

DEVELOPING COST PREDICTION MODEL FOR BUILDING PROJECT : CONCLUSION

Dr. S Kanchana¹, Ms. Sisira Ramesh²

¹Head of the Department, Department of Civil Engineering, RVS Technical Campus, Coimbatore-641402, India, ²PG Student, Department of Civil Engineering, RVS Technical Campus, Coimbatore-641402, India ***

Abstract - The critical problem in the construction industry is that building projects are completed at cost much higher than estimated project cost, hence it is essential to develop a cost prediction model that imprison all factors affecting the project cost using regression analysis through set of objectives such as: to locate the factors affecting the project cost; analyze the significance of the factors and develop cost predictive model. Literature review on the study stipulates that nature of clients, professional involved in a project and their choice regarding design, function, duration, technology and execution have significant effect on the overall project cost. Data for the study are obtained through random sampling of building projects completed in various location. The study points out the seven most exceptional factors to project cost such as: design related factors, time or cost related factors, parties experience related factors, financial issues related factors, bidding situations related factors , project characteristics related factors and estimating process related factors. These selected key factors are to be used for cost predictive model. The cost prediction model is developed with the help of SPSS software.

Key Words: SPSS MODEL, Cost estimation, Cost prediction model.

1. INTRODUCTION

1.1 Scope and Research objectives

The research goal is to provide investors in the construction business with a tool to predict and quantify substantial risk associated to change. A regression model is developed in this research to predict project delay and cost increment using real project data of different construction types and different sizes for each type. Many factors affect accuracy of construction projects cost estimating. Through this study, factors affecting building construction projects cost estimating are discussed. Design-bid-build projects, executed by private companies in an open tendering are selected for the scope of this study. The main objectives of this study are: [1] Identifying factors affecting the accuracy of the building

- construction projects cost estimating process.
- [2] Determining and testing the severity of factors that affect the accuracy of the building construction projects" cost estimating using analysis of data collected from questionnaire form.

- [3] Measuring the effects of the factors that severely affect the accuracy of the cost estimates and trying to link them.
- [4] Developing a model that can be used to assess the expected cost variance. Identifying such variance can help in accurately determining the risk premium that should be added to the estimated cost.

2. RESULTS AND DISCUSSIONS

2.1Response result

Table 3.1: Response Rate of Factors

VARIA BLE NAME	FACTORS THAT DETERMINE COST OF BUILDING PROJECT	EI (5)	VI (4)	MI (3)	SI (2)	NI (1)
i) Desig	n related factor					1
F1	Design complexity	20	52	14	0	0
F2	Construction	23	44	19	0	0
F3	complexity Technological advancement	14	36	26	10	0
F4	Specialization required of contractors	8	29	34	13	2
F5	Percentage of repetitive elements	8	16	38	19	5
F6	Presence of special issues	2	22	41	20	1
F7	Type of specification	1	23	38	23	1
F8	Extent to which bid documents allow additions to scope	6	23	41	16	0
F9	Flexibility of scope of works when contractor is hired	7	27	51	1	0
F10	Project scope definition completion when bids are invited	2	45	34	5	0
F11	Design completion(by owner) when bids are invited	0	4	45	37	0



International Research Journal of Engineering and Technology (IRJET)

RIET Volume: 06 Issue: 05 | May 2019

www.irjet.net

e-ISSN: 2395-0056 p-ISSN: 2395-0072

F12	Design Decision made (by owner)	2	22	40	19	3		project in location					
	when bids are invited						F29	Subcontractor experience and	3	29	34	18	2
F13	Design completion when budget is	23	43	20	0	0	F30	capability Communication	36	43	6	1	0
	fixed							among project					
	e/cost related factors	1	10	(0	0	F21	team	0	20	40	10	0
F14	Significance for project to be completed within budget	34	46	6	0	0	F31	Contractor's prior working relationship with the owners	0	28	42	16	0
F15	Importance for project to be delivered	2	29	48	7	0	F32	Contractor prior working relationship with	0	21	51	13	1
F16	Time given to consultant to evaluate bids	0	27	40	19	0	F33	consultant Contractor track record for	3	37	37	8	1
F17	Extent to which contract period is	6	36	33	11	0		completion on time					
54.0	allowed to vary	0.0	40	-			F34	Contractor track record for	2	28	46	10	0
F18	Importance for project to be completed on	32	48	5	0	1		completion on quality					
F19	time	2	29	42	13	0	F35	Contractor track records for	28	57	1	0	0
F19 F20	Bidding environment Consultant's level	2 19	46	42 21	0	0		completion on budget					
1.70	of construction sophistication	17	70	21		0	F36	Contractor staffing level	0	20	44	22	0
F21	Owner's level of construction	8	33	35	10	0	F37	Adequacy of contractor plant	0	12	49	25	0
iii)Par	sophistication ties experience relate			-	-		F38	and equipment Magnitude of	4	46	33	3	0
F22	Contractor's experience with similar project	33	46	7	0	0	150	change orders in contractor past project	Т	10	33	5	U
F23	Owners experience	1	22	49	14	0		ancial issues				-	
F24	with similar projectConsultant staffinglevel to attend to	0	23	44	19	0	F39	Accuracy of estimated financing cost	2	54	28	2	0
F25	contractor Owners staffing level to attend to	0	14	51	21	0	F40	Availability of management and finance	8	49	29	0	0
F26	contractor Consultant's	1	26	48	11	0	F41	plans Economic	4	44	36	2	2
Γ20	experience with similar type of	1	20	40	11	0	F42	instability Uncertainty of	т 1	23	45	17	0
	projects							taxes					
F27	Contractor's	13	47	23	3	0	F43	State of market	2	21	44	19	0
	experience with similar size of						F44	Periodical payments	2	36	39	9	0
F28	projects Contractors	1	33	43	9	0	F45	Currency exchange fluctuation average	0	29	44	13	0
	experience with						F46	Inflation pressure	1	25	40	20	0

© 2019, IRJET

Impact Factor value: 7.211ISO 9001:2008 Certified JournalPage 2208



International Research Journal of Engineering and Technology (IRJET)

TRIET Volume: 06 Issue: 05 | May 2019

www.irjet.net

e-ISSN: 2395-0056 p-ISSN: 2395-0072

F47Level of competition22841150F48Number of competitors12142220F49Time between project announcement and bid opening average1455260F50Accuracy of bidding documents provided by client01359140F51Type of contract01347260F52Size of contract02944130F53Project location02739200F54Site condition12250130F55Competent and leadership of project and nager02244170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management02244200F60Contract period04432100F61Punitive damages22642160F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards changes02244130F65Environmental02244100F64Atbor and changes0224410 <th>v)Biddi</th> <th>ng situations</th> <th></th> <th></th> <th></th> <th></th> <th></th>	v)Biddi	ng situations					
competitionin<			2	28	41	15	0
F48Number of competitors12142220F49Time between project announcement and bid opening average1455260F50Accuracy of bidding documents provided by client01359140F51Type of contract01347260F52Size of contract02739200F53Project location02739200F54Site condition12250130F55Competent and leadership of project manager02544170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and maagement12740180F58Labor and equipment required022441000F60Contract period04432100F61Punitive damages22642160F61Punitive damages22642160F62Arbitration clause02249150F64Arbitration clause02249150F65Environmental and consultant average02244363610F64Arbitration clause022		competition					
competitorsiii	F48		1	21	42	22	0
F49Time between project announcement and bid opening average1455260F50Accuracy of bidding documents provided by client01359140rbAccuracy of bidding documents provided by client01359140rbType of contract01347260F51Type of contract02944130F52Size of contract02739200F53Project location02739200F54Site condition12250130F55Competent and leadership of project manager02244170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F59Contract period04432100F60Content of the project specifications02244130F61Punitive damages22642160F63Knowledge of client and consultant and consultant and consultant and consultant and consultant and consultant and consultant and consultant and procedures7373636F64Attitude towards changes01043353710 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>							-
project announcement and bid opening averageI.I.I.I.I.F50Accuracy of bidding documents provided by client01359140F51Type of contract01347260F52Size of contract02944130F53Project location02739200F54Site condition12250130F55Competent and leadership of project manager02244170F56Experience and incentives of field ataff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required024432000F59Contract period04432100F60Content of the project specifications02443100F61Punitive damages22642160F64Attitude towards reque0737363610F64Attitude towards schedule0737363610F64Impact of project reque073736363610F64Attitude towards reque07373636363636<	F49		1	4	55	26	0
announcement and bid opening averageIIIIIIF50Accuracy of bidding documents provided by client01359140 vi) Project Characteristics II347260F51Type of contract01347260F52Size of contract02739200F53Project location02739200F54Site condition12250130F55Competent and leadership of project amanger02244170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12244180F58Labor and equipment required02244200F60Contract period04432100F61Punitive damages22642160F61Punitive damages22642160F64Attitude towards and consultant average010413736F64Importent of project schedule01041278F64Importent of project schedule01041278F64Importent of project schedule01041 </td <td>,</td> <td></td> <td>-</td> <td></td> <td>00</td> <td>20</td> <td>Ŭ</td>	,		-		00	20	Ŭ
bid opening averageiiiiiF50Accuracy of bidding documents provided by clientiiiiirbrAccuracy of bidding documents provided by clientiiiiirbrType of contract01347260F51Type of contract02944130F53Project location02739200F54Site condition12250130F55Competent and leadership of project manager02544170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required022441000F60Contract period04432100F61Punitive damages22642160F62Arbitration clause02249150F64Attitude towards and consultant average013363610F65Environmental issues01041278310F64Attitude towards changes010413363610 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
averageimageimageimageimageimageimageimageF50Accuracy of bidding documents provided by client01359140vi) Project CharacteristicsimageimageimageimageimageimageF51Type of contract01347260F52Size of contract02944130F53Project location02739200F54Site condition12250130F55Competent and project manager02544170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244100F60Contract period04432100F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant and consultant and consultant average13363610F64Attitude towards changes0435371010F66Impact of project changesF66Impact of project s							
F50Accuracy of bidding documents provided by client01359140vi) Project CharacteristicsiiiiiiF51Type of contract01347260F52Size of contract02944130F53Project location02739200F54Site condition12250130F55Competent and leadership of project02244170BadgerF56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required022442000F59Contract period04432100F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant average13363610F64Impact of project scheduleF64Impact of project schedule010433636F64Impact of project scheduleF65Environmental issues<							
documents provided by clientIIIIvi) Project CharacteristicsIIIIIF51Type of contract01347260F52Size of contract02739200F54Site condition12250130F55Competent and leadership of project02244170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required04432100F59Contract period04432100F60Content of the project02244130F59Contract period04432100F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant average13363610F64Attitude towards specification code73736612F64Mattitude towards schedule01043363612F64Mattitude towards schedule01043363612F64Mattitude to	F50	Accuracy of hidding	0	13	59	14	0
provided by clientImage of the second se	150		Ŭ	15	57		Ŭ
vi) Project CharacteristicsImage for the second							
F51Type of contract01347260F52Size of contract02944130F53Project location12250130F54Site condition12250130F55Competent and leadership of project02544170managerF56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required04432100F60Contract period04432100F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant average13363610F64Attitude towards changes04343612F65Environmental issues0104345258F66Impact of project specification code01043258F67Quality of specification code01043258F64Mtitude towards changes01043258F67Quality of <td>vi) Proi</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	vi) Proi						
F52 Size of contract 0 29 44 13 0 F53 Project location 0 27 39 20 0 F54 Site condition 1 22 50 13 0 F55 Competent and leadership of project 0 25 44 17 0 manager 0 22 41 23 0 0 F56 Experience and incentives of field staff 0 22 44 23 0 F57 Quality of firm's project planning and management 1 27 40 18 0 F58 Labor and equipment required 0 22 44 20 0 F60 Contract period 0 44 32 10 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 <t< td=""><td></td><td></td><td>0</td><td>13</td><td>47</td><td>26</td><td>0</td></t<>			0	13	47	26	0
F53 Project location 0 27 39 20 0 F54 Site condition 1 22 50 13 0 F55 Competent and leadership of project 0 25 44 17 0 F56 Experience and incentives of field staff 0 22 41 23 0 F57 Quality of firm's project planning and management 1 27 40 18 0 F58 Labor and equipment required 0 22 44 20 0 F59 Contract period 0 44 32 10 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F66 Impact of project schedule 0 7 37 36 6			-				-
F54Site condition12250130F55Competent and leadership of project manager02544170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management02244200F58Labor and equipment required02244200F59Contract period04432100F61Punitive damages22642160F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant average13363610F64Attitude towards changes04353710F66Impact of project specification code04343612F64Motionentall issues04343612F65Environmental issues01041278F67Quality of specification code01043365F68Unforeseeable change in local laws and procedures0336365F70Nationality of labor0336365			-	-			-
F55Competent and leadership of project manager02544170F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02249150F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards specification code04343612F65Environmental issues04343612F66Impact of project schedule01041278F67Quality of specification code01043258F64Unforeseeable change in local laws and procedures010336365F70Nationality of labor03363655			-				•
leadership of project managerIIIIIIF56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02249110F61Punitive damages22642160F62Arbitration clause02249150F63Knowledge of client and consultant average13363610F64Attitude towards changes04343612F65Environmental issues0737366F64Impact of project schedule01041278F67Quality of schedule01041278F68Unforeseeable change in local laws and procedures01043258F69Weather18363655F70Nationality of labor03363215						-	
project managerIIIIIIF56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02249110F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards changes04432100F65Environmental issues04353710F66Impact of project schedule0737366F67Quality of schedule01041278F68Unforeseeable change in local laws and procedures01041278F69Weather18363655F70Nationality of labor03363215	F55		0	25	44	1/	0
managerinininininF56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02946110F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards changes04343612F65Environmental issues04343612F67Quality of changes01041278F68Unforeseeable change in local laws and procedures01043258F69Weather18363655F70Nationality of labor0336365F71Social and cultural00264911		-					
F56Experience and incentives of field staff02241230F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02946110F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards changes04323710F65Environmental issues04343612F66Impact of project schedule01041278F67Quality of specification code01043258F68Unforeseeable change in local laws and procedures01836365F70Nationality of labor0002649111							
incentives of field staff incentives of field staff incentives of field staff incentives of field staff incentives of field project planning and management incentives of field project planning F58 Labor and 0 22 44 20 0 equipment required 0 22 44 20 0 F59 Contract period 0 44 32 10 0 F60 Content of the project specifications 0 24 42 16 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 10 41 27<			0				0
staff I <thi< th=""> I <thi< th=""> <thi< th=""></thi<></thi<></thi<>	F56		0	22	41	23	0
F57Quality of firm's project planning and management12740180F58Labor and equipment required02244200F59Contract period04432100F60Content of the project specifications02946110F61Punitive damages22642160F63Knowledge of client and consultant average13363610F64Attitude towards changes04343612F65Environmental issues04343612F66Impact of project schedule01041278F67Quality of specification code01043258F68Unforeseeable change in local laws and procedures0336365F70Nationality of labor00264911							
project planning and managementI.I.I.I.I.F58Labor and equipment required02244200F59Contract period04432100F60Content of the 							-
and management Imagement	F57		1	27	40	18	0
F58 Labor and equipment required 0 22 44 20 0 F59 Contract period 0 44 32 10 0 F60 Content of the project specifications 0 29 46 11 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 0 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 36 5 F6							
equipment required Image: sequipment required Image:							
required Image: section of the project specifications Image: section of the project specifications Image: section of the project specifications Image: section of the project specification of the project specifications Image: section of the project specification of the project section of the project specification code Image: specification of the project specification code Image: specification of the project specification code Image: specification code	F58		0	22	44	20	0
F59 Contract period 0 44 32 10 0 F60 Content of the project specifications 0 29 46 11 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
F60 Content of the project specifications 0 29 46 11 0 F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 7 37 36 6 F68 Unforeseeable change in local laws and procedures 0 10 41 27 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 32 15		-					
project specifications I I I I I F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 7 37 36 6 F68 Unforeseeable change in local laws and procedures 0 10 41 27 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 32 15			0	44	32	10	0
specifications Image is a specification is and consultant average Image is a specification clause Image is a s	F60	Content of the	0	29	46	11	0
F61 Punitive damages 2 26 42 16 0 F62 Arbitration clause 0 22 49 15 0 F63 Knowledge of client and consultant average 1 3 36 36 10 F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 0 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 32 15							
F62Arbitration clause02249150F63Knowledge of client13363610and consultant13363610and consultant13353710average14353710F64Attitude towards04343612F65Environmental04343612issues1737366F66Impact of project schedule01041278F67Quality of change in local laws and procedures01043258F69Weather1836365F70Nationality of labor00264911		specifications					
F63Knowledge of client and consultant average13363610F64Attitude towards changes04353710F65Environmental issues04343612F66Impact of project schedule0737366F67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F70Nationality of labor03363215F71Social and cultural00264911	F61	Punitive damages	2	26	42	16	0
and consultant average I I I I F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 0 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 52 15	F62	Arbitration clause	0	22	49	15	0
and consultant average I I I I F64 Attitude towards changes 0 4 35 37 10 F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 0 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 52 15	F63	Knowledge of client	1	3	36	36	10
F64Attitude towards changes04353710F65Environmental issues04343612F66Impact of project schedule0737366F67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor00264911							
changes I I I F65 Environmental issues 0 4 34 36 12 F66 Impact of project schedule 0 7 37 36 6 F67 Quality of specification code 0 10 41 27 8 F68 Unforeseeable change in local laws and procedures 0 10 43 25 8 F69 Weather 1 8 36 5 5 F70 Nationality of labor 0 3 36 32 15 F71 Social and cultural 0 0 26 49 11		average					
F65Environmental issues04343612F66Impact of project schedule0737366F67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911	F64	Attitude towards	0	4	35	37	10
issues Impact of project 0 7 37 36 6 F66 Impact of project 0 7 37 36 6 F67 Quality of 0 10 41 27 8 F68 Quality of 0 10 43 25 8 F68 Unforeseeable 0 10 43 25 8 change in local laws - - - - - - F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 32 15 F71 Social and cultural 0 0 26 49 11		changes					
issues Impact of project 0 7 37 36 6 F66 Impact of project 0 7 37 36 6 F67 Quality of 0 10 41 27 8 F67 Quality of 0 10 41 27 8 F68 Unforeseeable 0 10 43 25 8 change in local laws Image: Image: <td>F65</td> <td>Environmental</td> <td>0</td> <td>4</td> <td>34</td> <td>36</td> <td>12</td>	F65	Environmental	0	4	34	36	12
scheduleImage: scheduleImage: scheduleF67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911		issues					
scheduleImage: scheduleImage: scheduleF67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911	F66	Impact of project	0	7	37	36	6
F67Quality of specification code01041278F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911							
specification codeImage: Specification codeImage: Specification codeImage: Specification codeF68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911	F67		0	10	41	27	8
F68Unforeseeable change in local laws and procedures01043258F69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911							
change in local laws and proceduresIIIIF69Weather1836365F70Nationality of labor03363215F71Social and cultural00264911	F68		0	10	43	25	8
and proceduresIIIF69Weather183636F70Nationality of labor03363215F71Social and cultural00264911							
F69 Weather 1 8 36 36 5 F70 Nationality of labor 0 3 36 32 15 F71 Social and cultural 0 0 26 49 11		-					
F70Nationality of labor03363215F71Social and cultural00264911	F69		1	8	36	36	5
F71 Social and cultural 0 0 26 49 11				-			
	1,0	-			55	52	10
impact	F71		0	0	26	49	11
		impact					

F72	Religious	0	0	17	47	22
	regulations					
F73	Estimating method	4	10	26	35	11
F74	Public exposure	1	4	39	27	15
vii)Esti	mating process					
F75	Availability of productivity standards	0	4	41	36	5
F76	Availability of cost indexes average	1	1	47	31	6
F77	Relevant experience of estimating team	1	37	41	7	0
F78	Ability of estimating team	0	16	47	16	7
F79	Standard procedure for updating cost information	2	26	47	10	1
F80	Method used in determining contingency	6	22	38	16	4

2. Calculation of relative importance index (RII)

Table 2.1 : Calculation of Relative Importance Index (RII)

VARIA	FACTORS THAT DETERMINE COST OF			
BLE	BUILDING PROJECT	VAL		
NAME		UE		
i) Desig	n related factor			
F1	Design complexity	0.81		
F2	Construction complexity	0.81		
F3	Technological advancement	0.72		
F4	Specialization required of contractors	0.66		
F5	Percentage of repetitive elements	0.60		
F6	Presence of special issues	0.61		
F7	Type of specification	0.6		
F8	Extent to which bid documents allow	0.64		
	additions to scope			
F9	Flexibility of scope of works when	0.69		
	contractor is hired			
F10	Project scope definition completion	0.67		
	when bids are invited			
F11	Design completion(by owner) when	0.52		
	bids are invited			
F12	Design Decision made (by owner) when	0.60		
	bids are invited			
F13	Design completion when budget is fixed	0.80		
ii) Time	e/cost related factors			
F14	Significance for project to be completed	0.87		
	within budget			
F15	Importance for project to be delivered	0.66		
F16	Time given to consultant to evaluate	0.62		

© 2019, IRJET

Impact Factor value: 7.211ISO 9001:2008 Certified Journal | Page 2209



International Research Journal of Engineering and Technology (IRJET)

e-ISSN: 2395-0056 p-ISSN: 2395-0072

ET	Volume:	06	Issue:	051	Mav	2019	
61	volume.	00	133uc.	0.0	May	2017	

www.irjet.net

	bids	
F17	Extent to which contract period is	0.68
11/	allowed to vary	0.00
F18	Importance for project to be completed on Time	0.85
F19	Bidding environment	0.64
F20	Consultant's level of construction	0.79
120	sophistication	017 5
F21	Owner's level of construction	0.69
	sophistication	
iii) Par	ties Experiences Related	
F22	Contractor's experience with similar	0.86
	project	
F23	Owners experience with similar project	0.62
F24	Consultant staffing level to attend to contractor	0.61
F25	Owners staffing level to attend to	0.58
_	contractor	
F26	Consultant's experience with similar	0.64
	type of projects	
F27	Contractor's experience with similar	0.76
	size of	
500	projects	0.66
F28	Contractors experience with project in	0.66
F29	location Subcontractor experience and	0.63
Г29	capability	0.05
F30	Communication among project team	0.86
F31	Contractor's prior working relationship	0.62
	with the owners	
F32	Contractor prior working relationship	0.61
F33	with consultant Contractor track record for completion	0.67
гээ	on time	0.07
F34	Contractor track record for completion	0.65
151	on quality	0.05
F35	Contractor track records for completion	0.86
	on budget	
F36	Contractor staffing level	0.59
F37	Adequacy of contractor plant and	0.57
	equipment	
F38	Magnitude of change orders in	0.72
:) Г :	contractor past project	
	ncial issues	0.72
F39	Accuracy of estimated financing cost	0.73 0.75
F40	Availability of management and finance plans	0.75
F41	Economic instability	0.72
F42	Uncertainty of taxes	0.62
F43	State of market	0.61
F44	Periodical payments	0.67
F45	Currency exchange fluctuation average	0.64
F46	Inflation pressure	0.62
	ing situations	
F47	Level of competition	0.64

F48	Number of competitors	0.6
F49	Time between project announcement	0.55
	and bid opening average	
F50	Accuracy of bidding documents	0.59
	provided by client	
vi) Pro	ject Characteristics	
F51	Type of contract	0.57
F52	Size of contract	0.64
F53	Project location	0.62
F54	Site condition	0.62
F55	Competent and leadership of project	0.62
	manager	
F56	Experience and incentives of field staff	0.59
F57	Quality of firm's project planning and	0.62
	management	
F58	Labor and equipment required	0.6
F59	Contract period	0.68
F60	Content of the project specifications	0.64
F61	Punitive damages	0.63
F62	Arbitration clause	0.62
F63	Knowledge of client and consultant	0.48
	average	
F64	Attitude towards changes	0.47
F65	Environmental issues	0.47
F66	Impact of project schedule	0.5
F67	Quality of specification code	0.52
F68	Unforeseeable change in local laws and	0.53
	procedures	
F69	Weather	0.52
F70	Nationality of labor	0.46
F71	Social and cultural impact	0.43
F72	Religious regulations	0.38
F73	Estimating method	0.51
F74	Public exposure	0.48
	imating process	
F75	Availability of productivity standards	0.5
F76	Availability of cost indexes average	0.51
F77	Relevant experience of estimating team	0.67
F78	Ability of estimating team	0.56
F79	Standard procedure for updating cost	0.64
-	information	
F80	Method used in determining	0.62
	contingency	
	······································	I

2.2 Position of rank in each factors

2.2.1. Design related factors

The factor number DF1 that represents the Design complexity and DF2 Construction complexity which has the highest RII Value i.e. 0.81 (shown in red color in graph) therefore, it has highest rank i.e.1



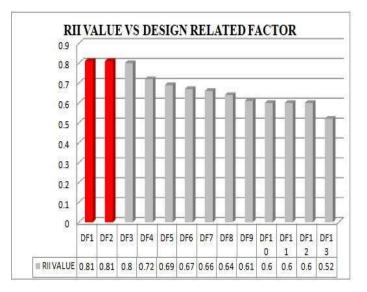


Fig 2.1: RII value of design related factors

2.2.2 Time or Cost related factors

The factor number TF1 that represents the factor, Significance for project to be completed within budget which has the highest RII Value i.e. 0.87therefore, it has highest rank i.e. 1.

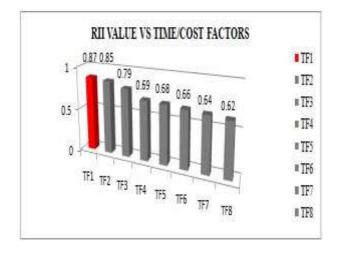
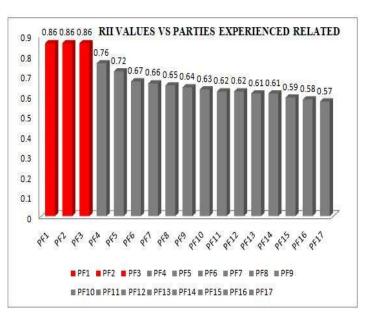
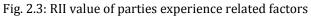


Fig 2.2: RII value of Time/ Cost related factors

2.2.3 Parties experience related factors

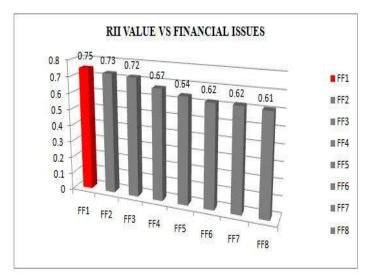
The factor number PF1 that represents the factor, Contractor's experience with similar project, PF2 that Communication among project team and PF3 Contractor track records for completion on budget which has the highest RII Value i.e. 0.86(shown in red color in graph) therefore, it has highest rank i.e.1.

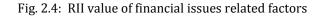




2.2.4 Financial issues

The factor number FF1 that represents the factor, availability of management and finance plans which has the highest RII Value i.e. 0.75(shown in red color in graph) therefore, it has highest rank i.e.1





2.2.5 Bidding Situations

The factor number BF1 that represents the factor, Number of competitors which has the highest RII Value i.e. 0.64, (shown in red color in graph) therefore, it has highest rank i.e.1



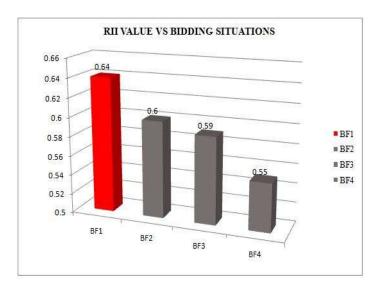


Fig. 2.5: RII value of bidding situations related factors

2.2.6 Project Characteristics

The factor number PC1 that represents the factor, Contract period which has the highest RII Value i.e. 0.68, (shown in red color in graph) therefore, it has highest rank i.e.1.

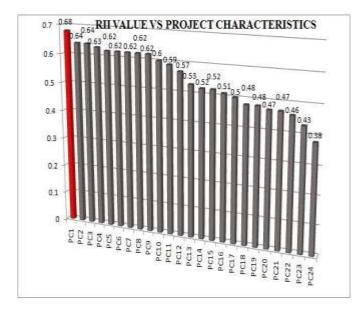
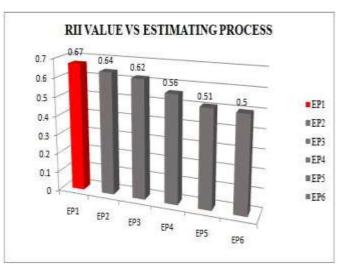
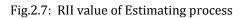


Fig.2.6: RII value of Project characteristics

2.2..7 Estimating Process

The factor number EP1 that represents the factor, Relevant experience of estimating team which has the highest RII Value i.e. 0.67 (shown in red color in graph), therefore, it has highest rank i.e.1.





3.6 Ranking Result

From the above analysis first rank of Design related factor is Design complexity and construction complexity, first rank of Time/Cost related factors is Need for project to be completed within budget, first ranks of Parties experience related is Contractor's experience with similar project, Contractor track records for completion on budget and Communication among project team, first rank of Financial issue related factors is Availability of management and finance plans, first rank of Bidding situation is Level of competition, first rank of Project Characteristics related factor is contract period, first rank of Estimating related factor is Relevant experience of estimating team.

FACTORS	RII VALUE
1. Design complexity	0.81
2. Construction complexity	0.81
3. Significance for project to be completed within budget	0.87
4. Contractor's experience with similar project	0.86
5. Contractor track records for completion on budget	0.86
6. Communication among project team	0.86
7. Availability of management and finance plans	0.75
8. Level of competition	0.64
9. Contract period	0.68
10. Relevant experience of estimating team	0.67

Table 3.10 Ranking result



3.7 SPSS MODEL

		(Coefficients ²					
2 2000-2421 C	Unstandardized Coefficients		Standardized Coefficients	Confi	.0% idence ral for B	Correlations		
Model	В	Std. Error	Beta	Lower Bound	Upper Bound	Zero- order	Partial	Part
(Constant)	-10.780	19.262		-57.912	36.351			
F1	0,415	0.645	0.433	-1.163	1.994	.001	0.254	0.09
F2	0.340	0.474	0.395	-0.821	1.501	0.075	0.280	0.10
F22	0.517	0.502	0.528	-0.710	1.745	0.144	0.388	0.155
F30	-0.230	0.455	-0.244	-1.344	0.884	-0.012	-0.202	-0.07
F35	-0.066	0.302	-0.071	-0.805	0.672	-0,073	-0.089	-0.03
F40	-0.440	0.455	-0.447	-1.553	0.672	-0.037	-0.368	-0.14
F47	0.530	0.601	0.658	-0.940	1.999	0.038	0.339	0.13
F59	-0.564	0.619	0.646	-0.950	2.077	0.026	0.349	0.13
977	-0.437	0.505	-0.472	-1.672	0.798	-0.013	-0.333	-0.13
77	-0.437				0.472 -1.672 dent Variable: F14			

Fig 3.9: Regression Model Coefficients.

4. CONCLUSIONS

Studies and discussions were done on cost estimation in construction industry at various fields based on the journals collected. Eighty factors affecting cost estimation in construction fields are identified. The study indicates seven most significant factors as major contributor to cost of public building projects. Design related factors, Time or Cost related factors, Parties experience related, Financial issues, Bidding situations, Project Characteristics, Estimating Process. These amounts to seven factors and all these factors were used for the model estimation. The details regarding the topic is collected by questionnaire survey with the help of estimation engineer, site engineer, supervisor project manager, contractor and others and 86 questionnaire samples were obtained and were used for the study. The importance level and ranking of the factors were done by Likert's scale method and RII technique. Most effective questionnaire was the Likert's scale method in which each and every one can respond according to his/her will.

The research has shown that project cost depends largely on highest ranked factors such as Design complexity and Construction complexity having RII value 0.81, Significance for project to be completed within budget having RII value 0.87, Contractor track records for completion on budget, Contractor's experience with similar project and Communication among project team having RII value 0.86 Availability of management and finance plans having RII value 0.75, Level of competition having RII value 0.64, Contract period having RII value 0.68, and Relevant experience of estimating team having RII value 0.67. This study will be able to develop a predictive cost model using these selected factors that exhibit a significant effect on project cost and these factors accounted for the model. Further research is required for the model to be fully appreciated.

REFERENCES

- [1] Afshin Firouzi, Wei Yang, and Chun-Qing.(2016), 'Prediction of Total Cost of Construction Project with Dependent Cost Items', Journal of Construction Engineering and Management, Vol. 142, No.12, pp.401-607.
- [2] Amol Tatiya, Dong Zhao, Matt Syal, George H. Berghorn and Rex LaMore (2016), 'Cost prediction model for building deconstruction in urban areas', Journal of Cleaner Production, Vol. 195, No.15, pp.1572-1580.
- [3] Anthony K. Mason and Alice Smith (2013), 'Cost Estimation Predictive Modelling: Regression versus Neural Network', The Engineering Economics, Vol. 42, No.2, pp.1-28.
- [4] ChangYoonJi, TaeHoon Hong, and ChangTaek Hyun.(2014), 'CBR Revision Model for Improving Cost Prediction Accuracy in Multifamily Housing Projects', Journal of Management in Engineering, Vol. 26, No.4, pp.229-236.
- [5] Cheong Peng Au Yong, Azlan Shah Ali and Faizah Ahmad (2013), 'Establishing relationship between Characteristics of preventive maintenance and Cost performance', RICS COBRA 2012, Vol. 11, No.13, pp.593-601.
- [6] Faizah Ahmad, Cheong Peng Au-Yong and Azlan Shah Ali(2013), 'Prediction cost maintenance model of offices Building based on Condition based maintenance', Maintenance and Reliability, Vol.15, No.1, pp.309-314.
- [7] Faizah Ahmad, Cheong Peng Au-Yong and Azlan Shah Ali(2014), 'Prediction cost maintenance model of offices Building based on Condition based maintenance', Maintenance and Reliabilty, Vol. 16, No.2, pp.319-324.
- [8] Faiq Mohammed Sarhan Al-Zwainy and Neran Taher Hadhal (2016), 'Building a Mathematical Model for Predicting the Cost of the Communication Towers Projects Using Multifactor Linear Regression Technique', International Journal of Construction Engineering and Management,. Vol. 5 No. 1, pp. 25-29.