skill set.

In order to accomplish this strategic vision, a tactical plan was established to implement BVBM on a project by project basis. In this manner, project-level personnel would have the ability to participate directly in the implementation process and gain hands on experience in accomplishing day-to-day procurement and contract management tasks according to BVBM. Pilot project were identified and it was determined that different project personnel should actively participate in the delivery of each pilot. There would be some overlap of personnel between projects to increase their educational exposure to the new techniques.

Educate the Change Message & Overcome Resistance

The vision for strategic and tactical implementation of BVBM was communicated with UA organizational members via education touch points, planning meetings, and bi-weekly project planning meetings. These trainings were intended to reduce tactical concerns of UA project-level employees and increase their understanding of how BVBM would be executed on a project-by-project basis. Ongoing training and support was also provided to them by the PBSRG during project delivery.

Preliminary educational outreaches and pre-proposal meetings were conducted with external stakeholders to introduce UA's intent in adopting the BVBM on their upcoming procurements. The intent behind these outreaches was twofold: first, to reduce natural reactions of confusion and resistance that would inevitably be encountered when UA first began pilot testing the new process and second, to help create a common level of understanding about the new business approach, address questions and concerns, and orient external industry with respect to how to be successful in this new environment.

Implement on a Test Basis

Initial pilot projects were planned to function as "hands on" learning experiences for the core team and additional UA project-level personnel, including contracting officers and project managers. Tactical planning identified pilot projects that could implement the BVBM on a test basis, with the strategic benefit that each of the three pilot tests was planned to be within a different industry or type of service. The core team would be directly involved in the delivery of the first pilot project so they could gain familiarity with the techniques within the BVBM. Bi-weekly training sessions were held with PBSRG to ensure the core team had the necessary knowledge to successfully implement BVBM on the pilot project. Separate personnel were later chosen to deliver the subsequent pilot projects so UA could begin internal expansion of BVBM exposure.

Expand to Intended Scale

Expansion of BVBM implementation to a full organizational program commenced after 1.5 years of mainly focusing on pilot project efforts and increasing organizational

readiness. After 1.5 years, the expansion program was launched with an additional seven projects in addition to the original three pilot projects. When the expansion projects were launched, UA also began expanding their pool of participating project-level personnel in order to continue building a contingent of supporters with direct implementation experience.

Transition to Institutionalization and Implement Long-Term Measurement

The transition to institutionalization will continue to develop UA's self-sufficiency with implementation by maintaining project-level application of BVBM on new contract releases. The development of organizational-level measurements has begun in order to track real-time performance of the overall BVBM program. This measurement is intended to drive accountability that will sustain BVBM in the long-term, identify areas of weakness that can be augmented, and continuously quantify the benefits of BVBM implementation.

Project Implementation Results

Results of BVBM implementation at the University of Alberta are separated into three sections. First, project-level results of the three pilot projects are examined. Second, highlights and results of BVBM expansion phase are discussed to show the magnitude of the current BVBM program at the UA. Finally, overall successes on the organizational level are quantified to reveal the total impact experienced over the first two years and four months of BVBM implementation.

Pilot Projects

UA implemented three pilot projects as the initial testing grounds for BVBM implementation. The first pilot project was to procure custodial services for an initial three year term with options for three additional extension terms of three years, two years, and two years (a maximum of ten years). The value-based selection process resulted in clear differentiation among the bidding contractors: the selected firm was the lowest submittal price and also had the highest overall evaluation rating in the other selection categories of past performance information, risk submittals, value added submittals, and interviews (as described in the Research Background section). The submittal price resulted in a direct budget savings of \$0.5 million per year, and UA gained another indirect savings of approximately \$180 thousand per year in value added options that were exercised. The value added options leveraged the contractor's expertise in providing quality control services that enabled the internal reassignment of three internal full time employees at UA. After more than 1.5 years of service delivery, performance measurements have shown that the contractor is working at an equal or higher standard than established on campus. At the first year annual performance review, the contractor's performance was shown to be 5.5 percent higher than previous service levels that were shown to be satisfactory on campus. This information was documented by comparing the average performance level of custodial services on campus for the previous five years before the contract was awarded and then comparing against the

documented performance over the first year. The observed 5.5 percent performance increase has been viewed by the owner as a metric of improved contract value.

The second pilot project was for design-build delivery of a high tech research facility on campus. The project scope consisted of the repurpose of a cold storage facility to a specialized academic teaching, research, and production facility for radiopharmaceuticals utilized in cancer treatment research. This was a technically challenging and highly complex facility that included a 24MeV cyclotron particle accelerator. The value-based selection process resulted in the selection of a highly qualified, expert design-build team. During the pre-contract planning period, the design-build team identified multiple risks that were unknown and would have had a significant negative impact if not discovered until mobilization and construction. After extending the pre-contract planning period by nearly two weeks, the design-build team was able to present UA with solution strategies that minimized the cost and schedule impacts of the unforeseen risks. The solution strategies included an improved layout of mechanical equipment interstitial space and a foundation design that better met structural requirements while simultaneously achieving schedule acceleration. UA analysis showed that if the project were awarded and conducted according to traditional delivery methods, it would be estimated at a cost of \$44-48 million and a scheduled duration of 48 months. Substantial completion was reached in December 2012 with final project closeout planned in late spring of 2013, which placed the total project cost (after unforeseen risk impacts) at \$32 million and the delivery duration of 18 months.

A third industry was selected to participate in UA’s third pilot project: the design and engineering consultant community. This third project was for the design and redevelopment of an iconic building on campus. After a phased selection process, expert consultants were separately selected to provide consulting services in the three areas of (1) architectural, structural, and building envelop services, (2) mechanical engineering, and (3) electrical engineering. The selection was made below budget and \$190 thousand in additional value added services were accepted, which provided UA with enhanced three-dimensional modeling, weather mapping, and augmented reality components. The design process has completed design development. To date, the design team has delivered phase reports for conceptual design and schematic design on time and at a level of quality that has been highly satisfactory.

Table 4

Pilot project results

#	Project	Contract Value	Cost Savings	Schedule Impacts	Satisfaction/Performance
1	Custodial Services (Campus-Wide)	\$18M (3 year term)	\$1.5M (10%)	5.5% service improvement	10 (out of 10) Satisfaction
2	DB Construction (High-Tech Research Facility)	\$32M	\$14M (30%)	30 mo. reduction (63%)	9.7 (out of 10) satisfaction
3	Design Services (Iconic Building Redevelopment)	\$4M	\$500K (12%)	0% designer cost & schedule increases	\$190k in Value Added options

The results of these three pilot projects are summarized in Table 4. UA has quantified a direct total savings of more than \$16 million under budgeted levels and compared against traditional delivery processes. Across the three industries where BVBM was implemented – general services, construction, and design – results have shown a significant increase in service levels, drastic reduction in schedule time compared against traditional delivery methods, and a reduction in vendor-generated change orders.

Organizational Implementation Results

Results of the pilot and expansion projects can also be combined to examine the impact that BVBM implementation has had on UA’s organizational level over the past few years. Table 5 provides a summary of the organizational implementation of BVBM at the University of Alberta. Key success indicators include the total contract value and number of projects implemented according to BVBM techniques as well as the versatility of BVBM to add value in the delivery of six unique service types: custodial, construction, design, travel management, consulting, and large scale product supply. Internal program analysis conducted by UA has estimated the direct cost savings on BVBM projects to be at least \$16 million. Low vendor/contractor-generated change order and delay rates have been documented on BVBM projects. The lead UA project manager responsible for delivering each of these projects have rated their satisfaction with the performance and risk management capabilities of best value proponents as an average 9.8 out of 10. Another indicator of BVBM success is the fact that 50 percent of the selected vendors were also the lowest cost Proponent during the evaluation process. This is an important success metrics because it shows that value-based procurement practices do not necessarily function to increase prices; instead, half the time it has been observed that the highest performing Proponent is also the lowest cost. It may also be worth noting that of the four contracts where the highest performing Proponent was not the lowest cost, three were actually the second lowest cost option.

Table 5

Organizational impact of BVBM implementation

Project	Industry
Total Best Value Projects	10
Estimated Value of Best Value Projects	\$150+
Number of Unique Services	6
Percentage where Best Value Selection was also Lowest Cost	50%
Total Cost Savings (measured internally by UA)	\$16M
Average Client Satisfaction with Vendor Performance	9.8 (out of 10)
Vendor / Contractor Change Order Rate	1.2%
Vendor / Contractor Schedule Delay Rate	3.7%

Other organizational factors of success that have been accomplished include:

- Consistent identification and selection of high performing vendors. The positive results of the organizational-level success indicators appear to show that the BVBM has achieved the strategic objective of consistently awarding contracts to high performing external vendors, contractors, designers, and consultants.
- Each of the ten projects has utilized, or is planned to utilize, a formal pre-contract planning period and structured performance measurement system.
- UA has conducted multiple debriefs on BVBM implementation with their core group and internal staff to communicate successes and lessons learned in order to foster greater organizational knowledge in BVBM application.
- Debrief sessions with selected external vendors and consultants have also occurred to solicit feedback from industry participants in BVBM implementation at UA.
- UA core group members have organized and conducted multiple presentations on their BVBM efforts to other public buyer organizations, including various governmental agencies and numerous professional associations consisting of Canadian purchasing officers, university business officers, financial officers, resource planners, and supply managers.
- Increased ability to leverage industry expertise via Value Added options provided with the submittals on all ten BVBM projects as well as the first use of Vendor-Generated Solution submittals on the Travel Management Services contract.

The training requirements and general delivery efforts for the first three pilot projects consumed most of the organizational bandwidth for BVBM implementation over the first 1.5 years. Yet in summer of 2012, UA began to expand its implementation efforts into a full BVBM program by launching multiple projects in rapid succession. In the last eight months, UA has launched an additional seven contracts under the project delivery characteristics of the BVBM, more than tripling the size of the overall UA BVBM program. The seven contracts within this expansion phase include a wide array of industries, including three design and engineering services contracts, a construction management program with two preferred suppliers, travel management services, eProcurement consulting services, and the campus-wide supply and delivery of cleaning products small equipment. A summary-level view of these projects is provided in Table 6, along with their contract value and current status.

Table 6

Expansion program

#	Project	Industry	Contract Value	Status
4	Construction Management Program	Construction	\$8M	Awarded
5	Redevelopment of Universiade Pavillion	Design	\$7M	Awarded
6	Fire Alarm Upgrades	Design	\$5M	Awarded
7	Travel Management Services	Services	\$2M	Awarded
8	Founders Hall Redevelopment	Design	\$5M	Awarded
9	Consulting Services for eProcurement	Services	\$100K	In Procurement
10	Cleaning Products	Services	\$48M	In Procurement

The expansion of the BVBM program at UA has seen the addition of seven projects with a total contract value of at least \$65 million. Project highlights include a construction management (CM) program that has identified a preferred supplier list consisting of two suppliers of construction management services. This program will accommodate small construction, renovation, and maintenance projects on campus including classroom renovations, laboratory development, and office space upgrades up to a maximum \$2.5 million value per project. The CM program has been established to provide UA with a rapid contracting and project delivery structure to accommodate quick turnaround on these smaller projects. Since this program will include multiple projects, two separate construction manager firms, and multiple UA project managers, it is planned to be a leading candidate to establish its own program-level performance measurement system to track cost and schedule growth as well as closeout ratings on CM performance for each job (which in turn impacts competitiveness on future projects released under the program).

Conclusion

The research objective was to: (1) present observations of the process model of organizational change used to implement the Best Value Business Model at the University of Alberta, (2) quantify project-level success indicators of BVBM implementation, and (3) quantify organization-level success indicators of BVBM implementation. An action research approach was used to observe, document, and analyze the implementation process at UA in relation to the change management principles recommended by the literature. The researchers acted as direct participants in the implementation effort to provide training support to UA's core team leadership and project-level personnel.

After more than two years of implementation, the documented success indicators have shown that BVBM implementation at UA has had a positive impact on both project and organization performance. To date, BVBM has been implemented on ten separate projects in six unique service sectors, including custodial, construction, design, travel management, information technology consulting, and large scale product supply. The direct cost savings on these projects has been documented to be as high as \$16 million when considering savings below budgets and conducting comparisons against traditional project delivery methodologies. Other success factors include low rates of vendor and contractor change orders and high satisfaction among UA project managers with regards to the performance of contracted service providers.

As the third year of implementation unfolds, UA objectives consist of fostering greater self-sufficiency with pre-contract planning enforcement, creation and establishment of program-wide measurement tools, and increased training for evaluation committees. UA plans to continue its rate of project-level application of BVBM techniques, including the integration of BVBM pre-contract planning and performance measurement techniques on non-value-based procurement contracts. Additional objectives include hosting internal review sessions to provide a forum to gain feedback from external vendors who

participated in BVBM project and also to promote formal discussion of lessons learned amongst UA personnel.

Contributions of this research include documentation how theoretical change management principles have been applied within an action research setting. This contributed to the literature by demonstrating that implementation of new project delivery processes can follow the theoretical constructions presented in the literature to achieve success on both the project and organizational levels. Additional contributions include identification and documentation of success indicators on the project level and for organization-wide implementation of new project delivery methods.

The researchers have additional objectives for future research to continue refining the process model for organizational change management. To support these objectives, the researchers recommend further development of training resources and strategies, followed by application and analysis in action research settings across a multi-organization data sample.

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