



Project Management Critical Success Factors in JKR

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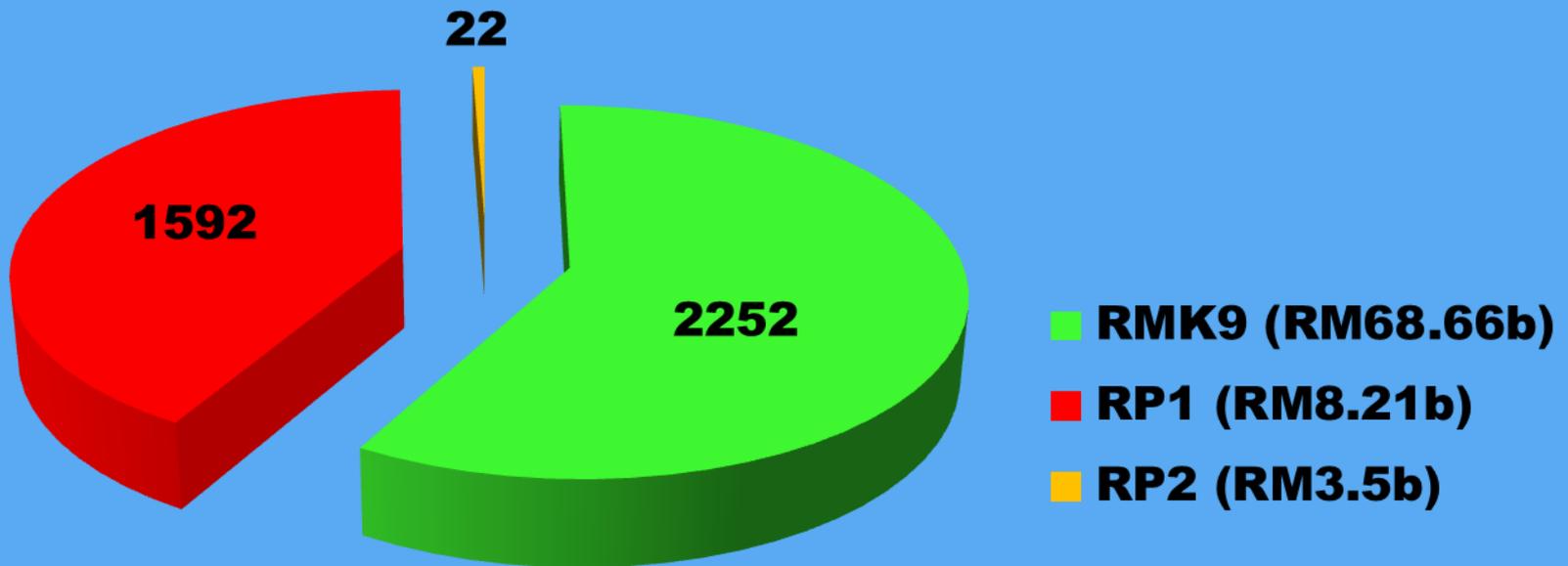


Project Management Critical Success Factors in JKR

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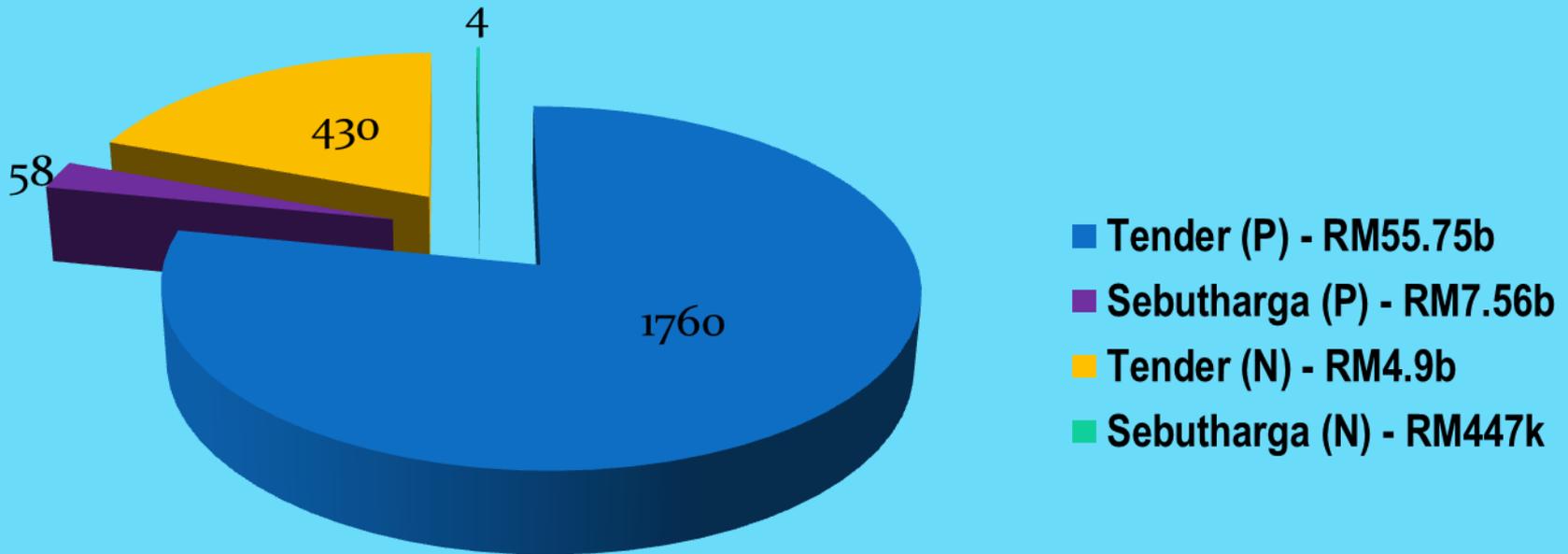
JKR Present Workload



SKALA 31st Jan 2012

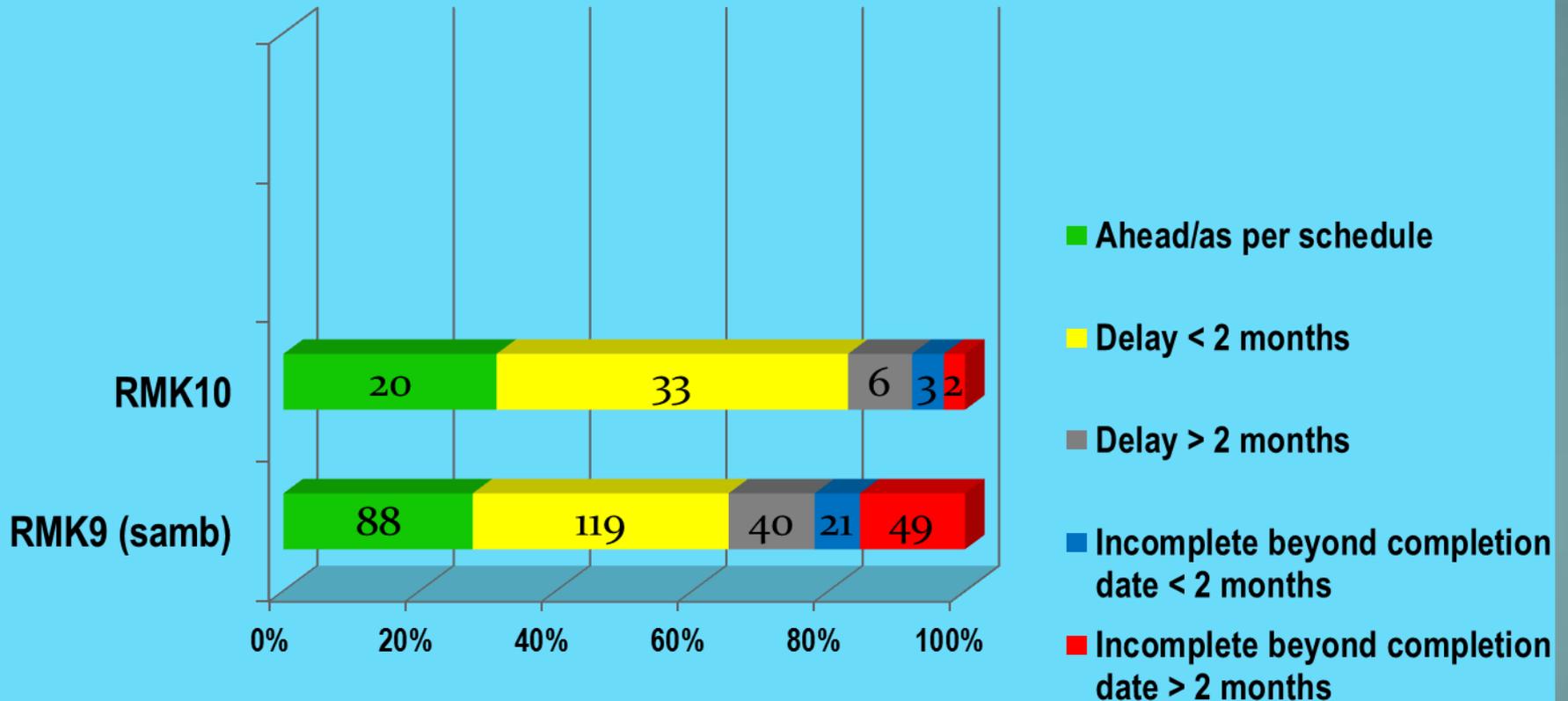
RMK9 (samb) Projects

Categories of projects in RMK9 (samb)



Projects Status (construction)

(SKALA 31 Jan 2012)



Problem Statement

- Four main areas of concern is ;
 - i) JKR fails to deliver as per required number of projects as expected,
 - ii) poor workmanship or quality
 - iii) cost overrun and fourthly,
 - iv) delay in projects delivery to the clients.
- In order to improve on these entire shortfalls, JKR has to improve on its project management. Critical factors that affect the JKR's project management practice needs to be addressed.

Aim & Objectives

AIM

- to compare the critical success factors of JKR project management from the viewpoints or perspectives of various stakeholders namely the internal and external stakeholders.

OBJECTIVES

- to established key important parameters that constitute critical success factors for JKR projects.
- a) to identify the critical success factors of JKR project management from JKR's perspective.
- b) to identify the critical success factors from the stakeholders' perspective.
- to determine the critical success factors of project management in JKR.

Scope & Limitation

1. Time

- The time frame of this research was subjected to the one stipulated by the time table of the taught course of the Master Degree programme by UTM. It was spread over 2 semesters.

2. Location

- All data collected was for construction projects implemented in Peninsular Malaysia for uniformity of parameters.

3. Data Collection

- Data collections was divided into two target groups namely the internal and external stakeholders.

Scope & Limitation (cont.)

4. Stakeholders

- The external stakeholders were :
 - the clients departments.
 - consultants
 - contractors
- The internal stakeholder were within JKR itself that is its staff ie those whom are directly involved in project management.

Research Methodology

Research design

- Aims & Objectives
- Scope & Limitations

Data collection

- Questionnaire Survey
- Internal & External Stakeholders

Research Methodology (cont.)

Exploratory interviews

- JKR and non JKR
- JKR, client, consultants & contractors

Documents search

- Speeches, papers, journal on JKR
- Media – newspapers, press statements

Literature review

- Journal, papers, proceedings
- Perceived/potential critical success factors

Definition

- What is success?

Kline (1994) associated success with “quality” and should be applied equally well for all three parties namely owner, constructor and designer.

As far as project management is concern, success is

- i) within cost
- ii) within time
- iii) within scope
- iv) within quality limits – quality is proportionate to cost. Quality cost money.
- v) Acceptable to customer (as their input & value for money)

Critical Success Factors

- Projects are unique in nature, and they are supposed to have a unique task or solution thus there is no ready-made solutions, causing a degree of uncertainty in the projects. (Hallgren & Maaninen-Olsson, 2009)
- When there is a degree of uncertainty involved, it is wise to know what are the critical success factors so that to avert failures. Failures cost money and time.

Literature Review

- Hides et al (2000)TQM philosophy such as better customer service, the error prevention, employee development and good leadership.....
- Eve (2007)there must be ownership of them by the highest level of the organisation
- Dvir et al (2003)

..... that planning is a central element in modern project management....

End-user involvement should start at the early stage in defining goals and functional requirement of the project.

Literature Review

- **Communication system should be sound throughout the project life. (Cicmil , 1997)**
- **Sanvido (1992) indicated there are four critical success factors :**
 - i) well-organised, cohesive management team in managing , planning, designing and constructing;**
 - ii) contracts that allows various discipline to behave as a team;**
 - iii) experience in management, planning, design and construction; and fourthly**
 - iv) optimization of information flow.**

Literature Review

- **Belout and Gauvreau (2004).... for human resources management, project managers should (i) allocate human resources by work packets (WBS) and audit needs to be carried in order to avoid human resources surpluses or shortages, (ii) communications during planning stage also need to be clearly defined, (iii) clients' needs has to be grasped and establish with them the project limit and priorities, (iv) top management support.**

Literature Review

Eve (2007)...elements to maximise **company's** project performance. They are:

- structured methodology and documentation to use across all levels of the organization,
- the project management competency required from the human resource of the organization should be defined, measured, understood and developed.
- direct intervention from the mentoring executive and senior management assisting project team members carry out their roles or bringing back on track in-trouble projects
- training to enhance skill designed and tailored to company's requirement
- development of all layers of management to fully understand their roles and responsibilities

Literature Review

...**project manager** should have certain traits or characteristics.

Snowdon (1979) listed the characteristics as follows:

- he should be able to understand and evaluate many simultaneous aspects of the problems which undoubtedly will come his way
- he should have sufficient experience across a broad base of technology to appreciate the significance of the contributions of others and recognise omissions or fault.
- he should have a logical, orderly and systematic approach to his work
- he should be able to communicate
- he should be able to deal sympathetically but firmly with the people involved in the project
- he should have well developed powers of leadership
- he should have a good working knowledge of the principles of management and organization and also be receptive to new ideas

Potential CSFs (literature review)

List gather from literature reviews :

1. Early involvement of the project manager
2. Improvement of process control
3. Improvement on training
4. Better customer service
5. Error prevention
6. Employee development
7. Good leadership
8. Ownership of project management by the highest level of the organisation.
9. Structured methodology and documentation
10. Project management competency be defined, measured, understood and developed.
11. Direct intervention from the mentoring executive and senior management
12. Training to enhance skill designed and tailored to company's requirement
13. All layers of management to fully understand their roles and responsibilities
14. Company-wide education on concepts of risk management, assigning of risks, visible risk register is maintained, up-to-date risk management plan
15. Adequacy of documentation of organizational responsibilities on the project
16. Keep project duration below three years as possible.
17. Scope change, done only through mature scope change process,
18. Maintaining the integrity of the performance measurement baseline.
19. Planning is a central element in modern project management
20. End-user involvement should start at the early stage
21. Stakeholders needs
22. Minimizing the duration

Potential CSFs (literature reviews) cont.

- 23 Minimizing cost.
- 24 Coordination
- 25 Client's satisfaction
- 26 Listening to the customer
- 27 Leadership skill
- 28 Communication system should be sound
- 29 Good traits or characteristics of project manager
- 30 Well-organised, cohesive management team in managing
- 31 Contracts that allows various discipline to behave as a team
- 32 Experience in management
- 33 Optimization of information flow
- 34 Nature of the project
- 35 Effective project management action
- 36 Application of innovative management approach such partnering or value management
- 37 Allocate human resources by work packets (WBS) and audit needs to be carried in order to avoid human resources surpluses or shortages
- 38 Communications during planning stage also need to be clearly defined,
- 39 Clients' needs has to be grasped and establish with the project limit and priorities,
- 40 Top management support.
- 41 Project management skills
- 42 Organization structure
- 43 Resources
- 44 Competitive strategy

Potential CSFs (literature reviews) cont.

- 45 Relationships
- 46 Bidding
- 47 Marketing
- 48 Technology
- 49 Adherence to quality targets,
- 50 Adherence to schedule,
- 51 Adherence to budget,
- 52 Customer satisfaction,
- 53 Functional requirements,
- 54 Technical specifications,
- 55 Revenue and profit,
- 56 Market share,
- 57 Reputation; and lastly
- 58 Competitive advantage.

Re-distribution of the clustered CSFs according to the authors of journals

CRITICAL SUCCESS FACTORS	Smith	Barad	Hides	Eve	Cooke-Davis	Dvir et al	Bryde & Robinson	Jha & Iyer	Lim & Zain	Cicmil	Snowdon	Sanvido	Larn et al	Belaut & Gavereau	Lu et al	Al-Tmeemy
Stakeholders' needs																
Coordination																
Good realationship							√									
Reputation																
Functionality																
Integrity of perf. measurement					√											
Innovation / innovative approach					√								√			
Competitive strategy																
Adherence to schedule / min. dur.							√							√		
Adherence to quality target																
Minimizing / adherence to cost																
Adequate planning						√										
Good contract preparation / doc.					√							√				
Good / matured Mgmt. process																
Customer Satisfaction									√							
Customer Focus										√						
T Training				√												
Good project mgnt Skills / structure				√												
Communication				√	√											
Good leadership / Manager			√							√						
Top Management involvement	√													√		

Potential CSFs (exploratory interviews)

List gathered from exploratory interviews :

1. Implementation of ISO.
2. ISO (SPK) as the checker for good quality product
3. ISO (SPK JKR)
4. ISO (SPK JKR) Implementation
5. Provide knowledge to staff dealing in PM.
6. 'Good' specification for 'good' product.
7. The specification needs to be simplified.
8. JKR should choose the right person to handle projects ie person with experience, competency, initiative.
9. Design problem should be solved at design stage but at construction stage.
10. Tender-choose the right contractor with experience.
11. Experience team for that particular job.
12. Contractor has experience staff
13. No shortage of construction materials.
14. Payment on time
15. JKR staff lack competency.
16. All relevant documents supplied to contractors & supervision team.
17. Too many jobs to supervise by same staff
18. Stick to the design as per contract
19. Stick to the design as per approved project brief
20. Same officer supervise too many projects.
21. Qualification not suitable to supervision job ie all site issues attended by technician not the superiors
22. Staff who are knowledgeable, with authority and focus towards the work

Potential CSFs (exploratory interviews) cont.

List gathered from exploratory interviews :

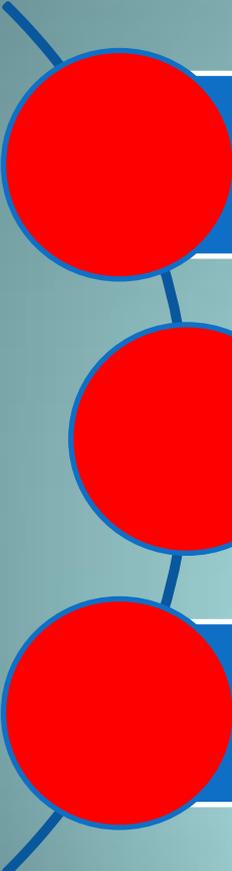
23. Insufficient staff for supervisory work
24. Changes of scope by the clients
25. Strictly follow the approved schedule (S-Curve)
26. Strictly follow the original agreed cost
27. Regular discussion (site meeting / technical meeting).
28. Monitor closely
29. Personnel not competent – training needed.
30. Competency due to no hands-on (mostly outsource)
31. Project management best practiced should be in-place.
32. Manage our stakeholder properly.
33. Brief, scope and need statement should be thorough and complete
34. Scrutinize the project schedule and monitor closely
35. The contractors are no longer constructors but they are businessman
36. Not properly managed by the stakeholders
37. No clear / no continuity in between project phases (lack of communication)
38. No clear roles and responsibilities.
39. Thorough communication between stakeholders.
40. Senior management involvement in decision making
41. Incompetence contractor.
42. Selection process of contractors.
43. Lack of ownership of the stakeholders.
44. Lack of coordination of the stakeholders

Potential CSFs (document searches)

List of critical success factors gathered from the document searches :

1. criteria of project implementation is not based on the lowest cost
2. emphasised to the aspects of value-added to the projects
3. the optimum usage of resources.
4. stern action be taken to the contractors who do not perform
5. expediting the payments due to the contractors.
6. Enforcement as per the existing guidelines and procedures
7. integrity in awarding of contracts
8. integrity in supervision of contractors.
9. Punitive measures taken against the contractors if they renege on their responsibilities.
10. Contractors who fail in their service should be eliminated from the system.
11. officers involved in projects should have high integrity values.
12. officers also should have a proactive attitude and not reactive.
13. appoint the officers that have the relevant expertise into the project team
14. high profile projects should be handled by a person who is senior and experience

Potential Critical Success Factors



58 Potential CSFs from literature review

105 Potential CSFs from exploratory interview

14 Potential CSFs from documents search

Categories & sub-categories of questionnaire survey

Category	Sub-category	No. potential CSFs	Total
A. Management	A1: Top Management	3	
	A2: Training	3	
	A3: Communication	6	
	A4: Competency	3	
	A5: Monitoring	2	
	A6: PM Practice	4	
	A7: Stakeholders	6	
	A8: Coordination	2	
	A9: Delegation	1	30
B. Administrative & Legal	B1: Control	8	
	B2: Planning	1	
	B3: Documentation	6	
	B4: Organization	3	
	B5: Resources	3	

Categories & sub-categories of questionnaire survey

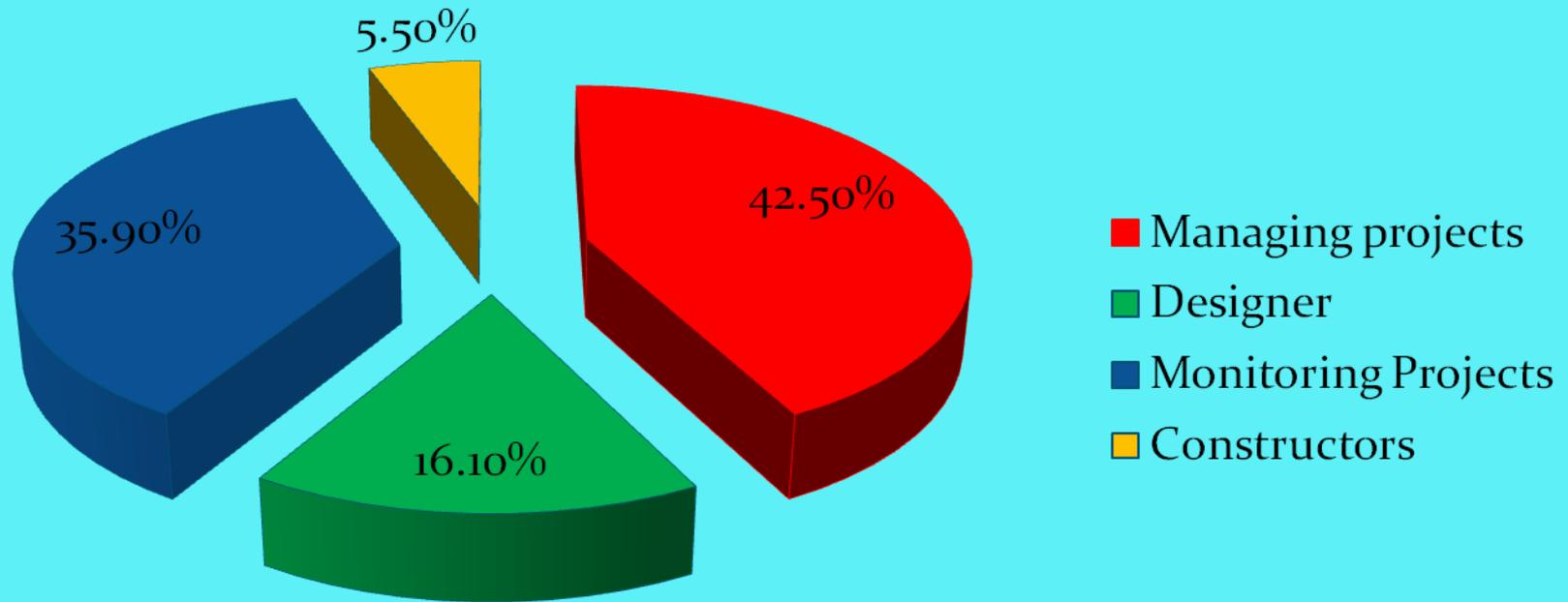
Category	Sub-category	No. potential CSFs	Total
	B6: Processes	7	
	B7: Encumbrances	2	
	B8: Integrity	4	
	B9: Work Load	1	35
C. Technical	C1: Project characteristic	4	
	C2: Quality system	1	5
D. Market / Finance	D1: Cost	3	3
E. Contractor	E1: Traits of contractor / contract	7	7
F. Time	F1: Duration	3	3
G. Quality	G1: Quality	1	1
H. Scope	H1: Scope	2	2
I. Customer	I1: Client Involvement	4	4
9 categories	26 sub-categories		90

Distribution of Questionnaire Survey Forms to Stakeholders

Stakeholders	Distribution (nos.)	Returned (nos.)	Percentage (%)
JKR	3,308	205	6.2
Client departments	96	27	28.1
Consultants	62	17	27.4
Contractors	107	24	22.4
TOTAL	3,573	273	7.6

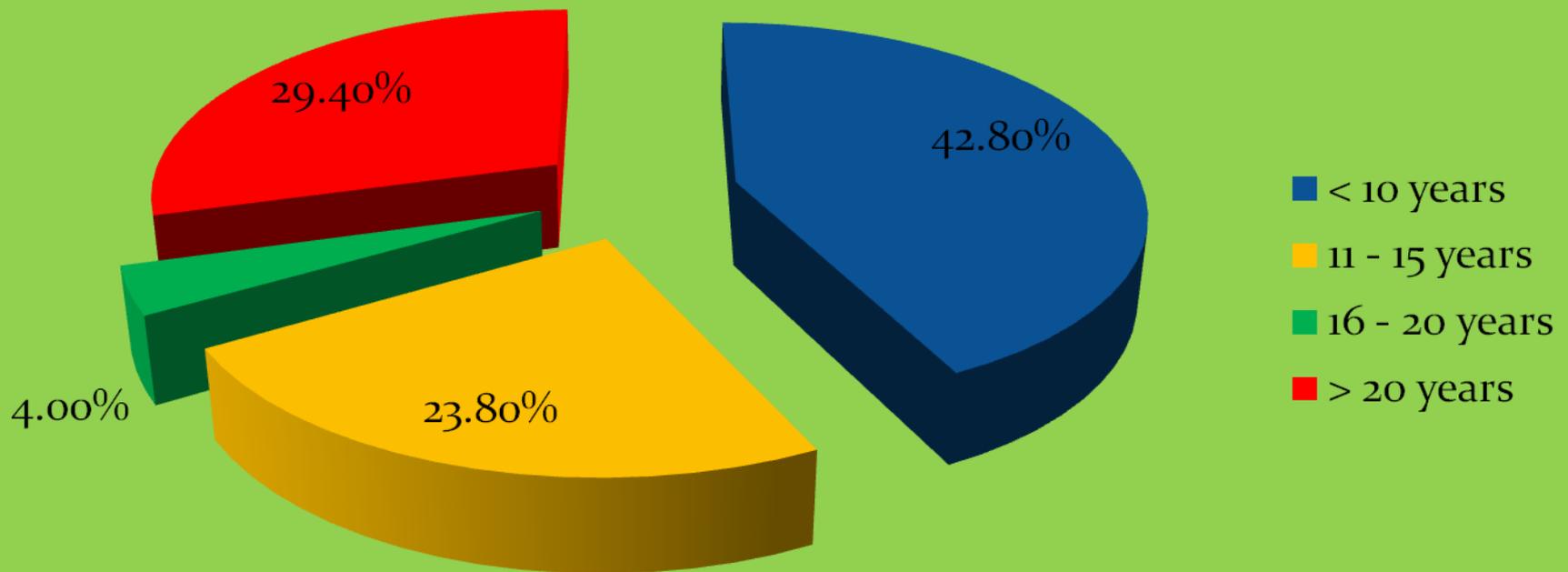
Area of professional fields

Areas of professional field



Working experiences

Working experiences



Normality Test

Histogram Plot – all categories bell-shaped

Q-Q Plot – all categories straight line plot

Normality Test

Skewness – all values between ± 2

Kurtosis – all values between ± 2

Factor Analysis

- All 9 categories of the 5 perspectives were analyzed using Factor Analysis. The results :

Organization	New Categories (no)	Retained Potential CSFs
Overall	7	79
JKR	7	78
Client Dept.	6	77
Consultants	5	56
Contractors	5	79

Factor Analysis: Criteria for Rejection

KMO

- Value < 0.7
- Meyers (2006)

Reliability Test (Cronbach alpha)

- Value < 0.6
- Black & Porter (1996)

No. of items in cluster

- ≤ 3 items
- Chua (2006)

Factor Analysis : All Respondents

Summary of categories after Factor Analysis done:

Categories	Original no. of items	Original alpha	Items deleted	Final numbers of items	Final alpha
Category 1 _{All}	30	0.941	3	27	0.941
Category 2 _{All}	35	0.945	4	31	0.947
Technical*	5	0.749	0	5	0.749
Market/Finance**	3	0.649	3	0	0.000
Contractor*	7	0.876	0	7	0.876
I + G + H (Category 6 _{All})	6	0.737	1	5	0.768
Customer*	4	0.807	0	4	0.807
	90		11	79	

Factor Analysis : JKR

Factor analysis on JKR respondents			
Category	Original Cronbach alpha	Retained items (potential CSFs)	Final Cronbach alpha
Category1 _{JKR}	0.931	BA12, BA13, BA21, BA22, BA23, BA31, BA33, BA34, BA35, BA36, BA41, BA42, BA43, BA51, BA52, BA61, BA63, BA64, BA71, BA73, BA74, BA75, BA81, BA82, BA91.	0.936
Category 2 _{JKR}	0.933	BB11, BB12, BB13, BB14, BB15, BB16, BB17, BB18, BB21, BB31, BB32, BB33, BB34, BB42, BB43, BB51, BB53, BB61, BB62, BB63, BB65, BB66, BB71, BB72, BB81, BB82, BB83, BB84, BB91.	0.936
Category 3 _{JKR}	0.933	BB35, BB36, BB41, BB67	0.694
Technical	0.701	All 5 items retained	0.701
Market / Finance	0.657	All 3 items rejected. KMO =0.550; ie < 0.7	0.000
Contractor	0.862	All 7 items retained	0.862
Category 7 _{JKR}	0.700	BF12, BF13, BG11, BH12	0.781
Customer	0.796	All 4 items retained	0.796

Factor Analysis : Clients Dept.

Factor analysis on CLIENTS DEPARTMENTS respondents			
Category	Original Cronbach alpha	Retained items (potential CSFs)	Final Cronbach alpha
Category 1 _{client}	0.966	BA11, BA12, BA13, BA21, BA22, BA23, BA31, BA33, BA34, BA35, BA36, BA41, BA42, BA43, BA51, BA52, BA61, BA62, BA63, BA64, BA71, BA72, BA73, BA74, BA75, BA76, BA81, BA82.	0.967
Category 2 _{client}	0.961	BB11, BB12, BB13, BB14, BB15, BB16, BB17, BB18, BB21, BB31, BB32, BB33, BB36, BB41, BB43, BB51, BB53, BB61, BB62, BB64, BB65, BB67, BB71, BB72, BB81, BB83, BB84, BB91.	0.962
Technical	0.836	All 5 items retained	0.836
Market / Finance	0.641	All items rejected. KMO =0.612; ie < 0.7	0.000
Contractor	0.910	All 7 items retained	0.910
Category 7 _{client}	0.844	BF11, BF12, BF13, BG11, BH12	0.871
Customer	0.867	All 4 items retained	0.867

Factor Analysis : Consultants

Factor analysis on CONSULTANTS respondents

Category	Original Cronbach alpha	Retained items (potential CSFs)	Final Cronbach alpha
Category 1 _{consultant}	0.951	BA11, BA12, BA21, BA22, BA32, BA33, BA34, BA35, BA36, BA41, BA42, BA43, BA61, BA62, BA71, BA72, BA73, BA74, BA76, BA81, BA82.	0.956
Category 2 _{consultant}	0.951	BA13, BA31, BA52, BA64, BA75.	0.237*
Category 3 _{consultant}	0.890	BB13, BB14, BB17, BB21, BB31, BB33, BB34, BB35, BB51, BB64, BB72, BB81, BB82, BB83, BB84, BB91.	0.926
Category 3 _{consultant}	0.890	BB11, BB12, BB18, BB32, BB42, BB53, BB61, BB67, BB71.	0.686
Category 4 _{consultant}	0.890	BB15, BB36, BB62, BB65, BB66	0.471*
Technical	0.738	All 5 items rejected. KMO = 0.688; ie < 0.7	0.000
Market / Finance	0.432*	All 3 items rejected. KMO = 0.475; ie < 0.7	0.000
Contractor	0.823	All 7 items rejected. KMO = 0.623; ie < 0.7	0.000
Time, Quality, Scope	0.086	All 6 items rejected. KMO = 0.397; ie < 0.7	0.000
Customer	0.520*	All 4 items rejected. KMO = 0.6228; ie < 0.7	0.000

Factor Analysis : Contractors

Factor analysis on CONTRACTORS respondents			
Category	Original Cronbach alpha	Retained items (potential CSFs)	Final Cronbach alpha
Category $1_{\text{contractor}}$	0.961	BA12, BA13, BA21, BA22, BA23, BA31, BA32, BA33, BA34, BA35, BA36, BA41, BA42, BA43, BA51, BA52, BA61, BA62, BA63, BA64, BA71, BA72, BA73, BA74, BA75, BA81, BA82, BA91.	0.963
Category $2_{\text{contractor}}$	0.979	BB11, BB12, BB13, BB14, BB15, BB16, BB17, BB18, BB21, BB31, BB32, BB33, BB34, BB35, BB36, BB41, BB42, BB43, BB51, BB52, BB53, BB61, BB62, BB63, BB64, BB65, BB66, BB67, BB72, BB81, BB82, BB83, BB84, BB91.	0.980
Technical	0.863	All 5 items rejected. KMO = 0.680; ie < 0.7	0.000
Market / Finance	0.681	All 3 items rejected. KMO = 0.559; ie < 0.7	0.000
Contractor	0.948	All 7 items retained	0.948
Time, Quality, Scope	0.916	All 6 items retained.	0.916
Customer	0.878	All 4 items retained	0.878

Relative Importance Index

$$RII = \frac{\sum \{[n_1x1] + [n_2x2] + [n_3x3] + [n_4x4] + [n_5x5]\}}{\sum n_i \times 5}$$

where:

RII = Relative Importance Index

n_i = frequency of occurrence for Likert value i

1,2,3,4,5 = the Likert Scale chosen

- **The potential Critical Success Factors were arranged in descending order.**

Mann Whitney U-Test

Effect size p -values < 0.05

Code	Mann Whitney (p values)	r values	Relationship
BA21	0.003	0.217	SMALL
BA41	0.017	0.180	SMALL
BA75	0.049	0.114	SMALL
BB11	0.001	0.226	SMALL
BB16	0.001	0.233	SMALL
BB17	0.035	0.143	SMALL
BB42	0.001	0.214	SMALL
BB43	0.001	0.212	SMALL
BB63	0.013	0.176	SMALL
BB82	0.022	0.141	SMALL
BB83	0.029	0.134	SMALL
BB84	0.047	0.153	SMALL
BB91	0.000	0.253	SMALL
BB11	0.049	0.150	SMALL
BB12	0.039	0.156	SMALL
BE13	0.049	0.130	SMALL
BH12	0.043	0.137	SMALL
Bi14	0.011	0.164	SMALL

Critical Success Factors of JKR Project Management

A. JKR perspective

Category (as per RII ranking)	Top three Critical Success Factors
1. Category 7 _{JKR}	<ol style="list-style-type: none">1. BG11 Adherence to quality targets2. BF13 Good work program3. BF12 Adherence to Schedule
2. Customer _{JKR}	<ol style="list-style-type: none">1. Bi14 Client should give complete brief and adequate funding2. Bi13 Clients' satisfaction of products delivered3. Bi12 End user involvement should start at early stage
3. Category 2 _{JKR}	<ol style="list-style-type: none">1. BB83 Integrity of officer involved in projects2. BB81 Integrity in awarding contracts3. BB82 Integrity in supervision of contracts

Critical Success Factors of JKR Project Management

B. Clients' Departments perspective

Category (as per RII ranking)	Top three Critical Success Factors
1. Customer _{client}	<ol style="list-style-type: none">1. Bi13 Clients' satisfaction of products delivered2. Bi11 Better customer service3. Bi12 End user involvement should start at early stage
2. Category 7 _{client}	<ol style="list-style-type: none">1. BG11 Adherence to quality targets2. BF12 Adherence to Schedule3. BF13 Good work program
3. Contractor _{client}	<ol style="list-style-type: none">1. BE13 Contractor's resources2. BE11 Project management skills of contractor3. BE14 Competitive strategy of contractors

Critical Success Factors of JKR Project Management

C. Consultants' perspective

Category (as per RII ranking)	Top three Critical Success Factors
1. Category 2 _{consultant}	<ol style="list-style-type: none">1. BA13 High profile project handled by a senior & experience person2. BA52 Act early when project delays3. BA31 Regular discussion (site / technical meeting)
2. Category 1 _{consultant}	<ol style="list-style-type: none">1. BA12 Early involvement of project manager2. BA34 Communication during planning stage needs to be clearly defined3. BA33 Communication during project implementation has to be good / sound
3. Category 3 _{consultant}	<ol style="list-style-type: none">1. BB72 Land acquisition resolved prior commencement of project2. BB81 Integrity in awarding contracts3. BB21 Planning is a central element in modern project management

Critical Success Factors of JKR Project Management

D. Contractors' perspective

Category (as per RII ranking)	Top three Critical Success Factors
1. Time, Quality Scope _{contractor}	<ol style="list-style-type: none">1. BF12 Adherence to Schedule2. BG11 Adherence to quality targets3. BH12 Specific / confirmed work scope
2. Customer _{contractor}	<ol style="list-style-type: none">1. Bi14 Client should give complete brief and adequate funding2. Bi13 Clients' satisfaction of products delivered3. Bi11 Better customer service
3. Contractor _{contractor}	<ol style="list-style-type: none">1. BE17 Reputation of the contractor2. BE11 Project management skills of contractor3. BE16 Bidding / revenue / profit of contractor

Critical Success Factors of JKR Project Management

E. Overall respondents perspective

Category (as per RII ranking)	Top three Critical Success Factors
1.Customer _{All}	<ol style="list-style-type: none">1. Bi14 Client should give complete brief and adequate funding2. Bi13 Clients' satisfaction of products delivered3. Bi12 End user involvement should start at early stage
2.Category 2 _{All}	<ol style="list-style-type: none">1. BB83 Integrity of officer involved in projects2. BB81 Integrity in awarding contracts3. BB82 Integrity in supervision of contracts
3. Time, Quality Scope _{All}	<ol style="list-style-type: none">1. BG11 Adherence to quality targets2. BF13 Good work program3. BF12 Adherence to Schedule

Conclusions / Recommendations

- Re-energize the project management knowledge areas where there are inadequacies as far as JKR professionals are concerned.
- Become the strategy for JKR to tackle the clients departments, consultants, contractors as far as project management is concerned.
- Become the departmental strategic Key Performance Indicators (KPIs)
- Concentrate on these critical success factors to improve project management of JKR

Thank You

