Abstract
A new project management model has been under development at Arizona State University. A model using the alignment of expertise instead of management and control is being used to deliver complex services including construction, IT, professional services, and combination construction/professional services. This model decreases the project management (PM) management, direction, and control functions. It uses new deductive logic concepts to identify experts, assist the experts to define their solutions, and measure and minimize their project cost and time deviations. The new model minimizes the risk of the project managers, and assists them to increase their leadership and quality assurance capabilities. The preliminary results are 98% customer satisfaction, minimal vendor caused project deviations, and increased vendor profit without increased project cost. Results include documented performance at Arizona State University and the University of Minnesota, the infrastructure agency in the Netherlands minimizing the delivery time of construction services by 50% on $800M of fast track projects, the General Services Administration (GSA) Heartland Region installing the model in 2012, Brunsfield, implementing the new model in their supply chain in Malaysia, and the Western States Contracting Alliance (WSCA) attempting to create a sole source arrangement with Arizona State University to get project management/procurement assistance using the new model to deliver services for its 26 different western states.

Keywords: new project management model, deductive logic, alignment of expertise

Introduction
The traditional project management model is one based on management, direction, and control of the vendor (Zwikael, 2009). The result of delivering construction and information technology through the traditional project management model has been less than effective over the past twenty years (Schneider, 2009; Lepatner, 2007; Egan, 1998). Using the industry structure model (Figure 1), the traditional method of the delivery of service is by use of a contract and specifications developed by the client/buyer's professional representative. Ironically, it places the buyer in a position of being the expert and directing expert vendors. The situation is made worse by the client's professional using minimum acceptable standards in their specifications with the intent to identify the required system/services. When the client is using a contract and specifications, the following are some of the negative results (Kashiwagi, 2009):
1. Control. Assumes control, which has never been validated as an accurate assumption.
2. Enforcement. Assumes that we can enforce the minimum acceptable standards, which is not accurate.
3. Low price. Makes the low price the most important factor.
4. Reactive. Forces vendors to be more reactive.
5. The Manager, director, controller is the non-expert. Makes the client/buyer's PM the expert, who must direct the vendor (one who actually does the work, who can see a project from beginning to end because of their expertise and experience, and one who should be accountable for the project results), which makes the vendor more reactive.

Control and enforcement have never been validated as a method to improve performance and value, and has always led to higher costs, more negative impacts, and higher risk (Kashiwagi, 2011). Dominant examples include the U.S. attempt and failure to change other countries (Iran, Iraq, Afghanistan, Haiti, etc.), the failure of the drug war and prohibition, the ineffective expectation of the penal system to change illegal behavior, and the unmet expectation of the welfare system. For some inexplicable reason, professionals continue to use practices which have not been documented to lead to conclusive successful results. Figure 2 shows that when
the client uses minimum standards, vendors assume that the client will award based on low price, and transform the minimum into a maximum and drive down both value and performance. Low price brings the following characteristics to the supply chain: reactive behavior, low performance, lack of accountability, and transactions.

Figure 1: Industry Structure Model

Figure 2: Minimum Standards

Figure 3 shows the impact of directing the vendor with a specifications and awarding to the low price. It forces the high performer vendor to do the following:

1. Assume that the specifications are perfect and all inclusive. The only way to minimize price is to assume that the project has no risk (Risk increases price).
2. Assumes that the minimum requirements are enforceable. Most minimum standards are not enforceable allowing vendors to "meet the minimum standards" with services that do not meet the intent.
3. Become reactive, minimizing any proactive thinking to minimize risk.
4. Clearly establishes the client as the expert.
5. Minimize the need for experts on their team.

Directing the vendor with a specification makes vendor #1 less competitive and allows vendor #4 to be competitive even if vendor #4 does not meet the minimum standard due to the inability to legally prove that vendor #4 is substandard.

Figure 3: Impact of Specifications and Price Based Award
The following problems have been identified over the last 18 years of research into project/risk management (Kashiwagi, 2011; Aubert, et. al., 1998; Gallivan, et. al., 1999):

1. The client's management, direction, and control of the vendor is not an optimal delivery system and leads to increased project risk and a degradation of value.
2. Vendors become more reactive and less visionary over time in a price based, client directed and controlled environment, increasing project risk.
3. A increased decision making environment (client representative must make more decisions on "what can be done?" and "how to make the vendor do what is required?" and vendors making decisions on how to make a profit when reacting to a non-expert's directions and cost expectations) increases project risk and the chances of parties thinking in their own best interest (win/lose).
4. Clients and vendors have responded to the increased risk by forming relationships, passing more information and working together, which has minimized accountability and increased legal issues.
5. Problems are looked at as technical issues, which require more technical expertise, more details, and decreasing transparency.
6. Time has not been taken on projects to preplan or plan ahead of time. Rather project managers representing buyers and clients concentrate on meeting technical requirements which are not easily translatable into performance requirements, leading to a major effort in dispute resolution, mediation, and methods of solving problems once they occur.
7. Once the project focus turns "technical," it becomes difficult for the client /buyer to assign accountability. Project test results show that vendors have a difficult time to have a concise plan, where they can identify, document the measure the time and cost deviation of projects.

Proposal
The current client driven delivery of services creates a systems problem. It has resulted in a reactive, decision making, win-lose and lower quality service environment. The project management and risk management industry has reacted to this dilemma by creating a decision making, management, direction and control profession to minimize the increased risk and potential negative impacts of the inefficient service model. This is despite dominant proof that it is not possible for one party to efficiently and effectively control another party. Under the perception of complexity, non-transparency, and the lack of vendor accountability, they have turned to management, direction, and control, even though organizations realize that they must slash management to become efficient. The authors are proposing that for project managers to increase the value and decrease the cost, a model based on deductive logic must be implemented to minimize the need to manage, direct, and control the vendor. The authors propose that the new project management model must use concepts of leadership and alignment that are "accurate" and have been proved through observation. Simply stated, if the client hires a vendor who knows what they are doing, the project has a great probability of being a success.

Methodology of Solution
To create a model that minimizes the decision making and management, direction, and control of vendors by the client, the authors propose the following methodology:
1. Identify the practices in the current model which increase risk (customer dissatisfaction, project cost and time deviation.)
2. Identify the opposite of practices that cause risk as characteristics that will minimize risk.
3. Put all characteristics in one solution.
4. Test the solution out to identify whether it can minimize project cost and time deviation and increase value and minimize cost.
5. Identify a methodology to implement the solution.

The authors take the approach of using deductive logic (observation) instead of inductive logic (exploratory). This approach requires dominant results (results that are obvious and do not require interpretation), instead of statistically valid results (assumes control of environment and a statistically random population.) The advantage of the deductive approach is:

1. The amount of time is required is minimized.
2. Logic and common sense can be used instead of best practices.
3. If results are not dominant, common sense directs the researchers that the proposed or hypothesized changes will not be implementable.

**Identifying Characteristics of a New Efficient and Effective PM Model that Minimizes Risk**

The following characteristics have the potential to increase project risk:
1. Participants who do not understand or accurately define the initial conditions of a project and as a result make decisions and have expectations of the final project conditions.
2. Non-experts managing, directing, and controlling experts.
3. Attempting to control other parties.
4. Hiring vendors who do not have a clear plan from the beginning to the end of the project.
5. Vendors who partner with the owner to determine what is to be done in an incremental fashion.
6. None or very low competition.
7. No performance measurements.
8. Lack of accountability.
9. Paying vendors a bonus to perform.
10. Vendors with no capability to simplify the project's complexity to those who are not experts.
11. Lack of planning.

The authors will identify the characteristics of an effective and efficient PM by taking the opposites of the factors that cause risk (Table 1). This is the philosophy of the Kashiwagi Solution Model (KSM) that without clearly identifying what is causing risk, identify what could cause problems based on the extreme opposites. Deductively, the opposites of what is not working, should identify an optimal PM model.

<table>
<thead>
<tr>
<th>Traditional, ineffective PM Model</th>
<th>Efficient/Effective PM Model</th>
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<tbody>
<tr>
<td>Decision making.</td>
<td>Minimized decision making.</td>
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<tr>
<td>Using non-experts.</td>
<td>Using experts.</td>
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<tr>
<td>Controlling other parties.</td>
<td>No control of other parties.</td>
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<td>Non-experts directing experts.</td>
<td>No directions to the experts.</td>
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<td>Hiring non-experts who do not have a plan.</td>
<td>The system must identify and expose the non-experts.</td>
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<td>Partnering with the vendor to determine what is to be done.</td>
<td>No partnering and the vendor determine what is to be delivered.</td>
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<td>Not having competition.</td>
<td>High competition among vendors.</td>
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<td>Not measuring performance.</td>
<td>All projects should be measured.</td>
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<td>Lack of accountability.</td>
<td>No group activity or group decision making which minimizes</td>
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<td></td>
<td>accountability.</td>
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<td>Paying vendors a bonus.</td>
<td>Bonuses are a manifestation of the absence of logic,</td>
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<td>accountability, and vision.</td>
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<td>Complexity.</td>
<td>All projects should be measured.</td>
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<td>Blind participants.</td>
<td>System must identify the lower performers and their lower</td>
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<td>values, and minimize their decision making.</td>
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Table 1: Tradition vs. Effective PM Characteristics and factors

The above analysis creates a list of potential requirements for the New PM model that minimizes project risk (Kashiwagi, 2011):
1. Minimized decision making
2. Treat vendors as experts
3. No management, direction, or control of vendors by clients
4. System solution instead of relying on client PM technical expertise
5. Exposing of non-expert vendors
6. No bonuses or sharing of profits
7. High competition
8. No partnering or group decision making by vendor and client personnel
9. Measurement of performance on all projects
Minimized Decision Making
Decision making is done by human beings who lack all information. A human being makes a decision when they believe there may be multiple potential outcomes. When a person can predict an outcome they will let the present conditions dictate what the future action will be. When decision making is increased, risk is increased (Snijders, et. al., 2003). Therefore, the new PM model minimizes decisions. Experts who can see a project from beginning to end, before they do the project, understand constraints, can see into the future, and minimize their decision making (Kashiwagi, 2010). Decision making requires a PM to use their own experiences and expertise to make the decision. To ensure that the PM does not make decisions, the new PM model suggests that the PM should not use their experience and expertise in decision making. When the PM does not have an answer, should defer to the vendor, thereby making the vendor accountable for the project performance. If the vendor cannot clearly identify the constraints and predict the future states, the vendor should not be selected. Therefore, the new PM model is not based on the PM's experience or expertise, but is controlled by the structure of the new PM model that forces the expert vendor to make the decision based on expertise and experience. The new PM model depends on the risk management system structure of the vendor, and not on the PM's experience and expertise. It is a systems solution that aligns vendor expertise, and not a management, direction, and control of vendor personnel by the owner's PM. The expert vendor must also minimize their decision making by hiring expert sub-vendors. If they hire based on the lowest cost, they may be forced to make more decisions on quality and performance, increasing the risk to the project.

Vendors are Expert
If vendors are experts, the client's PM will not need to give direction to the vendor. It will now be more important to identify if the vendor is an expert, than it is to manage, direct, and control the vendor. Experts have the following characteristics:
1. Can pre-plan and see the project from beginning to end before they do the project.
2. Minimize their decision making, but let the current conditions dictate the future conditions.
3. Can explain things simply, concise, and can be understood by everyone, even the very ignorant.
4. Plan to minimize everyone's risk, regardless if they have responsibility over other participants or not.
5. Understand that in order to maximize their profit, they must create a plan, and implement the plan and the plan has to include those who they do not control because they are the only risk to the expert.
6. Ask fewer questions and need less information on a project.
7. Know how they know they can do the project.
8. Can predict the future outcome and states of a project before they do it.
9. Can identify what is in/out of the project and how to minimize risk that they do not control.
10. Can write their contract.
11. Can act in the best behalf of the client without being regulated.

No Management, Direction, and Control
The authors are proposing the new PM model needs no management, direction, and control functions. Also, although difficult to prove, someone who is directing and controlling (micromanaging an expert) could actually be the source of poor performance, transactions and risk. An example of this is a micro-manager. The impact of no longer having to manage, direct, and control expert vendors includes the following (Kashiwagi, 2011):
1. No longer having to know exactly what the client wants. The expert vendors will propose what they can deliver that meets the intent/expectations of the client.
2. The specifications that were created by the client's professionals are no longer a requirement, which must be complete, all inclusive, and accurate, but is now intent, for the purpose of telling the expert vendors what the client has in mind.
3. The expert vendors are now forced to know what they will provide to meet the intent of the client/buyer.
4. The new PM model proposes that PMs should spend more time before the project in vendor selection and preplanning, instead of during the project.
5. The new PM model should require less effort from the expert vendors until selection of the proposed vendor, and more effort from non-expert vendors during selection, giving the competitive advantage to the high performing vendors.
6. The selection process criteria will cater to the characteristics of the expert vendor: less time, less project information required, shorter documents, interviews that require conciseness, brevity, simple explanations, and the ability to look into the future, and the ability to think in the best interest of the client by identifying and mitigating the client's risk that the vendor does not control.

7. The selection process will minimize the potential bias of the client's PM by being "blind" (no names on the vendor documents that are being rated), ratings which are not in alignment with other selection committee ratings will be overridden, and any ratings which will lead to a vendor being selected over another must be justified with an explanation that is dominant.

8. Before the expert vendor's proposal is accepted, the expert vendor, and only the selected expert vendor, will clarify their proposal in detail. Any costs in clarifying their proposal should be in their cost proposal, be within the client's budget, and be within the range of being politically acceptable and justifiable cost.

9. The performance of the vendor will be documented throughout the project, and their final performance which will be documented by customer satisfaction, cost and time deviation rates, number of change orders, and number of RFIs.

The new PM model will change the role of the traditional PM in the following ways:
1. Will minimize the need for technical expertise and decision making.
2. They will be more systems managers and leadership role.
3. Efforts will be more in the determining of client intent, selection of vendor, and preplanning by the vendor, and quality control in the delivery of the service.
4. Will force the vendor to do quality control and risk management.
5. Will force the PM to do quality assurance (selecting the right vendor and ensuring that the expert vendor is doing quality control and risk management.)
6. Is more of a leadership role than a management role.
8. Technical engineering inspectors can be third party or employed by the vendor. Buyer/client's technical personnel can still participate in inspections, but their functions should be less frequent at key times.

**Transparent Environment**
The new PM model becomes a very transparent environment. Transparency leads to the following:
1. Accountability.
3. Increased need for vendor technical expertise.
5. Increased use of simple performance measurements.
6. Responsible party must identify and explain deviations to performance.

**Case Study Results**
The new PM model has been under development and testing for 18 years. The following are results and observations from the tests (PBSRG, 2011; Kashiwagi, 2011):
1. Funding of $9M.
2. 900+ tests, delivering $4B of services.
3. 98% of time, minimal vendor cost and time deviation and customer satisfaction.
4. Transactions minimized up to 90%.
5. Vendor profit increased up to 100%.
6. No increase in project cost was identified. Over 50% of the time the lowest price received the award.
7. Arizona State University (ASU) received an additional $100M over ten years on three test implementations by changing to the new PM model and service delivery environment.
8. GSA Heartland Region (Region 6) is making the new PM model the standard PM model.
9. The largest agency in the Netherlands, the Rijkswaterstaat (agency responsible for construction projects for the development of transportation and waterways), ran a $1B test of delivery of fast track projects, minimized delivery time of contracts by 50%, commissioned a study on the feasibility of early results, and approved more testing.
10. The group responsible for Dutch professional procurement in the Netherlands (NEVI) is creating education and training packages for Dutch procurement professionals.
11. PIANOO, the Dutch procurement staff agency, gave an entire day presentation on the new PM model in the 2011 annual PIANOO conference.
12. The Western States Contracting Alliance (WSCA) is working with Arizona State University to create all agencies using WSCA to be able to have access to assistance to implement the new PM model.
13. The Brunsfield corporation, one of the most successful and innovate developer/vendor groups in Malaysia, is implementing the new PM model into their entire supply chain. Every entity in their supply chain will be exposed to the new PM model.
14. Successful testing in Finland and Botswana.

**Conclusions**

A new PM model has been developed. It transitions from a management, direction, and control model to a leadership and alignment model. The theoretical foundation of the new PM model is based on deductive logic and common sense, and not best practices. It has been tested out for 18 years with dominant results. The new PM model is being implemented by various groups, in five different countries (U.S., Netherlands, Finland, Malaysia, and Canada.) The new PM model minimizes project risk, forces preplanning and the use of expert vendors, creates transparency and assigns accountability through simple performance measurements. The new PM model test results can be found at pbsrg.com. For more information contact the author at dean.kashiwagi@asu.edu.

**References**


