

A Study of the Management Skills Required in Managing Information Technology (IT) Projects

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ABSTRACT

Project management is one of the important aspects in the field of information technology (IT). It is important that a project manager possesses some basic management skills to be successful. This paper presents the outcomes of a study, conducted via an online survey system and mail survey to identify the ranking of the five most important management skills. Ninety-three (93) responses were used for analysis to determine the ranking of the management skills. Analyses performed included frequency count, crosstabulations and comparisons with the most experienced managerial personnel involved in managing IT projects. The results indicate that “Getting Organised”, “Communicate Effectively”, “Thinking Creatively”, “Writing Effectively” and “Balancing Work and Life” are the five most important management skills, in that order.

Key words: Management Skills, Information Technology Projects, IT Projects, Getting Organised, Communicate Effectively, Thinking Creatively, Writing Effectively, Balancing Work and Life

INTRODUCTION

Project management is a set of principles, methods, tools and techniques for the planning, organising, staffing, directing and controlling of related activities to achieve an objective with time, cost and performance constraints (Parrish, 2001). In the field of Information Technology (IT), the management skills of the IT professionals, specifically, the project managers play a significant role to ensure the success of a project.

Many professional bodies such as the Project Management Institute (PMI) (PMI Certifications Overview, 2004) and Association for Project Management (APM) (APM Qualifications: Training and Professional Development, 2004) offer certifications for project managers. Such professional bodies evaluate a project manager on the level of certification that he wishes to attain. These certifications, however, only assess the knowledge of a project manager and not the management skills he must possess.

Management Skills

To manage projects successfully, a project manager needs to be able to deal with change and development. He must be able to work with constraints to meet the customers' demands for quick improvements to services. Hence, success is very much dependent on a manager's ability to manipulate his personal skills and knowledge to his advantage. The project manager must also have close rapport with those under his supervision, motivate and encourage them to accept his style of management and ideas.

According to Ali et al., (2002), a successful manager must possess a number of management skills. These include getting organised, writing effectively, thinking creatively, influencing people, developing natural language processing (NLP) skills, dealing with difficult people, appraising staff, managing public relations, putting customers first, managing globally, balancing work and life and managing one's career (Table 1). It is obvious that some of the skills, such as influencing people, developing NLP skills, dealing with difficult people and managing public relations, are related to communication. They can be grouped as being able to "communicate effectively". In this study, four management skills, namely, getting organised, writing effectively, thinking creatively and balancing work and life, together with "communicate effectively" have been chosen for investigation as they are crucial to all managerial personnel involved in managing IT projects. The remaining four skills were not considered in the study as they might not be directly applicable to all managers. For example, managing globally is obviously applicable to managerial personnel who have to manage IT projects on a global scale.

Table 1. The Twelve Management Skills.

No.	Management Skills	Description
1	Getting Organised (GO) - Achieving objectives on schedule and within budget.	Can be relied on to get work done on time as such people do not put anything off until later, whether the issue involves taking immediate action, thinking matters through, or gathering the facts necessary to make a decision.
2	Writing Effectively (WE) - Knowing how to communicate effectively through writing.	Ability to communicate efficiently and to take on board, change, and process information in written form. Write in good style by reading, writing and rewriting.
3	Thinking Creatively (TC) - The ability to think and apply creatively and break out from usual routines and patterns of behaviour and to increase personal effectiveness.	Challenging accepted ideas and ways of doing things in order to find new solutions or concepts. Overcome the barrier to creative thinking by seeking quick solutions to problems – look at the way time is being used currently and start to spend more time being creative.
4	Influencing People (IP) - The ability to form mutually-respectful relationships others and to succeed in getting your ideas heard.	Convincing and trustworthy. Able to present a clear case that matches other peoples' need to persuade them to accept your point of view.

No.	Management Skills	Description
5	<p>Developing NLP Skills (DNLPS)</p> <ul style="list-style-type: none"> - The ability to develop good relationships with others and to handle situations effectively. 	<p>Able to recognise the key skills needed, consider how to develop them and learn to use the technique of mental rehearsal to consolidate what you learn. Understand and adopt the basic principles and skills of non-verbal communication, so that you can enhance your working relationships.</p>
6	<p>Dealing with Difficult People (DDP)</p> <ul style="list-style-type: none"> - The ability to lead difficult individuals out of unproductive situations to improve performance and better working relationships. 	<p>Able to identify who will be difficult and when and aim for a solution that benefits both party equally.</p>
7	<p>Appraising Staff (AP)</p> <ul style="list-style-type: none"> - The ability to use appraisal to develop and motivate employees. 	<p>Create an environment in which people welcome continuous feedback, and use the appraisal interview as a formal round-up of these on-going, informal reviews.</p>
8	<p>Managing Public Relations (MPR)</p> <ul style="list-style-type: none"> - The ability to enhance the reputation of an organisation, help strengthen its relationships with key audiences, and enable it to deal with crises from a position of strength. 	<p>Able to distinguish between effective PR and cheap publicity gimmicks in order to build a solid, respected reputation with your key audiences. Also produce publicity material that will attain maximum impact with the minimum of stress, plan thoroughly and allow plenty of time.</p>
9	<p>Putting Customers First (PCF)</p> <ul style="list-style-type: none"> - The ability to maximise business performance by planning effectively to meet customer requirements on time, and give customers the benefits they want. 	<p>Put customers first, and will ensure that you meet and anticipate their demands and expectations, and so continue to win their business. Keep customers' needs in mind at all times to be able to meet their requirements.</p>
10	<p>Managing Globally (MG)</p> <ul style="list-style-type: none"> - The ability to cope with working across geographic and cultural borders. 	<p>Understand what globalisation is in terms of business and why it is important to the organisation in particular. Ready to deal with the challenge of global complexity.</p>
11	<p>Balancing Work and Life (BWL)</p> <ul style="list-style-type: none"> - Ability to balance in achieving material possessions and financial gain while not neglecting relationships, self-development, leisure pursuits, and personal happiness. 	<p>Balance between the demands of work and life. Use beliefs, perceptions, choices, and actions in strategic ways to reach the balance needed. Regularly review goals to help focus the time and energy to what is most important to you.</p>
12	<p>Managing Your Career (MYC)</p> <ul style="list-style-type: none"> - The ability to maintain a dynamic career path and develop a portfolio of skills and achievements. 	<p>Recognise that by taking a proactive approach to managing your career, you are more likely to realise your ambitions, do justice to your skills and stay in full employment. Monitoring progress to ensure that future plans are still on track.</p>

RESEARCH METHODOLOGY

To investigate the five management skills in the order of importance, a questionnaire survey was conducted from 8th March 2004 until 28th March 2004. Prior to the actual survey, a pilot test was carried out to ensure that the design of the questionnaire was easy-to-understand and easy-to-answer. Both the pilot test and actual survey were conducted via the Internet and through mail survey. An online survey system was developed, using PHP Hypertext Preprocessor (PHP) and a database was developed to store the survey data using MySQL.

The data collected included the respondents' details and how they ranked the five management skills. The respondents' details included the gender, age groups, educational levels, present position, working experiences in the present position and in managing IT projects, and the number of small, medium, large and very large scale IT projects they had been involved. For the online survey system, the respondents were required to rank each of the five management skills, using a ranking scale of 1 to 5 from a drop down list (Figure 1). Twenty people from the IT industry participated in the pilot test. The weaknesses identified from the pilot test pertained to the design of the questionnaire and the online survey system. They were corrected before the actual survey.

Questionnaire

Please rank the 5 management skills in **order** of importance, where **1** is **most important** skill and **5** is the **least important** skill required to be a successful manager.

No.	Management Skills	Rank
1	Getting organized	1 <input type="button" value="v"/>
2	Writing effectively	1 <input type="button" value="v"/>
3	Thinking creatively	1 <input type="button" value="v"/>
4	Communicate effectively	1 <input type="button" value="v"/>
5	Balancing work and life	1 <input type="button" value="v"/>

Note: No two skills can have the same ranking.

Figure 1. Online Questionnaire Survey.

ANALYSIS OF SURVEY OUTCOMES

In the actual survey, emails were sent to 1,000 managerial personnel to invite them to participate in the study via the mailer program of the online survey system. The email addresses were collected from the Multimedia Super Corridor (MSC) website, www.msc.com.my. This website provides a complete list of all the MSC status companies, together with details of the company address, person-in-charge, telephone number, fax number and email address. In the paper-based survey, altogether 30 sets of the questionnaires were sent to the IT companies in the Klang Valley.

Of the 1,000 invitations sent through email, and the 30 sets of the questionnaires sent by normal mail to the IT companies, only 95 responses were received via the online survey system and 5 from the mail survey. This implies an overall response rate of 9.7%. The responses were screened prior to data analysis. Of the 100 responses, 93 (93.0%) responses were used for analysis and the remaining 7 responses were discarded as the respondents included finance managers and lecturers who were not involved directly in the management of IT projects. The analysis of the survey outcomes are presented in the following sections.

1. Gender and Age Groups

Of the 93 respondents, 76 (81.7%) are male and 17 (18.3%) are female as shown in Figure 2. There are 17 (18.2%), 26 (28.0%), 29 (31.2%) and 21 (22.6%) respondents from the age groups of 20-30, 31-40, 41-50, and above 50 years, respectively (Figure 3).

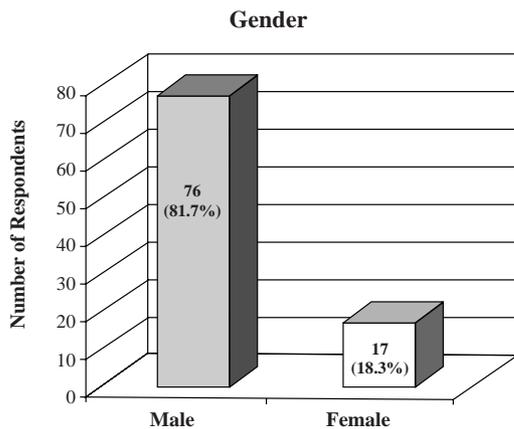


Figure 2. Gender of Respondents.

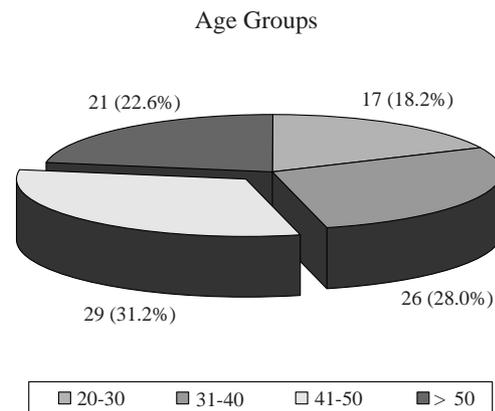


Figure 3. Age Groups of Respondents.

2. Educational Levels

Of the 93 respondents, 7 (7.5%), 36 (38.7%) and 50 (53.8%) respondents hold a PhD, Master's and bachelor degree, respectively, as shown in Figure 4. This indicates that the majority of the respondents (53.8%) are bachelor degree holders.

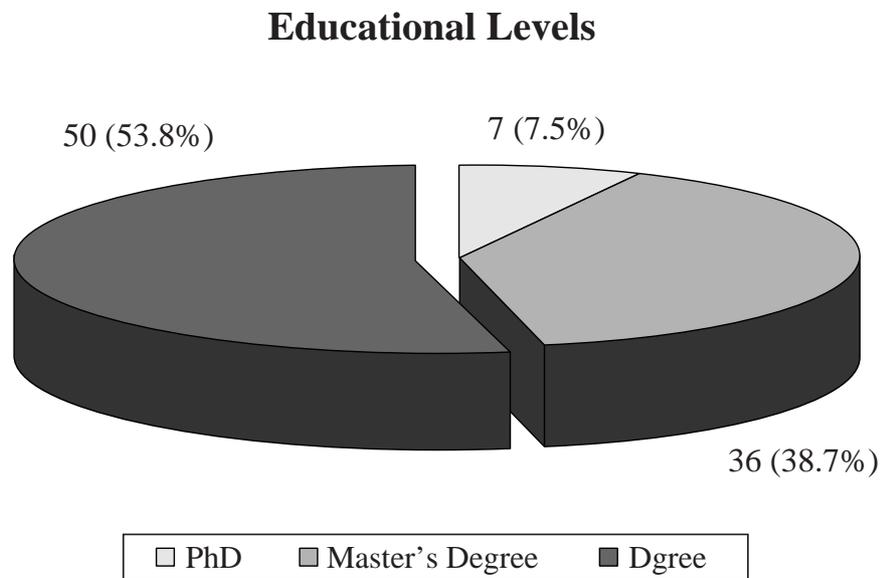


Figure 4. Educational Levels of Respondents.

3. Working Experience in the Present Position

In this survey, all the respondents are managerial personnel involved directly in IT projects such as software development, Web-based and multimedia projects. Their positions include chief executive officer (CEO), chief operating officer (COO), chief technology officer (CTO), IT director, IT project manager, software engineer and Web designer, to name a few. Of the 93 respondents, 8 (8.6%), 37 (39.8%), 32 (34.4%), 8 (8.6%) and 8 (8.6%) respondents possess less than 1 year, 1-3 years, 4-6 years, 7-9 years and 10 years and above of working experience in their present position, respectively (Figure 5). This shows that the majority of the respondents (74.2%) have working experience ranging from 1-6 years in the present position.

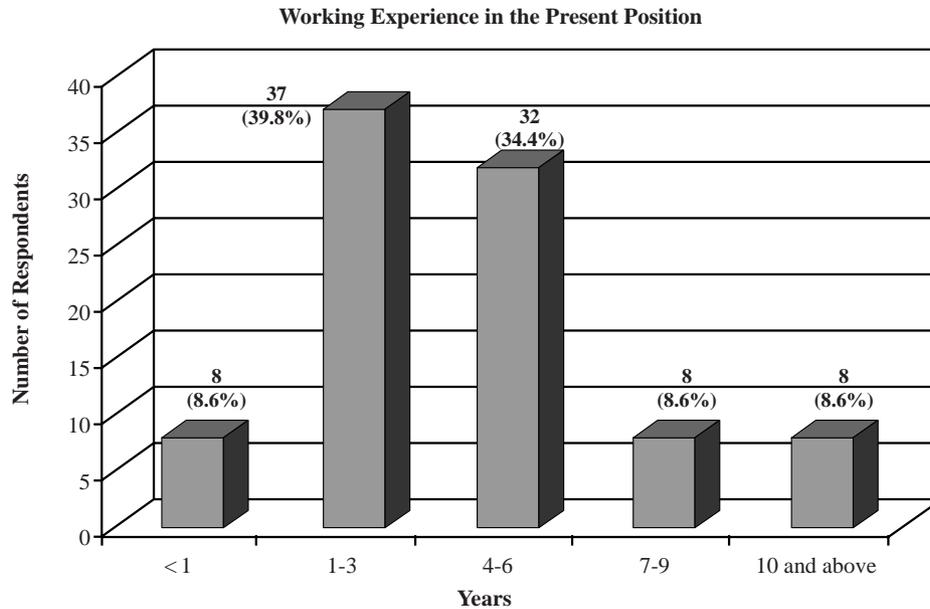


Figure 5. Working Experience in the Present Position.

4. Working Experience in Managing IT Projects

Of the 93 respondents, 1 (1.1%), 13 (14.0%), 37 (39.8%), 12 (12.9%) and 30 (32.2%) respondents possess 1, 2, 3, 4 and 5 years of working experience in managing IT projects, respectively (Figure 6). This shows that the majority of the respondents (84.9%) have 3-5 years of working experience in managing IT projects but none of them have more than 5 years of working experience.

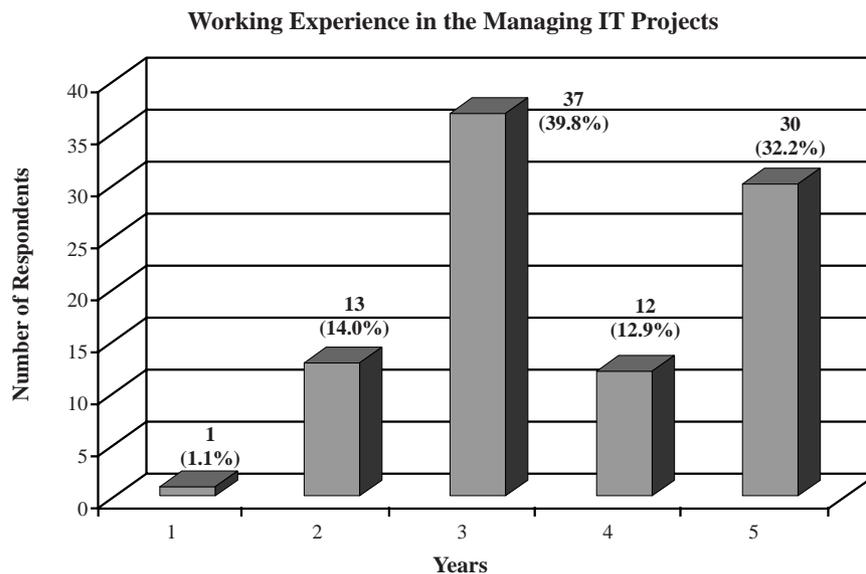
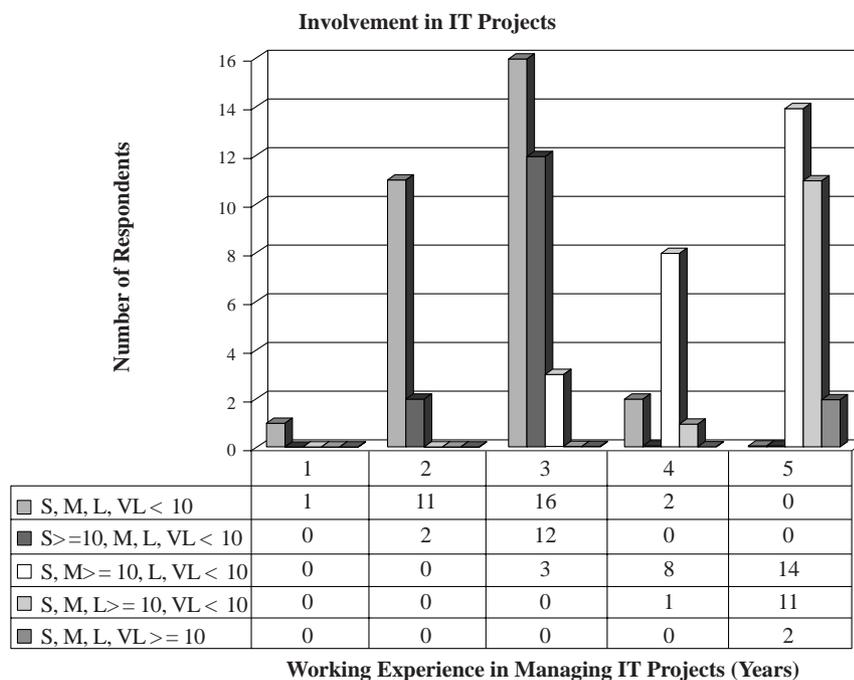


Figure 6. Working Experience in Managing IT Projects.

5. Involvement in IT Projects

In this survey, analysis was carried out on the number of small, medium, large and very large size IT projects the respondents have been involved. Small, medium, large and very large projects refers to IT projects which required 1-10, 11-30, 31-60 and 60 and above man-month to complete, respectively. Of the 93 respondents surveyed, only 1 (1.1%), 11 (11.8%), 16 (17.2%) and 2 (2.2%) respondents with 1, 2, 3 and 4 years of working experience in managing IT projects, respectively, have been involved in less than 10 projects in all four project sizes (Figure 7). There are 14 respondents who have been involved in 10 or more small size projects, but less than 10 projects in each of the medium, large and very large size projects. Of these 14 respondents, 2 (2.2%) and 12 (12.9%) respondents had 2 and 3 years of working experience in managing IT projects, respectively.

On the other hand, there are 25 respondents who have been involved in 10 or more for both small and medium size projects, but less than 10 in both large and very large size projects. These 25 respondents possess 3 (3 respondents, 3.2%), 4 (8 respondents, 8.6%) and 5 (14 respondents, 15.1%) years of working experience in managing IT projects, respectively. Only 1 (1.1%) and 11 (11.8%) respondents with 4 and 5 years of working experience in managing IT projects, respectively, have been involved in 10 or more projects in the three different sizes of projects, but less than 10 in very large size projects. Only 2 (2.2%) respondents with 5 years of working experience in managing IT projects have been involved in 10 or more projects in all four sizes of IT projects. They are from the 50 years and above age group, and have 7 years and above of working experience in the present managerial position (Table 2). These 2 respondents are the most senior and experienced managerial personnel in this survey.



Keys: S – Small, M – Medium, L – Large, VL – Very Large

Figure 7. Involvement in IT Projects.

Table 2. Personal Details of the Two Most-Experienced Managerial Personnel.

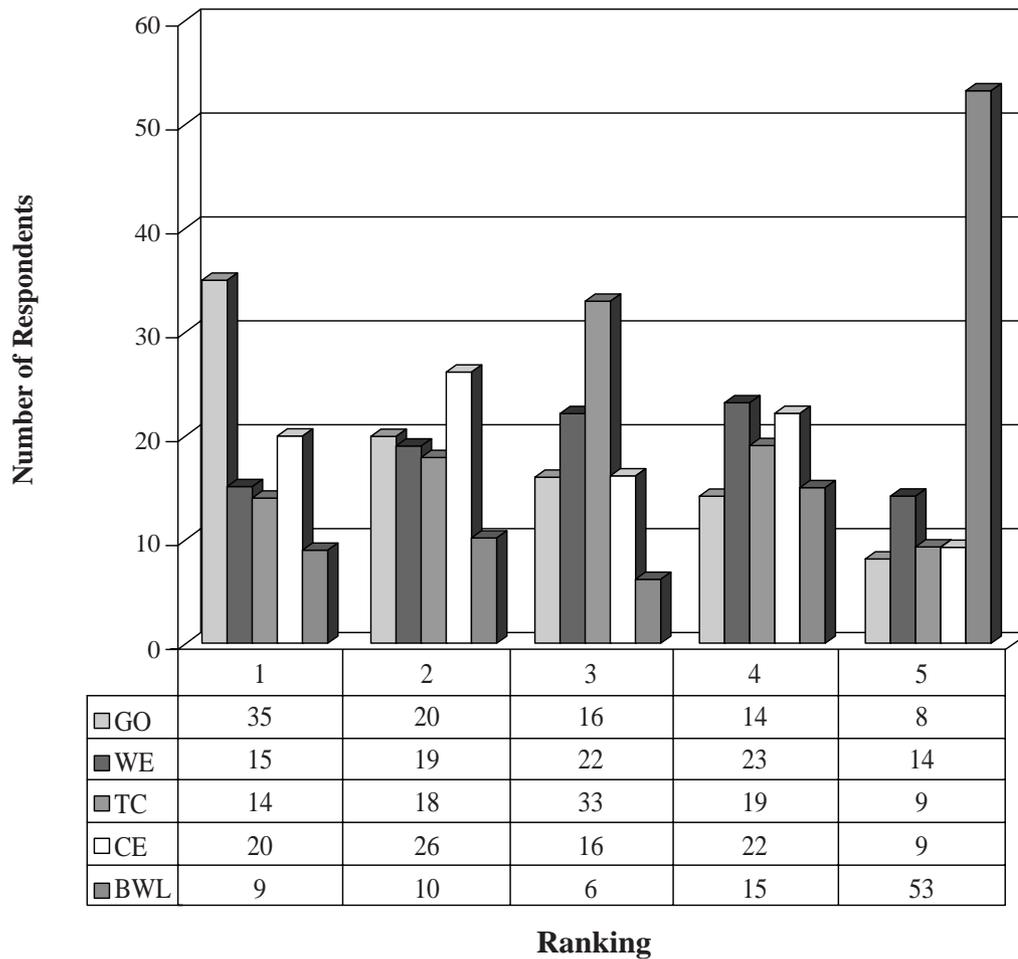
Present Position	Gender	Age Groups	Educational Levels	Working Experience in Present Position
Chief Technology Officer (CTO)	Male	> 50 years	Degree	7-9 years
Director	Male	> 50 years	Degree	10 years and above

RANKING OF MANAGEMENT SKILLS

To investigate the importance of the five management skills, the total numbers of respondents who ranked the five management skills, using a scale of 1 to 5 were first calculated. Rank 1 indicates the most important, and rank 5 the least important. The results are illustrated graphically in Figure 8. For respondents who ranked 1 for the five management skills, the order of importance is “GO” (35), “CE” (20), “WE” (15), “TC” (14) and “BWL” (9). As there are 5 ranks used in this survey, both rank 1 and rank 2 can be considered as “high ranking”, rank 3 is considered as “average”, rank 4 and rank 5 are “low ranking”. Hence, when the frequency of both rank 1 and rank 2 of each management skill are added, the order of importance indicates the same ranking as rank 1, as shown in Table 3.

The result shows that majority of the respondents agreed that “GO” is the most important management skill, followed by “CE”, “WE”, “TC” and “BWL” in descending order of importance. However, it is interesting to note that “BWL” is ranked 1 by 9 respondents. Among these 9 respondents, 8 (88.9%) of them have been involved in 10 or more IT projects of various sizes (small, medium, large and very large) and 6 out of 8 (75.0%) of them are from the 41 years and above age groups (Table 4). Today, the majority of managerial personnel are required to manage and monitor a few IT projects, concurrently. These personnel face a very stressful life as they must ensure that all IT projects are completed successfully, on schedule and within budget, and at the same time not neglecting his personal well-being. Thus, this survey outcome supports the fact that balancing one’s work and life does have significant impact on the ability to manage IT projects successfully.

Ranking of the Five Management Skills



Keys: GO – Getting Organised WE – Writing Effectively TC – Thinking Creatively CE – Communicate Effectively BWL – Balancing Work and Life

Figure 8. Ranking of the Five Management Skills.

Table 3. Ranking of Management Skills Based on Rank 1 and Sum of Rank 1 and Rank 2.

Management Skills	Rank 1	Rank 1 Plus Rank 2	Ranking
Getting Organised (GO)	35	55	1
Writing Effectively (WE)	15	34	3
Thinking Creatively (TC)	14	32	4
Communicate Effectively (CE)	20	46	2
Balancing Work and Life (BWL)	9	19	5

Table 4. Personal Details of the 9 Managerial Personnel Who Ranked 1 for “BWL”.

No.	Present Position	G	Age Groups	Educational Level	No. of Years in Present Position	Working Experience in IT Projects (Years)	Involvement in IT Projects			
							S	M	L	VL
1	Senior Software Engineer	M	41-50	Master’s Degree	4-6	5	17	21	19	5
2	Project Manager	M	41-50	Master’s Degree	1-3	5	20	15	10	5
3	Chief Technology Officer	M	> 50	Master’s Degree	1-3	3	9	14	3	3
4	General Manager	M	31-40	Degree	4-6	3	9	11	5	2
5	IT Manger Manager	M	31-40	Master’s Degree	4-6	3	12	6	5	2
6	Web Developer	M	20-30	Degree	1-3	2	2	6	8	3
7	Director	F	41-50	Master’s Degree	4-6	3	2	6	1	4
8	Research Manager	F	20-30	Degree	< 1	2	6	1	2	1
9	Chief Technology Officer	M	31-40	Master’s Degree	1-3	3	0	4	1	1

Keys: G – Gender M – Male F – Female S – Small
 M – Medium L – Large VL – Very Large

1. Crosstabulations of Working Experience in Managing IT Projects with Management Skills

The crosstabulations of working experience in managing IT projects with the rankings of the five management skills were generated, using Statistical Package for Social Sciences (SPSS) 11.0 for Windows (SPSS Base 11.0 Applications Guide, 2001). The results obtained are shown in Tables 5-9.

Table 5. No. of Years in Managing IT Projects * Getting Organised Crosstabulation.

		Getting Organised					Total
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
No. of Years in IT Projects	1	1 (2.9%)					1 (1.1%)
	2	4 (11.4%)	1 (5.0%)	1 (6.3%)	6 (42.9%)	1 (12.5%)	13 (14.0%)
	3	12 (34.3%)	12 (60.0%)	5 (31.3%)	2 (14.3%)	6 (75.0%)	37 (39.8%)
	4	3 (8.6%)	2 (10.0%)	5 (31.3%)	2 (14.3%)		12 (12.9%)
	5	15 (42.9%)	5 (25.0%)	5 (31.3%)	4 (28.6%)	1 (12.5%)	30 (32.2%)
Total		35 (100.0%)	20 (100.0%)	16 (100.0%)	14 (100.0%)	8 (100.0%)	93 (100.0%)

Table 6. No. of Years in Managing IT Projects * Writing Effectively Crosstabulation.

		Writing Effectively					Total
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
No. of Years in IT Projects	1		1 (5.3%)				1 (1.1%)
	2	3 (20.0%)	4 (21.1%)	4 (18.2%)		2 (14.3%)	13 (14.0%)
	3	6 (40.0%)	7 (36.8%)	10 (45.5%)	10 (43.5%)	4 (28.6%)	37 (39.8%)
	4	4 (26.7%)	2 (10.5%)	1 (4.5%)	3 (13.0%)	2 (14.3%)	12 (12.9%)
	5	2 (13.3%)	5 (26.3%)	7 (31.8%)	10 (43.5%)	6 (42.9%)	30 (32.2%)
Total		15 (100.0%)	19 (100.0%)	22 (100.0%)	23 (100.0%)	14 (100.0%)	93 (100.0%)

Table 7. No. of Years in Managing IT Projects * Thinking Creatively Crosstabulation.

		Thinking Creatively					Total
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
No. of Years in IT Projects	1				1 (5.3%)		1 (1.1%)
	2	2 (14.3%)	3 (16.7%)	3 (9.1%)	4 (21.1%)	1 (11.1%)	13 (14.0%)
	3	6 (42.9%)	4 (22.2%)	15 (45.5%)	7 (36.8%)	5 (55.6%)	37 (39.8%)
	4	1 (7.1%)	5 (27.8%)	3 (9.1%)	3 (15.8%)		12 (12.9%)
	5	5 (35.7%)	6 (33.3%)	12 (36.4%)	4 (21.1%)	3 (33.3%)	30 (32.2%)
Total		14 (100.0%)	18 (100.0%)	33 (100.0%)	19 (100.0%)	9 (100.0%)	93 (100.0%)

Table 8. No. of Years in Managing IT Projects * Communicate Effectively Crosstabulation.

		Communicate Effectively					Total
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
No. of Years in IT Projects	1			1 (6.3%)			1 (1.1%)
	2	2 (10.0%)	5 (19.2%)	4 (25.0%)	1 (4.5%)	1 (11.1%)	13 (14.0%)
	3	8 (40.0%)	8 (30.8%)	4 (25.0%)	14 (63.6%)	3 (33.3%)	37 (39.8%)
	4	4 (20.0%)	2 (7.7%)	3 (18.8%)	2 (9.1%)	1 (11.1%)	12 (12.9%)
	5	6 (30.0%)	11 (42.3%)	4 (25.0%)	5 (22.7%)	4 (44.4%)	30 (32.2%)
Total		20 (100.0%)	26 (100.0%)	16 (100.0%)	22 (100.0%)	9 (100.0%)	93 (100.0%)

Table 9. No. of Years in Managing IT Projects * Balancing Work and Life Crosstabulation.

		Balancing Work and Life					Total
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
No. of Years in IT Projects	1					1 (1.9%)	1 (1.1%)
	2	2 (22.2%)		1 (16.7%)	2 (13.3%)	8 (15.1%)	13 (14.0%)
	3	5 (55.6%)	6 (60.6%)	3 (50.0%)	4 (26.7%)	19 (35.8%)	37 (39.8%)
	4		1 (10.0%)		2 (13.3%)	9 (17.0%)	12 (12.9%)
	5	2 (22.2%)	3 (30.0%)	2 (33.3%)	7 (46.7%)	16 (30.2%)	30 (32.2%)
Total		9 (100.0%)	10 (100.0%)	6 (100.0%)	15 (100.0%)	53 (100.0%)	93 (100.0%)

From the crosstabulations, the number of respondents who assigned rank 1 to each of the five management skills were extracted and tabulated according to the working experience in managing IT projects (Table 10). The percentages are calculated, based on the total number of respondents who assigned rank 1 to each of the five management skills. Considering 3 years and above of working experience in managing IT projects to be the minimum number of years required to determine the ranking of the management skills rationally, the rankings of the five management skills are as indicated in the square brackets []. It is obvious that there are ambiguities and confusions in the ranking. For those with 3 years of working experience in managing IT projects, both “WE” and “TC” have the same ranking of 3. Similarly, for those with 4 years of working experience in managing IT projects, “WE” and “CE” are both ranked 1. However, when the total numbers of respondents with 4 and 5 years of working experience in managing IT projects are added, the ranking is “GO” (18), “CE” (10), both “WE” (6) and “TC” (6) have the same ranking, followed by “BWL” (2). This outcome implies that “WE” and “TC” are ranked at the same level of importance. Hence, analyses on the crosstabulations of age groups and educational levels with the five management skills, respectively, are necessary.

Table 10. Ranking of Management Skills Based on the Working Experience in Managing IT Projects.

Management Skills (Rank 1)	Balancing Work and Life				
	1	2	3	4	5
Getting Organised	1 (2.9%)	4 (11.4%)	12 (34.3%) [1]	3 (8.6%) [3]	15 (42.9%) [1]
Writing Effectively	0	3 (20.0%)	6 (40.0%) [3]	4 (26.7%) [1]	2 (13.3%) [4]
Thinking Creatively	0	2 (14.3%)	6 (42.9%) [3]	1 (7.1%) [4]	5 (35.7%) [3]
Communicate Effectively	0	2 (10.0%)	8 (40.0%) [2]	4 (20.0%) [1]	6 (30.0%) [2]
Balancing Work and Life	0	2 (22.2%)	5 (55.6%) [5]	0 (0.0%) [5]	2 (22.2%) [4]

2. Crosstabulations of Age Groups with Management Skills

Similarly, the crosstabulations of age groups with the five management skills were generated, using SPSS 11.0 for Windows. Table 11 shows the number of respondents who assigned rank 1 to each of the five management skills. The percentages are also calculated, based on the total number of respondents who assigned rank 1 to each of the five management skills.

Taking the age groups of 41 years and above of the respondents to be the minimum age required to determine the ranking of the management skills rationally, the rankings of the five management skills are as indicated in the square brackets []. Again, the results show that there are ambiguities and confusions in the ranking of the five management skills. In the 41-50 years age group, both “TC” and “BWL” are ranked at 4th position. Similarly, in the above 50 years age group, both “WE” and “BWL” are also ranked at 4th position. This implies that the three management skills are equally important to managerial personnel of 41 years and above age groups. However, when the total numbers of respondents from the two age groups are added, the ranking is “GO” (21), “CE” (13), and “WE” (6) and “TC” (6) have the same ranking, followed by “BWL” (4). Again, this implies that “WE” and “TC” are ranked at the same level of importance.

Table 11. Ranking of Management Skills Based on the Age Groups of Respondents.

Management Skills (Rank 1)	Age Groups (Years)			
	20-30	31-40	41-50	>50
Getting Organised	6 (17.1%)	8 (22.9%)	10 (28.6%) [1]	11 (31.4%) [1]
Writing Effectively	3 (20.0%)	6 (40.0%)	5 (33.3%) [3]	1 (6.7%) [4]
Thinking Creatively	2 (14.3%)	6 (42.9%)	3 (21.4%) [4]	3 (21.4%) [3]
Communicate Effectively	4 (20.0%)	3 (15.0%)	8 (40.0%) [2]	5 (25.0%) [2]
Balancing Work and Life	2 (22.2%)	3 (33.3%)	3 (33.3%) [4]	1 (11.1%) [4]

3. Crosstabulations of Educational Levels with Management Skills

Table 12 shows the total numbers of respondents who assigned rank 1 to each of the five management skills, based on crosstabulations of educational levels with the rankings of the five management skills. The percentages are calculated, based on the total number of respondents in the respective educational level.

For respondents with either PhD or Master’s degree, the results show that there are ambiguities and confusions in the ranking of the five management skills. For the 7 respondents with PhD qualification, both “TC” and “CE” are ranked at 3rd position. Similarly, for the 36 respondents with Master’s degree, both “TC” and “BWL” are also ranked at 3rd position. This implies that the three management skills (“TC”, “CE” and “BWL”) are equally important to managerial personnel with higher educational levels. On the other hand, for the 50 respondents with degree qualification, the outcome shows identical ranking with the ranking based on the number of respondents who assigned rank 1 to each of the five management skills.

As the results of crosstabulations indicate identical results among the three management skills – “TC”, “CE” and “BWL”, the ranking needs further analyses which include analyses based on the opinions of the most senior and/or most experienced respondents in managing IT projects.

Table 12. Ranking of Management Skills Based on the Educational Levels of Respondents.

Management Skills (Rank 1)	Educational Levels		
	Ph.D	Master’s Degree	Degree
Getting Organised	3 (42.8%) [1]	14 (38.9%) [1]	18 (36.0%) [1]
Writing Effectively	2 (28.6%) [2]	3 (8.3%) [5]	10 (20.0%) [3]
Thinking Creatively	1 (14.3%) [3]	6 (16.7%) [3]	7 (14.0%) [4]
Communicate Effectively	1 (14.3%) [3]	7 (19.4%) [2]	12 (24.0%) [2]
Balancing Work and Life	0 (0.0%) [5]	6 (16.7%) [3]	3 (6.0%) [5]
Total	7 (100.0%)	36 (100.0%)	50 (100.0%)

4. Crosstabulations on Working Experience in Managing IT Projects and Management Skills Based on the Respondents’ Involvements in the Various Sizes of IT Projects

As discussed in section 3.5 above (Figure 7), there are only 12 respondents who have been involved in 10 or more IT projects of small, medium, and large sizes but less than 10 very large size projects. Thus, it might not be possible to visualise and determine the ranking of the five management skills based on these 12 (12.9%) experienced respondents only. Hence, a crosstabulation on the working experience in managing IT projects with 3 years and above age groups, together with the conditions of involvements in 10 or more IT projects in both small and medium sizes, 5 or more large size IT projects and irrespective of the number of very large size IT projects, were selected for analysis. This analysis gives the opinions of 38 experienced respondents (Table 13). The results show that the ranking in descending order is “GO”, “CE”, “TC”, “WE” and “BWL”, as indicated in square brackets [] . This implies that “TC” is ranked at 3rd position and “BWL” is of least importance.

Table 13. No. of Years in Managing IT Projects * Management skills Crosstabulation.

		Management Skills (Rank 1)					Total
		Go [1]	WE [4]	TC [3]	CE [2]	BWL [5]	
No. of Years in IT Projects	1						
	2						
	3	2 (11.8%)		1 (14.3%)			3 (7.9%)
	4	2 (11.8%)	1 (33.3%)	1 (14.3%)	3 (33.3%)		7 (18.4%)
	5	13 (76.4%)	2 (66.7%)	5 (71.4%)	6 (66.7%)	2 (100.0%)	28 (73.7%)
Total		17 (100.0%)	3 (100.0%)	7 (100.0%)	9 (100.0%)	2 (100.0%)	38 (100.0%)

Note: The respondents are selected based on involvement in IT projects: small and medium size projects: ≥ 10 (in each size), large size projects ≥ 5 , and irrespective of the number of very large size projects.

Keys: GO – Getting Organised WE – Writing Effectively TC – Thinking Creatively CE – Communicate Effectively BWL – Balancing Work and Life

5. Crosstabulations of Age Groups with Management Skills Based on the Respondents' Involvements in the Various Sizes of IT Projects

Table 14 shows the crosstabulation on respondents with involvements in 10 or more IT projects in both small and medium size projects, 5 or more large size IT projects and irrespective of the number of very large size IT projects. This analysis presents opinions of 24 experienced respondents (Table 14). The results show that the ranking is “GO”, “TC”, “CE”, but “WE” and “BWL” are both ranked at 4th position as indicated in square brackets []. This implies that “TC” is ranked at 2nd position and both “WE” and “BWL” are the least important.

Table 14. Age Groups * Management Skills Crosstabulation.

		Management Skills (Rank 1)					Total
		Go [1]	WE [4]	TC [3]	CE [2]	BWL [5]	
Age	20-30						
	31-40			2 (40.0%)			2 (8.3%)
	41-50	7 (63.6%)	2 (100.0%)	1 (20.0%)	1 (25.0%)	2 (100.0%)	13 (54.2%)
	> 50	4 (36.4%)		2 (40.0%)	3 (75.0%)		9 (37.5%)
Total		11 (100.0%)	2 (100.0%)	5 (100.0%)	4 (100.0%)	2 (100.0%)	24 (100.0%)

Note: The respondents are selected based on involvement in IT projects: small and medium size projects: ≥ 10 (in each size), large size projects ≥ 5 , and irrespective of the number of very large size projects.

Keys: GO – Getting Organised WE – Writing Effectively TC – Thinking Creatively CE – Communicate Effectively BWL – Balancing Work and Life

6. Crosstabulations of Age Groups with Working Experience in Managing IT Projects

Four possible crosstabulations are made on the age groups and working experience in managing IT projects. These four different cases are:

- 1 – Respondents from ≤ 40 years age group and < 4 years of working experience in managing IT projects (i.e. junior and inexperienced respondents).
- 2 – Respondents from ≤ 40 years age group and ≥ 4 years of working experience in managing IT projects (i.e. junior but experienced respondents).
- 3 – Respondents from ≥ 41 years age group and < 4 years of working experience in managing IT projects (i.e. senior but inexperienced respondents).
- 4 – Respondents from ≥ 41 years age group and ≥ 4 years of working experience in managing IT projects (i.e. senior and experienced respondents).

The results of crosstabulations are shown in Table 15. The percentages are calculated, based on the total number of respondents who met each of the four selection criteria of age groups and working experience in managing IT projects. The outcomes show different rankings with ambiguities and confusions in cases 1 to 3. In case 1, “CE” and “BWL” are both ranked 4. In case 2, “TC” and “CE” are ranked 1 while “GO” and “WE” are ranked 3. In case 3, “TC” and “BWL” are both ranked 3. Only case 4 shows identical ranking with the ranking based on the number of respondents who assigned rank 1 to each of the five management skills. Hence, it is obvious that the rankings vary among respondents from different age groups and working experience in managing IT projects.

Table 15. Age Groups * No. of Years in Managing IT Projects Crosstabulation.

Management Skills (Rank 1)	Cases			
	1	2	3	4
Getting Organised	13 (35.1%) [1]	1 (16.7%) [3]	4 (28.6%) [2]	17 (47.2%) [1]
Writing Effectively	8 (21.7%) [2]	1 (16.7%) [3]	1 (7.1%) [5]	5 (13.9%) [3]
Thinking Creatively	6 (16.2%) [3]	2 (33.3%) [1]	2 (14.3%) [3]	4 (11.1%) [4]
Communicate Effectively	5 (13.5%) [4]	2 (33.3%) [1]	5 (35.7%) [1]	8 (22.2%) [2]
Balancing Work and Life	5 (13.5%) [4]	0 (0.0%) [5]	2 (14.3%) [3]	2 (5.6%) [5]
Total	37 (100.0%)	6 (100.0%)	14 (100.0%)	36 (100.0%)

7. Opinions of the Two Most Experienced Managerial Personnel

As mentioned in section 3.5 above (Figure 7), there are only two most senior and experienced managerial personnel who participated in the survey. Hence, it would be useful and interesting to know their respective rankings of the five management skills (Table 16). The following section presents a comparison of their rankings with the results of analyses presented in the previous sections.

Table 16. Opinions of the Two Most Senior and Experienced Managerial Personnel.

Present Position	Ranking of Management Skills				
	Go	WE	TC	CE	BWL
Chief Technology Officer	3	5	1	2	4
Director	3	4	1	2	5

Keys: GO – Getting Organised WE – Writing Effectively TC – Thinking Creatively CE – Communicate Effectively BWL – Balancing Work and Life

8. Analysis on the Rankings of the Five Management Skills

Altogether 20 analyses were performed to determine the ranking of the five management skills as listed below:

- 1 – Total count of rank 1 for each management skill.
- 2 – Total count of rank 1 and rank 2 for each management skill.
- 3 – Respondents with 3 years of working experience in managing IT projects.
- 4 – Respondents with 4 years of working experience in managing IT projects.
- 5 – Respondents with 5 years of working experience in managing IT projects.
- 6 – Total count of respondents with 4 and 5 years of working experience in managing IT projects.
- 7 – Respondents from 41-50 years age group.
- 8 – Respondents from > 50 years age group.
- 9 – Total count of respondents from 41-50 years and > 50 years age groups.
- 10 – Respondents with PhD degree.
- 11 – Respondents with Master's degree.
- 12 – Respondents with degree qualification.
- 13 – Working experience in managing IT projects based on selected cases: involvement in IT projects: small and medium size projects: ≥ 10 (in each size), large size projects ≥ 5 , and irrespective of the number of very large size projects.
- 14 – Age groups based on selected cases: involvement in IT projects: small and medium size projects: ≥ 10 (in each size), large size projects ≥ 5 , and irrespective of the number of very large size projects.
- 15 – Respondents from ≤ 40 years age group and < 4 years of working experience in managing IT projects.
- 16 – Respondents from ≤ 40 years age group and ≥ 4 years of working experience in managing IT projects.
- 17 – Respondents from ≥ 41 years age group and < 4 years of working experience in managing IT projects.
- 18 – Respondents from ≥ 41 years age group and ≥ 4 years of working experience in managing IT projects.
- 19 – Opinions of the most senior and experienced managerial personnel (Chief Technology Officer).
- 20 – Opinions of the most senior and experienced managerial personnel (Director).

The results of the rankings for the 20 analyses are tabulated clearly in Table 17. The numbers indicated in the brackets () are the number of respondents who ranked 1 for each of the five management skills. The numerals in columns 19 and 20 are the respective opinions of the two most-senior and experienced managerial personnel on the ranking of the five management skills (i.e. it represents one individual’s opinions only) and not all the respondents who ranked 1 for the five management skills. Hence, the results in these two columns are used for comparisons only and would not be used in the calculation to determine the overall ranking of the five management skills.

Also, it is important to note that there are three groups of identical results among the 18 analyses (1-18). The identical results are: 1, 2, 12 and 18; 3, 6 and 9; 5 and 8. Hence, only one set from each of these three groups of identical results would be used in the overall determination of the ranking (i.e. 1, 3 and 5) (Table 18). The remaining identical results are discarded (i.e. 2, 6, 8, 9, 12 and 18).

Table 17. Results of the 18 Analyses on the Ranking of the Five Management Skills.

MS	Results of the 18 Analyses																		EMPO	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GO	1 (35)	1 (55)	1 (12)	3 (3)	1 (15)	1 (18)	1 (10)	1 (11)	1 (21)	1 (3)	1 (14)	1 (18)	1 (17)	1 (11)	1 (13)	3 (1)	2 (4)	1 (17)	3	3
WE	3 (15)	3 (34)	3 (6)	1 (4)	4 (2)	3 (6)	3 (5)	4 (1)	3 (6)	2 (2)	5 (3)	3 (10)	4 (3)	4 (2)	2 (8)	3 (1)	5 (1)	3 (5)	5	4
TC	4 (14)	4 (32)	3 (6)	4 (1)	3 (5)	3 (6)	4 (3)	3 (3)	3 (6)	3 (1)	3 (6)	4 (7)	3 (7)	2 (5)	3 (6)	1 (2)	3 (2)	4 (4)	1	1
CE	2 (20)	2 (46)	2 (8)	1 (4)	2 (6)	2 (10)	2 (8)	2 (5)	2 (13)	3 (1)	2 (7)	2 (12)	2 (9)	3 (4)	4 (5)	1 (2)	1 (5)	2 (8)	2	2
BWL	5 (9)	5 (19)	5 (5)	5 (0)	4 (2)	5 (2)	4 (3)	4 (1)	5 (4)	5 (0)	3 (6)	5 (3)	5 (2)	4 (2)	4 (5)	5 (0)	3 (2)	5 (2)	4	5

Keys: MS – Management Skills EMPO – Experienced Managerial Personnel’s Opinions GO – Getting Organised
 WE – Writing Effectively TC – Thinking Creatively CE – Communicate Effectively BWL – Balancing Work and Life

Table 18. Final Results of the Ranking of the Five Management Skills.

MS	Results of the 18 Analyses												EMPO					FR	EMPO	
	1	3	4	5	7	10	11	13	14	15	16	17	1	2	3	4	5		19	20
GO	1 (35)	1 (12)	3 (3)	1 (15)	1 (10)	1 (3)	1 (14)	1 (17)	1 (11)	1 (13)	3 (1)	2 (4)	9	1	2	-	-	1 (12)	3	3
WE	3 (15)	3 (6)	1 (4)	4 (2)	3 (5)	2 (2)	5 (3)	4 (3)	4 (2)	2 (8)	3 (1)	5 (1)	1	2	4	3	2	4 (7)	5	4
TC	4 (14)	3 (6)	4 (1)	3 (5)	4 (3)	3 (1)	3 (6)	3 (7)	2 (5)	3 (6)	1 (2)	3 (2)	1	1	7	3	-	3 (9)	1	1
CE	2 (20)	2 (8)	1 (4)	2 (6)	2 (8)	3 (1)	2 (7)	2 (9)	3 (4)	4 (5)	1 (2)	1 (5)	3	6	2	1	-	2 (11)	2	2
BWL	5 (9)	5 (5)	5 (0)	4 (2)	4 (3)	5 (0)	3 (6)	5 (2)	4 (2)	4 (5)	5 (0)	3 (2)	-	-	2	4	6	5 (2)	4	5

Keys: MS – Management Skills FR – Final Result
 EMPO – Experienced Managerial Personnel’s Opinions
 GO – Getting Organised WE – Writing Effectively
 TC – Thinking Creatively CE – Communicate Effectively
 BWL ñ Balancing Work and Life

Based on the 12 analyses performed, it is obvious that the level of importance of the five management skills varies according to the age groups, working experience in managing IT projects, educational levels, and the involvements in different sizes of IT projects. The rankings for “GO” (1), “CE” (2) and “BWL” (5) are obvious and can be easily determined, based on the analyses performed. In fact, the ambiguities and confusions to determine the rankings apply to “WE” and “TC” only.

To determine the ranking confidently and without bias, the total number in the ranking of each of the five management skills based on the 12 analyses are first added. Taking into considerations the sum of the first three columns, the ranking of the five management skills is thus, “GO” (12), “CE” (11), “TC” (9), “WE” (7) and “BWL” (2). This count as indicated in column FR, is actually the total number of analyses with the first three highest ranking (ranks 1-3) for each of the five management skills from the 12 analyses of ranking. This result is further supported by the opinions of the two most-senior and experienced managerial personnel who indicated that “TC” is more important than “WE” (column EMPO).

DISCUSSION AND CONCLUSIONS

To manage any IT projects, besides management knowledge gained from books and professional studies, a manager must also equip himself with other skills or abilities such as communication skill, thinking creatively, dealing with difficult people and the ability to organise his work systematically. In this study, five management skills have been chosen for investigation on their order of importance. It is found that “Getting Organised”, “Communicate Effectively”, “Thinking Creatively”, “Writing Effectively” and “Balancing Work and

Life” are the five management skills ranked in descending order. This indicates that “Getting Organised” is the most important and “Balancing Work and Life” is the least important.

Indeed, despite “Balancing Work and Life” being ranked the least important, it is interesting to find that 9 respondents assigned ranked 1 to it. The survey findings reveal that 8 (88.9%) of them are fairly experienced (involved in 10 or more IT projects of various sizes) and 6 out of these 8 (75.0%) respondents are from the 41 years and above age groups. This infers that the ability to balance one’s work and life is very important if a manager has to manage and monitor multiple projects of various sizes (small, medium, large and very large) concurrently, a fact that a manager must face in today’s competitive work routines.

To further confirm the findings of this survey, that is, the top three management skills, namely, “Getting Organised”, “Communicate Effectively” and “Thinking Creatively”, are the most important among the five management skills investigated, further studies need to be conducted. To conduct such studies, data on the evaluation of the five management skills of the IT managerial personnel need to be collected. As can be seen from this survey, the response rate is only 9.7%. This poor response rate could be attributed to the fact that the managerial personnel are preoccupied with tight work schedule and thus, do not have the interest and time to participate in any survey conducted by the institutions of higher learning or research institutions. In fact, this also reflects the low interest of the managerial personnel from the IT industry to establish close collaborative networks with the research institutions. Obviously, this type of joint-research linkages could bring about great benefits, and exchange of knowledge and fruitful research outcomes to both the research institutions and the IT industry. Thus, it is hoped that the IT managerial personnel would provide stronger support and more cordial cooperation in the next phase of this research.

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