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Project management reform: a public body case study

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Many projects are not being delivered in accordance with predetermined requirements. Even if one could conclude that a particular project has been successful, the general record for projects is not a good one, with overruns in time and cost being commonplace. The indications are that the private sector is no worse but, quite likely, no better than the public sector. However, the public sector uses public money and, for that reason at least, the current demands for more effective management are axiomatic. This paper examines the implications that certain factors had on changing the project management approach of a public-sector organisation that uses engineers as project managers on capital works engineering projects. The results of this research, if such results can be applied to the whole sector, would indicate that the public sector is in need of reform on how it handles the project-side of its business. Greater or lesser amounts of reform would be dependent upon the project management maturity of any single public body.

1. INTRODUCTION: BEST PRACTICE IN PROJECT MANAGEMENT

Public bodies in the UK continue to be significant procurers of capital projects. Published data available for the 1990s show that both time and cost constraints for projects are, with certain exceptions, failing to be achieved. HM Treasury showed that for the period 1994–1995 there were 807 projects with an average estimated cost of £10·9 million per project.[1] The cost overruns were on average about 12–13%. The average time overruns were between 6% and 19% on average project duration of between 35 and 39 months. From the most recent comprehensive data available for the public sector, for the year 1999, the National Audit Office[2] showed that 73% of all construction projects had run over budget and 70% of all construction projects were delivered late to their sponsoring departments.

It is contended that one of the principal reasons why many public bodies are not delivering projects to budget, on time and to requirements is because they use traditional, or a general management approach. Academic and managerial wisdom is of the view that general management is not capable of dealing with the dynamics of change.[3] General management is generally incapable of dealing with non-repetitive situations; in fact this form of management cannot adequately handle projects. Project management, on the other hand, is an effective way of managing change. However, the form of management that an organisation uses in dealing with projects is only one of many factors that need to be considered when deciding how work should be handled.

Research carried out in the private and the public sectors over the nine years from late 1980s to late 1990s[4] shows that success or failure in organising work and utilising available abilities depends on how the organisation is structured and led, and on the quality of decision making. What is also of considerable significance is how individuals integrate, rather than the merits of the individuals themselves. Although individual competence is of considerable importance, it is not likely to account for what an organisation can achieve.

To be effective in handling work, the correct organisation structure should be adopted, the right people assigned to balanced and well-designed groups (or teams), and the management processes formalised for solving problems and making decisions. In this regard it is generally found that organisations (private and public) work better when they are de-layered, downsized and decision making is devolved. These '3Ds' are equally important when considering the project side of an organisation's business.

Research[5–7] carried out over the past 30 years has generally concentrated on the project success factors of the final deliverables but, as alluded to by some in this field, there is little that has been undertaken that deals with the success variables that change with time. Variations in the success variables, their relative importance and the associated metrics are different at every stage of the project. The success factors that would be appropriate at the end of the construction stage are different and more extensive than those at the end of the design stage, which in turn are more extensive and different to those applying at the end of the concept stage.

In 1997 a two-year research effort on best practice in project management was published.[8] The research centred on what happens in the management of projects in large functional organisations. Change in project management best practice through the life cycle was not investigated.

Representatives from about 40 top organisations, mainly private but some public, took part in a series of benchmarking forums over the research period. The forums followed a scientific

Strategic	Personnel	Methodology
A1 Organisation structure	B1 Pay and reward	C1 Methods
A2 Strategic communications	B2 Selection and retention	C2 Measurement
A3 Performance measurement	B3 Technical competence	C3 Risk
A4 PM—core competency	B4 Career development	C4 Communications plan
A5 PM performance	B5 Conflict resolution	
A6 Analytical ability	B6 Project change	
A7 Honesty and ethics	B7 Project evaluation	

Table 1. Key success factors

benchmarking approach with each participant being asked to list problems relating to the implementation of project management in their organisation. From these lists the following three general subject areas were identified and developed

(*a*) strategic
(*b*) personnel
(*c*) methodology.

Using this general division a series of key success factors and core best practices were generated. It was found that there are a number of key success factors within each of the three general subject areas. These key success factors are general guidelines or requirements that would apply to 'best practice' project organisations. The 18 key success factors, and for convenience their code designator, are listed in Table 1.

The research also indicated that there were core best practices that are needed to address each one of the key success factors. core best practices are specific actions that the project-driven organisation would need to adopt to achieve successful project outcomes.

The recommended core best practices were linked to each of the key success factors and are presented in Table 2 as a brief comment referenced against the stated code numbers given in Table 1. These key success factors and core best practices are not organisation (private or public)-specific but would apply to the project side of possibly any organisation's business.

2. PROJECT MANAGER COMPETENCIES

In 1987 the Project Management Institute in the USA first published its *Project Management Body of Knowledge*; this was redrafted in 1994, updated in 1996, and the current version was published in 2000.[9] The *Project Management Body of Knowledge* established a framework for managing projects; it provides a basic reference for anyone interested in the profession of project management, and it is used by the Project Management Institute to develop project managers through certification programmes.

To become certified with the Project Management Institute, any eligible individual is required to take an examination that is structured in five parts, namely (1) project initiation, (2) project planning, (3) project execution, (4) project control, and (5) project closing. The questions set within these five parts can be taken from any of the nine knowledge areas of the Project Management Institute's *Project Management Body of Knowledge*. The nine project management knowledge areas are: integration, scope, time, cost, quality, human resources, communications, risk and procurement.

As far as the Project Management Institute is concerned, achieving the Project Management Professional (PMP) certification is an essential prerequisite for an individual's professional development. The Project Management Institute has structured its competence development[10] for project managers on evaluating individuals using the three competencies of knowledge, performance and personal competence.[11] The nine knowledge areas underpin the knowledge and performance competencies and the personal competence is based on core personality, behaviour and attitudes.

Other Project Management associations in other geographical areas have subsequently developed their own *Project Management Body of Knowledge*. The Association for Project Management in the UK, for example, has published four editions of its *Project Management Body of Knowledge*, the latest being in 2000.[12] The Association for Project Management's approach is to offer different qualifications that are likely to meet the needs of an individual at different stages in their project management career. Competence is also perceived by Association for Project Management as an amalgam of knowledge, experience and personal attitude.

Research on competency carried out in the UK over a twelve-year period (from about 1988) utilising the development of thousands of project managers revealed that less than 15% of the individuals assessed had the all-round experience, skills and management judgement needed to lead complex projects.[13] Five models, four of them dealing with management capability and one dealing with project manager capability, were developed to suggest how good project practices can be introduced into traditional management structures. The project manager capability model identified project manager by level A, B and C. Level A types were responsible for managing work packages and had three or less staff reporting to them. Level B project managers ran projects having inter-product complexity and greater organisational complexity than level A, with up to ten staff reporting to them. Level C types led major programmes of very high complexity with teams of up to 100 staff. It was concluded that the competency of a project manager would be dependent upon their project involvement and the relationship with functional managers in their organisation, level B and C project managers needing considerably more than level A skills training.

A study of 170 practising construction project managers in the UK, almost 80% of whom were aged between 41 and 63 years and with close to 90% having engineering degrees, provided some interesting results.[14] Sixty-four per cent had acquired the necessary experience on up to ten projects before attaining the title of project manager. About a third had taken up to ten years to achieve this title, another third had taken 11–20 years, and a further third took more than 21 years. The elements that impact on competency were grouped into the PM functions that are explained by listing some associated knowledge and skills (see Table 3).

Key success factors	Core best practice
A1 Organisation structure	The organisation structure for the management of projects should be established such that it focuses on achieving project goals, minimising bureaucracy, limiting the layers of management, and having a free flow of information. Placing an appropriate structure within a public body is critical. A public body that undertakes cross-functional projects, such as planning, legal, finance, social, engineering, needs to have project management authority at executive level that spans such functions.
A2 Strategic communications	A formal and aggressive effort is needed to communicate and promote the benefits of projectised functional management. Within a large functional organisation the value of the project management approach needs to be communicated upwards, downwards and sideways. The communications activity consists of showing how the project management approach can help each functional group achieve its objectives.
A3 Performance measurement	Although this can be seen as a methodology it is important at a strategic level for the organisation to be placed in a position where it can measure the performance of all projects. It is therefore able to see the macro position as well as the status of individual projects.
A4 Core competency integration	In a projects-driven organisation the project management process has to be strategic. Therefore the methodologies that are project management need to be integrated within the entire value chain of the corporate processes.
A5 Project manager performance	Best practice indicates that the evaluation of a project manager's performance should preferably be evaluated using a number of factors in addition to the normally expected project success (time schedule, out-turn cost). Stakeholder satisfaction, handling risks, handling impact, are a few examples of the other factors.
A6 Analytical ability	The most successful project managers are those who have the ability to combine an analytical approach with their experience. Best practice indicates that project managers need to have high ability in the use of quantitative techniques when examining project alternatives and opportunities.
A7 Honesty and ethics	Best practice research of the personal attributes of a project team member show that there is a high correlation between honesty and successful project goal achievement.
B1 Pay and reward	Project managers' jobs are entrepreneurial in nature; they are often seen as being responsible for running a business unit or a profit centre or a social gain centre. Pay and reward needs to be based on project risk, as well as competency and skill. Bonuses should be paid for good performance but more complex bonus arrangements should be available to support medium- to long-term corporate objectives.
B2 Selection and retention	Choice of the person to be project manager is a critical element that affects the process of managing the project. Authority and responsibility need to be defined by the project sponsors. An individual's competencies and skills need to match the job profile. Core best practices regarding pay and motivation are needed to retain the best project managers.
B3 Technical competence	This particular best practice relates to competence in project management and in the technical fields that apply to each project. Target training needs to be provided so long as it provides results. Training outcomes need to be measured and the results used as input to career development.
B4 Career development	The term *project manager* needs to be used when the title reflects the position. Clear job descriptions that differentiate different types of project manager role are recommended. Project management like any other profession needs to offer a career path, skills that are needed, and how such skills can be obtained.
B5 Conflict resolution	Best practice project management groups should use formal conflict management techniques.
B6 Project change	Best practice project management groups should measure and control the impact of project changes.
B7 Project evaluation	Best practice project management groups should use a range of methods to evaluate project success and failure, such as record keeping, project journals, periodic or exception reviews and auditing.
C1 Methods	Best practice organisations should have a methodology that integrates the project management process throughout the organisation.
C2 Measurement	Best practice organisations should measure the impact of the project process on the host organisation's bottom line.
C3 Risk	Best practice organisations need to have a risk policy backed up by a risk evaluation and management process.
C4 Communications plan	Best practice project management teams should have formal methods of ensuring superior stakeholder communications.

Table 2. Key success factors and their associated core best practices

It was found that the knowledge and skills necessary to maintain a project manager's competency were provided primarily through their working experience. As engineers are educated to be engineers, the extent to which post-education training enables engineers to become more effective managers is considered to be an absolute necessity; experience alone is inadequate.

3. EVALUATING PROJECT MANAGEMENT IN A LARGE PUBLIC AUTHORITY

During 2001–2003 research was undertaken in the Republic of Ireland while assisting the engineering corps of Dublin City Council to reform its project management working standards and practices.

PM function	Examples of knowledge and skills
Technical skills	Planning and scheduling, basic technical knowledge in own field
Managerial skills	Leadership, delegation, negotiation, decision making
Financial skills	Establishing budgets, reporting systems
IT skills	Project management software, spreadsheet, computer-aided design
Legal skills	Drafting contracts, health and safety issues
Communication skills	Presentation, correspondence, report writing
General skills	Chairing meetings, understanding the organisation

Table 3. PM functions and associated skills base

At that time Dublin City Council was engaged in the city's infrastructural development through a 137-project portfolio with a value in excess of IR£1·24 billion (€ 1·6 billion). Most of these projects were of a capital works nature but some were studies and had yet to achieve approval status for the expenditure of capital funds. The top 19 projects had individual values between a lower level of IR£8 million and the largest budget cost of IR£353 million, which was the Dublin Port twin road tunnel. The top 19 projects had an aggregated value of about IR£1·06 billion and about 100 projects within the portfolio were small, having an individual capital value not exceeding IR£3 million.

This portfolio was significantly different to that existing in the few decades prior to about 1995. European funding flows to the Republic changed local authority attitude from one of, at best, mediocre levels of social infrastructure development to one in which the past decades of underinvestment appeared to be reversing all at once. A net result of this change was that engineering design that had traditionally been carried out by local authorities in-house was procured externally. A further result was that an engineer became less of an engineer and more of an administrator involved in the management of projects. It was within this environment that the engineering corps of Dublin City Council and their projects were researched.

Analysis of the corps project management capabilities was carried out on 60 staff members who were professional engineers assigned to engineering, road or transport projects; this represented 44% of the engineer population. Seventy-two, or 53%, of the engineering corps participated in an assessment of individual project management competence. It was felt that these population samples were significant and would be representative of the total engineering corps.

Certain general data about the engineering corps were collected and analysed. A sample of some of the more interesting statistics shows

(*a*) 69% were over 41 years old
(*b*) 61% felt that senior management were not aware of their views
(*c*) 16% had only worked with their current employer and had no experience of working elsewhere
(*d*) a total of 92% were of the view that formalised project management was either essential (49%) or would be of benefit (43%)
(*e*) 70% saw the role of the project manager and the associated training in project management as the way forward
(*f*) 56%, on average, of an engineer's time was taken up on non-engineering matters.

These statistics comprised some of the information obtained by conducting a weekly electronic forum, named Friday Forum, that was posted each Friday to every engineer's mailbox. At each Forum a question, with multiple choice answers, was asked and each engineer was requested to electronically respond to the question by the following Wednesday. The answers were analysed automatically and the result posted along with the next question the following Friday. The Friday Forum ran for the period July 2001 to February 2002 and 24 questions and answers were generated. Response rates were about 45% to start with and although the size of the response fluctuated over the period, the response rate rose considerably. Towards the end of the period it was as high as 85%.

3.1. Best practice project management

During 2002 engineers were interviewed on a one-to-one basis using a common structure of questions; the responses were recorded on a standard information form. The questions asked related to project management issues that concerned each individual on the project or projects to which they were currently assigned. It was found that the issues concerning engineers varied across a very wide range of matters from strategic to tactics. To conveniently group these issues it was decided that any grouping of responses should, if possible, reflect the key success factors that would be found within today's projects-driven organisations. The rationale for such a linkage was that if such best practices were in place then, by and large, this would address what were seen as issues.

Another way of interpreting this approach could be by benchmarking the way the engineering corps carried out its project business. Accordingly, the three areas of strategic (S), personnel (P) and methodology (M) from the 1997 research were selected together with sub-headings and brief explanations as shown in Table 4.

The greater or lesser importance of the issues raised by the interviewees S1 to M3 were aggregated against these headings and are shown as a pie chart graphic in Fig. 1. The three most significant project management issues identified by the projects' personnel were

(*a*) M2—PM practices and methods
(*b*) P1—selection and retention of project personnel
(*c*) S2—organisational and project communications.

Issue	Explanation
S1 Organisational structure	Includes reporting relationships upwards, downwards, sideways, outwards, etc.
S2 Organisational and project communications	Includes all means of communication both with the funding authority, at upper level including conforming with Dublin City Council requirements, at project level and between external entities on the project.
P1 Selection and retention of personnel	Includes identifying the right people, giving them appropriate reward, and motivating them into a meaningful career.
P2 Ability and performance of personnel	Relates to the satisfaction rating of an individual in their own development and, if appropriate, that of their in-house peers.
M1 Getting the project started	Relates to the adequacy or otherwise of the up-front inception and feasibility stages.
M2 PM practices and methods	Includes all matters in the post start-up phase dealing with protocols that were/were not used by engineers in managing projects.
M3 Handling change and project status/evaluation	Includes all matters relating to change in a project, its progress, its evaluation, its eventual success or otherwise.

Table 4. Breakdown of research areas

The importance of these issues were 32%, 24%, and 15% respectively and when taken together they equate to just over 70% of all issues raised. In other words, the engineering corps believe that the most significant issues that affected the outcome of projects were M2, P1 and S2 in order of decreasing significance. Almost a third believed that the lack of formal project management procedures (practices and methods) was the most important factor impacting on project success. Almost a quarter believed that the selection and retention of project personnel was the second most important factor. And between 1 in 5 and 1 in 6 are of the view that communications is crucial.

Another way of interpreting the outcome is by using the three general subject areas of S, P and M. By examination, this shows strategic matters at 21%, personnel at 26%, and methodology at 53% as being the engineer's opinion of what is needed to achieve 'best practice'.

3.2. Competency as project managers

All 135 individuals who were identified as the engineering corps were sent a Skills Assessment Questionnaire that sought to determine their self-assessed competence on a range of project management processes. Completed forms were received from 61 individuals, representing a return rate of 45%. Senior management within the engineering corps were excluded so that what was analysed would be reflective of engineers working on projects.

The questionnaire headings were linked to the life stages of a project so that any variation in competence between stages from the start to the finish of projects could be identified.

The Skills Assessment Questionnaire was structured with four categories against which the individual could assign their competence. Using a concept developed for engineers,[15] competency categories were adopted and identified as A, K, C and E. The competency levels and a brief definition are given in Table 5.

Levels A and K would indicate a very low and low-competence status respectively and would not be adequate levels for a project manager role. Level C would be interpreted as having some ability and, providing great care is taken in the selection, a C level

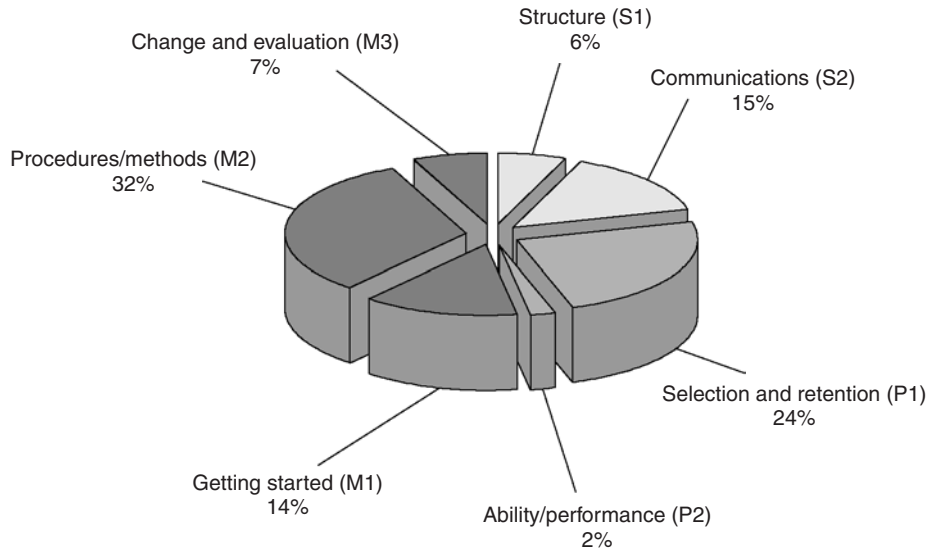

Fig. 1. Project key success factors identified by engineers

Competency level	Definition
A	The individual is *aware* of the topic but would not fully know what it means nor could they define it
K	The individual has *knowledge* of the topic, would be able to define it and explain what it is to someone else
C	The individual would be *capable* of defining and applying the topic to a project but would not be able to see the broader application or be competent enough to train other staff
E	The individual would have a high level of *expertise in* the topic and would have the ability to mentor and train other staff in the topic

Table 5. Competency levels and their definitions

competence could be assigned a project manager role. Level E would be a competency level expected for a certified project manager.

The results of the competency self-assessment carried out in Dublin City Council are shown in Fig. 2. The competency profiling was undertaken by asking 'what do you know' type questions on project management processes that were linked to a six-stage project life cycle from concept to construction. For instance, the questions asked that were linked to the *feasibility stage* covered such processes as project charters, risk identification, value planning, procurement strategy, and quality policy.

Averaging the results for each competency A, K, C and E and distributing any error proportionally it was found that the numbers of engineers having A, K, C and E competency over all life cycle stages was 39%, 30%, 26% and 5% respectively. Therefore, nearly 4 in 10 engineers have only an awareness of many of the processes that make up the totality of the project management approach. Further, 3 in 10 engineers have only a basic knowledge of the processes. In other words, 7 out of every 10 engineers would be ranked as having low or very low project management competency. It was found that slightly more than 1 in 4 would have some ability as a project leader and only 1 in every 20 would have the competency sufficient to train, or act as a mentor, to other less competent personnel.

The competency profile, when related to a project's development life cycle (see Fig. 2), clearly shows an alarming deficit in competence during the earlier stages of a project when decisions taken have the maximum impact on a project.[16] In fact, even more disturbing was the outcome from other internal investigations showing that historically the concept stage was entirely missing from most projects handled by this local authority.

It is worth stating that, in general, self-assessment evaluations have a tendency for overstating a position or a view; the true picture is probably not as good as the statistics indicate.

4. IN-HOUSE PROJECT MANAGEMENT DEVELOPMENT

Based on the analysis of the self-assessment competency it was clear that a comprehensive management development programme was needed to convert engineers into more competent managers of projects. It was proposed that as an initial recommendation the project manager career structure shown in Fig. 3 should be considered.

It was proposed that a suite of in-house training modules be developed that would initially serve all engineers having less than, say, five years post-graduation experience and/or those indicating only an awareness (level A) of project management processes. The analysis of competencies within Dublin City Council indicates that this could attract around 50 engineers.

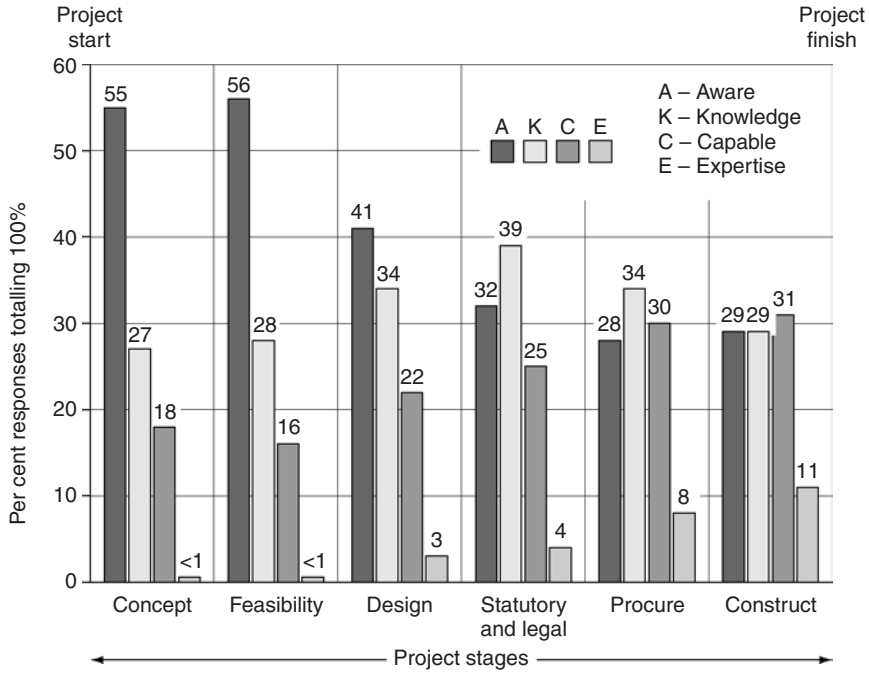

Fig. 2. Levels of project management competence

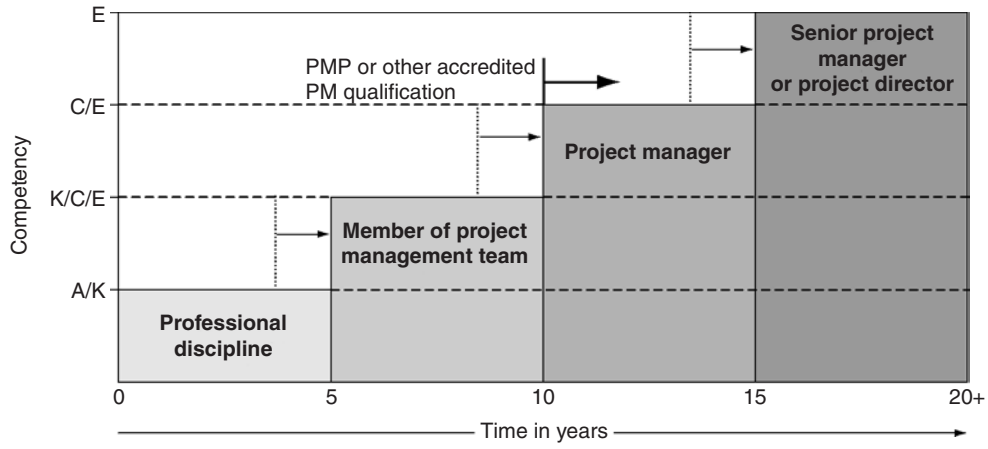

Fig. 3. Career progression in project management

Such training modules were referred to as K modules, the intention being to raise engineers' competency to K level. K modules were to be the basic framework modules for initial training and would form the foundation for knowledge and understanding of project management. These modules would cover the management of projects in all stages of a project's life cycle but would focus on the processes used in the earlier stages.

The next level of competency would lead the individual to the C modules which would be more advanced and would build on the foundation K modules. Although the C modules would, in general, raise competency in many of the same subjects available at K level, this higher-level training would relate to the interpretation and application of Dublin City Council's newly developed corporate standards and practices. At this achieved level of training an individual could be assigned a role as a project manager. These modules would be of eventual interest to around 95 Dublin City Council engineers.

The final level of competency would be achieved through advanced 'hard' and 'soft' project management modules in which individuals showing significant ability in the K and C level training would be invited to participate. Hard refers to such matters as value engineering, risk management, etc. and soft refers to leadership, team building, etc.

Figure 3 shows competency as the ordinate and years of post-education work experience as the abscissa. The information provided by the graph cannot be interpreted prescriptively. Some engineers might maintain their discipline within projects and never become, or wish to become, managers. The time that it takes for an aspiring project manager to achieve that role is dependent on many factors. The levels of individual competence vary but the lowest level of competence shown by the ordinate should be the target as a person progresses through their development programme.

5. FINDINGS AND ADVICE FOR PUBLIC BODIES SPONSORING CAPITAL ENGINEERING PROJECTS

As the recommendations and actions taken by Dublin City Council management to reform their project management took place during the first half of 2003 it is too early to draw any conclusions on the effect that the reforms have had.

Based on the research work carried out during 2001–2003, and assuming that the specific case can be interpreted as the general case, there are a number of very important strategic and tactical issues that senior management in public bodies would need to address. If the working culture of a public-sector organisation's staff engaged on projects is to be more effective, the topics shown in Table 6, linked to the 1997 and the 2002 research key success factors, are offered as a summary of findings along with brief statements of advice.

5.1. Organisation structure

Finding: It was found that except for the very large programme (series of projects), project teams were organised as microcosms of the corporate structure—that is, mirroring the functional hierarchy. Teams, in most cases, consisted of personnel who maintained their normal workstation. Functional heads maintained the decision-making role on projects.

The bureaucratic, hierarchical organisation is likely to be correct for operational work but for projects this is known not to work and something much more radical is required. For the larger project, dedicated personnel working in a dedicated team probably in a location away from the home base, otherwise known as the task force, is likely to be a common approach. For the medium-size project, dedicated teams working and reporting to project managers, not functional managers, is the preferred structure. Perhaps for small

Topic	2002 research findings (see Fig. 1)	1997 research findings (see Table 1)
Organisation structure	S1, S2	A1, A2
Project support office	S1, S2	A3–A7, B2, B4, B7, C1
The project manager	S2, P1, P2, M1–M3	A4–A7, B1, B2, B4–B7, C1–C4
Empowerment	S1, S2, M3	A4, B3
Standards and practices	M1–M3	A3–A5, C1–C4
Skills transfer	P1, P2	B1–B7, C1–C4

Table 6. Summary of findings

projects it would be acceptable to organise the work using the disparate approach.

For all project-type work the management and control should not be centralised within a functional department: it should be delegated to the project managers.

5.2. Project Support Office

Finding: This particular local authority was considered to be at the lower end of formalised project management maturity. In such an organisation, where operations (e.g. social support) is the primary business, then balance to accommodate secondary (project) work can be effectively addressed by creating a project management unit or centre with responsibility for inculcating 'best practice'.

An essential part of any change process, involving a large functional organisation dealing with cross-functional projects, is how to handle project-team work. This requires at senior management level a cross-culturing of the project management ethos and a willingness to raise the profile of the project-driven side of a public body's business that is typically, and probably predominantly, of an operations nature.

In this particular case a Project Support Office (PSO) was established and engaged as part of the outreach resource to project teams. For organisations wishing to raise their project management maturity, such an intervention is quite common. This approach ensures that project management strategies and procedures are adopted, are being used, and are in accordance with best practice.

At Dublin City Council the PSO's remit, although primarily focused on capital works projects, was further utilised by engaging it in the organisation's project portfolios and in-house programmes.

5.3. The project manager

Finding: An individual was normally assigned as a manager of a project based on their engineering seniority and/or their knowledge and familiarity with the project under consideration.

The person assigned the position of project manager needs to be an individual with a high level of competence in both the hard and soft sides of project management. Except for the very small project, the person assigned as project manager should be just that: the project manager should not also hold a technical specialist on the same project. It may be necessary for public bodies to take a fairly radical approach on attracting the right people if an internal search indicates there is a dearth of talent.

Although a difficult concept for public bodies to consider, pay and rewards should be in keeping with what project managers receive in the private sector. Remuneration should take account of experience, size of project, risk and complexity of project, and the duration of the project; if possible it should be based on performance.

5.4. Empowerment

Finding: Although individuals were appointed to the role of project manager it was found, in most cases, that such appointments did not come with commensurate responsibility and authority. The department heads or those in charge of functions generally retained responsibility for projects.

The appointment of a single individual (the project manager) with commensurate responsibility and authority for project decisions results in a high correlation of success in achieving the normal project targets of performance, time schedule, and cost budget. This empowerment however requires the delegation of senior management function to the project manager. Creating a charter between the senior management person (the project sponsor) and the project manager who specifies the responsibilities and authorities of each party can accommodate this requirement.

5.5. Standards and practices

Finding: Although having been engaged in project procurement and implementation for many years, this particular organisation had not formalised its project management processes nor did it have comprehensive and consolidated procedures.

There is a need for organisations handling projects to have working standards and working practices documented, formalised and committed to by senior management and those working on projects. Project management of an organisation's range of projects with teams of internal, and perhaps external, resources requires project management protocols that are consistent and deliver results. This usually means the introduction of a corporate set of project management processes to which all project teams would be required to strictly adhere. Checking for adherence to these processes should be a responsibility of a PSO using a documented approach to project auditing.

5.6. Skills transfer

Finding: Within the organisation under consideration it was found that not one engineer had any form of project management qualification or certification. A structured programme of training would be needed to create a core of project management champions and managers of projects.

Probably more so than in other disciplines, there is likely to be a pressing need within the engineering corps of public bodies for a significant number of staff to have a structured development plan for increasing their levels of project management competency. A training programme that is progressive and is based on best practice and focuses on the management of projects in hand is recommended. The fundamentals should be taught in classroom sessions but the more advanced aspects of project management should be related to on-the-job training. Assignment-based training related to a current project provides the individual with skills and the organisation with value-added templates and outcomes.

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