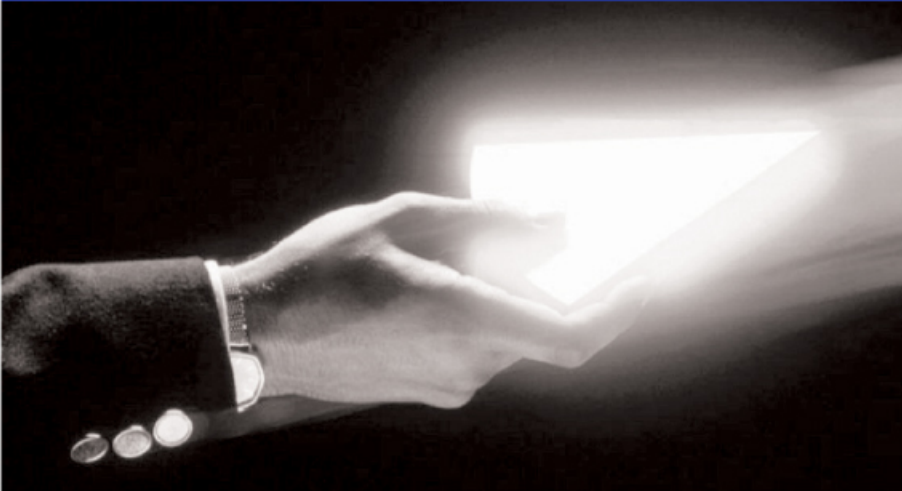


INDECO
Management Solutions

**Researching the
unanswered
questions of Project
Management**

Dr. Peter W.G. Morris



**smart businesses
seek smart solutions**

“Researching the Unanswered Questions of Project Management”

Dr. Peter W.G. Morris

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It is notable how little impact project management has either in the business schools or indeed in the business management literature. Yet speak to many managers, particularly of engineering based organizations, and typically they will wax strong and enthusiastic about the importance of the effective management of projects. Why the disconnect?

One reason often given is that project management is pre-eminently a practical discipline, whereas much of general business management is more knowledge based. Another, however, is that project management is too often inadequately focussed, concentrating on middle management tools and techniques and organizational issues and not sufficiently on the things that deliver real business benefit.

Neither point necessarily precludes the other. Both can be right. Nevertheless, it is the contention of this paper that the subject as it is too often presented – not least frankly in PMI – is insufficiently connected to the question of business success; and that its conceptual framework is inadequate to the job it should really be addressing. Since there is not a lot of benefit, on this basis, for doing research, it is not surprising that most of what gets done is seen as "techy" and of little interest to project management practitioners.

This paper prosecutes this argument by:

- reviewing recent evidence of project related concerns in major enterprises;
- proposing a new model of project management;
- reviewing recent publications in the principal project management research journals;
- suggesting a refreshed research agenda for the discipline.

Contemporary issues in the management of projects.

Some modesty is necessary before attempting such a catalogue. Who, after all, can lay claim to speak authoritatively on “all” the contemporary issues that are of concern in the management of projects?

Indeed it is worth pausing here for a moment, for this question goes to the very heart of the issue being addressed. If project management is to be really relevant to the big picture of organizational performance then its scope is going to be

broad indeed. Are *all* the issues that are relevant to all organisations involved in projects to be potential candidates? Is this practicable? Can it be correct?

If the only thing that really distinguishes projects from non-projects is the project life cycle, then the discipline must be generically applicable to the management of *all* projects, whatever their type. To develop a broad understanding of the generic discipline of the management of projects, scholars will therefore have to address the broad range of issues affecting all stages of the life cycle in all kinds of projects. This is certainly a tough challenge: it will require a substantial breadth of analysis and understanding. Maintaining a coherent conceptual view of the discipline at this broader level is genuinely difficult. But this, this paper argues, is what the discipline's research agenda should be about.

Critically, however, the discussion must be about more than merely tools and techniques, or process and structure, people or decisions. It has to relate to some measure of performance and success.

The Management of Projects.

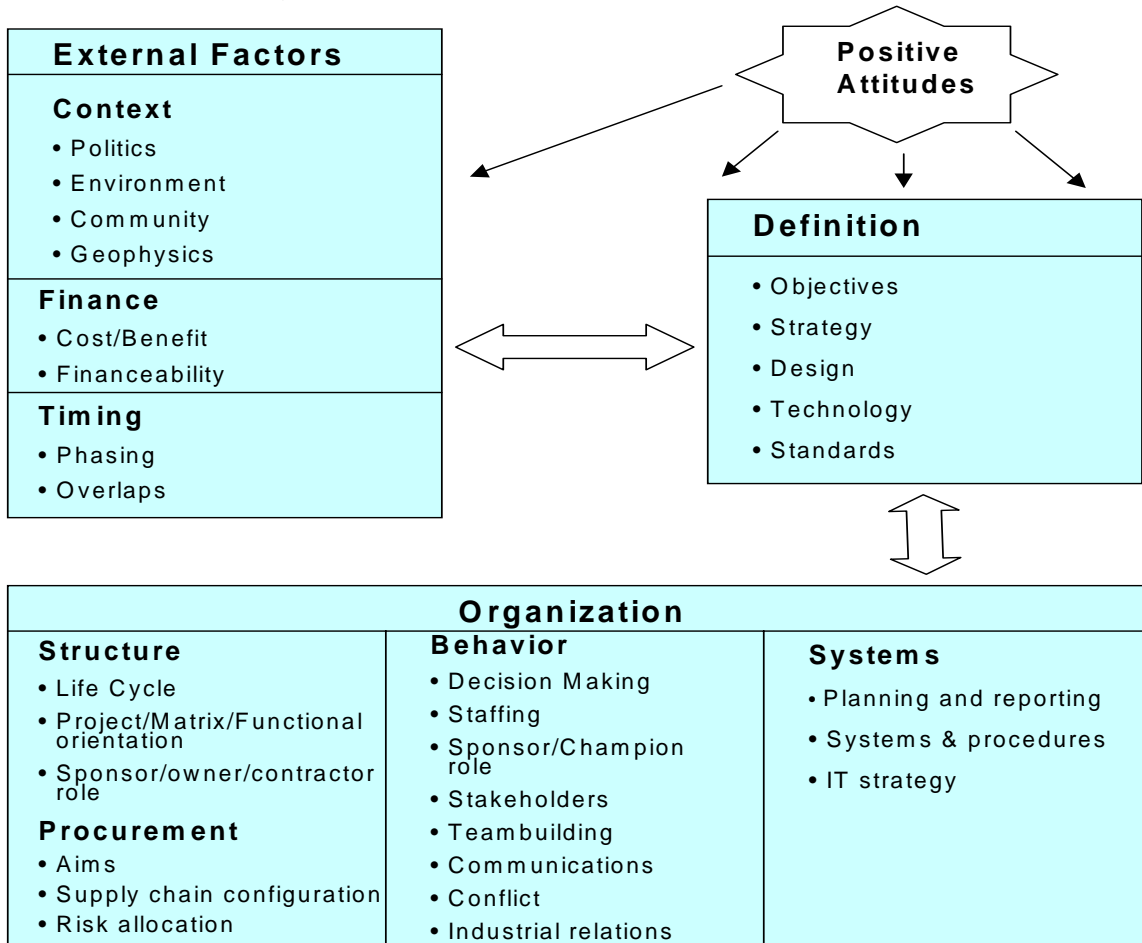
Initiating and accomplishing projects successfully should be the aim of the discipline.

Success is both an important concept and a difficult one. *The Anatomy of Major Projects* [1] addressed the topic at length. It showed that:

- success is a slippery concept to measure – and that it has different definitions depending on who you are and what your role in the project is (and when you attempt to measure it);
- defining the project is critically important – defining what the targets are is a major part of delivering a successful project;
- many of the issues that cause projects to go wrong are not even addressed in most of the simpler, generic project management textbooks, not the least of these being those of technology, design, environment, and finance;
- a more holistic model of project management was needed – one that focuses on delivering successful projects rather than simply completing a task “on time, in budget, to scope”. This model I called “the management of projects” [2].

Figure 1 was an attempt, now somewhat dated, developed in *The Anatomy* to capture the factors which were seen to contribute to project success (and failure). At the heart of the model is agreeing a robust definition of what it is that we are trying to achieve. (For if you cannot define this effectively, don't be surprised if you don't achieve it.) Developing this definition is not easy and is itself, of course, part of the process of managing a project. The definition interacts with a number of key factors: the sponsor's objectives, the financing available, the socio-political and environmental context of the project, and the scheduling requirements and possibilities. Optimizing all these so that the best value, most realistic definition is

obtained is a real management skill. And just as project management has traditionally thought that delivering “on time, in budget, to specification” requires commercial, organizational, people and systems (control) skills – as it does – so too does developing the project definition.



Within this framework of the world of managing projects, then, what are the issues that concern today’s managers?

Current issues in the management of projects.

Table 1 categorises issues that are typically current in a range of project based industries. The examples are not scientifically derived but are drawn from current personal consulting and academic experience. The key point is, however, that any reading of the technical press, or interviews with executives in these industries, would, I believe, validate that it is issues such as these that are typically dominating management’s attention in the projects’ field.

| Industry | Issues | Examples | Initiatives |
|-------------------|--|---|--|
| Construction | Partnering. E commerce. Design Management. Standardisation. Value Management (& VE). Project Management as a discipline. Finance/BOT. Continuous Improvement. IT. Contracts. Organizational Learning (OL). | European and US construction majors. Changing roles of UK QS companies & CMs. | <ul style="list-style-type: none"> • Latham, Egan • CII • PFI/PPP • NEC |
| Transport | Systems Engineering. Design Management. Program Management. HSE. Partnering. Procurement strategy. Overruns. | Railtrack. US Program management A/Es. BAA | |
| Oil & Gas | Front End Loading. Benchmarking. Partnering. E Commerce. Procurement strategy. HSE. PM competencies. | Shell. BP. Du Pont. Chevron. | <ul style="list-style-type: none"> • CII, ECI • ACTIVE, CRINE • IPA |
| Power & Water | BOT. Cost competitiveness. Competencies and JV relationships | Enron. PowerGen. Thames Water. | |
| Electronics | Requirements Management. Time-to-Market. Risk Management. Systems Engineering. Marketing. Technology. | Nokia. Ericsson. BT. WorldCom. Bowthorpe. Dell. | |
| Pharmaceuticals | Time-to-market. New Product Development. Project Management as a discipline. Role of the Project Manager. Competencies. OL. Risk Management. Portfolio Management. Benchmarking. | Pfizer. GlaxoWellcome. AstraZeneca. Merck. | <ul style="list-style-type: none"> • Pharmaceuticals benchmarking and SIGs |
| Finance/Banking | Project Management as a Discipline. Change Management. Project Support Office. PM Methodologies/ processes. E Project Management (Portal support). Benefits Management. | National Australia Bank Group. Lloyds TSB. Legal & General | <ul style="list-style-type: none"> • PRINCE 2 |
| Software | Requirements. Estimating. Change Control. Overruns & poor performance. Competencies. Processes. Testing. PM Methodologies. Change Control. PM role and authority. Maturity Models. | Unisys. EDS. Andersen Consulting. Microsoft | <ul style="list-style-type: none"> • PRINCE 2 |
| Defense/Aerospace | Requirements. Systems Engineering. Partnering. Integrated Project Teams. Overruns. Concurrent Engineering. Processes. IT. Competencies. Processes. Configuration Management. | BAES. Rolls-Royce. Thomson CSF. Boeing. Lockheed Martin. | <ul style="list-style-type: none"> • Earned Value initiative (actually more to do with Value Management than EVA) |

Table 1: Examples of current project management issues in leading project based industries.

Generalising, issues in today's world of project management might, therefore, I suggest, typically include the following.

- How do we ensure that our projects develop and deliver successful products?
- How do we accurately capture requirements and effectively manage project development against them?
- How can we develop products more quickly (time-to-market, concurrent engineering) and securely (avoiding overruns and poor performance), and for better value (lower cost, better functionality)?
- How can we better manage design, including requirements capture (briefing), technology selection, documentation/IT, integration with manufacturing and marketing, and testing?
- What is the appropriate procurement strategy for our projects? Should we be using partnering and if so, where and with what financial incentives? Are we getting the best value for money from our procurement and contract management practices?
- Are we getting optimum productivity throughout the life cycle?
- What is the Internet doing to project management practice? What is E project management, how will E commerce affect us, what is E learning?
- What really are the roles and authorities that we should have in our project management people? How do we build these competencies?
- Do we have the right project management processes and practices in place?
- How does our organization learn and continuously improve?
- Is project management really giving us business benefit? How do we know this?

And so on.

The point is that answering these questions is not easy. Sometimes advice can be found that will help in moving things forward. Sometimes however research is needed both to understand the issues, formulate the proper questions, and begin to get the answers.

Research Issues in the Management of Projects

Research is the practice of discovering information that was not previously available. Note that, in this definition, it is a practice – a set of processes, techniques and competencies – and that its product can be represented as information. Also, although the pun is unintended, it is best practised rather than just occasionally attempted. The practices are better if performed frequently.

Research can be the collection of survey data, for example on markets, usage, performance, etc. On the other hand it can relate to building our conceptual and theoretical understanding.

Information can be defined as interpreted data. At a more subtle level, knowledge can be distinguished from information by the ability to predict through the

application of theory (cognate models). At another level, then, research is about interpreting data or information, and this requires a theoretical (conceptual) base.

The more challenging research is that which tries to build or extend our theoretical models. It is primarily with this kind of research that this paper is concerned.

In some areas research is a very important and popular activity. In life sciences and new materials, for example, the current pace of research is feverish. The tide of knowledge is rolling back at a huge rate: lives and fortunes hang on research outcomes. Even in management, research answers can significantly affect companies' well being and performance. Management research is certainly alive and thriving. But what about research in project management? What kinds of issues are candidates for this kind of research in project management, and what in fact *is* being researched?

Project management research areas.

It is not the intent of this paper to delve too deeply into suggesting such topics but a few might usefully be extended from Table 1. These are shown in Table 2.

Though specialized to the project management field, an important aspect of this list is that it is squarely about how project management can best contribute to improved business performance.

Research, I contend, will be seen as more relevant when it is more evidently addressing business driven issues such as these rather than being primarily middle management, tools and techniques oriented.

But is this fair? Is this a valid portrait of contemporary project management research? To test this thesis we recently reviewed all the papers and book reviews in the PM Network (PMN) and the Project Management Journal (PMJ) and in The International Journal of Project Management (IJPM) from 1990-99¹. Papers were classified against the Body of Knowledge framework developed recently by CRMP that has now become the basis of the new APM Body of Knowledge (and is likely to influence the revisions to the IPMA Body of Knowledge when these are made in a year or two's time.)

The current CRMP BoK framework is shown in Figure 2.

¹This makes the third such analysis. Martin Betts and Peter Lansley classified IJPM papers for the period 1982-92 [3]. The topics they used to classify the papers (with the % of papers over the period shown in brackets) were: Human factors (15%), Project organisation (15%), Project environment (12%), Project planning (12%), Conceptual models (10%), Project information (9%), Project performance (7%), Risk management (7%), Project startup (6%), Project procurement (4%), and Innovation (3%). Professor Stephen Wearne, at UMIST, has recently analysed PMJ and IJPM papers and PMI and IPMA conference papers using an early version of the CRMP BoK as the basis of classification [4].

Table 2: Current examples of research issues in project management.

- What is the so-called Body of Knowledge of project management: in what areas do we in fact expect project managers to be knowledgeable?
- What then are the competencies that we expect of our project management staff (taking competencies to comprise knowledge, skills, behavior and aptitude)? Are there “core” competencies in addition to role-specific ones? How should we best be developing project management competencies?
- What are the measures of project success? What are the critical factors that cause projects to be successful or to fail? (And how useful a measure is project overrun?)
- What contribution has project management made to business performance?
- When, and how, should life cycle costs be factored into project optimization?
- What is the core [set of] project life cycle processes? Why does the life cycle vary between project types and what does this tell us about the generic practice of project management?
- What is the relationship between project management, systems engineering, and design management? What is best practice in requirements management (and why does it vary between industries)?
- What is project management’s role in effecting fast track/ concurrent engineering?
- Is procurement the responsibility of project management? Do we know where and when partnering is best applied and under what commercial conditions? How do different procurement strategies affect project management’s roles, responsibilities and processes (partnering, firm price, BOT, etc)?
- Can we honestly say that we understand the basic project management toolkit? Do we understand why the various p.m. methodologies differ?
- What is the real difference between Program Management, Portfolio Management, and Project Management? How generic are these terms? How generic is the PSO?
- What are current changes in CIT – not least the Intranet – doing to project management’s abilities? How does these changes affect, for example, project modelling and design, data management and configuration control, commercial practices, and organizational learning and competency development?

| | | | | |
|---|--|---|---|--|
| 1.0 General: | | | | |
| 1.1 Project Management 1.2 Programme Management | | 1.3 Portfolio Management: 1.4 Project Context: | | |
| 2.0 Strategic | | | | |
| 2.1 Project Success Criteria: 2.2 Strategy/ Project Management Plan 2.3 Value Management | | 2.4 Risk Management: 2.5 Quality Management: 2.6 Safety, Health & Environment 2.7 Ethics | | |
| 3.0 Control: 3.1 Work Content & Scope Management: 3.2 Time Scheduling/ Phasing: 3.3 Resource Management: 3.4 Budgeting & Cost Management: 3.5 Change Control: 3.6 Performance Management: 3.7 Information Management: | 4.0 Technical 4.1 Design, Production & Hand -Over Management: 4.2 Requirements Management: 4.3 Technology Management: 4.4 Estimating: 4.5 Value Engineering: 4.6 Modelling & Testing 4.7 Configuration Management: | 5.0 Commercial 5.1 Business Case 5.2 Marketing & Sales: Management: 5.3 Financial Management: 5.4 Procurement: 5.5 Bidding: 5.6 Contract Management 5.7 Legal Awareness | 6.0 Organisational 6.1 Life Cycle Design & Management 6.1.1 Opportunity 6.1.2 Design & Development 6.1.3 Production 6.1.4 Hand-over 6.1.5 (Post) Project Evaluation Review [O&M/LS] : 6.2 Organisation Structure: 6.3 Organisational Roles | 7.0 People: 7.1 Communication: 7.2 Teamwork: 7.3 Leadership: 7.4 Decision Making: 7.5 Negotiating & Influencing: 7.6 Conflict Management 7.7 Project Management Competency Development: 7.8 Personnel Management: |
| Opportunity Identification | | Design & Development | | Production |
| Concept/ Marketing Feasibility/ Bid | | Design, Modelling & Procurement | | Make, Build & Test |
| Hand-over | | | Post-Project Evaluation | |
| Test, Commission, Start-up | | | Operation & Maintenance / Integrated Logistics; Project Reviews/ Learning From Experience | |

Figure 2: The CRMP Body of Knowledge

Before discussing the classification of project management research we should spend a moment considering the BoK model(s) and why they are so important in shaping our thinking on project management research.

The Body[s] of Knowledge and the relevance to project management research paradigms.

Between 1998 and 1999 the Centre for Research in the Management of Projects at UMIST conducted research sponsored by industry and the Association for Project Management to determine what topics project management professionals feel that p.m. practitioners should be knowledgeable in. A “straw man” framework was developed – admittedly based on the existing APM BoK but revised with some items omitted and some other topics added. Data was collected from over 117 companies. A very high degree of agreement was achieved on what topics companies believed project practitioners ought to knowledgeable in [5]. These topics are shown in Figure 3, above.

It was the UMIST team’s intent not so much to deliver a new BoK “model” but to determine genuinely (a) whether those polled considered it important that p.m. practitioners be knowledgeable in these areas or not (b) what in fact is meant by

these topics². A structure for the new BoK only became necessary towards the end of the research when it became very apparent that reviewers wanted the topics grouped into a model containing a limited number of major elements [6]. The research team therefore developed a BoK model, a slightly revised version of which is shown in Figure 3. (The initial version was published in April 1999.)

Why wasn't the PMBOK® structure used, and why is the CRMP BoK so much broader than PMI's?

APM's BoK was developed in the early 90s (1990-95), PMI's essentially between 1981 and 87 with a revision in 1996 (and with another underway currently). APM's model was strongly influenced by research then being carried out into the issue of what it takes to deliver successful projects [7]. The question being asked was the "management of projects" one referred to earlier: what factors have to be managed if a project is to be delivered successfully? APM considered this to be crucial because it goes to the heart of what the professional ethos of project management is. Put simply, is it to deliver projects "on time, in budget, to scope", as the traditional view has had it [8], or is it to deliver projects successfully for the project customer/sponsor? In essence, it was felt, it has to be the latter, because if it is not, project management is ultimately a self-referencing profession that in the long-term no one is going to get very excited about.

The APM BoK therefore incorporated knowledge on the management of topics that the work of researchers had identified as contributing to project success – such as technology, design, people issues, environmental matters, finance, marketing, the business case, and general management [9] – in addition to the traditional PMBOK® areas of scope, time, cost, resources, quality, risk, procurement, etc.

The resultant BoK is indisputably a broader model than PMI's. The PMBOK® focuses on ten areas of project management (Figure 4), nine of which are "knowledge areas" with another being general to project management. These ten areas overlap, but essentially are distinguished from "General Management Knowledge and Practice" and "Application Area Knowledge and Practice". "General Management" is referred to as relating to management of the ongoing enterprise; recognised as "often essential for any project manager". Confined to Leading, Communicating, Negotiating, Problem Solving, and Influencing, together with half a column on standards and regulations and culture, the whole area is treated in half a page. "Application" areas are described as categories of projects that may be significant in such projects but not in all. No detail is given in the PMBOK®. The paradigm is thus proposed that everything generic to project

²Apropos research: interestingly the APM review team, while welcoming whole-heartedly the empirical basis now provided by the CRMP data, was adamant that the APM version should not refer to abstruse, difficult-to-understand research papers, such as those published in IJPM!

management is covered by the ten areas, with extensions where appropriate for General Management and Application areas.

The flaw in this model is its failure to recognize and elaborate the critically important responsibilities project managers have, and the generic functions they perform, in:

- (a) ensuring that the project's requirements and objectives are clearly elaborated;
- (b) defining the relation of the project to the sponsor's business objectives;
- (c) developing the project's strategy;
- (d) managing the evolution of the proposed technical solutions to the project requirements.

The key point is that, as research and practice have demonstrated [10], there are generic practices and processes that all competent project management practitioners may have to call on, and should be familiar with, in these areas. Project management work in these areas is [very] often critical to project success, yet the PMBOK® either totally or virtually ignores them. The result is that a huge swathe of the profession is led to ignore these dimensions; the discipline is downgraded from its real potential; and researchers are encouraged, tacitly, to overlook many of the issues that are most critical to the discipline's real effectiveness³.

The intent in making these points is not to argue that one BoK is “better” than another – hopefully the different models will slowly converge – but that as it stands the PMI model is unnecessarily, and even dangerously, delimiting the scope of the discipline. And one casualty of the paradigm it creates of project management is research in the subject. The broader CRMP model provides a better tool, it is proposed, for mapping the range of research published in PMJ, PMN and IJPM and comparing this research with contemporary concerns in the management of projects.

Research in the 90s in project management

Figure 4 shows the number of papers published in PMJ and PMN between 1990 and 1999 classified against the 50 CRMP BoK topics.

The most popular topics are papers or books dealing with:

- examples or issues relative to particular project contexts (Application areas): 38
- Time scheduling/phasing: 22
- Project Success Criteria: 14
- Control: 12
- Project Management in General: 12
- Teamwork: 12
- Performance Management: 10
- Project Management Competency Development: 10

³ For example, the 2000 New Zealand Project Management Conference is streaming all papers under the ten PMBOK® topic areas. QED.

| | | | | |
|--|---|-------------------------------------|---|---|
| 1.0 General: 12 | | | | |
| 1.1 Project Management | | 1.3 Portfolio Management: 2 | | |
| 1.2 Programme Management | | 1.4 Project Context: 38 | | |
| 2.0 Strategic | | | | |
| 2.1 Project Success Criteria: 14 | | 2.4 Risk Management: 7 | | |
| 2.2 Strategy/ Project Management Plan: 3 | | 2.5 Quality Management: 5 | | |
| 2.3 Value Management | | 2.6 Safety, Health & Environment: 1 | | |
| 2.7 Ethics | | | | |
| 3.0 Control: 12 | 4.0 Technical | 5.0 Commercial | 6.0 Organisational: 1 | 7.0 People: 3 |
| 3.1 Work Content & Scope Management: 3 | 4.1 Design, Production & Hand -Over Management: 6 | 5.1 Business Case | 6.1 Life Cycle Design & Management | 7.1 Communication: 5 |
| 3.2 Time Scheduling/ Phasing: 22 | 4.2 Requirements Management | 5.2 Marketing & Sales: 2 | 6.1.1 Opportunity | 7.2 Teamwork: 12 |
| 3.3 Resource Management: 7 | 4.3 Technology Management: 1 | 5.3 Financial Management: 7 | 6.1.2 Design & Development | 7.3 Leadership: 4 |
| 3.4 Budgeting & Cost Management: 2 | 4.4 Estimating: 7 | 5.4 Procurement: 9 | 6.1.3 Production | 7.4 Decision-Making: 3 |
| 3.5 Change Control: 3 | 4.5 Value Engineering: 1 | 5.5 Bidding: 2 | 6.1.4 Hand-over | 7.5 Negotiating & Influencing: 1 |
| 3.6 Performance Management: 10 | 4.6 Modelling & Testing | 5.6 Contract Management: 5 | 6.1.5 (Post) Project Evaluation Review [O&M/ILS]: 1 | 7.6 Conflict Management: 1 |
| 3.7 Information Management: 7 | 4.7 Configuration Management: 2 | 5.7 Legal Awareness | 6.2 Organisation Structure: 9 | 7.7 Project Management Competency Development: 10 |
| | | | 6.3 Organisational Roles: 1 | 7.8 Personnel Management: 4 |

Figure 4: the number of papers published in PMJ and PMN between 1990 and 1999 classified against the CRMP BoK topics.

- Organization Structure: 9
- Procurement: 9
- Estimating: 7
- Financial Management: 7
- Information Management: 7
- Resource Management: 7
- Risk Management: 7
- Design & Production Management: 6
- Communication: 5
- Contract Management: 5
- Quality Management: 5

These 204 papers or book reviews on these 19 topics account for 83% of all the papers published in PMJ/PMN during this period. The large number of papers (17%) dealing with contextual issues certainly attests to an interest in the practical application of project management. Of the 22 papers on scheduling, 17 are on OR [technique] based issues; of the remaining five, only three⁴ relate overtly to business performance. Indeed of the total 204 papers, arguably only 19 (approximately 10%) refer explicitly to business related performance at all^{5, 6}. (Note however how the number increases in frequency post 1996.) There is little on Strategy, nothing on Value Management, none on Requirements Management, none on the Business Case, and just one on Value Engineering.

⁴ Those by Thamhain (1993), Ibbs, Lee & Li (1998), and Leach (1999)

⁵ Those of Mark (1992), Feney (1992), Christensen (1993), Ryder (1993), Thamhain (1993), Ingram (1994), Blanchard (1995), Tan (1996), Jiang (1996), Pascale et al. (1997), Shenhar et al. (1997), El-Najdawi & Liberatore (1997), Jannadi (1997), Robinson (1997), Christensen & Gordon (1998), Leach (1999), Lidow (1999), Baccani (1999) and Chang (1999).

⁶ The ten on Performance Management refer predominantly to Earned Value.

There are however nine on Procurement and four others on Bidding and Contract Management.

The exact numbers should not be treated too definitively – for example Cleland’s 1991 paper on “Product Design Teams: The Simultaneous Engineering Perspective” (a) could be classified as being under Design, Phasing, or Teams (we took the latter) (b) is related, via improved cycle times, to business performance. The point basically however is demonstrated that the overwhelming majority of papers do not make any real connection between project management and business performance.

Figure 5 shows the number of papers published in IJPM between 1990 and 1999 classified against the CRMP BoK topics. Here the situation is a little better, though not much.

| | | | | |
|---|--|--|--|--|
| 1.0 General: 47 | | | | |
| 1.1 Project Management | | 1.3 Portfolio Management: 8 | | |
| 1.2 Programme Management: 7 | | 1.4 Project Context: 100 | | |
| 2.0 Strategic: 3 | | | | |
| 2.1 Project Success Criteria: 11 | | 2.4 Risk Management: 42 | | |
| 2.2 Strategy/ Project Management Plan: 4 | | 2.5 Quality Management: 19 | | |
| 2.3 Value Management | | 2.6 Safety, Health & Environment: 3 | | |
| 2.7 Ethics: 1 | | | | |
| 3.0 Control: 24 | 4.0 Technical: 3 | 5.0 Commercial: 2 | 6.0 Organizational: 3 | 7.0 People: 19 |
| 3.1 Work Content & Scope Management: 6 | 4.1 Design, Production & Hand -Over Management: 5 | 5.1 Business Case: 2 | 6.1 Life Cycle Design & Management | 7.1 Communication: 1 |
| 3.2 Time Scheduling/ Phasing: 30 | 4.2 Requirements Management: 3 | 5.2 Marketing & Sales: 1 | 6.1.1 Opportunity | 7.2 Teamwork: 8 |
| 3.3 Resource Management: 3 | 4.3 Technology Management: 2 | 5.3 Financial Management: 10 | 6.1.2 Design & Development | 7.3 Leadership: 5 |
| 3.4 Budgeting & Cost Management: | 4.4 Estimating: 5 | 5.4 Procurement: 19 | 6.1.3 Production | 7.4 Decision Making: 5 |
| 3.5 Change Control: | 4.5 Value Engineering: 2 | 5.5 Bidding: 10 | 6.1.4 Hand-over | 7.5 Negotiating & Influencing: |
| 3.6 Performance Management: 5 | 4.6 Modelling & Testing | 5.6 Contract Management: 9 | 6.1.5 (Post) Project Evaluation Review [O&M/ILS] : | 7.6 Conflict Management: 1 |
| 3.7 Information Management: 19 | 4.7 Configuration Management: 5 | 5.7 Legal Awareness: 2 | 6.2 Organization Structure: 5 | 7.7 Project Management Competency Development: 21 |
| | | | 6.3 Organizational Roles: 10 | 7.8 Personnel Management: 2 |

Figure 5: papers published in IJPM between 1990 and 1999 classified against the CRMP BoK topics.

The most popular topics are:

- examples or issues relative to particular project contexts: 100
- Project Management in General: 47
- Risk Management: 42
- Time scheduling/phasing: 30
- Control: 24
- Project Management Competency Development: 21
- Information Management: 19
- People: 19
- Procurement: 19
- Quality Management: 19
- Project Success Criteria: 11
- Bidding: 10
- Financial Management: 10
- Organization Roles: 10

- Contract Management: 9
- Portfolio Management: 8
- Teamwork: 8
- Program Management: 7
- Performance Management: 6
- Communication: 5
- Configuration Management: 5
- Estimating: 5
- Decision Making: 5
- Leadership: 5
- Organization Structure: 5
- Program Management: 5
- Resource Management: 5

These 459 papers or book reviews on these 27 topics account for 93% of all the papers published in IJPM during this period. IJPM is much more clearly research focused than PMN and (even) PMJ. The number of papers is greater and its coverage, on the whole, broader. The large number of articles makes it virtually inevitable that there is considerable “techy-ness” for many of the papers – the 42 on Risk Management being a case in point. There are 25 papers in the Technical area, compared with PMJ/PMN’s 17, with a more even coverage. (7 of the PMJ/PMN papers were on Estimating.) There is a strong emphasis on Procurement and related contract matters (41, with a further 10 on Financial Management). There *are* papers on Business Case and Marketing & Sales though at two and one respectively the proportion is minute. In fact, of the 501 papers published in IJPM during the decade, we would estimate only 38 as explicitly relating project management and business performance⁷. Even doubling this number to allow for an over-harsh classification, the percentage is still less than 15%.

Figure 6 presents the combined numbers of papers from the three journals. The most popular topics are:

- examples or issues relative to particular project contexts:148
- Project Management in General: 59
- Risk Management: 49
- Control: 36
- Project Management Competency Development: 31
- Procurement: 28
- Information Management: 26
- Project Success Criteria: 25

⁷ Tighe (1991), Rhyne & Whyte (1991), Gyeszly (1991), Barnes (1991), Leong (1991), Ireland (1992), Frizelle (1993), Tiong et al. (1993), Lisburn et al. (1994), Mansfield et al. (1994), Reijners (1994), Wearne (1994), Kayes (1995), Wateridge (1995), Sunde & Lichtenberg (1995), Belassi & Tukel (1996), Ongunlana (1996), Quartey (1996), McElroy (1996), Jafaari et al.(1996), Laufer et al. (1996), Kirby (1996), Chan (1997), Gabriel (1997), Voropayev (1998), Love et al. (1998), Gupta (1998), Eden et al. (1998), Wateridge (1998), Lopes & Flavel (1998), Grundy (1998), Clarke (1999), Archer & Ghasemzedah (1999), Tam (1999), Lim & Mohammed (1999), Hendricks et al. (1999), Kog et al. (1999), Atkinson (1999) – no doubt there are others: the list is intended to be indicative, not exhaustive.

| | | | | |
|---|---|--|---|--|
| 1.0 General: 59 | | | | |
| 1.1 Project Management | | 1.3 Portfolio Management: 10 | | |
| 1.2 Programme Management: 7 | | 1.4 Project Context: 148 | | |
| 2.0 Strategic: 3 | | | | |
| 2.1 Project Success Criteria: 25 | | 2.4 Risk Management: 49 | | |
| 2.2 Strategy/ Project Management Plan: 7 | | 2.5 Quality Management: 24 | | |
| 2.3 Value Management: | | 2.6 Safety, Health & Environment: 4 | | |
| 2.7 Ethics: 1 | | | | |
| 3.0 Control: 36 | 4.0 Technical: 3 | 5.0 Commercial: 2 | 6.0 Organisational: 4 | 7.0 People: 22 |
| 3.1 Work Content & Scope Management: 10 | 4.1 Design, Production & Hand -Over Management: 11 | 5.1 Business Case: 2 | 6.1 Life Cycle Design & Management | 7.1 Communication: 6 |
| 3.2 Time Scheduling/ Phasing: 52 | 4.2 Requirements Management: 3 | 5.2 Marketing & Sales: 3 | 6.1.1 Opportunity | 7.2 Teamwork: 20 |
| 3.3 Resource Management: 10 | 4.3 Technology Management: 3 | 5.3 Financial Management: 17 | 6.1.2 Design & Development | 7.3 Leadership: 9 |
| 3.4 Budgeting & Cost Management: 2 | 4.4 Estimating: 12 | 5.4 Procurement: 28 | 6.1.3 Production | 7.4 Decision Making: 8 |
| 3.5 Change Control: 2 | 4.5 Value Engineering: 3 | 5.5 Bidding: 12 | 6.1.4 Hand-over | 7.5 Negotiating & Influencing: 1 |
| 3.6 Performance Management: 18 | 4.6 Modelling & Testing | 5.6 Contract Management: 14 | 6.1.5 (Post) Project Evaluation Review [O&M/ILS] : 1 | 7.6 Conflict Management: 2 |
| 3.7 Information Management: 26 | 4.7 Configuration Management: 7 | 5.7 Legal Awareness: 2 | 6.2 Organisation Structure: 14 | 7.7 Project Management Competency Development: 31 |
| | | | 6.3 Organisat'l Roles: 11 | 7.8 Personnel Management: 6 |

Figure 6: the combined numbers of papers from PMJ & PMN (1990-99) and IJPM (1990-99).

- Quality Management: 24
- People: 22
- Teamwork: 20
- Performance Management: 18
- Financial Management: 17
- Contract Management: 14
- Organization Structure: 14
- Bidding: 12
- Estimating: 12
- Design & Production Management: 11
- Organization Roles: 11
- Portfolio Management: 10
- Work Content & Scope Management: 10
- Leadership: 9
- Decision Making: 8
- Configuration Management: 7
- Program Management: 7
- Strategy: 7
- Personnel Management: 6
- Communication: 5
- Resource Management: 5

As one would expect, the very great proportion of the combined set of papers is focused on *intra* project management topics – though with the obvious proviso of the 148 (20%) on the project context. Even Procurement and the related areas of Finance and Contracts, which together provide 59 papers, only account for 8% of the total. And Project Success Criteria (25) is, overall, very low (3%). Strategy is even lower (seven: 1%). Value Management is zero! (Value Engineering is three – not much better.) Requirements Management equally scores a dismal three.

Discussion and relevance to today's research agenda.

It must be emphasized that this analysis can only be taken at a broad level of generalization. It is more than easy to claim that a paper has really been misallocated or wrongly classified. (Several papers deal with issues from more than one BoK topic: another analyst could say that in their opinion a paper should really be classified under another topic. Similarly, another analyst could say that in their view a paper *did*, say, address business needs where here we have said that it did not.) The analysis is made not to prove an ineluctable truth but to make the following points via the survey data.

Even allowing for errors in categorization, the data shows the following.

1. Project management research has not been particularly orientated to demonstrating business relevance.
2. There is almost nothing at all relating expenditure on project management to business benefit.
3. There is significant mismatch between current research priorities and published research.

Let us take the first point as now made. The second point, which is quite extraordinary, seems to be a matter of record, at least as far as these journals are concerned⁸. (And would seem to point to a major research need in its own right.)

The third point is worth looking at further. Firstly it needs acknowledging from the outset that the list of topics given in Table 2 is both personal and very generalized. Perceptions of research priorities are bound to differ depending on the role one occupies and the issues being faced at the time. Second, the survey is bound to show a mismatch: the data shows the published results of research that was conducted during at least the last three or four to fourteen or more years ago: it takes time for research to be initiated, carried out, and then published. Nevertheless, if we accept the list in Table 2 as a valid set of high level generalisations, it is worth comparing the Table 2 list, and extensions thereof, with the findings of Figure 7. This is Table 3.

Table 3: Current research areas of interest with the record of past papers

| Topic | No. of Paper | Table 2 type "current" issues | Comment |
|------------------------|--------------|---|---|
| 1.0 General | 59 | Benchmarking; Maturity Models | Benchmark processes & practices as well as metrics |
| 1.1 Project Management | 0 | Definition as a Discipline; Methodologies; Business Benefit | Several industries are seeking to understand better & introduce p.m. as a core discipline |
| 1.2 Program Management | 7 | Business Benefit; Methodologies (PRINCE etc.); practice as super p.m. – as with US A/Es (Bechtel etc) | |

⁸ Ibbs, C W, & Kwak, Y-H [11], published by PMI – but not in PMJ or PMN – is an exception.

| | | | |
|--|-----|---|---|
| 1.3 Portfolio Management | 10 | New Product Development/ Project Management | |
| 1.4 Project Context | 148 | | New Product Development generally failing to appreciate Management of Projects perspective. Engineering Management /PM linkage could be strengthened |
| 2.0 Strategic | 3 | Linkage between project & corporate strategy | |
| 2.1 Project Success Criteria | 25 | Overruns; High failure rate of IS projects KPIs and CSFs; Business Benefit; Scorecards. | A crucial area. Links with 5.1, 5.3 and others |
| 2.2 Strategy Plan | 7 | Strategy formulation | Project strategy, though central, is inadequately understood |
| 2.3 Value Management | 0 | Evidence of application & benefit | |
| 2.4 Risk Management | 49 | Perception of Risk | Already exhaustively covered? |
| 2.5 Quality Management | 24 | | |
| 2.6 Safety, Health, Environment | 4 | New legislation | |
| 2.7 Ethics | 1 | Reasons why important | |
| 3.0 Control | 36 | Scorecards (e.g. Balanced) | |
| 3.1 Work Content & Scope | 10 | | WBS, PBS still causing terminology difficulties |
| 3.2 Scheduling & Phasing | 52 | Concurrent Engineering | More has been published outside IJPM and PMJ/ PMN. |
| 3.3 Resource Management | 10 | | |
| 3.4 Budgeting & Cost Management | 2 | Treatment of Whole Life [operating] Costs | BOT/ private finance; relates also to 5.3 |
| 3.5 Change Control | 2 | | |
| 3.6 Performance Management | 18 | | EVA still unpopular |
| 3.7 Information Management | 26 | IT tools, Intranet, E project management. Role of IM strategy. Knowledge Management | An enormous area with whole networks of researchers active – e.g. Construct IT, CIFE, etc. Link with processes and practices (i.e. business benefit) important. |
| 4.0 Technical | 3 | Need to establish more clearly the generic role of p.m. | This area is not well “mainstreamed” yet in project management, though research shows that its management is vital to project success |
| 4.1 Design, Production etc Management. | 11 | Identification of generic practices; Simultaneous Design; Systems Engineering/ PM and Design Management/PM linkages | |
| 4.2 Requirements Management | 3 | Best Practice; applications; tools | Still weakly recognized as fundamental to p.m. |
| 4.3 Technology Management | 3 | Strategy; introduction of not-yet-proven technology | |
| 4.4 Estimating | 12 | Software | Still difficult to get s/w estimating reliability |
| 4.5 Value Engineering | 3 | Non-construction applications | A powerful area of business benefit not well applied outside construction |
| 4.6 Modelling & Testing | 0 | CAD & virtual modelling | |
| 4.7 Configuration Management | 7 | Relation to Info Mgmt | |
| 5.0 Commercial | 2 | | |
| 5.1 Business Case | 2 | Business benefits of p.m. Link with corporate measures. (See 2.1 etc.) | |
| 5.2 Marketing & Sales | 3 | Linkage to PID; Concurrent Engineering | |
| 5.3 Financial Management | 17 | BOT etc; Financial measures for project management benefit (2.1 & 5.1) | BOT has figured strongly in IJPM |
| 5.4 Procurement | 28 | Partnering; Supply Chain Mgmt; E Commerce; Procurement Strategy; Target setting in Partnering. | A huge area with still an enormous amount to be clarified |

| | | | |
|---------------------------------|----|--|--|
| 5.5 Bidding | 12 | Rebid on repeat contracts | |
| 5.6 Contract Administration | 14 | New Forms of Contract | |
| 5.7 Legal Awareness | 2 | | |
| 6.0 Organizational | 4 | | |
| 6.1 Life Cycle | 1 | Generic models; role of ILS | |
| 6.2 Organization Structure | 14 | Processes. Impact of procurement/ supply chain configuration on (a) organization (b) project management practices – e.g. Design/Build v. independent designer models | Continued need to clarify and refine processes |
| 6.3 Organization Roles | 11 | PSO. Role of sponsor – particularly in inexperienced organizations | |
| 7.0 People | 22 | | |
| 7.1 Communication | 6 | Impact of telecoms/internet. | |
| 7.2 Teamwork | 20 | High-performance teams. IPTs. Virtual teams | A key area, but well covered in research |
| 7.3 Leadership | 9 | | |
| 7.4 Decision Making | 8 | | |
| 7.5 Negotiating & Influencing | 1 | | |
| 7.6 Conflict Management | 2 | | |
| 7.7 P.M. Competency Development | 31 | BoK topics; Competency; E learning; learning mechanisms; Organizational Learning. Certification | A very important area, consistently receiving attention, and needing to with new technology and pressures on competency and external certification |
| 7.8 Personnel | 6 | PM as a career | PM often not a core career: how then to build best practice professionalism? |

Again due note needs to be made of the inaccuracies inherent in such a high level comparison. There are whole research communities busy in just single areas of the table (for example in IT and Procurement). The table is presented for indicative purposes.

The following points would seem to stand out.

- There has, surely, to be research initiated as soon as possible on the business benefits of investing in project management. There has been hardly any to date.
- Benchmarking results have in general been poorly covered so far⁹.
- The role of “the management of projects” as a paradigm in New Product Development (“Project Context”) would seem to offer a link into the general business management writing that should be exploited.
- Engineering Management (“Project Context”) is in general not a well-covered area. Project management could make a significant contribution to improving understanding of this area.
- Strategy is widely seen as of fundamental importance in projects and their management. There is virtually nothing published on it.

⁹ This includes the contribution of the PMI Fortune 500 Benchmarking program. CII’s work for example, though still relatively weak, is much more robust.

- Value Management has nothing published on it in IJPM and PMJ/PMN. VM and VE both have significant potential to business benefit; neither are formally well practised outside construction.
- There has been a vast output on Risk Management: is there really that much more to be researched? (Yet the public's perceptions of risk continue to be poor; often intuition does not fit well with probability theory.)
- Much of what has been published in IJPM and PMJ/PMN on Concurrent Engineering is anecdotal, and tends more to be about Fast Track. There is little on the theoretical underpinning, little on technology support, and little on business benefit. More is published in general engineering management literature.
- There is no research published in these journals on Ethics in project management.
- The traditional areas of project control – the basics of much of the literature, training and teaching in project management – would seem to offer little significant scope for research¹⁰.
- Information Management – already well served – is a strong area for continued research.
- There are several areas in the technical area that are currently weakly served: requirements management, systems engineering, and design management, for example, all need more robust analysis and exposition.
- There is next to nothing published in IJPM and PMJ/PMN on the relation between marketing and project management.
- BOTs – private finance – have been well covered in IJPM but the whole area is creating profound changes in the practice of project management – and not just in construction (power, water, transport, etc.). IT and defense/aerospace for example are both significantly affected. The impact extends through organization, financing, supply chain, people, process, metrics, etc. There is much research opportunity here still.
- Procurement and supply chain configuration continues to offer major research opportunities. Partnering and E Commerce are currently extremely hot topics. Arguably our overall theory of procurement is not as robust as it could be.
- Organization and People issues continue to cause major challenges in the effective implementation of projects. How much new theoretically based research is still to be accomplished is questionable. Organizational Learning is an example however of where there is genuinely new theoretical ground to explore.
- P.M. competency development – particularly of the knowledge [BoK] elements and the issue of certification, and the relationship with Knowledge Management and Organizational Learning – has rightly been, and will

¹⁰ As an example of the danger of such generalization, research underway at UMIST is currently looking at linguistics as a basis for time recording and estimating in software projects instead of the more traditional PBS. The method has been successfully adopted in BAES – the old British Aerospace.

continue to be, a major area of research enquiry. This also links to business benefit and to career development [Personnel].

Validity of Project Management as a research area and research funding

However arguable the shape and details of the above analysis, there would seem to be little doubt that the subject area is (a) important and (b) alive and full of potential. Much is on-going, both in industry – competencies, BOTs, concurrent engineering, etc. – and in research groups. Much, however, is industry specific (construction, software, defense, etc.). How valid a research field is generic project management as such? How strong a theoretical basis does it have? Are we fooling ourselves by proposing that there is such a thing as a research agenda in project management?

The above analysis suggests that the traditional core of project management (tools and techniques – and to a lesser extent, middle management organizational issues) are now well understood. Though they often pose challenges in implementation, their theoretical bases and application have limited (though still some) research needs.

There has been much published on the contextual application of project management (20% of all the papers). This is excellent and much needed. Project management, though a generic discipline, is contextual.

The results of this paper's analysis suggest that the major research needs of project management are now to demonstrate, within a theoretical context, how the overall discipline works coherently to deliver projects successfully. This finding, I believe, is supported not just by the above analysis but by current business experience.

Validity of the findings

A potential criticism of the analysis behind this view is that it is overly self-referencing. After all, the criticism could go, the analysis is based partly on a personal and quasi subjective presentation of project management issues and research needs, and partly on a more objective (but still very questionable) categorization of papers classified against a framework that stems from a particular view of the discipline (the "management of projects"/ APM BoK view).

There is some validity in such a criticism. There is also much that could be said to counter it. Tables 1 and 2 undoubtedly *do* represent contemporary issues. The APM/CRMP BoK models *are* based on research (first on the causes of project success and failure; second on what project management professionals believe p.m. practitioners need to be knowledgeable of).

Funding and theoretical coherence

Who will pay for this research? Is there a strong enough theoretical basis for at least some of it to be funded by the traditional academic research funding agencies?

This is where we came in. Many enterprises are willing to pay for work to be done to provide answers to as yet unanswered questions in project management. Often they call this consulting support – and this is indeed research of a kind, as we said at the outset. The challenge for research which has a stronger theoretical basis is precisely the perceived weakness of the discipline's theoretical base. Partly because project management *is* so practical, many practitioners find it difficult to get enthusiastic about introducing theory. And from the academic side, the subject – at least as it has been presented here in this paper – is so large, cross-sectoral and multi-dimensional that the traditional funding agencies often (though not always) consider it too tenuous. Project management does not hit square onto many of the traditional academic funding agencies. Academic work is typically funded by agencies looking at a particular aspect of the overall subject.

There are exceptions – and we should look to the professional institutions to be leading them – but generally it is up to us, the researchers, teachers, scholars and enthusiasts of the discipline to work on building the overall theoretical basis to the subject. I genuinely see this still as the major challenge.

Conclusions

Research into project management is alive and well. IJPM is having to increase the number of its issues per year to cope with rising demand. This conference itself attests the fact. But there is still far to go.

It is inevitable that an analysis such as that carried out in this paper will show that published research lags today's research issues: three to four years is a typical cycle time from research topic conception, through raising funds, performing the research, to publishing it. Yet there is a need, fundamentally, to refocus the discipline and its research paradigm. We need to understand better, in particular, the linkages between project management and business performance, and project management's generic responsibilities and actions in the whole area of technology and design. Information technology and procurement/ supply chain management remain as key areas, in many sectors, of p.m. business leverage. And the way we deal with and build knowledge, learning and competency development is key, and with today's HR concerns and technologies, is an important area of research.

The challenge of research in project management today, I contend, is to build a broad, multi-industry, theoretically grounded, explanation of what is required to initiate and accomplish projects successfully.

Research has a fundamental role to play in building this theoretical framework.

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