Competing By Project Management Standardization

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ABSTRACT

The central issue of this paper emerged in the course of observation of three companies: Intel, Armstrong World Industries, and Oregon Anesthesiology Group. They have become successful companies competing by differentiation, low-cost, and best-cost capabilities, which are supported by their distinct focus on schedule-driven, cost-driven, and cost-quality-driven project effectiveness, respectively. To further enhance their project effectiveness and capabilities, what project management (PM) strategies could these and other companies with the same choice of competitive strategy use? To answer the question, we surveyed 239 project managers and team members from various industries and organizations in the U.S. and Canada. From their responses we identified across-the-industry benchmarks for the pursuit of higher project effectiveness. First, organizations with higher levels of PM standardization have higher project effectiveness. Second, the standardization – including PM culture, structure, and systems – does not automatically lead to higher project effectiveness and capability building. Third, competing by standardization means aligning it with competitive strategies.

KEY WORDS Competitive strategies; project management / program management; project effectiveness; standardization

THE PROBLEM DEFINITION

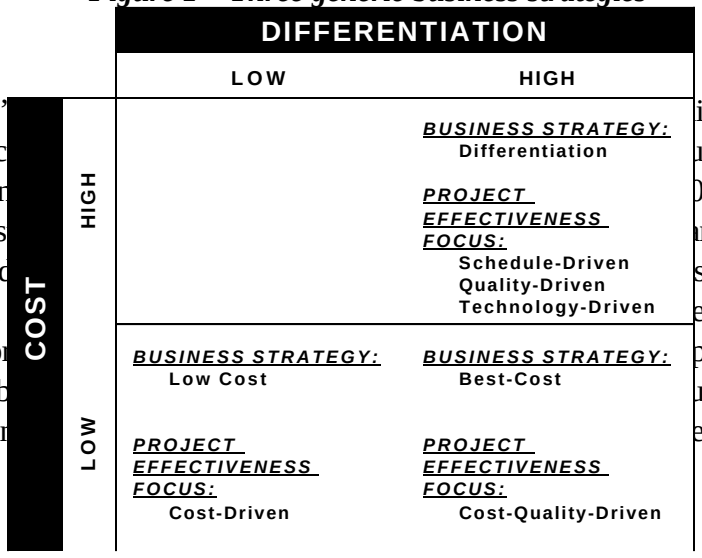
The essence of strategy lies in creating competitive advantages [1], which give an organization an edge over rivals in attracting customers and defending against competitive force [2]. Organizational resources and capabilities may equip an organization with such advantages [3]. Visualize, for example, project management as an organizational resource that contributes to the generation of the competitive advantage. Useful for this visualization can be the concept of generic competitive strategy [4] that helps understand how an organization attracts customers, withstands competitive pressures, and strengthens its market position [2]. Building on this concept, we focus in this paper on how project management may contribute to a specific generic strategy in the course of generation of competitive advantage. To construct a common base of understanding, we begin with a description of three business situations that we observed in our research, each featuring a different generic strategy (see Figure 1). Although the description is too brief to provide all necessary details, it provides a context that illuminates the issue.

Companies competing on differentiation may concentrate on accomplishing advantages stemming from technological leadership, brand name quality, time-to-market, or their combination. Intel's generic strategy is one of differentiation that thrives on innovation and time-based competitive advantage. In it a significant role belongs to technology development, whose job is to roll out new

computer chips faster and faster. Crucial to this effort is the effectiveness of the chip development projects expressed as the degree of accomplishment of ever-shrinking new chip development cycle times. In this paper, the cycle times are our focus. We have observed the same passion for schedule acceleration in projects implemented in other non-product development activities of Intel as well. Intel, however, is not alone in its obsession for shrinking project schedule goals. Faced with a competitive environment that rewards short cycle times, other firms such as Hewlett-Packard, Ingersoll-Rand, IBM, and Honeywell have managed to do the same [5]. As a result, building competitive advantages through the accomplishment of ever-shorter project schedule goals takes on a great significance for an organization that wishes to compete on the basis of innovative products. Examples of the advantages include extended product sales life, more loyal customers, increased market share, and higher profit margins [6]. In this paper, our focus is on time-based capabilities and related schedule-driven effectiveness.

Armstrong World Industries' (AWI) generic strategy is quite different from Intel's. Instead of differentiation and time-to-market capabilities that Intel relentlessly pursues, AWI has set out to become the cost leader in the industry. As a plant manager put it: "We have been in the business of manufacturing building materials for over 70 years. Technological change is not a big factor in our industry; rather, it is the ability to compete on cost. To develop the ability and become the leader in the industry, we have had to streamline every possible manufacturing-related process and continuously lower the bar for our manufacturing cost goals. Part of that effort has been the process for managing our cost cutting and manufacturing process development projects." Manufacturing is apparently that piece of action where project effectiveness in terms of the degree of accomplishment of ever-lower cost goals helps support AWI's low-cost capabilities. In the course of our research we have noticed an equal cost cutting zeal in other non-manufacturing parts of AWI. This is no secret to other manufacturing firms riding the same wave: They handle their projects by linking them all to their generic competitive strategy of low-cost leadership [7]. Like in other manufacturing firms of its strategic type, these capabilities along with other capabilities give AWI such competitive advantages as higher profits and larger market share [3].

Figure 1 – Three generic business strategies



While Intel and AWI' ities rooted in schedule- and cost-based projec up (OAG) relies on a best-cost provider gen 0 medical doctors, the aim is to have the bes re comparably positioned [2]. Accord st and quality goals. Says a vice president en putting a relentless pressure on all care p project management protocols in order to b utely mandatory that we do so in our service a ers will take their

business somewhere else." Using its cost- quality advantage OAG has been able to hold a commanding share of its market. That a cost-quality combination as a source of capabilities is a viable choice was confirmed by other researchers [8]. The bottom line is that the companies focused on best-cost strategy are adept at exploiting project effectiveness as their source of competitive advantage.

Intel, AWI, and OAG all strategize the exploitation of their project effectiveness. Each company's perspective of how project effectiveness should be driven is different: schedule-driven (Intel), cost-driven (AWI), and cost-quality-driven (OAG). While these drivers are primary targets in effective projects (Figure 1 shows these drivers), other drivers may exist too. Along with other organizational resources, project effectiveness contributes to the creation of capabilities: time-to-market (Intel), low-cost (AWI), and best-cost (OAG). These capabilities, then, as well as others, may lead to competitive advantage. Given this sequence of organizational resources (project effectiveness included) - capabilities (project management included) -
competitive advantages, the question is: "What PM strategies could be used to enhance project effectiveness and eventually contribute to competitive advantages of companies pursuing the differentiation, low-cost, and best-cost generic strategies?"

Our quest to answer this question began with the literature search that identified a set of PM strategies frequently deployed in the industry. They are the set addressing major areas of a company's project management systems, sometimes bundled and sometimes deployed independently. We termed this set standardized project management (SPM). The expectation is that SPM should be able to enhance that component of project effectiveness – schedule-, cost-, or quality-driven - that would help create capabilities required by specific generic strategies. All prescriptive and descriptive literature that we reviewed does not provide adequate evidence that SPM is an approach that may increase projects' effectiveness. Nor does it discuss much of the connection between SPM and generic competitive strategies.

Hoping that we can contribute to the evidence, we embarked on an exploratory research study to examine how SPM could be used to increase project effectiveness in companies that compete by differentiation, low-cost, and best-cost generic strategies. With such intent in mind, we proceed to define SPM, describe the scope of the work, explain our methodology, and discuss results and implications for project managers.

SPM DEFINED

The PM community is no stranger to SPM. For example, in a recent report the Fortune 500 Project Management Benchmarking Forum asserts that 85% of their members use standardized approaches and procedures [9]. According to another study, some companies tend to standardize their PM practices [10]. In the software development arena, the Software Engineering Institute's Capability Maturity Model helped many organizations standardize PM practices [11]. Seeking to standardize their PM processes, some organizations resort to ISO 9000 certification. The Project Management Institute's work on an organizational PM maturity model is about the same issue – standards for helping

organizations improve management of all their projects. Also, some vendors sell models for standardization of PM practices [11]. In sum, there is a significant interest in SPM.

SPM is a process of managing projects that is composed of standardized practices. The standardization is defined as the degree of absence of variation in implementing such practices. Accordingly, the lower the variation, the higher standardization, and vice versa: the more varied are the practices, the less standardized they are. SPM's rationale is to create a predictable process in which PM practices are stable and in control. The implementation of such a process, then, prevents PM practices from differing from project to project, from project manager to project manager. As a result, the process is repeatable despite the change in customer expectations and competitive landscape. Not surprisingly, SPM initiatives are pursued with an amazing host of stickers, some of them being "standardized project management approaches and procedures," "project management system," "project management standards," or "maturity models." Yet, whatever the sticker is, the desired bottom line for an SPM effort is to engender a foundation to sustain competitiveness through increased and maintained project effectiveness. At the heart of SPM lies its proactive approach conceived to engineer, monitor, and enhance PM processes and practices. Apparently, this is in sharp contrast to all those reactive PM approaches based on a response to the specifics of a project situation.

The increased emphasis on SPM in the project world may be related to the quality revolution that has been in motion since the 80's. Gurus of the revolution, specifically Deming and Juran, argue that the great majority of quality problems can be traced back to processes. The employees, their argument goes, cause few of the problems. The bottom line, then, is that it is management's job to continuously improve processes with which the employees work, certainly by getting the employees involved. So, a business philosophy like this has been accepted by many in the PM community, directing attention on quality processes as an underlying thread of PM. According to some experts, the philosophy is to credit for the formation of what is now referred to as modern PM [12]. It is along this line of thought and action that SPM surfaced as a core element of modern PM.

SPM's *raison d'être* is to integrate the PM process throughout the organization and the entire value added chain [13]. Our literature scan helped us identify seven interrelated components of SPM: process, organization, information technology, methods, metrics, culture, and leadership [9], [11], [13], [14], [15]. To be on the practical side, we emphasize that all these components are executed via specific PM practices. In the case of the first component, the process, the PM practices include the implementation of project life cycle stages, PM activities, product management activities, and milestones [13]. The process itself can be defined as a sequence of activities that is intended to create added value for project customers. For a process to unfold we need the project organization that provides integrated planning and control for each project, connects projects, and manages them as a portfolio. Connecting the process and project organization is information technology whose role is to make the process easily accessible throughout the project organization [15]. The major direction of action in these three components - process, project organization, and information technology – is actually process structure, organization structure, and information technology structure, respectively. Because of their structural focus we term their standardization structural standardization.

On a daily basis the process is reinforced by methods. Examples of the methods are tools (e.g. Work Breakdown Structure), templates, compensation systems, and continuous improvement mechanism [13], [16]. Tightly knit with the methods are metrics, which measure performance of the process [17]. Since the metrics' primary role is to help understand how well the corporate project strategy works, they are based on a set of standard performance measurements, often called the project scorecard, that address such areas of project health as customer relations, financial performance, process quality, and learning and growth. Specific examples are value measurement model and return on investment. In corporate lingo, methods and metrics are often referred to as management systems. In line with that language, we label standardization of methods and metrics as systemic standardization.

PM organizations strive to design an effective organizational culture, in which project personnel know their role, and understand the behaviors attendant upon the role [13]. The intention is that the personnel have a sense of identity with the PM organization, and accept investing both materially and emotionally in their culture [14]. A prevailing manner in managing the culture is to express it as a set of values and beliefs. The values and beliefs manifest the company's personality, direct personnel's behavior, and get incorporated in PM practices. To SPM, the values and beliefs are one more organizational domain to standardize. Intimately linked with the cultural style is the leadership style. In today's organizations, there is a strong drive to define the leadership style in terms of specific leadership competencies [18]. Naturally, the competencies are congruent with and supportive of the other elements of SPM. One example of the competency is the ability to work in white waters' type of change while staying focused on project goals. For culture's reliance on the values, part of which are often leadership values, we use term cultural standardization to describe standardization of culture and leadership competencies.

Now that we have defined SPM, we can make our inquiry more specific: ask practicing project people how they use structural, systemic, and cultural standardization in increasing the schedule-driven, cost-driven, and cost-quality-driven project effectiveness. Then, identify from their responses across-the-industry benchmarks that companies competing by differentiation, low-cost, and best-cost generic strategies may consider in their never ending pursuit of higher project effectiveness. For this purpose, we surveyed 239 project managers and team members from various industries and organizations in the U.S. and Canada (sample description is shown in Figures 2, 3, and 4). For details about the research design, see the Appendix.

FEEDING THE CYCLE TIME FRENZY

In the following section we describe how practicing project managers boost schedule-driven, cost-driven, and cost-quality-driven project effectiveness by means of standardization of the structure, systems, and culture. Our findings relate to the overall sample; at this time no analysis of the sample subsets was performed. We begin with the schedule-driven effectiveness.

For those in the business of time-based competition, nothing matters as much as the capability to deliver in a speedy manner. Their constant drive to shrink cycle times and improve their value

proposition to their customers may see a benefit in the essence of what we have found about the impact of standardization on the accomplishment of schedule goals. Venturing into the analysis of the impact, our expectation was that higher standardization would lead to better accomplishment of the goals. How our expectation was met can be seen in Figure 5.

In the figure, the y-axis shows schedule-driven effectiveness of projects on the scale 1 to 5 (1 being the lowest degree, 5 being the highest degree), while the x-axis indicates the degree of structural, systemic, and cultural standardization, again on the scale 1 to 5 (1 being the lowest degree, 5 being the highest degree) (for scales of measurement, see the appendix on the research methodology). Note that we divided the standardization scores into quartiles labeled as lower,

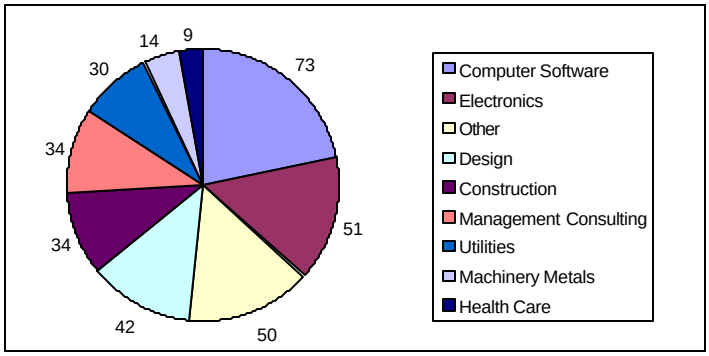


Figure 2 - Organization types in the sample

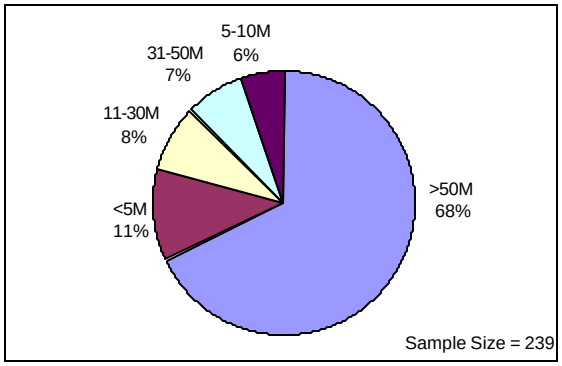


Figure 3 – Organization size in the sample

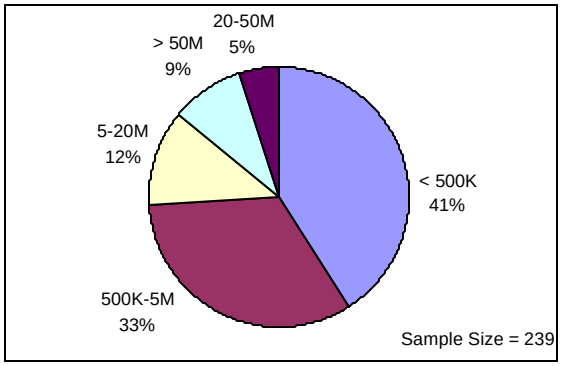


Figure 4 – Project size in the sample

lower middle, upper middle, and upper upper. Then, we calculated the mean value of the schedule-driven project effectiveness for each quartile and connected them into a line. The result is three lines, each depicting how a different type of standardization – structural, systemic, or cultural - impacts project effectiveness.

A look at the figure shows that the higher the three types of standardization, the higher the schedule-driven project effectiveness. And the lesson is clear. One way to boost the cycle time is to raise the level of standardization of project structure, systems, and culture. For those who compete on time the standardization is an avenue toward accelerated projects, fast product development capabilities, and pertaining competitive advantages.

A COST SURPRISE

A basic premise of standardization is that creating a repeatable, streamlined process could lead to lower costs. Armed with this premise, we assumed that the higher the standardization – whether the structural or systemic or cultural - the higher the cost-driven project effectiveness would be. That is not exactly what we found. To clarify this, let us look at Figure 6. Except for y-axis that shows the cost-driven project effectiveness, everything else on this figure is as in Figure 5 - the scales, the quartiles, and the three lines. Overall, the lines indicate how a different type of standardization – structural, systemic, or cultural - impacts the cost-driven project effectiveness.

Figure 5 – The impact of standardization on schedule-driven project effectiveness

What does Figure 6 show? Surprisingly, in the real world the growth of the structural and cultural standardization does not improve the cost-driven project effectiveness. In contrast, the systemic standardization does. While discerning that in Figure 6 may be too much of a challenge, it is what statistical analysis reveals. Apparently, without more information, we can't do much more than to theorize about this issue. Consequently, one reason for the surprise may be the possibility that structural and cultural standardization may lead to higher administrative and bureaucratic expenses, which may impact the overall cost. Also, in high-tech industries from which a substantial part of our sample comes, schedule goals are much more important to meet than cost goals because the brevity of the technological life cycle makes a time-to-market race the priority. As a result cost-driven project effectiveness may be more likely to be sacrificed in order to ensure speedy completion of the project. On the other hand, systemic standardization has a significant impact on the cost-driven project effectiveness. Perhaps as a consequence of the systemic standardization, the establishment of regular points of performance evaluation and predetermined method of managing the projects tend to increase the predictability of cost, leading eventually to the increase of the cost-driven project effectiveness.

Figure 6 - The impact of standardization on cost-driven project effectiveness

A message from Figure 6 may be that when it comes to cost-driven project effectiveness, the practicing managers concentrate on standardizing PM systems - methods and metrics. It may be their way to beef up their low-cost capability through cost-driven project effectiveness.

THE OLD TRUTH IS TRUE

The very essence of quality improvement lies in reducing variation. Although Deming taught us some significant lessons about this, we have generally known for a long time that by reducing variation, projects can expect to save time and money, and increase quality and reliability [19]. And that is the issue we looked at here – will increasing standardization, that is reducing variation, of the structure, systems, and culture in projects improve the quality-driven effectiveness? The practicing project managers we polled offered a positive answer to this question. That the old truth that quality thrives on the lack of variation is true can be seen in Figure 7.

Conceptually, Figure 7 is like Figures 5 and 6 in that it illustrates the influence of the structural, systemic, and cultural standardization on a component of the project effectiveness, except that in Figure 7 the effectiveness is expressed in quality terms. Accordingly, the y-axis in Figure 7 represents the quality-driven project effectiveness. And the effectiveness grows higher as the three types of standardization grow higher. In particular, in their quest for higher quality-driven project effectiveness practicing project managers seek to minimize the variation in structural, systemic, and cultural practices in their projects. And to those whose organization's focus is one of competing on quality, this finding may show them the way to enhance their value proposition by means of managing quality-driven project effectiveness.

Figure 7 - The Impact of standardization on quality-driven project effectiveness

MANAGERIAL IMPLICATIONS AND CONCLUSIONS

The central issue of this paper was hatched out in the course of observation of three companies: Intel, AWI, and OAG. They have become successful competitive forces through capabilities such as time-to-market (Intel), low-cost (AWI), and best-cost (OAG), which are supported by their distinct focus on

schedule-driven, cost-driven, and cost-quality-driven project effectiveness, respectively. To further enhance their project effectiveness and capabilities, what PM strategies could these and other companies with the same choice of competitive strategy use? To find the answers, we first turned to the literature search that lead us to one potentially viable option – SPM. Then, we asked practicing project people how they use SPM. From their practice we learned what is illustrated in Figure 8.

Inquiring about how standardization of structure, systems, and culture may change the schedule-driven, cost-driven, and quality-driven project effectiveness, we first learned that perhaps there is an SPM space populated by various strategies to compete by standardization. Those who live in the fast lane, cherishing time-based competition, may consider reaching the next level of schedule-driven project effectiveness via structural, systemic, and cultural standardization (see 8.A in Figure 8). On that level, an opportunity lies for faster cycle time capabilities and ensuing competitive advantages.

To low-cost capability builders we recommend setting their sights on cost-driven project effectiveness, seeking to compete by higher systemic standardization (see 8.B in Figure 8). Such a road may help them get to their desired strategic posture. In contrast, organizations with an eye on the best-cost plan of attack may have to combine the strategy of systemic standardization for cost capability, with the approach of standardizing structure, systems, and culture for the sake of higher quality-driven effectiveness (see 8.C in Figure 8).

There is an interesting thing here. In Figure 8, both recommendations for those searching for higher levels of schedule-driven effectiveness (see 8.A) and cost-driven effectiveness (see 8.B) include systemic standardization. But note that the systemic standardization will vary with the type of project effectiveness. If an organization is in pursuit of the low-cost capability, their systems' methods and metrics will be selected and tailored to help manage cost. Quite to the contrary, those after schedule-driven project effectiveness will install their systems not around cost focus, but rather around schedule management enhancement. Their systemic standardizations, then, may be ocean apart, even though we use the same term to describe them. The same holds true when other types of standardization – structural or cultural – are recommended to help improve various types of project effectiveness. Each one will be customized to fit its purpose.

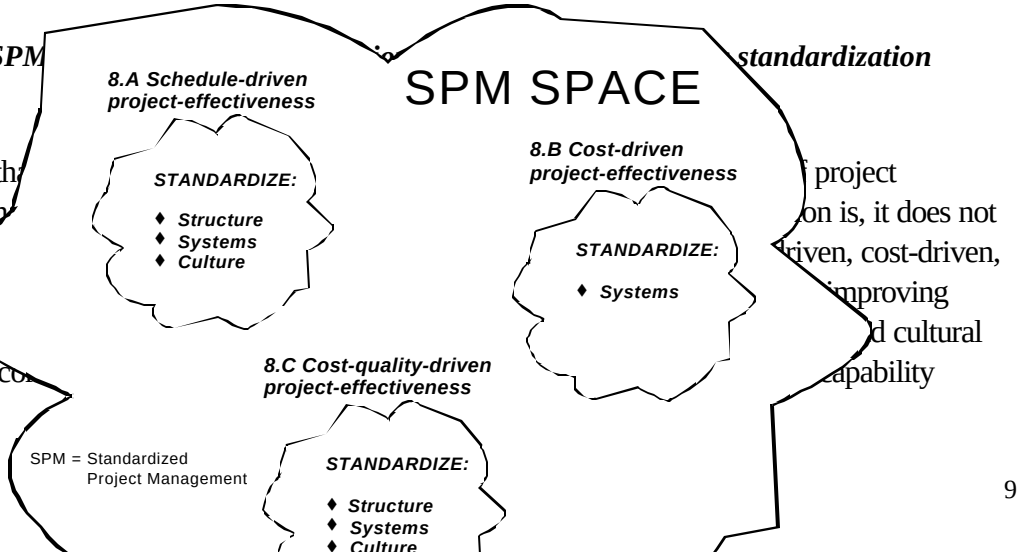


Figure 8 - SPM ... standardization

Overall, it appears th... project effectiveness, which... on is, it does not imply that design... driven, cost-driven, and quality-driv... improving project effectiv... d cultural standardization. Acco... capability

building and strategic advantages. Other more important factors, market position for example, may have their way and the project effectiveness sought may not change or even may go south for any number of reasons. Definitely, more work is needed to learn what type of SPM efforts best fit particular types of organizations, conditions, and situations.

A further look at the study's findings shows that they are in tune with previously published case studies and conceptual papers [9], [10], 12], [13]. In particular, the drive toward standardization of project structure, systems, and culture may enhance the project effectiveness and help build capabilities. Look at these findings as possible benchmarks and "traffic" signs for people who are responsible for an organization's capability building. Whether they are in the time-to-market business, low-cost leadership contest, or in the best-cost warfare, an understanding of which element of standardization carries potential for increasing specific type of projects' effectiveness may be a significant help in taking a road toward better capability enhancement.

But, let's face reality. There are some limitations to how we arrived at these findings, and, accordingly, to their value. The respondents in our study were primarily attendees of PM workshops, people who typically know more about PM than an average project participant. The outcome is that our sample of respondents may not be entirely representative of the population of project participants. Also limiting is the fact that we did not look beyond a narrow set of factors, including standardization of the structure, systems, and culture. Other factors, not addressed in our study, also have an impact on project effectiveness.

While more research in the area of PM standardization is going to be necessary to corroborate our findings, some emerging issues deserve a close look as well. First, the belief of some of our respondents that PM standardization provides positive returns only to a certain point, after which its further growth produces negative returns, needs to be researched. Second, the research light should also be shed on how an organization's competitive strategy influences the architecture of its PM standardization.

In summary, we can recommend that a business strategist look at our findings as benchmarks, coming from a cross-industry research. Pursuing the benchmarks will inevitably sow the seeds of risk, for they are not adapted for the strategist's industry and strategic thrust. Therefore, use them to design an SPM effort by tailoring it to your environment and the type of project effectiveness you are after.

There is value in PM standardization. After this study, we cannot claim that the standardization ensures direct improvement in the project effectiveness, capability building, and competitive position. The research we have described provided some evidence that organizations with higher levels of standardization have higher project effectiveness. In a quest for getting more from PM, competing by structural, systemic, and cultural standardization as well as aligning them with competitive strategies may be what an organization really needs.

REFERENCES

1. Hamel, G. and Prahalad, C.K. "Strategic Intent", Harvard Business Review, pp. 63-76, May - June 1989.

2. Thompson, A.T. and Strickland, A.J. Crafting and Implementing Strategy. Irwin. 1995.

3. Harrison, J.S. and St. John, C.H. Strategic Management of Organizations and Stakeholders. 2nd ed. South-Western College Publishing. 1998

4. Porter, M.E. Competitive Advantage. The Free press. 1985.

5. Smith, P.G. and Reinertsen, D.G. Developing Products in Half the Time. Van Nostrand Reinhold. 1st ed. 1991.

6. Nevens, T.M., Summe, G.L., and Uttal, B. "Commercializing Technology: What the Best Companies Do." Harvard Business Review, pp.154-163, May-June 1990.

7. Hayes, R.H., Wheelwright, S.C. and Clark, K.C. Dynamic Manufacturing. The Free Press.1988.

8. Clark, K.B. and Fujimoto, T. Product Development Performance. Harvard Business School Press. 1991.

9. Toney, F. and Powers, R. Best Practices of Project Management Groups in Large Organizations. Project Management Institute. 1997.

10. Ibbs, C. W. and Kwak, Y.H.. "The Benefits of Project Management Financial and Organizational Rewards to Corporations," Project Management Institute. 1995.

11. Cabanis, J. "Show Me the Money." PM Network, pp. 53-60, September 1998.

12. Benjamin and E. Levinson. "A Framework for Managing IT-Enabled Change," Sloan Management Review, pp. 23-33, 1993.

13. Kerzner, H. In Search of Excellence in Project Management. Van Nostrand. 1998.

14. Schacht, N.R. "Project Management Culture: An Anthropological Perspective." PM Network, pp. 53-56, September 1997.

15. Levine, H.A. "Minnesota Smith and the Temple of Unrealized Dreams." PM Network, pp. 11-15, October 1996.

16. A Guide To The Project Management Body of Knowledge. Project Management Institute. 1996.

17. Rummler, G.A. and Brache, A.P. Improving Performance. Jossey-Bass Publishers. 1995.

18. Dinsmore, P.C. Winning in Business with Enterprise Project Management. AMACOM. 1999.

19. Stevenson, W.J. Production / Operations Management. 4th ed. Irwin. 1993.

APPENDIX: THE RESEARCH METHODOLOGY

This appendix briefly lays down a research method that was used to assess the impact of standardization on project effectiveness. Our approach concentrated on the sample, data collection procedure, and statistical analyses. To gather data, we went to an initial sample of 295 project participants (project directors, project managers and team members). With the purpose of making sure that they had minimum PM qualifications, we checked their background against one criterion: two years of experience in project work. After this, a final qualifying sample included 239 project participants.

The survey instrument contained seven questions about the extent of standardization for PM process, organization, information technology, methods, metrics, culture, and leadership. According to the design, the numerical responses for the first three were added up, averaged out, and labeled structural standardization. Using the same approach, we developed numerical responses for (a) systemic standardization based on the numerical responses for methods and metrics; and (b) cultural standardization based on the numerical responses for culture and leadership. Numerical responses about the extent of standardization were captured on a 5-point Likert scale (5 being the highest extent, 1 being the lowest extent). Along the same line, the extent of the accomplishment of project goals expressed in cost, time, quality, and customer satisfaction was also assessed on a 5-point Likert scale. In a pretest of the survey instrument with five experts regarding content validity and item wording, we received their comments and used them to improve the instrument. Then, over several months, by means of the questionnaire we collected data from the project participants who attended various PM workshops and interviewed some of them.

As suggested by Kerlinger and applied by many researchers, although most Likert scales are basically ordinal, we can assume with considerable assurance equality of intervals. Thus, although there are risks in using parametric techniques to examine relationships between the variables measured with ordinal scales, these risks are usually not great. MANOVA was used as the parametric technique for the statistical analyses. The normality of the data was confirmed by examining the normal probability plots and the z-statistic.

BIO-SKETCH

Dragan Milosevic has over 20 years of experience as an engineer, manager, strategist, and consultant. At present, he is an associate professor of engineering and technology management at Portland State University and a senior consultant for Pinnell/Busch, Inc., Portland, Oregon. He received the B.Sc. and Ph.D. degrees in engineering and the M.B.A. degree from the University of Belgrade, Yugoslavia. His research interests center on management of technology, and he is currently exploring issues associated with value creation through project management and multicultural management.