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Developing project management competency: perspectives from the construction industry

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Abstract

Project managers in today's construction industry are faced with a situation whereby the fundamental roles and functions they perform are witnessing a gradual shift in focus. To maintain their professional competency, practising project managers in construction adapt to this changing industry environment by relying on knowledge and skills acquired through training and experience. The extent to which such training enables project managers to effectively adapt to changing demands have considerable relevance not only for the training of future project managers, but more importantly, the kind of management and general manpower development policies that construction organisations can adopt. The paper presents a study that focuses on the development of construction project managers and how they maintain their professional skills in a changing construction business environment. The paper first sets out the areas of knowledge and skill required for project management certification, and argues that the traditional engineering orientation of these requirements are insufficient for today's construction project manager. It identifies the general knowledge and skill elements that are perceived as essential for developing project management competency through a survey of project managers in the construction industry. © 2000 Elsevier Science Ltd and IPMA. All rights reserved.

Keywords: Construction; Project managers; Knowledge; Skills; Experience

1. Introduction

Project managers in construction are responsible for the overall success of delivering the owner's physical development within the constraints of cost, schedule, quality and safety requirements. As such they play a crucial role not only in the operational activities of architectural and engineering construction companies but also the development of infrastructure in every country. From the beginning of the 1990s the business climate in the construction industry has witnessed unprecedented dynamics as organisations respond to increasing competition within a stagnant or declining market [1]. The industry's procurement methods are changing with clients allocating greater risks to contractors [2]. The emergence of design-and-construct contracts as an alternative to the more traditional options of open competitive tendering for procuring public projects, and their widespread adoption is impacting on the role of project managers. Equally, the renewed demand for quality, productivity and performance is leading many organisations, and particularly construction companies, to question traditional philosophies and principles associated with their management processes and business practices [3].

Within such a changing industry climate, project managers increasingly find themselves accountable not just for the technical content of the project as expressed by the engineering and construction accuracy, reliability of the facility, and within-cost performance. Project managers find themselves confronted by issues, and undertaking additional roles, that have traditionally not been part of their responsibility [4, 5]. Both Celan and Dorman [6] and Russell and

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Jaselski [7] recognised this changing role for construction project managers and argued that they must supplement their traditional functions with other *non-engineering* knowledge and skills to meet today's professional demands for which they become responsible. Ahmad [8] equally emphasised the need for the project management function itself to adapt to these changing industry conditions in order to maintain its relevance for project delivery well into the future. Ahmad [8] presented the solution to such adaptation as pairing the project management function with information technology (IT). The significance of such pairing becomes more apparent when viewed against the 70% proportion of construction project managers who considered their IT resources inadequate to deal with the demands of their job [9]. Although this is relevant to developing future project managers, it does not cover all the different issues that project managers operating in today's industry environment are likely to encounter. For example [10] sees the management of relationships as an essential ingredient that is increasingly impacting on successful project delivery. It is true to say that the management of relationships can be facilitated by technology and engineering principles. However, the very essence of relationships is *non-technical* and often social-oriented skills. Many practising project managers in performing their duties and roles, naturally, reflect these skills. The industry can gain valuable lessons and insight for expanding the scope and coverage of the functions required of project managers by establishing the additional skills and knowledge that these practitioners have to continuously acquire in order to retain marketable services. These additional requirements often encompass the broader social aspects such as societal expectations for environmentally responsible behaviour, and maintaining the right relationships that will have a positive impact on the project outcome. For the construction industry, the essence in focusing on improving competency of project managers derives also from the impact of projects on the company's business. Each project forms a significant proportion of the company's overall turnover. The failure of a single project can therefore trigger the failure of the whole company [11, 12].

The development of the requisite knowledge and skills needed to perform this expanding role have traditionally relied on engineering degree programmes that are pursued in academic institutions. Construction and engineering degree programmes for educating project managers traditionally reflect a technological content. To ensure their continued relevance in an industry, Construction Project Managers often rely on various learning activities that help them to fulfil for the project, both the construction specific and the non-construction functions demanded of them. Identifying the routes and mechanisms by which these construction project managers acquire such requisite skills should provide options for addressing the training of future construction project managers ([13]). A more significant aspect of the study however, is identifying potential lessons for management development policy that construction organisations may adopt.

This paper presents the outcome of a survey that examined how construction project managers acquired and developed the necessary skills and knowledge for practice. The paper focuses on the general aspects of skill and knowledge development, since that presents commonality for the different project types in construction. The study is based on a survey conducted in the UK. The results from the study identify and provide appropriate lessons and options that can inform in-house training schemes for project managers of construction organisations as well as academic and industry-based programmes that serve as training routes for future project managers.

2. Essential PM knowledge

Professional competency in project management is attained by the combination of knowledge acquired during training, and skills developed through experience and the application of the acquired knowledge. Much of the knowledge needed to manage construction projects is unique to project management (such as critical path analysis and project cash flow forecast). Fig. 1 outlines the generic areas of knowledge that construction project managers are usually expected to acquire by various Accreditation Bodies and, which reflect their technical requirements for certification. The compiled knowledge areas cover two main sources, the reference material of the Project Management Institute—PMI [14] and the Association of Project Managers [15], and a review of instructional material for several other organisations that provide training services in project management to corporate establishments.

Academic programmes in project management cover a significant proportion of the outlined knowledge areas. The knowledge areas required by project managers for practice, however, transcend the scope covered by the Accreditation Bodies. This demands appreciating a context much wider than that offered by engineering programmes, and the subject boundaries defined by the certification requirements. While it is acknowledged that the certification requirements do not equate with engineering programmes, it provides a view of the changing requirements that project managers have to face up to. Modern project management practice therefore, demands other *general* and *management* knowledge, coupled with skills that extend beyond the technical aspects of traditional engineering

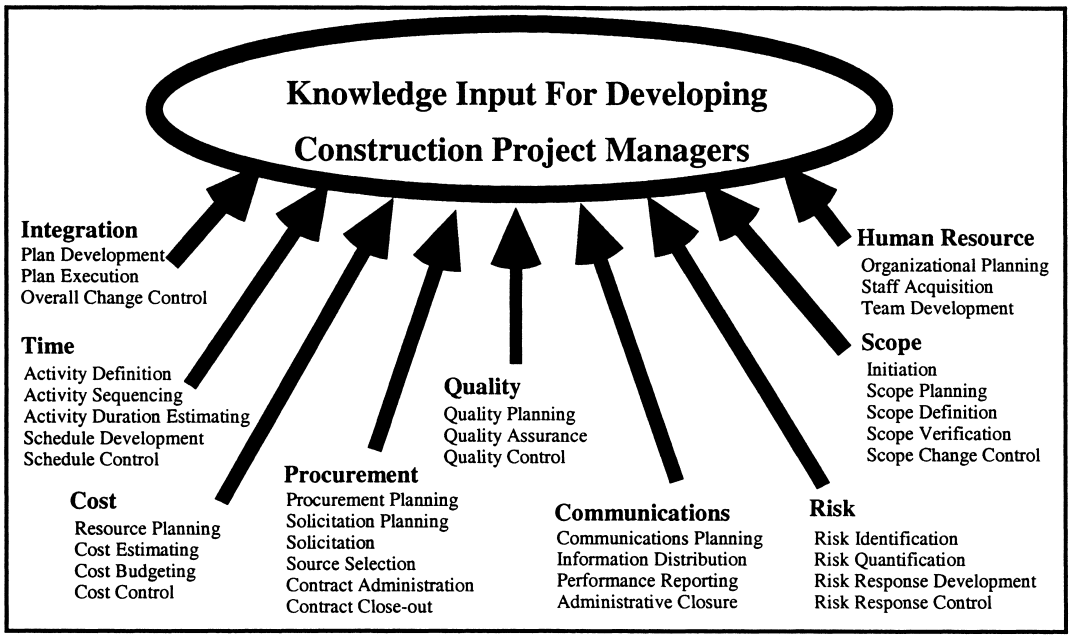

Fig. 1. Generic knowledge areas of project management (adapted from PMBOK).

areas. Since projects generally form part of a functional organisation, much of the additional knowledge will overlap with the general functions required for managing enterprises. This will include the following areas.

- Finance and accounting
- Sales and marketing
- Strategic planning
- Tactical planning
- Operational planning
- Organisational behaviour
- Personnel administration
- Conflict management
- Personal time management
- Stress management

The general knowledge areas will cover among others, the following supporting disciplines.

- Economic analysis
- Social trends
- Political developments
- IT advancements
- Legal framework
- Statistics, probability theory and risk

It is important to emphasise that although the list of knowledge areas presented above is comprehensive it is not exhaustive. The scope of knowledge areas required for managing projects will also be influenced by the context of industry in which the project managers work, as well as the requirements of engineering institutes (for example the Chartered Institute of Building—CIOB and Institution of Civil Engineers—ICE).

3. Essential PM skills

Projects in construction cover several areas of specialisation. It is to be expected that construction project managers who specialise in, say building works, will not necessarily be specialists in water engineering projects. However, acquiring the knowledge inputs for a particular type of project area enables the project manager to develop two types of skills. These are specific skills, which relate directly and only to construction projects, and in particular, the areas that reflect their speciality; and general skills, which are transferable from the construction arena to other fields, but more importantly from one area of construction to another. The general skills provide much of the foundation for developing project management skills. They are often essential for the project manager to function effectively with his/her specialist knowledge. The following general skills often become relevant to construction project managers ([16]: 306–310; [17]: 182–188).

3.1. Leading

This entails providing leadership at the three main levels of project leadership, technical leadership, team leadership and will involve the following skills.

- Establishing direction by developing a vision of the future and strategies for producing the changes needed to achieve that vision.
- Aligning people through communication of the vision by words and deeds to all whose co-operation may be needed to achieve the vision.
- Motivating and inspiring subordinates by helping people energise themselves to overcome political, bureaucratic, and resource barriers to change.

3.2. Communicating

Communicating involves the exchange of information. Effective communication is a broader skill and involves a substantial body of knowledge that is not unique to the project context. The many dimensions for communicating by the project manager often require the skills of writing, oral and listening.

3.3. Negotiating

Negotiations occur around many issues, during the life of a project, many of which involve the project manager. The following situations are often encountered during the course of a construction project, and for which the negotiation skills of the project manager are called for.

- Scope, cost, and schedule objectives
- Changes to scope, cost, or schedule
- Contract terms and conditions
- Resource availability and utilisation

3.4. Problem solving

Problem solving skills involve a combination of problem definition and decision making which is concerned with problems that have already occurred. The problem definition aspect requires distinguishing between causes and symptoms. Equally the problems may be technical (differences of opinion about the best way to design a product), managerial (a functional group is not producing according to plan), or interpersonal (personality or style clashes). The project manager's decision regarding the defined problems may call for quick response.

These skills combine with the traditional engineering knowledge of the project manager to produce what [18] described as the new perspective of project management. Fig. 2 illustrates this new perspective and identifies some key areas in which the modern project manager in construction needs to develop competency

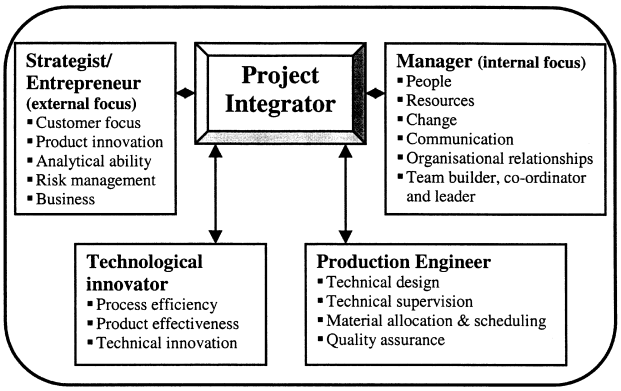

Fig. 2. The evolving role of the project manager.

in order to perform effectively. As a *Strategist/Entrepreneur* the project manager is required to provide innovative solutions both for the product as well as the business processes involved in the delivery of the project's outcome. This requires both long-term and short-term perspective for the project and its wider business/industry context. As a *Manager*, the project manager has to see to the general functions associated with the project. These include managing human systems, logistics, information flows and organisational relationships. The use of technology as a leverage for competitive advantage has become more important now to effective delivery of projects. This operates both at the production level and the use of IT resources. The project manager is required to be astute regarding options that can be deployed for effective *technological innovation* to optimise the project's performance. The production process in construction combines specific activity phases including planning and scheduling, estimating and cost control, contract management and purchasing. As *Production engineer* the project manager is required to manage the effective implementation of each of these phases to achieve reasonable levels of efficiency.

4. Developing PM knowledge and skills—focus on construction

The construction industry presents a suitable environment for reviewing the development of professional competency in project management. This is because nearly all its business activities are based on the project management approach and so it abounds in cases of successful project management that can provide useful lessons. A survey was undertaken to ascertain how practising construction project managers acquire the relevant knowledge and skills, which enable them to perform effectively in their professional roles. The survey elicited two key issues from the project managers.

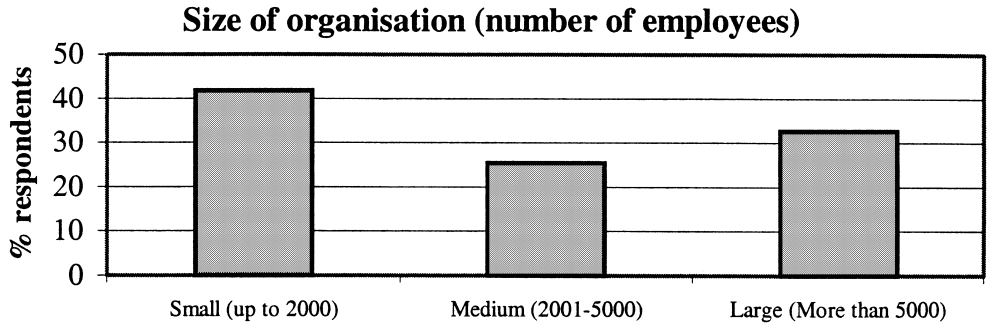

Fig. 3. Distribution of respondents by size of organisation.

- What particular factors within the categories of knowledge, skills and practical experience formed the source of their professional competence.
- Their perception of the relative importance for each of the identified factors in the above categories in contributing to their professional performance.

The study therefore focused on the knowledge and skill factors that construction professionals had to acquire in order to become project managers. These factors comprised academic background and experience-related knowledge as well as skills. The perception of the practising project managers regarding the relative importance of the factors to their professional performance also provides useful options for designing training programmes of future project managers.

4.1. The research approach

The survey was administered by applying two research instruments, the interview technique and a postal option. The first instrument was implemented for a selected group of organisations for which several interviews were conducted with key professional personnel. This helped to assess the criterion for selecting successful project managers, and to determine the metrics for various factors identified in the objectives. The second phase of the survey involved the postal option. The main tool employed in collecting the core data for the survey was a structured questionnaire, which was developed by employing the outcome of the interview phase and various other criteria identified from literature.

The questionnaire instrument involved a UK-wide survey of project managers within the construction industry. The questionnaire was structured to elicit the general and technical background of these practising project managers. This comprised both the academic and experiential aspects of their development. According to [19], these two elements were established in previous research as essential factors that contributed significantly to the development of project managers. The questionnaire instrument also elicited the relative importance of various knowledge and skill elements that can enhance the professional competency of project managers. These were compiled from the areas outlined in Section 2 and Section 3 and refined in the interviews, which was undertaken in the first phase. In all, 170 good responses from practising project managers were obtained out of 500 questionnaires, which was sent out for the postal survey, giving a response rate of 35%. This level of response rate exceeded the norm expected for survey research in construction and also yielded a sample size suitable for the subsequent parametric analysis.

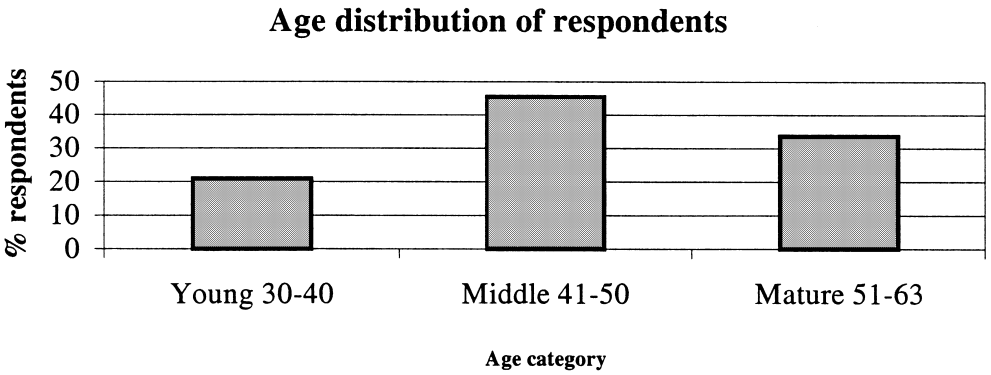

Fig. 4. Age category of respondents.

5. Results and dicussion

The results of the survey were analysed by descriptive statistics, and have been organised in two main sections. The first section addresses the first objective of the study. This presents various distributions associated with the general background, academic development and experience of practising project managers in construction. The second section presents summarised attitudes of the respondents regarding the relative importance of the various factors for developing and maintaining effective project management competency.

5.1. Developing construction PM competency

5.1.1. General background

Figs. 3–5 present general information relating to the respondents. Fig. 3 shows the distribution of respondents by size of organisation, (using number of employees as proxy for size of organisation). This indicates that the outcome of the survey reflects all size categories of construction organisations. The lessons from the study should therefore have relevance to both large and small organisations within construction. Fig. 4 depicts the age distribution of project managers.

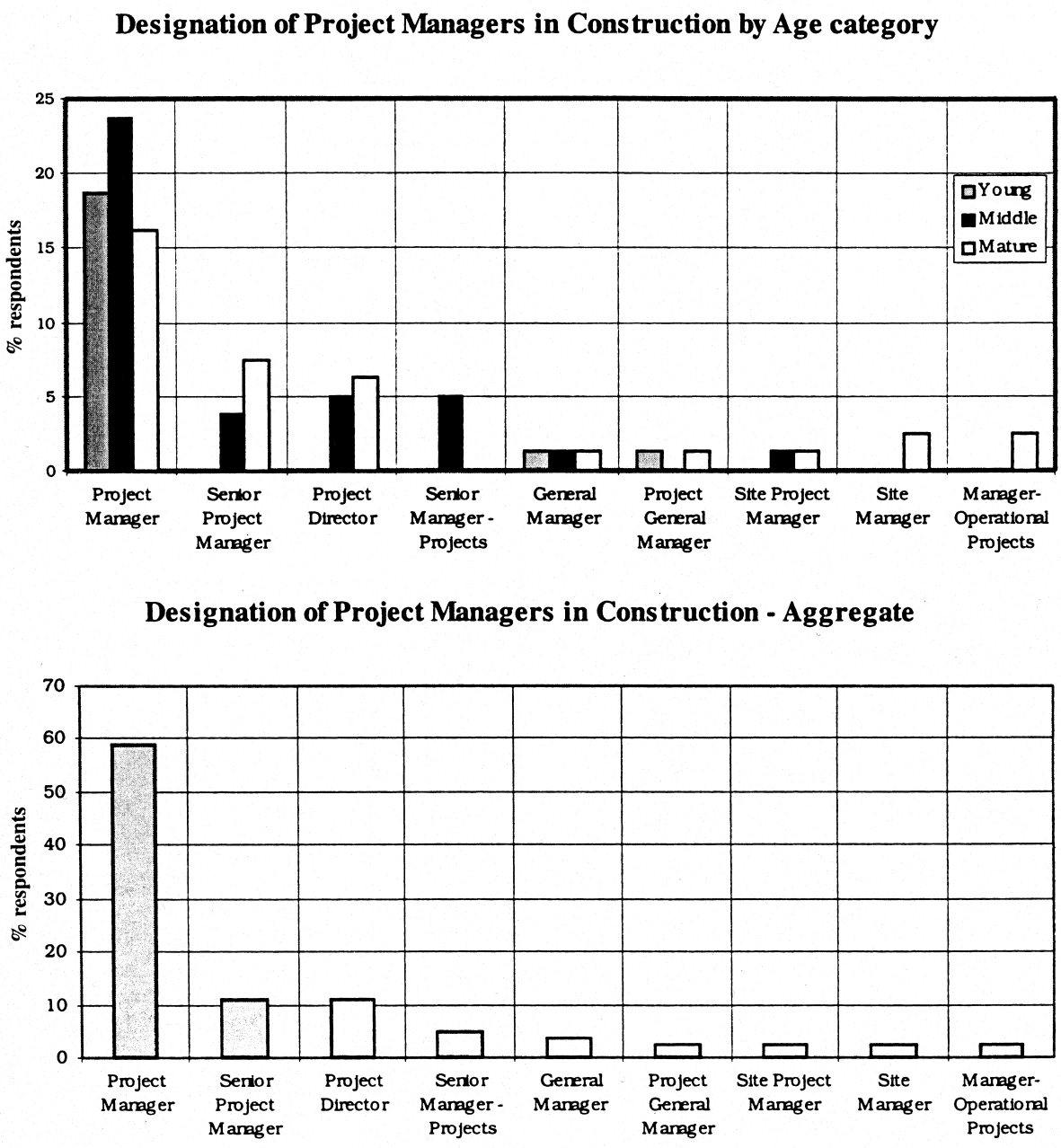

Fig. 5. Distribution of staff performing project management function by designation.

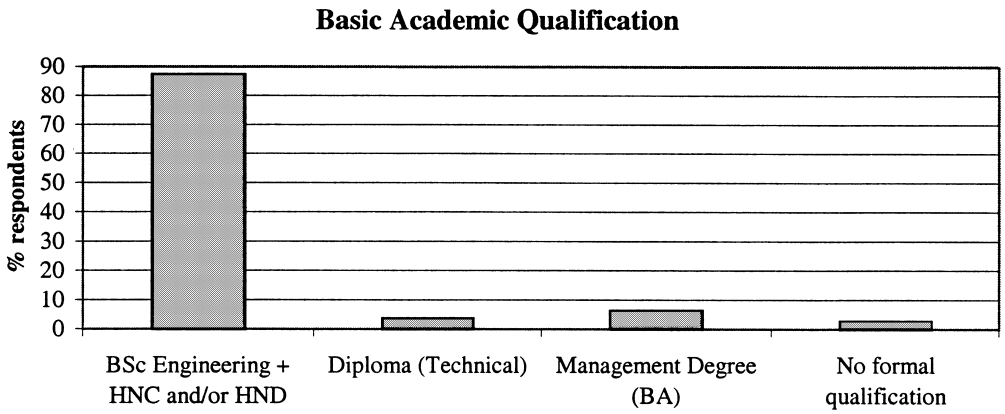

Fig. 6. Academic background of project managers in construction.

It shows that the respondent project managers are predominantly in the age group of 41–50 years. There is however a significant proportion of the respondents in the category *mature* (51–63 years). This may be reflective of the long period of experience needed in order to attain the status of project manager within construction. Fig. 5 depicts various designations for persons that are employed to undertake the functions of

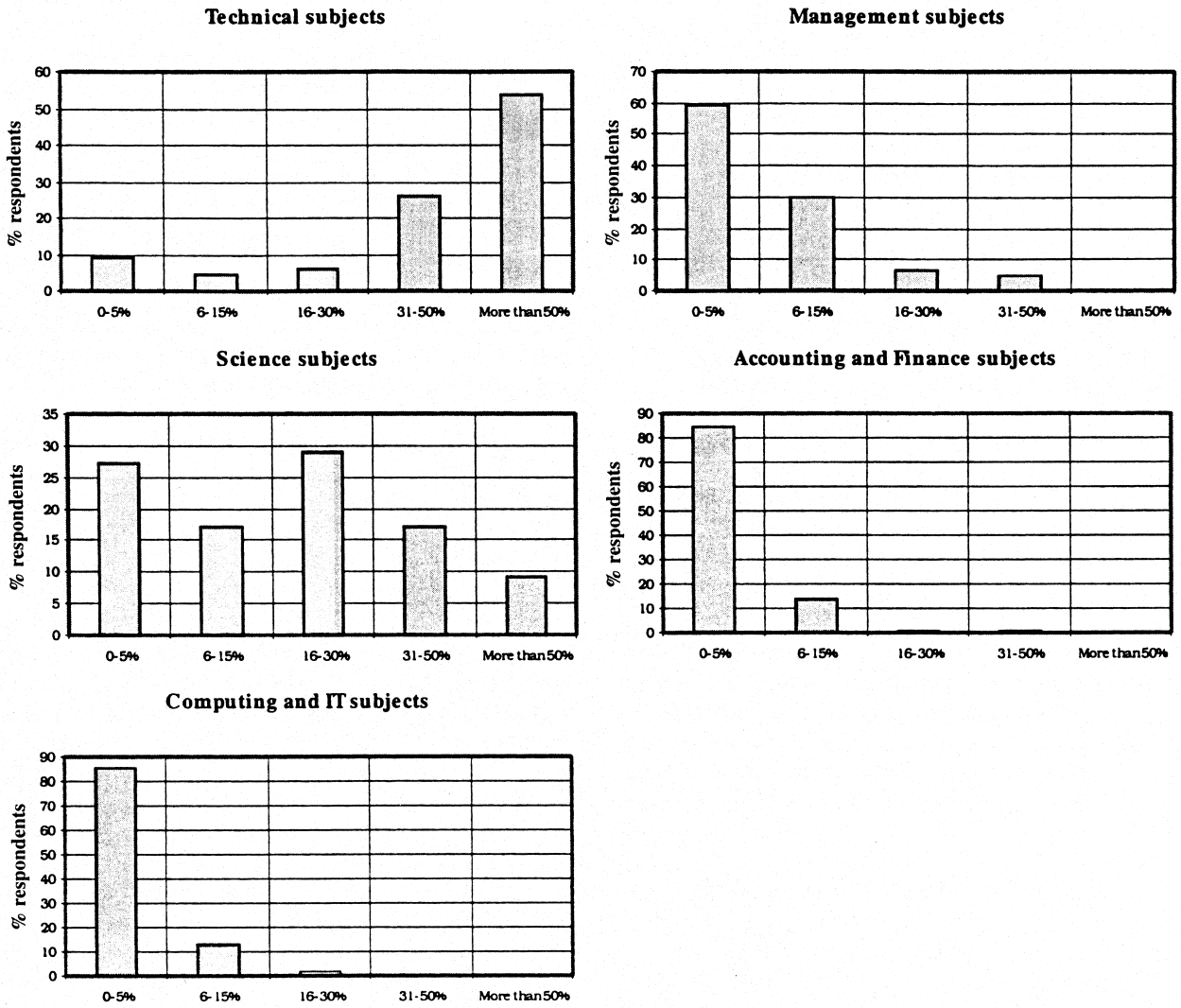

Fig. 7. Content distribution of project managers' academic qualification.

the project manager. These have been organised into the three age categories adopted in Fig. 4, so as to identify any potential correlation with years of experience. The distribution shows that although there are other designations such as Project Director and Senior Manager for executives that perform the project management function, a high proportion of respondents had the designation of *Project Manager*. This was consistent for the three age categories in Fig. 4.

5.1.2. Academic development

Figs 6 and 7 detail the academic qualifications obtained by respondents. Fig. 6 shows that project managers generally hold an academic degree in engineering after they had obtained a practical qualification such as the Higher National Diploma (HND) or Higher National Certificate (HNC).

The content of their qualification is oriented towards the technical and science disciplines. In Fig. 7 the detailed programmes pursued shows that management, accounting and finance and computing formed an insignificant proportion of the academic development of these project managers. This may account for the slow take-up of IT within construction identified in other earlier research undertaken by Tucker and Mohamed [20]. Project managers in construction undertake various training modules to compensate for the areas lacking from their academic development. The training takes the form of a formal in-house learning activity or external courses and in all cases will take the project manager away from the routine work that is performed. Fig. 8 presents a distribution of the training options of the respondents at the time of the survey. This shows a strong emphasis on management and human resources as well as other business studies programmes. In particular, the distribution shows that *management* and the other training programmes outlined above, along with acquiring knowledge and skills in '*advanced technology within their own field*' by construction professionals, are largely undertaken on a full time basis. Such full-time training activity will normally include postgraduate programmes for which the project manager spends a considerable period (usually up to twelve months), completely away from post. The high proportion of the respondent project managers that returned management as a full time training option is perhaps indicative of its importance to their role. What is rather surprising was the low participation in IT training for project managers, considering that their academic background generally lacked this option as depicted in Fig. 7. In nearly all the cases of training, as Fig. 8 shows, the full-time approach is preferable to a part-time programme. In the case of IT however, the preference is for a part-time option training by the respondent construction project managers. This is reflected by the low degree of willingness to take up IT courses that can enhance their performance as depicted in Fig. 9.

5.1.3. Experience

Project managers acquire various knowledge and skills through the experiences they go through in their working life. The relevance of such experience derives from the changing conditions of their business environment. Thus, what academic knowledge and training they previously acquired will need to be tuned to match the changing conditions of practices within the construction industry.

Fig. 10 presents the number of years of experience accumulated by the respondents prior to becoming project managers. This shows that project managers in construction generally have to accumulate at least 10 years working-experience to attain that position. Over this 10-year period they would generally have passed through between 6 to 10 different posts as illustrated in Fig. 11.

The survey also revealed that a majority of project managers (64%) acquire the requisite background experience on up to 10 projects before attaining this status. Fig. 12 however, indicates that a small proportion of project managers experience between 11 and 50 projects before attaining the PM status. It can only be inferred that such experience will be on small to medium projects, which are of a relatively short duration. It is interesting to note that some project managers experienced more than 50 projects before attaining PM status. This however, formed an insignificant proportion of the total respondent group and no direct inference can be drawn from their case.

A greater proportion of the respondents had spent less than four years in the position of project manager. Their responses provide a good view as to what relatively new project managers perceive as crucial areas of skill and training in order to make them competent in their new role. Fig. 13 also shows that relatively, a good proportion of the respondents has accumulated over four years of experience. This is equally significant to the survey as it provides a perspective of the skill and knowledge areas that had to be acquired in order to competently discharge the of project manager.

Predominantly, project managers in the respondent group have managed between one and 10 projects since attaining that status, with most of them currently responsible for one project as depicted by Fig. 14 and Fig. 15.

5.2. Respondent attitudes on PM competency

This section presents respondent perspectives on how various knowledge and skill factors contributed to their professional development, and its relevance in maintaining their competency. The various knowledge

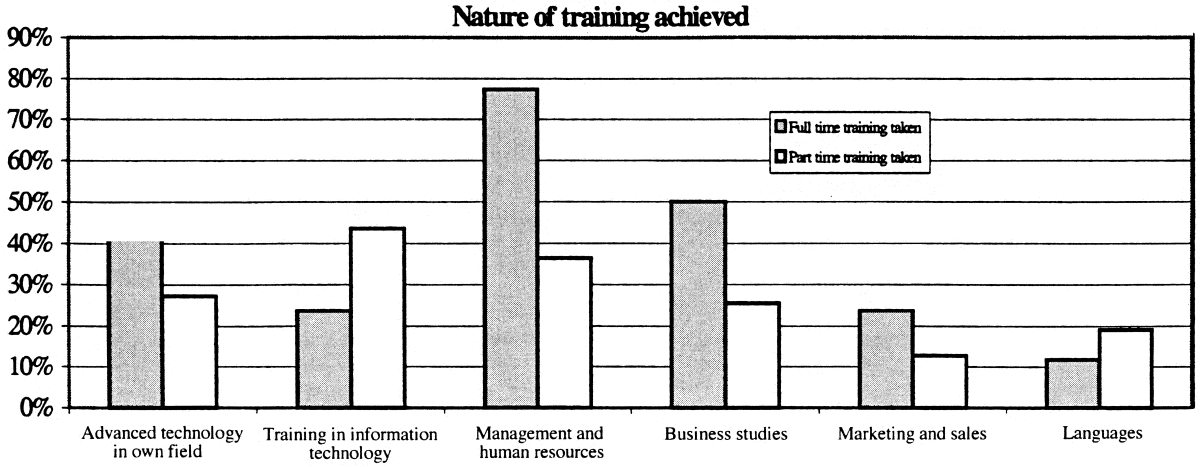

Fig. 8. Current training options of construction project managers.

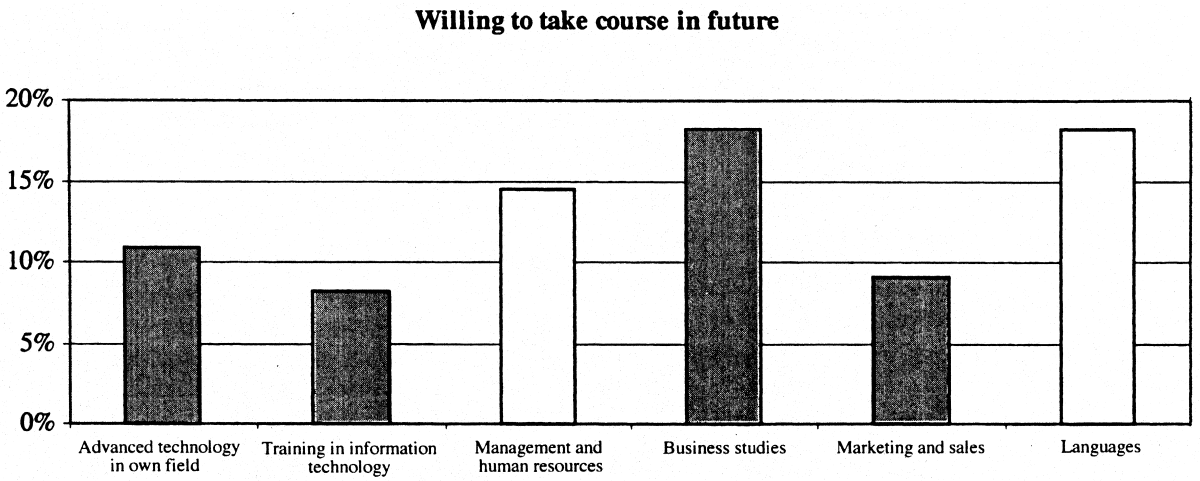

Fig. 9. Future training programmes that project managers are willing to undertake.

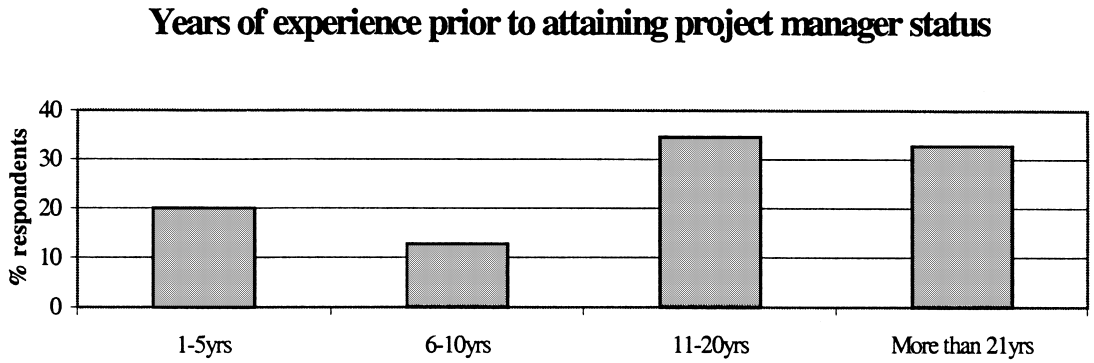

Fig. 10. Distribution of experience prior to attaining project manager status.

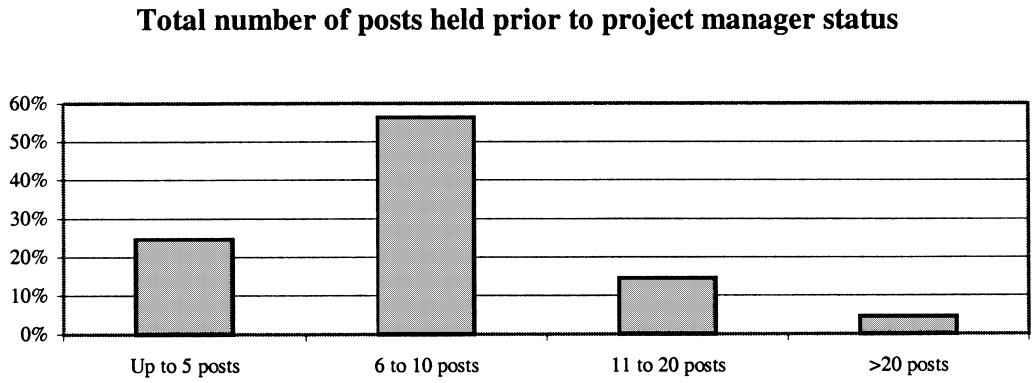

Fig. 11. Overall career progression of project managers.

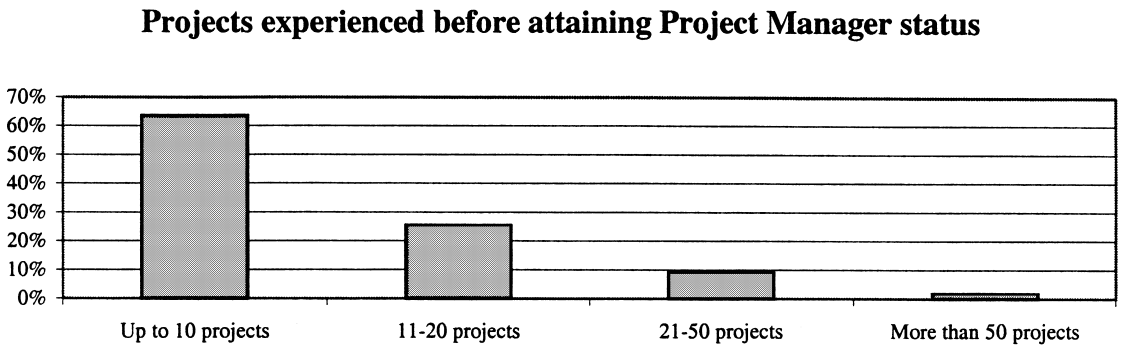

Fig. 12. Projects experienced prior to attaining project management status.

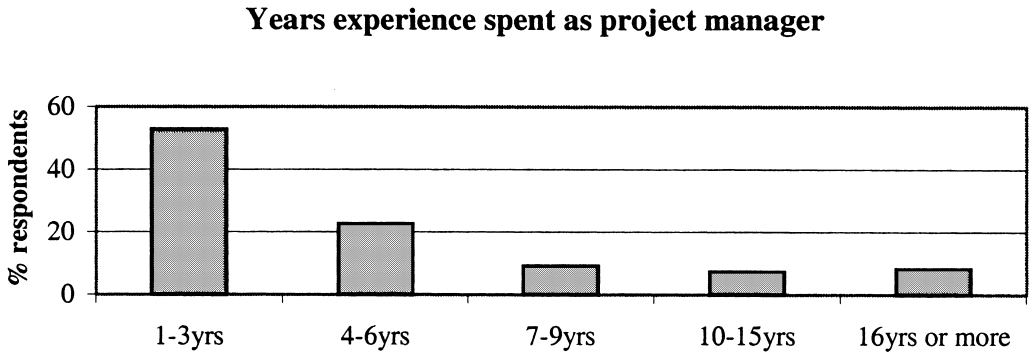

Fig. 13. Distribution of project management experience for the respondents.

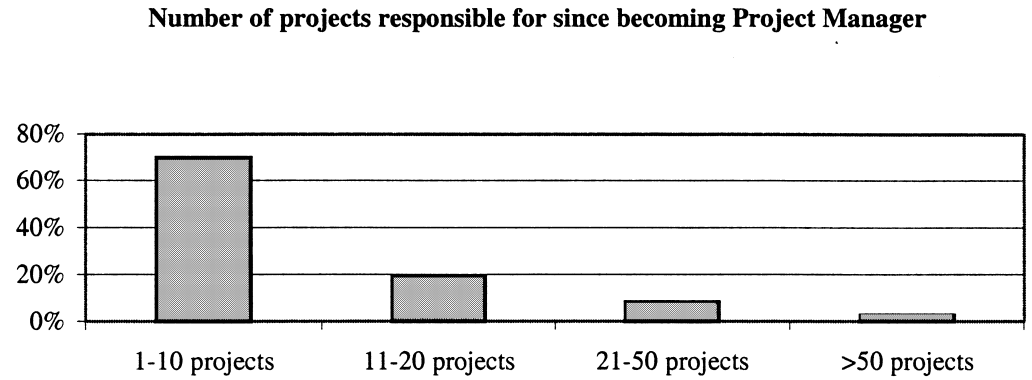

Fig. 14. Number of projects managed by project managers since attaining that status.

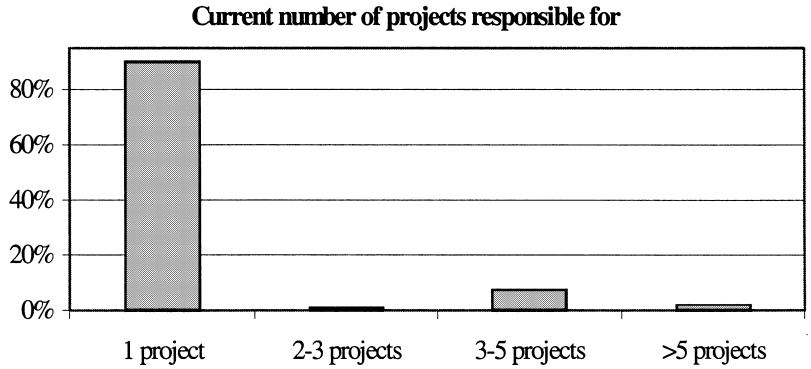

Fig. 15. Current number of projects managed by respondent project managers.

and skill areas outlined in Section 2 and Section 3 were decomposed into several elements that impact on competency of project managers. These elements define isolated knowledge and skills (k–s) that are usually offered in training modules for developing and maintaining project management competency. The survey elicited for each k–s element the degree of importance for developing and maintaining PM competency. Each k–s element was evaluated for a k–s factor. The rationale of the k–s factor is to identify the critical knowledge and skill areas for developing project management competency in construction determined by the wider perception of the construction industry. The perceived level of importance for each element was established by applying equation 1.

$$k - s \text{ factor} = 100^{*}\Sigma x_i f_i/(x_{\max}{}^{*}\Sigma f_i) \quad (1)$$

where: i takes on a value between 1 and 5 based on the adopted nominal scale; x_i represents discrete categories of scaled respondent attitudes; $x_{\max}$ represents the maximum value of x_i; f_i represents the frequency for each category of x_i; Σf_i represents the total sample size for each k–s element.

The k–s factor values ranged between 100 and 0, with higher values indicating a greater degree of importance. The analysis extracted two categories of k–s elements, the primary and the secondary ones. The survey also established the extent to which the different modes of acquiring such PM competency were relevant

Table 1
Primary knowledge and skill elements for developing PM competency

Generic PM function	Knowledge and skill (k–s)	k–s factor
Technical skill	Planning and scheduling	97.3
	Construction management activities	89.1
	Basic technical knowledge in own field	94.5
	Productivity and cost control	82.7
Managerial skill	Leadership	98.2
	Delegation	96.4
	Negotiation	95.5
	Decision making	91.8
	Motivation and promotion	90.0
	Team working	90.0
	Time management	82.7
	Top management relations	81.8
Financial skills	Establishing budgets	94.3
	Reporting systems	90.6
Legal skills	Drafting contracts	92.4
Communication skills	Presentation	95.3
	General and business correspondence	90.6
	Report writing	88.7
General skills	Chairing meetings	96.1
	Understanding of organisation	84.5

Table 2
Secondary knowledge and skill elements for developing PM competency

Generic PM function	Knowledge and skill (k–s)	k–s factor
Technical skill	Forecasting techniques	74.5
	Quality control	72.7
	Estimating and tendering	70.9
	Material procurement	65.5
	Reading and understanding drawings	62.7
	Design activities and background	59.1
	Site layout and mobilisation	54.5
Managerial skill	Human behaviour	76.4
	Strategic planning	60.0
Financial skills	Project finance arrangement	74.5
	Establishing cash flows	65.1
IT skills	Project management software	75.6
	Spreadsheet	59.3
	CAD	55.8
Legal skills	Health and safety issues	76.2
	Industrial relations	57.1
	Preparation of claims and litigation	55.2
Communication skills	Public speaking	74.5
General skills	Marketing and sales	50.5
	Public relations	50.1

Table 3
Impact of competency delivery mechanisms on *k–s* element

k–s element	Percentage contribution		
	Academic courses	Formal training	Job experience
Technical skill			
Basic technical knowledge in own field	28.2	18.2	80.0
Forecasting techniques	8.2	9.1	64.5
Site layout and mobilisation	0.0	0.9	82.7
Material procurement	0.9	1.8	77.3
Operation research	5.5	1.8	13.6
Technical writing	17.3	20.0	51.8
Design activities and background	21.8	10.9	67.3
Reading and understanding drawings	21.8	11.8	81.8
Construction management activities	0.9	13.6	86.4
Planning and scheduling	3.6	13.6	77.3
Estimating and tendering	2.7	11.8	74.5
Productivity and cost control	3.6	15.5	72.7
Work study	4.5	7.3	18.2
Plant hire and management	0.9	0.9	24.5
Quality control	6.4	27.3	66.4
Managerial skill			
Leadership	3.6	23.6	83.6
Time management	4.5	23.6	61.8
Decision making	7.3	27.3	70.9
Negotiation	3.6	23.6	76.4
Delegation	0.9	8.2	79.1
Strategic planning	5.5	5.5	49.1
Human behaviour	8.2	20.0	63.6
Motivation and promotion	5.5	19.1	64.5
Recruitment	0.0	10.0	43.6
Team working	6.4	25.5	74.5
Top management relations	2.7	6.4	70.0
Financial skills			
Reporting systems	3.6	11.8	68.2
Project finance arrangement	9.1	13.6	59.1
Investment appraisal	10.9	13.5	32.7
VAT and Taxation	3.6	5.5	18.2
Stock control and evaluation	3.6	5.5	17.3
Establishing cash flows	8.2	16.4	47.3
Establishing budgets	7.3	12.7	80.9
IT skill			
Operating systems	5.5	5.5	15.5
Programming languages	9.1	4.5	8.2
Special applications	5.5	6.4	16.4
Spreadsheet	4.5	9.1	33.6
Database	3.6	5.5	25.5
Network systems	5.5	3.6	14.5
CAD	4.5	8.2	33.6
Project management software	5.5	10	39.1
Information systems and IT tools	4.5	7.3	17.3
Legal skills			
General legal background	10.9	12.7	34.5
Drafting contracts	3.6	17.3	69.1
Industrial relations	1.8	9.1	48.2
Health and safety issues	1.8	22.7	55.5
Preparation of claims and litigation	0.9	6.4	50.9
Trade unions and public authorities	0.9	4.5	41.8

Communication skills			
Presentation	3.6	34.5	73.6
Report writing	10	20	69.1
General and business correspondence	7.3	10.9	77.3
Public speaking	3.6	26.4	64.5
General skills			
Marketing and sales	4.5	10	32.7
Public relations	1.8	3.6	38.2
Understanding of organisation	4.5	7.3	67.3
Chairing meetings	3.6	12.7	78.2

for the various k–s elements. These were expressed by indexed values of the contribution from different mechanisms for delivering project management knowledge and skills.

Table 1 and Table 2 present the resulting k–s factors associated with each element. These have been organised respectively into primary and secondary groupings, to reflect the perceived impact of the various elements. All elements that yielded k–s factors above 80.0 were extracted to form the primary group. The k–s elements that returned factors between 50.0 and 80.0 formed the secondary group. Elements with factors below 50 were eliminated, as these did not provide strong enough evidence of perceived impact on developing and maintaining project management competency.

Different aspects of experiences that are skill based dominated the elements in Table 1. This is indicative of the important role of experience for achieving, maintaining and renewing skills and competency in construction project management. But of greater significance is the ability to employ such experience to address the changing conditions and requirements that the industry environment presents from day to day. Table 2 presents the elements that were categorised as secondary factors. This predominantly reflected elements of an academic nature, and which usually form part of many academic programmes in project management.

In Table 3, the relative contribution of different mechanisms for delivering project management competency is presented for the various k–s elements. This complements the relative significance of the k–s elements in Tables 1 and 2. Table 3 shows that for nearly all cases the contribution of academic programmes to the competency of project managers is rated lower than that of formal industry training they attend while on the job. Similarly, the perceived contribution of formal training was out-ranked by that of experiences on the job. While these perceptions are of great importance to designing mechanisms that can facilitate the acquisition and maintaining of project management competency, there are obvious reasons why the contribution from academic input would rank the lowest in all cases. Project managers have generally acquired some years of working experience. This makes their academic background more remote to their immediate circumstances and so they are unlikely to regard this background as having a direct impact. Again, the perception of the project managers regarding academic programmes will be based on developments that occurred several years ago. Obviously, developments in academia may have moved on from that time, much like the changes that have occurred in industry and also to the demands placed on the project management function itself. Equally, academic programmes by their very nature address people from several different backgrounds. As such it can only be broad and not specific to any project management job situation. It therefore has to be emphasised that for the dominant role of *experience* to be relevant for maintaining competency, this has to be built on a sound academic background. All the same, the evidence from the survey shows that academic programmes, although essential to acquiring project management competency, do not significantly contribute to maintaining and renewing the same to any appreciable degree.

The over-reliance on experience for maintaining the competency of project managers means that they can miss out on the broader outlook, since most experience acquired will be specific. The high indices associated with the contribution of experience as perceived by project managers however, implies that making academic programmes in project management relevant cannot overlook the experience factor.

6. Conclusions

The importance of project management to construction derives from the nature of how the industry's business activities are conducted. Its growing take up in other industries as a result of the productivity gains that can be associated with implementing this managerial technique cannot be overlooked. Developing the requisite competency to ensure efficient performance on the part of the managers who run projects is there-

fore essential to its success. This work was aimed at providing an insight on how such acquired competency can be made relevant to the changing business circumstances of the industry. The paper established the changing role of project managers and how, increasingly, they are required to perform roles outside the traditional scope of project management. The survey established that the knowledge and skills necessary to maintain their competency, in order to fulfil these changing demands are acquired largely from their experiences. While this is very useful and directly relevant to their job situation, it excludes the benefit of the broader outlook demanded by the senior position of a project manager.

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